



CITY COUNCIL WORKSHOP MEETING AGENDA

Monday, March 6, 2017, 4:30 PM

City Municipal Center, 616 NE 4th Avenue

I. CALL TO ORDER

II. ROLL CALL

III. PUBLIC COMMENTS

IV. WORKSHOP TOPICS

A. Wireless Communication Facilities

Details: This topic is regarding wireless communication facilities subject to a moratorium under Ordinance No. 16-015. Staff will review the current status of the moratorium, provide an overview of testimony received to date, the research conducted, and provide options for consideration and discussion by Council. The Planning Commission has expressed support for option No. 2 that was recommended by staff.

Presenter: Phil Bourquin, Community Development Director

Recommended Action: Staff requests Council's direction regarding the outlined options.

 [1 - Options Presentation](#)

[2 - Ordinance No. 16-015](#)

[3 - Spokane Cell Tower Frequently Asked Questions](#)

[4 - Federal Communications Commission \(FCC\) 14-153](#)

[5 - Association of Washington Cities \(AWC\) Legislative Bulletin](#)

[6 - 5G Technology](#)

[7 - Comment from Glenn Watson](#)

[8 - Additional Comment from Glenn Watson](#)

[9 - Response to Glenn Watson](#)

[10 - Comment from Robert and Josephine Behar](#)

[11 - Eugene Agenda and Minutes - Update Code for Towers](#)

[12 - Spokane Ordinance 2015](#)

[13 - PCIA Summary Shot Clock Ruling](#)

B. 2017 Clark Regional Natural Hazard Mitigation Plan (NHMP)

Details: Clark Regional Emergency Services Agency (CRESA) formed a regional partnership comprised of Clark County cities and special purpose districts to completely revise and update the expired 2004 Clark Regional NHMP. A Hazard Mitigation Plan is the foundation of a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. The result of this effort will be a Federal Emergency Management Agency (FEMA) approved multi-jurisdictional, multi-hazard mitigation

plan that meets federal mandates and establishes eligibility for hazard mitigation grant funding to implement hazard mitigation measures specified in the City's annex. The NHMP will be evaluated and revised on an annual 5-year time frame. The NHMP includes two volumes: Volume 1 contains components that applies to all planning partners and Volume 2 contains components that are jurisdiction specific. Staff recommends a resolution be prepared to consider the adoption of all of Volume I, and the introduction, appendices and the City's portion (starting on page 64) of Volume 2 of the NHMP.

Presenter: Lauren Hollenbeck, Senior Planner

Recommended Action: Staff recommends Council direct the City Attorney to draft a resolution to be placed on the March 20, 2017 Regular Meeting Agenda for Council's consideration.

 [Staff Report](#)

[Executive Summary NHMP](#)

[Chapter 3 City of Camas Annex, Volume II](#)

[NHMP Volume I](#)

[NHMP Volume II](#)

[NHMP Council Presentation](#)

C. Community Development Miscellaneous and Updates

Details: This is a placeholder for miscellaneous or emergent items.

Presenter: Phil Bourquin, Community Development Director

D. Comprehensive Utility Rate Study Professional Services Agreement

Details: The City last completed a comprehensive Utility Rate Study in 2013 for the Water, Sewer, Stormwater and Solid Waste utilities and adopted rates through 2018 for each utility. Additionally, the City's last comprehensive review of the Water and Sewer System Development Charges (SDCs) was in 2010. The attached scope of work and professional services agreement with FCS Group will provide for completion of an updated comprehensive Utility Rate Study for the Water, Sewer and Stormwater systems, a peer review of the Solid Waste rates being completed with the Solid Waste Planning effort, an updated study of the Water and Sewer SDCs, and development of options for implementing a Stormwater SDC. The proposed fee for the Utility Rate Study is \$110,630 and the project is anticipated to take approximately 12 months to complete. The 2017/2018 adopted budget does not currently contain a specific line item for this effort; however, staff is proposing that it be included in the upcoming budget amendment.

Presenter: Steve Wall, Public Works Director

Recommended Action: Staff recommends this item be placed on the March 20, 2017 Consent Agenda for Council's consideration.

 [2017 Utility Rate Study Contract](#)

E. Public Works Miscellaneous and Updates

Details: This is a placeholder for miscellaneous or emergent items.

Presenter: Steve Wall, Public Works Director

F. An Ordinance Amending Chapter 6.12 and 6.16 of the Camas Municipal Code (CMC) Relating to Livestock and Poultry

Details: The current CMC regarding livestock and poultry is out of date and does not reflect the current needs of an urban community. In 2016, the City received citizen complaints about a rooster in the urban area that was causing a nuisance. Staff has reviewed the code and will

present the proposed chapter amendments and a draft ordinance.

Presenter: Peter Capell, City Administrator

Recommended Action: This item will be placed on a future agenda for Council's consideration.

 [Draft Ordinance amending CMC 6.12 and 6.16](#)

[Draft Chapter 6.12 LIVESTOCK and 6.16 POULTRY AND RABBITS - Markup](#)

[Draft Chapter 6.12 LIVESTOCK and 6.16 POULTRY AND RABBITS](#)

G. Repealing Camas Municipal Code (CMC) Chapter 2.72

Details: CMC Chapter 2.72 defines a full-time officer and employee and designates the benefits for those employees. This information is also defined in the bargaining contracts and the non-represented employee handbook. In some cases, the CMC benefits are not the same as designated in the contracts, which would take precedence to the CMC. Staff recommends that CMC Section 2.72 be repealed.

Presenter: Peter Capell, City Administrator

Recommended Action: This item will be placed on a future agenda for Council's consideration.

 [Draft Ordinance Repealing CMC 2.72](#)

[Chapter 2.72 PERSONNEL INSURANCE](#)

H. City Administrator Miscellaneous Updates and Scheduling

Details: This is a placeholder for miscellaneous or scheduling items.

Presenter: Peter Capell, City Administrator

V. COUNCIL COMMENTS AND REPORTS

VI. PUBLIC COMMENTS

VII. ADJOURNMENT

NOTE: The City welcomes participation of its citizens in the public meeting process. Effort will be made to ensure anyone with special needs can participate. For more information call 360.834.6864.



Exhibit 1
MC16-05

City of Camas

Wireless Communication Facilities

February, 2017

Background

City Council through Ordinance 16-015 expressed a desire to:

- Review City of Camas zoning and use codes related to Wireless Communication Facilities for consistency with the vision, goals, and policies established through the “Camas 2035” Comprehensive Plan; and
- Explore best available information on wireless technology, stealth technology, and alternatives to the placement of additional Wireless Communication Facilities through the City of Camas;

Work Plan

Ordinance 16-015 established a Work Plan:



October 3, 2016 -City Council held a public hearing on Ordinance 16-015 establishing a moratorium on new Wireless Communication Facilities;



November 15, 2016 – Planning Commission public hearing to hear from citizens on regarding allowing the permitting of Wireless Communication Facilities within the City of Camas;



February 22, 2017 –Planning Commission workshop to discuss a list of options, based upon the testimony received through the November 15, 2016 public hearing and through research conducted. Recommendation from the Planning Commission on the direction is anticipated;

Camas 2035 Comprehensive Plan

(Vision/Goals/Policies)

- **Vision:** Vital, Stable and Livable Neighborhoods. “...Quality public facilities, services and utilities contribute to a high quality of life”. [pg. 3]
- **Franchise Utility Goal** [pg. 5-12]
 - F-1: To Ensure that energy and communication facilities and their services are available to support development when they are needed.
- **Franchise Utilities Policies** [pg. 5-12]
 - F-1: Minimize the effects on adjacent properties, the environment, and the visual quality of the community of siting, developing, operating, and maintaining these facilities.
 - F-2: Coordinate to provide reliable service through partnering and agreements with utility companies.
 - F-3: Promote the conservation of energy resources through the adoption of appropriate energy codes and efficient land use patterns and transportation systems.

New/Emerging Technologies



- Demand for smart phones and other devices reliant on wireless communications (Internet of Things) continues to increase.
- Capacity to meet demand has resulted in new infrastructure development options such as:
 - Distributed antenna systems (“DAS”)/Small Cell networks located in right-of-way;
 - Development of new technologies such as 5G.
- The 2017 Washington State Legislature may consider legislation that could mandate how the City of Camas regulates small cell and 5G technologies.

Advantages of DAS and Small Cell Technologies [FCC 14-153]

- Physically much smaller;
- Can be placed on utility poles, building walls and rooftops, and other small structures either privately owned or in the public rights-of-way;
- Can be used in densely populated areas where traditional towers are not feasible or where localized wireless traffic demands would require an unrealistic number of macrocells;
- Utilize small equipment and transmit at lower signal power levels, they can be deployed in indoor environments to improve interior wireless services;
- Can address coverage needs in areas with stringent siting regulations, such as historic districts.
- Smaller and less visible. Easier to deployed with stealth measures such as concealment enclosures that blend with the structures on which they are installed;
- Comparatively cost-effective way of addressing increased demand for wireless broadband services in urban areas.

Public Testimony

November 15, 2015 Planning Commission (Summary)

- Establish clear and objective standards for effectively evaluating a significant gap in service and in evaluating visual and site impacts of new cell towers;
- Limit cell towers in residential zones to those necessary to address a significant gap in service under federal law;
- Require the significant gap analysis demonstration that no alternative sites are available within commercial or industrial zoned properties;
- Require least obtrusive designs (height, site location and architectural and landscape) and least obtrusive technologies in siting cell towers and other telecom. facilities.

Conclusions

- Changes have occurred in cell technologies and in the infrastructure options available to provide wireless coverage;
- Camas 2035 Plan desires to “Minimize the effects on adjacent properties, the environment, and the visual quality of the community of siting, developing, operating, and maintaining these facilities”.
- Public desires greater clarity in standards, further limitations on cell towers in residential areas and greater design considerations than currently provided under Camas Municipal Code, CMC 18.35.
- 2017 Washington State Legislation could impact the effectiveness of additional regulations tied to DAS or small cell technologies

Options

Staff is looking to the Planning Commission and City Council for direction. The following three (3) options are provided for discussion and consideration. Staff recommends Option 2.

1. NO ACTION. Conclude the moratorium and rely on the existing code.
2. NEW CODE. Direct Staff to prepare a draft Ordinance for consideration in a public hearing to: a) Address concerns of the community as summarized in this presentation; b) Address and promote DAS, Small Cell and 5G technologies; and c) be reviewed for consistency with FCC and other legal requirements.
3. HOLD OFF. Direct Staff to hold off on preparation of a Draft Ordinance until the 2017 Washington Legislative Session is concluded or until no legislation on small cell or DAS is pending and to incorporate any changes into a draft Ordinance. This option would likely require an extension to the moratorium that is set to expire August 7, 2017.

Next Steps

- March 6, 2017 – City Council workshop.
- May 16, 2017 – Planning Commission hearing to consider draft amendments to the Camas Municipal Code.
- June 19, 2017 – City Council hearing
- July 3, 2017 -Ordinance Adoption.

ORDINANCE NO.16-015

AN ORDINANCE related to land use and zoning, declaring an emergency, and adopting a moratorium on the establishment of any wireless communication facilities, wireless communication support structure, monopole support structure, or lattice support structure, hereinafter collectively referred to as “Wireless Communication Facilities”, within the limits of the City of Camas; and providing for an immediate effective date.

WHEREAS, Camas Municipal Code Chapter 18.35 sets forth certain regulations for the placement, development, permitting, and removal of Wireless Communication Facilities; and

WHEREAS, for the purposes of this Ordinance, wireless communication facilities, wireless communication support structure, monopole support structure, or lattice support structure, as defined pursuant to Camas Municipal Code Section 18.35.030, shall be collectively referred to herein as “Wireless Communication Facilities”; and

WHEREAS, approved Wireless Communication Facilities shall be vested for the terms as otherwise specified in the land use decision or as per the Camas Municipal Code; and

WHEREAS, Camas Municipal Code Chapter 18.35 was initially established pursuant to Ordinance 2299, on July 23, 2001; and

WHEREAS, while minor amendments to Ordinance 2299 have occurred, the City has not undertaken a comprehensive review of CMC 18.35 related to Wireless Communication Facilities; and

WHEREAS, the City of Camas has made significant changes in the Comprehensive Plan, Zoning Districts, as well as expanded both the Urban Growth Areas and City Limits multiple times since Ordinance 2299 was passed; and

WHEREAS, the City of Camas, through Ordinance 16-010, has adopted a 20-year Comprehensive Plan titled “Camas 2035”; and

WHEREAS, the City Council desires to review its zoning and use codes related to Wireless Communication Facilities for consistency with the vision, goals, and policies established through the

ORDINANCE NO. 16-015

“Camas 2035” Comprehensive Plan; and

WHEREAS, the City Council desires to explore best available information on wireless technology, stealth technology, and alternatives to the placement of additional Wireless Communication Facilities through the City of Camas; and

WHEREAS, the City Council finds that the regulatory requirements established by this Ordinance are necessary for the immediate preservation of the public peace, health, and safety, and for the immediate support of City government and its existing public institutions,

NOW THEREFORE, BE IT ORDAINED BY THE CITY OF CAMAS:

Section 1. The City Council adopts the foregoing recital clauses herein as findings in support of the adoption of the moratorium provided by this ordinance.

Section 2. Pursuant to the provisions of RCW 36.70A.390 and RCW 35.63.200, a land use authorization moratorium is hereby enacted prohibiting until August 7, 2017, within the City of Camas, the application for and the permitting, placement or development of any Wireless Communication Facilities, as defined herein.

Section 3. Work Plan. The following work plan includes target dates, but it is the intent for staff to have some flexibility in scheduling to accommodate for quorums, workloads, and notice requirement. The City Council moratorium hearing will occur October 3, 2016; a public hearing to hear from citizens on the record regarding allowing the permitting of Wireless Communication Facilities will occur on November 15, 2016 before the Planning Commission; staff will prepare of list of options based upon the testimony received and research conducted and present the options to the Planning Commission in a workshop on Wednesday, February 22, 2017 and to the City Council in a workshop on March 6, 2017; staff will draft a report and amendments available by May 5, 2017; the Planning Commission will conduct a hearing on

ORDINANCE NO. 16-015

May 16, 2017; and the recommendations of the Planning Commission together with the record will be forwarded on to City Council for consideration in a hearing on June 19, 2017;

Ordinance Adoption will occur July 3, 2017.

Section 4. Effective Date. This Ordinance is designated as a public emergency ordinance necessary for the protection of public health, public safety, public property or public peace, and shall be effective upon adoption, provided that it is passed by majority plus one of the whole membership of the City Council.

Section 5. Severability. If any clause, sentence, paragraph, section, or part of this ordinance or the application thereof to any person or circumstance shall be adjudged by any court of competent jurisdiction to be invalid, such order or judgment shall be confined in its operation to the controversy in which it was rendered and shall not effect or invalidate the remainder or any parts thereof to any person or circumstances and to this end, the provisions of each clause, sentence, paragraph, section or part of this law are hereby declared to be severable.

PASSED BY the Council and APPROVED by the Mayor this 6th day of September, 2016.

SIGNED: _____

Mayor

ATTEST: _____

Clerk

APPROVED as to form:

City Attorney

FACT SHEET

1. Why can't the City of Spokane prohibit cell towers in residential zones?

What local governments can and cannot require is complex. Federal law does not permit a total prohibition of cell towers in residential zones if doing so would prohibit the delivery of wireless services to that zone. The placement, construction and modification of cell towers and antennas in cities is subject to Federal statutes, laws, regulations and case law. Coupled with Federal laws are State environmental regulations and local legal requirements. The City cannot deny an application for a wireless site because of citizens' health concerns if the proposed site is in compliance with Federal Radio Frequency ("RF") emissions standards. In essence, Congress has adopted a national policy that encourages the deployment of wireless facilities and equipment, as well as the wide-spread availability of wireless services which can provide video, voice and data. As more people telecommute and work from home, the availability of broadband in residential areas becomes increasingly important. Under Federal court cases, cell phone companies have the right to close a significant gap in their own coverage. Unfortunately, the courts do not tell us what constitutes a significant gap, calling that question one that cannot be held to a particular standard. If there is a significant gap, however, the law allows the City to require that the wireless company close that gap using the least intrusive means as reasonably determined by the City which can include aesthetic considerations. The City can regulate matters such as design, location criteria, visual impact, aesthetics and zoning compliance.

2. Why is there a need for high cell towers in residential zones?

Consumers nationwide are less reliant on landline telephone service. Smartphone and tablet usage continues to result in higher demand for high-speed wireless data services. To meet that demand, providers are modifying existing sites and infrastructure and installing new facilities and equipment. Consumer usage of cell phones for video, voice and data has created a demand for coverage and capacity that has grown exponentially. Moreover, the demand for wireless service has pushed deep into residential neighborhoods. Sometimes, taller towers are necessary for customers to receive a signal and reception with good quality, and to provide fall-back coverage in areas also served by smaller cells. In other words, if the smaller cells become overloaded, then the macro site can provide redundancy. Cell phone providers typically use a combination of macro (tall-high) and micro (smaller-lower) sites to make their networks work. Cities cannot dictate technology to cell phone providers. Local governments are in the aesthetics business, not the technology business.

3. Are cell towers physically safe to be around?

Congress delegated sole authority to the FCC to set national rules and regulations to establish acceptable RF emission and safety guidelines for cell sites. The wireless carriers need to construct facilities which by law must adhere to Federal guidelines in order to promote safety.

Local governments cannot establish their own RF safety requirements, or even adopt those created by the FCC.

The FCC regulations provide a fifty (50) times safety margin between the maximum public exposure allowed, and the level where a physiological change can be measured in a person. Wireless operators commonly operate at a fraction of the maximum permitted by the FCC because to transmit with higher power will commonly cause cell site to cell site interference.

It should also be noted that ground level exposure is much less than that if someone were close to the antenna and in its transmission path. Further information can be found on the FCC's RF Safety website.

4. Why can't they eliminate large towers and utilize smaller sites instead?

Height is still an integral part of search ring signal coverage and capacity analysis. Sometimes large towers are necessary due to topography, or to provide background (fall-back) coverage in combination with "small cells" and Distributed Antenna Systems ("DAS"). The Industry has generally evolved from placing unsightly tall towers to deploying monopines and other stealthed facilities. Camouflaged facilities continue to evolve. The Industry is also moving towards small cell sites and using outdoor and indoor DAS.

5. Will any trees need to be removed to accommodate these sites?

The providers have an ongoing need for wireless sites. Tree removal will be dependent on specific locations, but generally should be avoided to the greatest degree possible. Typically, leaves will not stop signals but may reduce or slow down transmissions, resulting in some signal degradation. Greater willingness on the part of the City to make its vertical assets available potentially reduces the need for tree removal. The City will be considering what type of municipal facilities may be viable candidates to support DAS, small cells and antennas.

6. How will neighbors be notified in the future of possible cell towers and how can they participate?

The City is in the process of instituting a comprehensive software notification system this Summer. It is critical that citizen stakeholders be given the opportunity to timely weigh in on cell tower applications in residential and non-residential neighborhoods. Criteria can be developed regarding which neighbors are notified depending upon how close they will be to new cell towers. Once neighbors receive notification from the City, they can participate by e-mailing their comments to the City and take part in public meetings and hearings.

Citizen input is welcomed and encouraged during the process. It should be noted, though, that there may be a divergence of opinion on whether a particular application should be approved, denied or modified. It will then be up to the City, in accordance with applicable law, to determine whether an application meets the requisite criteria and render a decision.

7. What effect do cell tower sites have on property values?

The effect of cell tower sites on property values is an emotionally charged topic. Homeowners subjectively believe that a diminution in value is a given. Objective research seems to indicate otherwise, particularly as the distance from the cell site increases, and as time passes. Cell tower sites that are camouflaged have less effect on property values than non-stealthed, freestanding towers and poles. This ambiguity regarding property values leads to uncertainty for homeowners. While one homeowner may be concerned about aesthetics and health risks, another may welcome a cell tower because of improved coverage, capacity, network speed and improved cell service. Additionally, the effect on property values is fact specific and may vary depending upon the type of facility (cell tower, antenna site, monopine, etc.), along with its location, visual ramifications and the type of residential neighborhood. In any event, it is in residents' best aesthetic interests to minimize the number of new cell towers inside the core of residential zones by encouraging collocation among providers and expedited review processes for smaller and stealthed facilities. Further, there has been anecdotal discussion that where residences do not have good cell phone reception, this could negatively impact potential buyers' willingness to purchase homes in that area. The ability to receive and initiate phone calls, make emergency calls, and communicate with e-mails and text messages are services that people have come to expect.

**Before the
Federal Communications Commission
Washington, D.C. 20554**

**Exhibit 4
MC 16-05**

In the Matter of)	
)	
Acceleration of Broadband Deployment by)	WT Docket No. 13-238
Improving Wireless Facilities Siting Policies)	
)	
Acceleration of Broadband Deployment:)	WC Docket No. 11-59
Expanding the Reach and Reducing the Cost of)	
Broadband Deployment by Improving Policies)	
Regarding Public Rights of Way and Wireless)	
Facilities Siting)	
)	
2012 Biennial Review of)	WT Docket No. 13-32
Telecommunications Regulations)	

REPORT AND ORDER

Adopted: October 17, 2014

Released: October 21, 2014

By the Commission: Chairman Wheeler and Commissioners Clyburn, Rosenworcel, Pai, and O’Rielly
issuing separate statements.

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I. INTRODUCTION

1. We take important steps in this Report and Order to promote the deployment of wireless infrastructure, recognizing that it is the physical foundation that supports all wireless communications. We do this by eliminating unnecessary reviews, thus reducing the costs and delays associated with facility siting and construction. In particular, we update and tailor the manner in which we evaluate the impact of proposed deployments on the environment and historic properties. We also adopt rules to clarify and implement statutory requirements related to State and local government review of infrastructure siting applications, and we adopt an exemption from our environmental public notification process for towers that are in place for only short periods of time. Taken together, these steps will further facilitate the delivery of more wireless capacity in more locations to consumers throughout the United States. Our actions will expedite the deployment of equipment that does not harm the environment or historic properties, as well as recognize the limits on Federal, State, Tribal, and municipal resources available to review those cases that may adversely affect the environment or historic properties.

2. Demand for wireless capacity is booming: more consumers are accessing mobile broadband every year, driving more innovation and expanding access to public safety. But our ability to meet this demand depends on the infrastructure that supports the services. We therefore take concrete steps to facilitate the deployment of the infrastructure necessary to support surging demand, expand broadband access, support innovation and wireless opportunity, and enhance public safety—all to the benefit of consumers and the communities in which they live.

3. Our actions recognize that a technological revolution has changed the wireless network landscape. The Commission’s current rules for deploying infrastructure were drafted at a time when antennas were huge and bolted to the top of enormous towers. While that kind of macrocell deployment still exists and will continue to exist, there are now a variety of complementary and alternative

technologies that are far less obtrusive. Distributed antenna system (DAS) networks and other small-cell systems use components that are a fraction of the size of macrocell deployments, and can be installed—with little or no impact—on utility poles, buildings, and other existing structures. We are revising our rules to reflect this technological progress. At the same time, however, we recognize that State, local and Tribal governments play important roles in this process, including with respect to their own land use regulation and as part of our historic preservation review process. While we eliminate review procedures that are not necessary for small-size facilities collocated on existing structures, we do so in a manner that preserves local zoning requirements and rules requiring camouflage or concealment measures. In particular, the rules we adopt today will allow local jurisdictions to retain their ability to protect aesthetic and safety interests. Accordingly, our actions are intended to encourage deployments on existing towers and structures—rather than entirely new towers—in recognition that collocations almost always result in less impact or no impact at all.

4. These measures reflect our ongoing commitment to promote wireless infrastructure deployment, with the goal of facilitating robust wireless coverage for consumers everywhere. We have undertaken three particularly notable initiatives this year to facilitate wireless infrastructure deployment in addition to the actions we take today. First, we adopted rules that substantially reformed tower lighting and marking requirements.¹ The steps we took in that proceeding eased compliance burdens for tower owners without any adverse impact on aviation and public safety. Second, we recently commenced discussions with relevant government and non-governmental stakeholders to develop a process for “clearing” existing towers that were not subject to historic preservation review prior to construction, including those commonly referred to as “twilight towers.” Once complete, this effort will make thousands of additional towers available for collocation, resulting in an enormous expansion in deployment opportunities for public safety operations and commercial wireless offerings. Finally, we are working with other government stakeholders to expand on the measures we adopt today. In particular, we intend to tailor further our environmental and historic preservation reviews for small-scale wireless deployments by implementing more broadly applicable efficient procedures.²

5. The rules we adopt today should help spur wireless broadband deployment, in part, by facilitating the sharing of infrastructure that supports wireless communications. We create strong incentives for wireless providers to collocate on structures that already support wireless deployments, and we likewise facilitate sharing of transmission equipment by, for example, using “neutral-host” DAS that

¹ See 2004 and 2006 Biennial Regulatory Reviews - Streamlining and Other Revisions of Parts 1 and 17 of the Commission’s Rules Governing Construction, Marking and Lighting of Antenna Structures, WT Docket No. 10-88, Amendments to Modernize and Clarify Part 17 of the Commission’s Rules Concerning Construction, Marking and Lighting of Antenna Structures, RM-11349, *Report and Order*, FCC 14-117 (rel. Aug. 8, 2014) (*Part 17 Report and Order*).

² We note that other efforts are also ongoing. Among these, we continue to assist the interagency Working Group established by Executive Order 13616 to facilitate broadband deployment on Federal buildings and rights-of-way. See *Accelerating Broadband Infrastructure Deployment*, Executive Order No. 13616, 77 Fed. Reg. 36903 (June 14, 2012) (Executive Order 13616). Finding that “decisions on access to Federal property and [rights-of-way] can be essential to the deployment of both wired and wireless broadband infrastructure,” Executive Order 13616 created a “Broadband Deployment on Federal Property Working Group” to develop “a coordinated and consistent approach in implementing agency procedures, requirements, and policies related to access to Federal lands, buildings, and [rights-of-way], federally assisted highways, and tribal lands to advance broadband deployment.” *Id.* In part, this effort is to fulfill the directive of Sections 6409(b) and (c) of the Spectrum Act, which address access to Federal property for the deployment of wireless broadband facilities, including requirements that the General Services Administration (GSA) develop application forms, master contracts, and fees for such access in consultation with the Working Group. See *Middle Class Tax Relief and Job Creation Act of 2012*, Pub. L. No. 112-96 § 6409(b), (c), 126 Stat. 156 (2012) (Spectrum Act); Executive Order 13616 § 4. The Working Group is composed of representatives from seven Federal agencies that each have significant ownership of or responsibility for managing Federal lands, buildings, and rights-of-way, federally assisted highways, or Tribal lands, and also includes representatives from four other agencies, including the Commission, that “provide advice and assistance.” *Id.*

can support multiple providers simultaneously. Promoting shared use in this manner advances several important policy goals while creating little or no potential for competitive harm and, indeed, promoting opportunities for increased competition. First, a “shared use” approach leverages existing resources and thus facilitates provider efforts to expand both coverage and capacity more quickly. Second, sharing wireless infrastructure—whether towers, other support structures, or transmission equipment—reduces costs and promotes access to such infrastructure, and thus may reduce a notable barrier to deployment. Finally, sharing resources—rather than relying on new builds—safeguards environmental, aesthetic, historic, and local land-use values.

6. Facilitating wireless deployment more generally advances the interests of a wide array of stakeholders, ranging from public safety entities to wireless innovators to schools and libraries. But wider and more robust deployment is particularly important for individual consumers. According to the National Center for Health Statistics and the Centers for Disease Control and Prevention (CDC), wireless service is the only telecommunications connection for an increasing percentage of Americans, especially among more vulnerable populations.³ A CDC report covering the second half of 2013 determined that two in every five American homes (41.0%) had only wireless telephones during the second half of 2013, up from 30% in 2010. Moreover, more than half of adults in poverty live in wireless-only households.⁴ The same report found that approximately 34% of households with both landline and wireless telephones use wireless telephones for all or almost all calls.

7. Consumers are also increasing their reliance on and use of mobile broadband services. According to one estimate, Americans will have 34 million mobile broadband devices by the end of 2015, an increase of nearly 50% from 2013,⁵ and the volume of data crossing North American mobile networks will grow almost eight-fold between 2013 and 2018.⁶ Consumers in the United States already account for approximately 45% of the 278 million Long Term Evolution (LTE) connections worldwide, and they are projected to have the biggest share of all Fourth Generation (4G) connections worldwide in the coming years.⁷ This growing demand reflects the importance of broadband to our nation’s economic growth, global competitiveness, and civic life.⁸ As the President recognized in an Executive Order promoting the

³ See “Wireless Substitution: Early Release of Estimates From the National Health Interview Survey, July-December 2013,” Stephen J. Blumberg, Ph.D., and Julian V. Luke, Division of Health Interview Statistics, *available at* <http://www.cdc.gov/nchs/data/nhis/earlyrelease/wireless201407.pdf>.

⁴ See *id.*

⁵ See “34 Million Americans will have Mobile Broadband Devices,” April 22, 2014, *available at* <http://www.ctia.org/resource-library/facts-and-infographics/archive/34-million-americans-mobile-broadband-devices>.

⁶ See Alina Selyukh, Reuters, “U.S. mobile data traffic to jump nearly eight-fold by 2018: Cisco,” Feb. 5, 2014, *available at* <http://www.reuters.com/article/2014/02/05/us-usa-spectrum-cisco-idUSBREA140VY20140205>. TIA indicates that American spending on mobile data services “rose by a third in 2012, and during the next four years it will increase by 94 percent.” TIA Comments at 2. Cisco further forecasts that global mobile data traffic will increase 11-fold between 2013 and 2018—in other words, global mobile data traffic will grow at a compound annual growth rate (year-over-year) of 61% from 2013 to 2018. See “Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2013-2018,” *available at* http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white_paper_c11-520862.html (Cisco VNI Report 2014). See also “2014-2017 ICT Market Review & Forecast,” *available at* <http://www.tiaonline.org/resources/market-forecast> (finding that “[t]he skyrocketing demand for wireless data is a key driver, fueling growth for the [Information and Communications Technology] market.”).

⁷ Cisco VNI Report 2014, *available at* http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/white_paper_c11-520862.html, at 10.

⁸ See Connect America Fund; A National Broadband Plan for Our Future; Establishing Just and Reasonable Rates for Local Exchange Carriers; High-Cost Universal Service Support; Developing a Unified Inter-carrier Compensation Regime; Federal-State Joint Board on Universal Service; Lifeline and Link-Up; Universal Service Reform—Mobility Fund, WC Docket Nos. 10-90, 07-135, 05-337, 03-109, CC Docket Nos. 01-92, 96-45, GN

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deployment of broadband infrastructure, “[b]roadband access is essential to the Nation’s global competitiveness in the 21st century, driving job creation, promoting innovation, and expanding markets for American businesses,” and also “afford[ing] public safety agencies the opportunity for greater levels of effectiveness and interoperability.”⁹

8. As the demand for wireless capacity surges, we must take steps to ensure that the networks underlying wireless services can bear the load.¹⁰ The record confirms that meeting America’s growing demand for wireless broadband will require the deployment of large numbers of new or improved wireless facilities. AT&T alone plans to deploy more than 40,000 additional small cells, 1,000 additional DAS networks, and 10,000 additional macrocells from 2013 through 2015.¹¹ Verizon states that it expects to have deployed more than 3,000 small cells across the country in 2014 alone.¹² Recent data further demonstrate the impact of growing wireless demand on the need for new infrastructure. In its comments in a recent proceeding, PCIA states that in 2013 providers were expected to add up to 27,000 additional cell sites,¹³ while CTIA reports that its member companies had 304,360 cell sites in service at year-end 2013, a 26% increase in five years.¹⁴

9. Despite the widely acknowledged need for additional wireless infrastructure, the process of deploying these facilities can be expensive, cumbersome, and time-consuming.¹⁵ In addition to any private arrangements necessary to gain access to suitable land or structures, parties must typically obtain siting approval from the local municipality. They must also comply with the Commission’s rules for environmental review, which implement our obligations under Federal statutes including the National Environmental Policy Act of 1969 (NEPA) and Section 106 of the National Historic Preservation Act of 1966 (NHPA or Section 106).¹⁶

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Docket No. 09-51, WT Docket No. 10-208, *Report and Order and Further Notice of Proposed Rulemaking*, 26 FCC Rcd 17663, 17667 para. 3 (2011), *aff’d In re: FCC 11-161*, 753 F.3d 1015 (10th Cir. 2014). *See, generally*, Federal Communications Commission, Connecting America: The National Broadband Plan, at xi (rel. Mar. 16, 2010) (*National Broadband Plan*).

⁹ *See* Executive Order 13616.

¹⁰ *See* Alan Pearce, Ph.D., J. Richard Carlson, MBA, Michael Pagano, Ph.D, Wireless Broadband Infrastructure: A Catalyst for DGP and Job Growth 2013-2017, at 1-2 (Sept. 2013), submitted as an attachment to Letter from Jonathan M. Campbell, PCIA-The Wireless Infrastructure Association, to Marlene Dortch, Secretary, FCC, WT Docket Nos. 13-238, 13-32; WC Docket Nos. 11-59, 10-90, 07-135, 05-337, 03-109; GN Docket No. 09-51; CC Docket Nos. 01-92, 96-45 (filed Oct. 22, 2013).

¹¹ HetNet Forum Seminar Presentation, Small Cell Acceleration (July 29, 2013), *available at* <http://www.thedasforum.org/wp-content/uploads/2013/07/HetNet-Forum-Small-Cell-Acceleration-Seminar-Presentations.pdf>, at 21.

¹² Verizon Comments at 8.

¹³ PCIA-The Wireless Infrastructure Association and the HetNet Forum Comments, WT Docket No. 13-135, at 8.

¹⁴ *See* CTIA, “Annual Wireless Industry Survey,” *available at* <http://www.ctia.org/your-wireless-life/how-wireless-works/annual-wireless-industry-survey>.

¹⁵ *See* Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies, Acceleration of Broadband Deployment: Expanding the Reach and Reducing the Cost of Broadband Deployment by Improving Policies Regarding Public Rights of Way and Wireless Facilities Siting, Amendment of Parts 1 and 17 of the Commission’s Rules Regarding Public Notice Procedures for Processing Antenna Structure Registration Applications for Certain Temporary Towers, 2012 Biennial Review of Telecommunications Regulations, WT Docket Nos. 13-238, 13-32, WC Docket No. 13-122, *Notice of Proposed Rulemaking*, 28 FCC Rcd 14238, 14240 para. 3 (2013) (*Infrastructure NPRM*).

¹⁶ *See* 42 U.S.C. §§ 4321 *et seq.*; 16 U.S.C. § 470f.

10. Although these review requirements serve important local and national interests, local and Federal review processes can slow deployment substantially, even in cases that do not present significant concerns.¹⁷ Because these processes can significantly delay deployment, we now take action in four areas to reduce regulatory obstacles and bring efficiency to wireless facility siting and construction, as summarized below. We take these actions based on consideration of the entire record compiled in response to the *Infrastructure NPRM*.¹⁸

11. *Environmental and Historic Preservation Review Processes.* First, in Section III, we adopt measures to refine our environmental and historic preservation review processes under NEPA and NHPA to account for new wireless technologies, including physically small facilities like those used in DAS networks and small-cell systems that are a fraction of the size of macrocell installations.¹⁹ In contrast to the large-scale antennas and structures that our review processes were designed to address, these smaller antennas (and their associated compact radio equipment) can operate on existing short structures such as utility poles as well as on rooftops or inside buildings. As described in detail in the Executive Summary and in Section III, we expand an existing categorical exclusion from NEPA review so that it applies not only to collocations on buildings and towers, but also to collocations on other structures like utility poles. We also adopt a new categorical exclusion from NEPA review for some kinds of deployments in utilities or communications rights-of-way. With respect to NHPA, we create new exclusions to address certain collocations on utility poles and other non-tower structures. We take these steps to assure that, as we continue to meet our responsibilities under NEPA and NHPA, we also fulfill our obligation under the Communications Act to ensure that rapid, efficient, and affordable radio communications services are available to all Americans.²⁰

12. Prior to adopting or changing rules to implement NEPA, an agency is required to publish its proposed procedures in the Federal Register for comment, and the Council on Environmental Quality (CEQ) must advise whether the proposed procedures conform to NEPA and CEQ's regulations.²¹ In keeping with this process, CEQ has advised that the measures we adopt in this Report and Order to clarify and modify our environmental review process conform with NEPA and CEQ regulations.²² We have also

¹⁷ See Fibertech Comments at 7 (reporting that “[m]any small cells deployments have languished for years due to lengthy and unproductive bureaucratic administrative tasks and hearings,” and citing cases). Verizon reports that the NHPA review process alone takes an average of 84 days for its DAS deployments (where such review is required), even though DAS networks are desirable in large part because the components are small and unobtrusive; in one case, the NHPA review took 150 days for a single DAS installation on a single pole. Verizon Comments at 9.

¹⁸ In response to the *Infrastructure NPRM*, we received 207 timely filed comments and 42 timely reply comments. Major commenters are listed, and the short forms by which they are cited in this Report and Order are identified, in Appendix A. In addition, we received numerous brief comments and *ex parte* submissions from a variety of interested parties, which are not listed in the Appendix but were reviewed and considered. To the extent that we cite comments in other proceedings, the citation specifies the docket.

¹⁹ Small cells are low-powered wireless base stations that function like cells in a mobile network but provide significantly smaller coverage area than traditional macrocells. DAS networks represent another wireless alternative to macrocells, but differ from small cells in that, whereas each small-cell deployment includes its own transceiver equipment that generally serves on wireless carrier/operator, a DAS network involves the use of transceiver equipment at a central hub site to support multiple antenna locations throughout the desired coverage area and in “neutral-host” deployments can serve multiple wireless carriers/operators. We describe these technologies in detail below. See *infra*, Section III.A.

²⁰ 47 U.S.C. § 151.

²¹ 40 C.F.R. § 1507.3(a).

²² See Letter from Horst G. Greczmiel, Associate Director for NEPA Oversight, Council on Environmental Quality, to Peter B. Trachtenberg, Deputy Chief, Spectrum and Competition Policy Division, dated Oct. 17, 2014. This letter will be filed in WT Docket 13-238. The rules were first proposed in the *Infrastructure NPRM* that was published in the Federal Register on December 5, 2013. See Proposed Rules, Federal Communications Commission, 47 C.F.R.

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coordinated the steps we are taking to tailor and clarify our Section 106 review process with the Advisory Council on Historic Preservation (ACHP) and with Tribal Nations.²³

13. We emphasize that additional, broader exclusions for DAS networks and other small facilities may well be appropriate. We conclude, however, that additional measures will require further consultation with CEQ, ACHP, state historic preservation officers, and Tribal Nations. With regard to our review process under Section 106, we find that broader reform is more appropriately undertaken through the development of a “program alternative” as defined under ACHP’s rules.²⁴ Therefore, Commission staff are working with ACHP and other stakeholders to develop a program alternative that will promote additional efficiencies in the historic preservation review of DAS and small-cell deployments, and we expect that this process will conclude between 18 and 24 months after the release of this Report and Order.

14. *Temporary Towers.* In Section IV, we codify a waiver previously granted by the Commission,²⁵ and adopt a narrow exemption from the Commission’s requirement that owners of proposed towers requiring antenna structure registration (ASR) provide 30 days of national and local notice to give members of the public an opportunity to comment on the proposed tower’s potential environmental effects. The exemption from notification requirements applies only to proposed temporary towers meeting defined criteria, including limits on the size and duration of the installation, that greatly reduce the likelihood of any significant environmental effects. Allowing licensees to deploy temporary towers meeting these criteria without first having to complete the Commission’s environmental notification process will enable them to more effectively respond to emergencies, natural disasters, and other planned and unplanned short-term spikes in demand without undermining the purposes of the notification process. This exemption will “remove an administrative obstacle to the availability of broadband and other wireless services during major events and unanticipated periods of localized high demand” where expanded or substitute service is needed quickly.²⁶

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Parts 1 and 17, WT Docket Nos. 13-238, 13-32; WC Docket No. 11-59; FCC 13-122, Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies, 78 Fed. Reg. 73144-02 (Dec. 5, 2013).

²³ See Letter from Jeffrey S. Steinberg, Geoffrey C. Blackwell, and Peter B. Trachtenberg, to Tribal Leaders, dated Aug. 28, 2014, WT Docket No. 13-238, filed Sept. 4, 2014 (Tribal Letter); Memo from Spectrum and Competition Policy Division, Wireless Telecommunications Bureau, WT Docket No. 13-238, filed Sept. 4, 2014 (Tribal Sept. 4, 2014 Conference Call) (describing conference call with representatives of approximately 20 Tribal Nations concerning the Tribal Letter and issues in the rulemaking); Memo from Spectrum and Competition Policy Division, Wireless Telecommunications Bureau, WT Docket No. 13-238, filed Sept. 11, 2014 (describing meetings with approximately 100 representatives from Tribal Nations across the United States at the conference of the National Association of Tribal Historic Preservation Officers, including a discussion of DAS and small cells and the ongoing proceeding); Memo from Spectrum and Competition Policy Division, Wireless Telecommunications Bureau, WT Docket No. 13-238, filed Sept. 19, 2014 (describing Division staff meetings with Robert Thrower, Tribal Historic Preservation Officer for the Poarch Band of Creek Indians, and Jeremy McDaniel of the Catawba Indian Nation, including a discussion of DAS and small cells and the instant rulemaking proceeding). See also *Infrastructure NPRM*, 28 FCC Rcd at 14258 para. 54 & nn.104, 105 (detailing the Commission’s preliminary Tribal outreach regarding Section 106 review for DAS and small cells).

²⁴ 36 C.F.R. § 800.14.

²⁵ See Amendment of Parts 1 and 17 of the Commission’s Rules Regarding Public Notice Procedures for Processing Antenna Structure Registration Applications for Certain Temporary Towers; 2012 Biennial Review of Telecommunications Regulations, RM-11688, WT Docket No. 13-32, *Order*, 28 FCC Rcd 7758 (2013) (*Waiver Order*).

²⁶ See *Waiver Order*, 28 FCC Rcd at 7758 para. 1. As with the NEPA measures in Section III, CEQ’s October 17, 2014 letter also advised that the environmental notification exemption we adopt in this Report and Order conforms with NEPA and CEQ’s regulations.

15. *Section 6409(a) of the Spectrum Act.* In Section V, we adopt rules to implement and enforce Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012 (Spectrum Act).²⁷ Section 6409(a) provides, in part, that “a State or local government may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station.”²⁸ By requiring timely approval of eligible requests, Congress intended to advance wireless broadband service for both public safety and commercial users.²⁹ Section 6409(a) includes a number of undefined terms, however, that bear directly on how the provision applies to infrastructure deployments, and the record confirms that there are substantial disputes on a wide range of interpretive issues under the provision. We accordingly adopt rules that clarify many of these terms and enforce their requirements, thus advancing Congress’s goal of facilitating rapid deployment. These rules will serve the public interest by providing guidance to all stakeholders on their rights and responsibilities under the provision, reducing delays in the review process for wireless infrastructure modifications, and facilitating the rapid deployment of wireless infrastructure, thereby promoting advanced wireless broadband services.

16. *Section 332(c)(7).* Finally, in Section VI, we clarify issues related to Section 332(c)(7) of the Communications Act and the Commission’s *2009 Declaratory Ruling*.³⁰ Among other things, we explain when a siting application is complete so as to trigger the presumptively reasonable timeframes for local and State review of siting applications under the *2009 Declaratory Ruling*, and how the timeframes apply to local moratoria and DAS or small-cell facilities. These clarifications will eliminate many disputes under Section 332(c)(7), provide certainty about timing related to siting applications (including the time at which applicants may seek judicial relief), and preserve State and municipal governments’ roles in the siting application process.

* * *

17. Taken together, the actions we take in this Report and Order will enable more rapid deployment of wireless facilities, delivering broadband and wireless innovations to consumers across the country. At the same time, they will safeguard the environment, preserve historic properties, protect the interest of Tribal Nations in their ancestral lands and cultural legacies, and address municipalities’ concerns over impacts to aesthetics and other local values.

II. EXECUTIVE SUMMARY

18. In this Section, we summarize the steps we take to facilitate wireless infrastructure deployment. First, as detailed in Section III.B, we adopt the following measures with regard to our NEPA process for review of environmental effects:

- Amend the existing NEPA categorical exclusion for antenna collocations on buildings and towers to clarify that it includes equipment associated with the antennas (such as wiring,

²⁷ See Spectrum Act § 6409(a). We note that Section 6409(a) has since been codified in the Communications Act as 47 U.S.C. § 1455(a). However, for consistency with the *Infrastructure NPRM*, we continue to refer to it as Section 6409(a).

²⁸ Spectrum Act § 6409(a)(1).

²⁹ See H.R. Rep. 112-399, at 136 (2012) (Conference Report). We note that much of the Conference Report describes provisions in the House or Senate bills, and is not necessarily representative of Congressional intent in passing the Spectrum Act. The portions of the Conference Report that we rely upon in this Report and Order pertain expressly to the Spectrum Act as passed.

³⁰ 47 U.S.C. § 332(c)(7); Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(b) to Ensure Timely Siting Review & to Preempt Under Section 253 State & Local Ordinances That Classify All Wireless Siting Proposals As Requiring A Variance, WT Docket No. 08-165, *Declaratory Ruling*, 24 FCC Rcd 13994 (2009) (*2009 Declaratory Ruling*).

cabling, cabinets, and backup-power), and that it also covers collocations in a building's interior;

- Amend the NEPA categorical exclusion for collocations to cover collocations on structures other than buildings and towers; and
- Adopt a new NEPA categorical exclusion for deployments, including deployments of new poles, in utility or communications rights-of-way that are in active use for such purposes, where the deployment does not constitute a substantial increase in size over the existing utility or communications uses.

All of these categorical exclusions are subject to Sections 1.1307(c) and (d) of the Commission's rules, which require the preparation of an Environmental Assessment (EA) for a proposed facility otherwise categorically excluded from environmental processing if the processing bureau, either on its own motion or in response to a public complaint, determines that it may have a significant environmental impact.³¹

19. As detailed in Section III.C, we adopt the following measures with regard to our Section 106 process for review of effects on historic properties:

- Adopt an exclusion from Section 106 review for collocations on utility structures, including utility poles and electric transmission towers, that meet the following conditions:
 - The deployment does not exceed a specified size limitation, detailed in Section III.C.2.a, when measured together with any other wireless deployment on the same structure;
 - The deployment will involve no new ground disturbance; and
 - The deployment is not (1) inside the boundary of a historic district, or within 250 feet of the boundary of a historic district; (2) located on a structure that is a designated National Historic Landmark or is listed in or eligible for listing in the National Register of Historic Places (National Register); or (3) the subject of a pending complaint alleging adverse effect on historic properties.
- Adopt an exclusion from Section 106 review for collocations on buildings and any other non-tower structures that meet the following conditions:
 - There is an existing antenna on the building or structure;
 - The new deployment meets certain requirements related to visibility and proximity to an existing antenna;
 - The new antenna will comply with all zoning conditions and historic preservation conditions on existing antennas that directly mitigate or prevent effects, such as camouflage or concealment requirements;
 - The deployment will involve no new ground disturbance; and
 - The deployment is not (1) inside the boundary of a historic district, or within 250 feet of the boundary of a historic district; (2) located on a structure that is a designated National Historic Landmark or is listed in or eligible for listing in the National Register; or (3) the subject of a pending complaint alleging adverse effect on historic properties.
- Clarify that the existing exclusions for certain collocations on buildings under the Commission's programmatic agreements extend to collocations inside buildings.

20. In Section IV, we adopt an exemption from the Commission's requirement that ASR applicants provide local and national environmental notification prior to submitting a completed ASR

³¹ 47 C.F.R. § 1.1307(c), (d).

application for certain temporary antenna structures meeting criteria that make them unlikely to have significant environmental effects. Specifically, we exempt antenna structures that:

- Will be in place for 60 days or less;
- Require notice of construction to the Federal Aviation Administration (FAA);
- Do not require marking or lighting under FAA regulations;
- Will be less than 200 feet above ground level; and
- Will involve minimal or no ground excavation.

21. In Section V, we adopt rules to clarify and implement the requirements of Section 6409(a) of the Spectrum Act. Among other measures, we:

- Clarify that Section 6409(a) applies to support structures and to transmission equipment used in connection with any Commission-licensed or authorized wireless transmission;
- Define “transmission equipment” to encompass antennas and other equipment associated with and necessary to their operation, including power supply cables and backup power equipment;
- Define “tower” to include any structure built for the sole or primary purpose of supporting any Commission-licensed or authorized antennas and their associated facilities;
- Clarify that the term “base station” includes structures other than towers that support or house an antenna, transceiver, or other associated equipment that constitutes part of a “base station” at the time the relevant application is filed with State or municipal authorities, even if the structure was not built for the sole or primary purpose of providing such support, but does not include structures that do not at that time support or house base station components;
- Clarify that a modification “substantially changes” the physical dimensions of a tower or base station, as measured from the dimensions of the tower or base station inclusive of any modifications approved prior to the passage of the Spectrum Act, if it meets any of the following criteria:
 - for towers outside of public rights-of-way, it increases the height by more than 20 feet or 10%, whichever is greater; for those towers in the rights-of-way and for all base stations, it increases the height of the tower or base station by more than 10% or 10 feet, whichever is greater;
 - for towers outside of public rights-of-way, it protrudes from the edge of the tower more than twenty feet, or more than the width of the tower structure at the level of the appurtenance, whichever is greater; for those towers in the rights-of-way and for all base stations, it protrudes from the edge of the structure more than six feet;
 - it involves installation of more than the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets;
 - it entails any excavation or deployment outside the current site of the tower or base station;
 - it would defeat the existing concealment elements of the tower or base station; or
 - it does not comply with conditions associated with the prior approval of the tower or base station unless the non-compliance is due to an increase in height, increase in width, addition of cabinets, or new excavation that does not exceed the corresponding “substantial change” thresholds;

- Provide that States and localities may continue to enforce and condition approval on compliance with generally applicable building, structural, electrical, and safety codes and with other laws codifying objective standards reasonably related to health and safety;
- With regard to the process for reviewing an application under Section 6409(a), provide that:
 - A State or local government may only require applicants to provide documentation that is reasonably related to determining whether the eligible facilities request meets the requirements of Section 6409(a);
 - Within 60 days from the date of filing, accounting for tolling, a State or local government shall approve an application covered by Section 6409(a); and
 - The running of the period may be tolled by mutual agreement or upon notice that an application is incomplete provided in accordance with the same deadlines and requirements applicable under Section 332(c)(7), as described below, but not by a moratorium;
- Provide that an application filed under Section 6409(a) is deemed granted if a State or local government fails to act on it within the requisite time period;
- Clarify that Section 6409(a) applies only to State and local governments acting in their role as land use regulators and does not apply to such entities acting in their proprietary capacities; and
- Provide that parties may bring disputes—including disputes related to application denials and deemed grants—in any court of competent jurisdiction. The Commission will not entertain such disputes.

22. In Section VI, we adopt clarifications of our *2009 Declaratory Ruling*, which established the presumptively reasonable time periods within which a State or local government must act on a facilities siting application under Section 332(c)(7) of the Communications Act. We take the following specific actions:

- Clarify, with regard to the Commission’s determination in the *2009 Declaratory Ruling* that a State or municipality may toll the running of the shot clock if it notifies the applicant within 30 days of submission that its application is incomplete, that:
 - The timeframe begins to run when an application is first submitted, not when it is deemed complete by the reviewing government;
 - A determination of incompleteness tolls the shot clock only if the State or local government provides notice to the applicant in writing within 30 days of the application’s submission, specifically delineating all missing information, and specifying the code provision, ordinance, application instruction, or otherwise publically-stated procedures that require the information to be submitted;
 - Following an applicant’s submission in response to a determination of incompleteness, the State or local government may reach a subsequent determination of incompleteness based solely on the applicant’s failure to supply the specific information that was requested within the first 30 days;
 - The shot clock begins running again when the applicant makes its supplemental submission; however, the shot clock may again be tolled if the State or local government notifies the applicant within 10 days that the supplemental submission did not provide the specific information identified in the original notice delineating missing information;
- Clarify that the presumptively reasonable timeframes run regardless of any applicable moratoria;

- Clarify that where DAS or small-cell facilities, including third-party facilities such as neutral-host DAS deployments, are or will be used for the provision of personal wireless services, their siting applications are subject to the *2009 Declaratory Ruling* and the presumptively reasonable timeframes it established; and
- Decline to adopt an additional remedy for State or local government failures to act within the presumptively reasonable time limits.

III. NEPA AND NHPA REVIEW OF SMALL WIRELESS FACILITIES

23. In this section, we adopt measures to update our review processes under NEPA³² and Section 106 of NHPA,³³ with a particular emphasis on accommodating new wireless technologies that use smaller antennas and compact radio equipment to provide mobile voice and broadband service. These technologies, including distributed antenna systems (DAS), small cells, and others, can be deployed on a variety of non-traditional structures such as utility poles, as well as on rooftops and inside buildings, to enhance capacity or fill in coverage gaps. Updating our environmental and historic preservation rules will enable these innovations to flourish, delivering more broadband service to more communities, while reducing the need for potentially intrusive new construction and safeguarding the values the rules are designed to protect.

24. Our environmental and historic preservation rules have traditionally been directed toward the deployment of macrocells on towers and other tall structures.³⁴ Since 1974, these rules have excluded collocations of antennas from most of the requirements under our NEPA review process, recognizing the benefits to the environment and historic properties from the use of existing support structures over the construction of new structures. These exclusions have limitations, however. The collocation exclusion under NEPA, which was first established in 1974, on its face encompasses only deployments on existing towers and buildings, as these were the only support structures widely used 40 years ago, and therefore does not encompass collocations on existing utility poles, for example. Similarly, the collocation exclusions in our process for historic preservation review under Section 106 do not consider the scale of small wireless facility deployments.

25. Thus, while small wireless technologies are increasingly deployed to meet the growing demand for high mobile data speeds and ubiquitous coverage, our rules and processes under NEPA and Section 106, even as modified over time, have not reflected those technical advances. Accordingly, after review of the record, we conclude that it will serve the public interest to update our environmental and historic preservation rules in large measure to account for innovative small facilities, and we take substantial steps to advance the goal of widespread wireless deployment, including clarifying and amending our categorical exclusions. We conclude that these categorical exclusions, as codified in Note 1 and 4 of Section 1.1306 of our rules, do not have the potential for individually or cumulatively significant environmental impacts.³⁵ We find that the steps we take today will serve both the industry and the conservation values our review process was intended to protect. These steps will eliminate review processes and the sometimes cumbersome compliance measures that accompany such review, relieving the industry of review process requirements in cases where they are not needed. At the same time, we eliminate the need for bureaucratic review of deployments that do not require it. These steps will advance our goal of spurring efficient wireless broadband deployment while also ensuring that we continue to protect environmental and historic preservation values.

³² See 42 U.S.C. §§ 4321 *et seq.*

³³ See 16 U.S.C. § 470f.

³⁴ We use the term “macrocell” to refer to a high-powered deployment, typically installed relatively high on a tower, to provide signal coverage to a large geographic area.

³⁵ 47 C.F.R. § 1.1306 Note 1, Note 4.

26. Specifically, and as discussed in detail below, we take the following actions in connection with our NEPA review process: (1) we amend the existing NEPA categorical exclusion for antenna collocations on buildings and towers to clarify that it includes equipment associated with the antennas (such as wiring, cabling, cabinets, and backup-power equipment), and that it also covers collocations in a building's interior, and we codify these clarifications; (2) we amend the NEPA categorical exclusion for collocations to cover collocations on structures other than buildings and towers; and (3) we adopt a new NEPA categorical exclusion for deployments, including deployments of new poles, in utility or communications rights-of-way that are in active use for such purposes, where the deployment does not constitute a substantial increase in size over the existing utility or communications uses.³⁶

27. We also adopt measures to update our historic preservation review process under Section 106 of NHPA. Relying on our authority under the rules of ACHP, we adopt two limited exclusions from Section 106 review, one applicable to utility structures specifically and the other to non-tower structures in general, including buildings. First, we exclude from Section 106 review collocations on utility structures, including utility poles and electric transmission towers, that meet the following conditions: (1) the antenna and any associated equipment, when measured together with any other wireless deployments on the same structure, meet specified size limitations; and (2) the deployment will involve no new ground disturbance. Second, we exclude collocations on buildings and any other non-tower structures that meet the following conditions: (1) there is an existing antenna on the building or structure; (2) the collocation meets one of three alternative criteria for visibility, location, and size, as described in detail below; (3) the new antenna complies with all zoning conditions and historic preservation conditions on existing antennas that directly mitigate or prevent effects, such as camouflage or concealment requirements; and (4) the deployment involves no new ground disturbance. We further limit both of these collocation exclusions, however, to deployments that are not (1) inside the boundary of a historic district, or within 250 feet of the boundary of a historic district; (2) located on a structure that is a designated National Historic Landmark or is listed in or eligible for listing in the National Register; or (3) the subject of a pending complaint alleging adverse effect on historic properties. In other words, these two new targeted exclusions address collocations on utility structures and other non-tower structures where historic preservation review would otherwise be required under the Collocation Agreement and our existing rules only because the structures are more than 45 years old. In addition to these two new exclusions, we further clarify that the existing exclusions for certain collocations on buildings under the Commission's programmatic agreements extend to collocations inside buildings.

28. While these steps will provide significant benefits for wireless deployments, particularly DAS and small-cell deployments, we intend to take additional measures, including adopting broader exclusions from NEPA and Section 106 review. However, consistent with NEPA and NHPA, we conclude that additional measures will require further consideration and consultation. Accordingly, we do not, at this time, adopt categorical exclusions from NEPA and NHPA review that would cover all DAS

³⁶ We emphasize that none of these exclusions, or any other action we take in this Report and Order, would exclude any facility from the requirement under our rules to conduct an Environmental Assessment if human exposure to radiofrequency (RF) emissions will exceed specified levels. See 47 C.F.R. § 1.1307(b). We further note that the Commission issued a First Report and Order, Further Notice of Proposed Rule Making, and Notice of Inquiry last year that addressed several issues regarding compliance with current RF exposure criteria, and sought comment on whether to reassess the current limits. See Reassessment of Federal Communications Commission Radiofrequency Exposure Limits and Policies; Proposed Changes in the Commission's Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields, ET Docket Nos. 13-84, 03-137, *First Report and Order, Further Notice of Proposed Rulemaking, and Notice of Inquiry*, 28 FCC Rcd 3498 (2013) (*RF Emissions R&O, FNPRM, & NOI*). Because that proceeding remains open, we do not address comments filed in this proceeding to the extent they suggest changes to our RF exposure standards.

and small-cell deployments.³⁷ We recognize that there are ways to make the historic preservation review process in particular even more efficient. We find, however, that broader reform of our process is more appropriately undertaken through the development of a “program alternative” as defined under ACHP’s rules, which provides greater opportunity and flexibility to tailor our process than our limited authority under ACHP’s rules to adopt exclusions.³⁸ Therefore, in consultation with ACHP and other applicable stakeholders, Commission staff are developing a program alternative that will further facilitate review of DAS and small-cell deployments by better focusing review on those deployments that are likely to raise concerns, including on structures other than utility poles and transmission towers even if there is no existing antenna on the structure. For example, Verizon proposes that we find that no historic properties will be affected by a deployment on structures other than utility poles and transmission towers where (1) the facility meets specified volumetric limits; (2) the facility involves no new ground disturbance under the standard defined by the Nationwide Programmatic Agreement (NPA); (3) the facility requires historic preservation review solely due to the age of the structure; and (4) the structure is neither listed in the National Register nor formally determined eligible for listing by the Keeper of the National Register.³⁹ While we find that such an exclusion is not appropriate under the governing ACHP rule that provides us narrow authority to unilaterally adopt exclusions from Section 106 review, we intend to address this proposal in the program alternative process. We expect that this process will conclude between 18 and 24 months after the release of this Report and Order.

A. Description of DAS, Small Cells, and Other Small Wireless Technologies

29. The increasing demand for advanced wireless services and greater wireless bandwidth is driving an urgent and growing need for additional infrastructure deployment and new infrastructure technologies.⁴⁰ To meet localized needs for coverage and increased capacity in outdoor and indoor environments, many wireless providers have turned in part to DAS and small-cell technologies.⁴¹

30. Small cells are low-powered wireless base stations that function like cells in a mobile wireless network, typically covering targeted indoor or localized outdoor areas ranging in size from

³⁷ See *Infrastructure NPRM*, 28 FCC Rcd at 14254-55 para. 43 (seeking comment on whether to adopt a categorical exclusion for some or all of the components involved in DAS and small-cell deployments from NEPA review other than for compliance with RF exposure limits).

³⁸ As discussed below, we must comply with the rules of ACHP, which specify the process under which Federal agencies shall perform their historic preservation reviews. See 36 C.F.R. §§ 800.2, 800.3. Program alternatives, which allow Federal agencies to streamline their Section 106 process by tailoring the process to the agency’s programs and decision-making process, substitute in whole or in part for ACHP’s Section 106 regulations under Subpart B. See 36 C.F.R. § 800.14. Program alternatives can include alternative procedures or programmatic agreements, among other possibilities. See “Program Alternatives,” available at <http://www.achp.gov/progalt/>.

³⁹ See Letter from Tamara Preiss, Verizon, to Marlene H. Dortch, Secretary, FCC, WT Docket 13-238, filed Oct. 8, 2014 (Verizon Oct. 8, 2014 *Ex Parte*).

⁴⁰ See PCIA Comments at 2-3; Verizon Comments at 2.

⁴¹ See Crown Castle Comments at 2 (“DAS and Small Cell networks provide an increasingly important role in facilitating the deployment of broadband infrastructure, as network operators seek to target broadband capacity to the locations where their customers use wireless broadband and to improve in-building coverage.”); Implementation of Section 6002(B) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, *Sixteenth Report*, WT Docket No. 11-186, 28 FCC Rcd 3700, 3933 para. 373 (2013) (*Sixteenth Competition Report*); J. Sharpe Smith, AGL Magazine, “Towers Will Handle Most Mobile Data Growth in Next Five Years,” Mar. 11, 2013, available at <http://www.aglmediagroup.com/tag/james-taiclet/> (noting projection by Cisco that 25% of wireless data growth through 2017 will be carried by DAS, picocells and Wi-Fi); Tammy Parker, FierceWirelessTech, “Active DAS equipment market growing 20% annually in North America,” Aug. 18, 2012, available at <http://www.fiercebroadbandwireless.com/story/active-das-equipment-market-growing-20-annually-north-america/2012-08-18>.

homes and offices to stadiums, shopping malls, hospitals, and metropolitan outdoor spaces.⁴² Wireless service providers often use small cells to provide connectivity to their subscribers in areas that present capacity and coverage challenges to traditional wide-area macrocell networks, such as coverage gaps created by buildings, tower siting difficulties, and challenging terrain.⁴³ Because these cells are significantly smaller in coverage area than traditional macrocells, networks that incorporate small-cell technology can reuse scarce wireless frequencies, thus greatly increasing spectral efficiency and data capacity within the network footprint.⁴⁴ For example, deploying ten small cells in a coverage area that can be served by a single macrocell could result in a tenfold increase in capacity while using the same quantity of spectrum.⁴⁵

31. DAS provides another alternative to macrocells mounted on tall antenna structures.⁴⁶ A DAS network distributes RF signals from transceivers at a central hub to a specific service area with poor coverage or inadequate capacity.⁴⁷ As typically configured, a DAS network consists of: (1) a number of remote communications nodes deployed throughout the desired coverage area, each including at least one antenna for transmission and reception; (2) a high capacity signal transport medium (typically fiber optic cable) connecting each node to a central communications hub site; and (3) radio transceivers located at the hub site (rather than at each individual node as is the case for small cells) to process or control the communications signals transmitted and received through the antennas.⁴⁸ DAS deployments offer robust and broad coverage without creating the visual and physical impacts of multiple macrocells. Further, whereas small cells are usually operator-managed and support only a single wireless service provider, DAS networks can often accommodate multiple providers using different frequencies and/or wireless air interfaces.⁴⁹

⁴² See *Sixteenth Competition Report*, 28 FCC Rcd at 3937-38 para. 384; “Small Cell Forum: What is a small cell?”, available at <http://www.smallcellforum.org/aboutsmallcells-small-cells-what-is-a-small-cell>. While the industry has not always been consistent in the terms it uses for different types of small-cell technology, generally speaking, femtocells, picocells, metrocells, and microcells refer to types of small-cell technologies with coverage areas of increasing size.

⁴³ See Amendment of the Commission’s Rules with Regard to Commercial Operations in the 3550-3650 MHz Band, GN Docket No. 12-354, *Notice of Proposed Rulemaking and Order*, 27 FCC Rcd 15594, 15596 para. 4, 15605 para. 30 (2012) (3.5 GHz Service Rules NPRM). Networks using a mix of both macrocells and small wireless technologies are sometimes referred to as “heterogeneous networks” or “HetNets.” See, e.g., Sara Landström, Anders FuruskÅr, Klas Johansson, Laetitia Falconetti, and Fredric Kronestedt, “Heterogeneous networks – increasing cellular capacity,” available at http://www.ericsson.com/res/thecompany/docs/publications/ericsson_review/2011/heterogeneous_networks.pdf; PCIA Comments, GN Docket No. 12-354, at 3 n.6.

⁴⁴ See 3.5 GHz Service Rules NPRM, 27 FCC Rcd at 15596 para. 4.

⁴⁵ *Id.*

⁴⁶ See *Sixteenth Competition Report*, 28 FCC Rcd at 3906 para. 321.

⁴⁷ See, e.g., “the DAS forum: Distributed Antenna Systems (DAS) And Small Cell Technologies Distinguished,” available at http://www.thedasforum.org/wp-content/uploads/2013/02/DAS-And-Small-Cell-Technologies-Distinguished-2_4_13.pdf, at 5.

⁴⁸ *Id.* See also Ontario Energy Board, Expert Report of Charles L. Jackson, “Wireless Networks and Utility Poles,” June 11, 2013, available at <https://www.torontohydro.com/sites/electricsystem/Documents/Wireless/Expert%20Evidence%20of%20Charles%20L.%20Jackson%20June%2011.%202013.pdf>, at 13 (noting that while “each small cell is a separate base station, . . . a cell with a distributed antenna system is built by connecting several antennas to a single base station”).

⁴⁹ See, e.g., “Small Cell Forum: What is a small cell?”, available at <http://www.smallcellforum.org/aboutsmallcells-small-cells-what-is-a-small-cell> (noting that small cells are “operator-controlled”); “the DAS forum: Distributed Antenna Systems (DAS) And Small Cell Technologies Distinguished,” available at http://www.thedasforum.org/wp-content/uploads/2013/02/DAS-And-Small-Cell-Technologies-Distinguished-2_4_13.pdf.

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32. Small wireless technologies like DAS and small cells have a number of advantages over traditional macrocells. Because the facilities deployed at each node are physically much smaller than macrocell antennas and associated equipment and do not require the same elevation, they can be placed on light stanchions, utility poles, building walls and rooftops, and other small structures either privately owned or in the public rights-of-way. Thus, providers can deploy the technologies in geographic areas, such as densely populated urban areas, where traditional towers are not feasible or in areas, such as stadiums, where localized wireless traffic demands would require an unrealistic number of macrocells.⁵⁰

33. In addition, because these technologies utilize small equipment and transmit at signal power levels much lower than macrocells, they can be deployed in indoor environments to improve interior wireless services.⁵¹ Current estimates suggest that more than 60% of wireless voice calls and 70% of wireless data usage take place inside buildings.⁵² DAS and small-cell deployments not only improve interior coverage in a general sense, they can also enhance security by providing a cost-effective mechanism for public-safety communications throughout a building alongside commercial cellular services.⁵³ Deployments of such small facilities are also particularly useful to address capacity or coverage needs in areas with stringent siting regulations, such as historic districts. Because small cells are smaller and less visible than macrocells, providers can more easily deploy them with stealth measures such as concealment enclosures that blend with the structures on which they are installed.

34. More broadly, DAS and small-cell deployments are a comparatively cost-effective way of addressing increased demand for wireless broadband services, particularly in urban areas.⁵⁴ As a result, providers are rapidly increasing their use of these technologies, and the growth is projected to increase exponentially in the coming years. According to one estimate, more than 37 million small cells will be

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2_4_13.pdf, at 3 (noting that in contrast to DAS, “small cell solutions are typically deployed piecemeal to provide coverage or enhance capacity in much smaller areas with a single wireless communications technology for a single wireless carrier.”).

⁵⁰ See, e.g., PCIA Comments at i; Verizon Comments at 2, 8; Letter from D. Zachary Champ, PCIA-The Wireless Infrastructure Association, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 11-59; GN Docket No. 12-354, filed Mar. 19, 2013 (PCIA Mar. 19, 2013 *Ex Parte*), Attach. (Dr. Amos J. Loveday, DAS/Small Cells & Historic Preservation: An Analysis of the Impact of Historic Preservation Rules on Distributed Antenna Systems and Small Cell Deployment, Feb. 27, 2013, at 1, 2 (“Loveday Report”)); “the DAS forum: Distributed Antenna Systems (DAS) And Small Cell Technologies Distinguished,” available at http://www.thedasforum.org/wp-content/uploads/2013/02/DAS-And-Small-Cell-Technologies-Distinguished-2_4_13.pdf, at 6. See also PCIA – The Wireless Infrastructure Association and the DAS Forum Comments, WC Docket No. 11-59, at 11-12, 27 (PCIA and DAS Forum *NOI* Comments).

⁵¹ Common candidates for indoor DAS deployments include offices and corporate campuses, stadiums, universities, retail centers, health care facilities, transportation centers (e.g., airports, train and subway stations) and hospitality venues (e.g., hotels, convention centers). See Tracy Ford, BICSI News Magazine, “Installing DAS & Small Cells – What You Need to Know,” available at <http://www.thedasforum.org/wp-content/uploads/2013/04/Ford-BISCI-News-Article.pdf>.

⁵² *Id.* Another report estimates that more than two-thirds of all wireless communication occurs indoors. See ECS, “An In-Depth Look at DAS, Wi-Fi, and Small Cell Growth and Trends,” available at <http://ecselectrical.net/2014/03/an-in-depth-look-at-das-wi-fi-and-small-cell-growth-and-trends/>.

⁵³ See John B. Whatley, “White Paper: Considerations for an in-building distributed antenna system,” available at <http://www.rcrwireless.com/article/20120104/infrastructure-2/das/white-paper-considerations-for-an-in-building-distributed-antenna-system/>. Public safety information can be broadcast across a range of frequencies that DAS networks can support. *Id.*

⁵⁴ See “Heterogeneous Networks, Securing Excellent Broadband Mobile Experience, Everywhere,” Ericsson White Paper, Sept. 2014, available at <http://www.ericsson.com/res/docs/whitepapers/wp-heterogeneous-networks.pdf>, at 5-6.

deployed by 2017.⁵⁵ Another predicts that 16 million DAS nodes will be deployed by 2018—with the number of nodes doubling between 2013 and 2016—and that more than 50% of DAS networks will include Wi-Fi capability by 2018.⁵⁶ Indeed, one study projects that aggregate small-cell capacity will overtake macrocell capacity by 2016-2017.⁵⁷ As they are increasingly relied upon, DAS and small-cell technologies are also posing new logistical deployment challenges.⁵⁸ In particular, because individual DAS nodes and small cells cover small areas, providers must often deploy a substantial number of nodes to achieve the seamless coverage of a single macrocell.⁵⁹

B. NEPA Categorical Exclusions

1. Regulatory Background

35. NEPA requires Federal agencies to identify and evaluate the environmental effects of proposed Federal actions and to prepare a “detailed statement” for “major Federal actions significantly affecting the quality of the human environment.”⁶⁰ In particular, NEPA requires Federal agencies to take a “hard look” at “major” Federal actions that may have significant environmental consequences and to disseminate relevant information to the public.⁶¹ The Commission satisfies its NEPA responsibility to

⁵⁵ See Joe Madden, “Cost Comparison: Carrier Wi-Fi, Small Cells, DAS, Repeaters,” April 2013, *available at* http://www.richardsonrfd.com/resources/RelDocuments/SYS_29/Joe_Madden_April2013.pdf, at 2. Verizon states that it plans to deploy over 3,000 small cells across the country in 2014. *See* Verizon Comments at 8. By 2015, AT&T plans to deploy over 40,000 small cells and over 1,000 DAS networks, in addition to 10,000 macrocells. *See* PCIA Comments at 3.

⁵⁶ See Antenna Systems & Technology, “16 Million DAS Nodes to be Deployed Through 2018,” *available at* <http://www.antennasonline.com/main/news/16-million-das-nodes-to-be-deployed-through-2018/> (citing a forecast report by Mobile Experts called “DAS: Absorbing Small Cells and Wi-Fi”).

⁵⁷ See Tescoco, “Cellular Coverage/Capacity . . . the Small Cell Revolution,” *available at* https://www.tescoco.com/yts/knowledge_center/su/cellular-coverage-capacity-the-small-cell-revolution.html. A December 2012 survey conducted by Informa found that 98% of operators think small cells are essential to the future of their networks. *Id.*

⁵⁸ See, e.g., Wireless Magazine, “Small cells and DAS – A widely distributed choice,” Feb. 22, 2013, *available at* <http://www.wireless-mag.com/features/24320/small-cells-and-das--a-widely-distributed-choice.aspx> (noting that multiple operators often need to share systems in order to please localities, and that efficient management of a shared system may require a middleman to acquire and manage sites); Vladan Jevremovic, Ph. D., “The Technological Future of Small Cells,” *available at* <http://www.ibwave.com/blog/the-technological-future-of-small-cells/> (noting challenges of heterogeneous networks, also known as HetNets, which integrate small-cell technologies and DAS with macrocells into a single network).

⁵⁹ See, e.g., “the DAS forum: Distributed Antenna Systems (DAS) And Small Cell Technologies Distinguished,” *available at* http://www.thedasforum.org/wp-content/uploads/2013/02/DAS-And-Small-Cell-Technologies-Distinguished-2_4_13.pdf, at 3, 4 (explaining that DAS networks can range from just two nodes to ten, fifty, or even more nodes, covering areas ranging from several blocks to entire cities); AT&T, “DAS a Winner, How AT&T’s Distributed Antenna System Keeps Fans Connected,” *available at* http://www.att.com/Common/about_us/files/pdf/das_football.pdf (indicating DAS deployment in a stadium typically includes hundreds of antennas). For further information regarding DAS and small cells, *see* FCC, “Augmenting Mobile Broadband in Your Community – An Overview of Distributed Antenna Systems and Small Cell Solutions,” *available at* <http://www.fcc.gov/events/augmenting-mobile-broadband-your-community-overview-distributed-antenna-systems-and-small-cel> (describing Commission-hosted workshop providing “an overview of [DAS] and small cell technologies that augment mobile broadband and wireless services”).

⁶⁰ See 42 U.S.C. § 4332(2)(C); 47 C.F.R. § 1.1305; National Environmental Policy Act Compliance for Proposed Tower Registrations, Effects of Communications Towers on Migratory Birds, WT Docket Nos. 08-61, 03-187, *Order on Remand*, 26 FCC Rcd 16700, 16702-03 (2011) (*Environmental Notification Order on Remand*) (citing *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349-50 (1989)).

⁶¹ *Robertson*, 490 U.S. at 349-50.

identify and evaluate the environmental effects of proposed Federal actions that do not have significant impacts and therefore do not require a “detailed statement” (an Environmental Impact Statement⁶²) using an environmental assessment or a categorical exclusion.⁶³ Federal actions include projects or programs that are entirely or partly financed, assisted, conducted, regulated, or approved by Federal agencies.⁶⁴

36. Under Section 204 of NEPA, the Council on Environmental Quality (CEQ) is entrusted with NEPA oversight responsibility.⁶⁵ CEQ’s regulations direct agencies to identify their Federal actions and place each within one of three categories.⁶⁶ The first category encompasses actions that normally have a significant environmental impact. Before undertaking these actions, the agency must prepare an Environmental Impact Statement (EIS).⁶⁷ The second category includes actions that may, but do not necessarily, have a significant environmental impact.⁶⁸ For actions in this category, an agency may conduct an Environmental Assessment (EA) in lieu of an EIS.⁶⁹ If the EA shows that a proposed action will have no significant environmental impact, then the agency issues a Finding of No Significant Impact,⁷⁰ and the proposed action can proceed. Otherwise, the agency must proceed with the EIS process. The third category—“categorical exclusions”—covers actions that, based on the agency’s assessment, “do not individually or cumulatively have a significant effect on the human environment . . . and for which . . . neither an environmental assessment nor an environmental impact statement is required.”⁷¹ CEQ regulations require that an agency that chooses to establish categorical exclusions must also provide for “extraordinary circumstances” under which an action that is normally categorically excluded may have a significant environmental effect and therefore require further NEPA review in an EA or EIS.⁷²

37. The Commission has generally found that its grant or approval of an application that will result in the deployment of a wireless communications facility qualifies as a Federal action, thereby subjecting the facility to NEPA procedures.⁷³ With respect to the first category of actions described

⁶² 40 C.F.R. § 1508.11.

⁶³ 47 C.F.R. §§ 1.1306, 1.1307.

⁶⁴ 40 C.F.R. § 1508.18(a).

⁶⁵ See 42 U.S.C. § 4344.

⁶⁶ See 40 C.F.R. § 1507.3(b)(2).

⁶⁷ See 40 C.F.R. § 1501.4. An EIS is a detailed statement by the responsible Federal official on: “(i) the environmental impact of the proposed action, (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented, (iii) alternatives to the proposed action, (iv) the relationship between local short-term uses of man’s environment and the maintenance and enhancement of long-term productivity, and (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.” 42 U.S.C. § 4332(2)(C); see also 40 C.F.R. § 1508.11. The Commission’s procedures for preparing an EIS are described in 47 C.F.R. §§ 1.1314-1.1319.

⁶⁸ See 40 C.F.R. §§ 1501.4(b), 1507.3(b)(2)(iii) (providing that agency procedures shall identify those typical classes of action that normally require EAs but not necessarily EISs).

⁶⁹ See 40 C.F.R. §§ 1501.4(b), 1507.3(b)(2)(iii). An EA is briefer than an EIS, and its purpose is to determine whether an EIS is required. Pursuant to CEQ’s regulations, an EA is a document that: (1) discusses the need for a proposed action, the alternatives, and the environmental impacts of the proposed action and alternatives; (2) lists the agencies and persons consulted; and (3) provides evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact (FONSI). See 40 C.F.R. § 1508.9. See also 40 C.F.R. § 1501.4(b).

⁷⁰ See 40 C.F.R. § 1508.13.

⁷¹ 40 C.F.R. § 1508.4. See 40 C.F.R. § 1507.3(b)(2)(ii); 47 C.F.R. §§ 1.1306, 1.1307.

⁷² 40 C.F.R. § 1508.4.

⁷³ See *Infrastructure NPRM*, 28 FCC Rcd at 14247 para. 21.

above, the Commission has found that *none* of its actions are of a type that ordinarily *will* have the potential for a significant environmental impact, and therefore that no facility deployments automatically require an EIS.⁷⁴ Sections 1.1307(a) and (b) of the Commission's rules identify the environmentally sensitive circumstances under which communications-facility deployments *may* significantly affect the environment and require preparation of an EA.⁷⁵ Section 1.1307(a) includes facilities to be located in an officially designated wilderness area, an officially designated wildlife preserve, or a flood plain. It also includes facilities that may affect threatened or endangered species or their critical habitats, or are likely to jeopardize proposed threatened or endangered species or destroy or adversely modify proposed critical habitats; that may affect districts, sites, buildings, structures or objects that are listed, or eligible for listing, in the National Register; that may affect Native American religious sites; that will involve significant change in surface features (*e.g.*, deforestation); or that will be located in residential neighborhoods and will be equipped with high intensity white lights.⁷⁶ In addition, under Section 1.1307(b) a facility may have a significant environmental impact if it would cause human exposure to RF emissions in excess of specified levels.⁷⁷ For all of these proposed facilities identified in Sections 1.1307(a) and (b), unless they are identified in the Notes to Section 1.1306 as discussed below, applicants must prepare and submit an EA that the Commission uses to determine whether the deployment would result in a significant environmental impact. Sections 1.1307(c) and (d) also require the preparation of an EA for a proposed facility otherwise categorically excluded from environmental processing under Section 1.1306 if the processing bureau, either on its own motion or in response to a public complaint, determines that it may have a significant environmental impact.⁷⁸

38. With respect to the third category described above, Section 1.1306 of the Commission's rules specifies those actions that are categorically excluded from environmental review.⁷⁹ Under Section 1.1306, wireless facility deployments, including deployments of new wireless towers, are categorically excluded from review if they fall outside of the environmentally sensitive categories identified in Sections 1.1307(a) and (b). Further, Note 1 to Section 1.1306 (Note 1) clarifies that the requirement to file an EA under Section 1.1307(a) generally does not apply to "the mounting of antenna(s) on an existing building or antenna tower" or to the installation of wire or cable in an existing underground or aerial corridor, even if an environmentally sensitive circumstance identified in Section 1.1307(a) is present.⁸⁰ More specifically, Note 1 provides that mounting an antenna on an existing building or antenna tower is categorically excluded under NEPA unless Section 1.1307(a)(4) applies (that is, if the proposed installation may affect historic properties protected by Section 106) or if the proposed installation would result in human exposure to RF emissions in excess of health and safety guidelines cited in Section 1.1307(b). Note 1 reflects a preference first articulated by the Commission in 1974, and codified into Note 1 in 1986, that "[t]he use of existing buildings, towers or corridors is an environmentally desirable alternative to the construction of new facilities and is encouraged."⁸¹

⁷⁴ See 47 C.F.R. § 1.1305.

⁷⁵ See 47 C.F.R. § 1.1307(a), (b).

⁷⁶ See 47 C.F.R. § 1.1307(a).

⁷⁷ See 47 C.F.R. § 1.1307(b). As noted above, the Commission has initiated a proceeding on RF emissions criteria, and that proceeding is pending. See *supra*, n.36.

⁷⁸ See 47 C.F.R. § 1.1307(c), (d).

⁷⁹ See 47 C.F.R. § 1.1306(a).

⁸⁰ 47 C.F.R. § 1.1306 Note 1.

⁸¹ *Id.* See, *e.g.*, Amendment of the Commission's Environmental Rules, *Order*, 3 FCC Rcd 4986, 4986 para. 7 (1988) (*1988 NEPA Order*) ("The Commission has long held that the mounting of antennas on existing buildings or antenna towers generally is environmentally preferable to the construction of a new facility, a preference which is reflected in note 1."); Implementation of the National Environmental Policy Act of 1969, Docket No. 19555, *Report and Order*, 49 FCC 2d 1313, 1324 para. 27 (1974) (*1974 NEPA Order*). The Note 1 categorical exclusion for

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2. Antennas Mounted on Existing Buildings and Towers

a. Clarification of “Antenna”

39. *Background.* The *Infrastructure NPRM* sought comment on whether to provide expressly that the categorical exclusion for the mounting of “antenna(s)” on buildings or towers also applies to the equipment associated with the antenna, such as transceivers, converters, and power supplies.⁸² It also sought comment on whether and how, in this context, the Commission should clarify what constitutes associated equipment.⁸³

40. Industry commenters argue that the categorical exclusion should be interpreted to include associated equipment.⁸⁴ Verizon argues that if the exclusion does not encompass such equipment, then our rules would require NEPA review for every collocation, and that this would vitiate the exclusion and frustrate its intended purpose.⁸⁵ Some municipal commenters express concerns about the proposed clarification, however.⁸⁶ Savannah opposes including any associated equipment under the NEPA collocation categorical exclusion, asserting that it may have a greater environmental or historic preservation impact than the antenna itself.⁸⁷ Tempe argues that the categorical exclusion should not extend to diesel generators because of their fumes, noise, and potential for spills.⁸⁸

41. *Discussion.* Because the record confirms some uncertainty regarding the scope of the Commission’s existing Note 1 categorical exclusion for the “mounting of antenna(s) on existing buildings and antenna towers,” we take this opportunity to clarify the scope of the categorical exclusion.⁸⁹ We first clarify that the term “antenna” as used in Note 1 encompasses all on-site equipment associated with the

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collocations on existing buildings or towers was originally adopted in 1986. *See* Amendment of Environmental Rules in Response to New Regulations Issued by the Council on Environmental Quality, *Report and Order*, GEN Docket No. 79-163, 60 Rad. Reg. 2d 13 (1986) (*1986 NEPA Order*). It was modified in the *1988 NEPA Order* to provide that such collocations are subject to Section 1.1307(a)(4) as well as to Section 1.1307(b). *See 1988 NEPA Order*, 3 FCC Rcd at 4986 para. 7.

⁸² *Infrastructure NPRM*, 28 FCC Rcd at 14254 para. 40.

⁸³ *See id.*

⁸⁴ *See, e.g.,* AT&T Comments at 10 (arguing that Note 1 already extends to associated equipment and therefore needs no amendment to do so); PCIA Comments at 17 (arguing as an “analogy” that associated equipment is covered by the term “antenna” as used in the programmatic agreements governing the Commission’s historic preservation review process); UTC Comments at 4 (supporting amendment to the exclusion so that it “expressly covers” the associated equipment); Verizon Comments at 15-16 (arguing that Commission should change the phrase “mounting of antenna(s)” to “mounting of antenna(s) and associated equipment,” or otherwise “make clear” that the Note 1 exclusion applies to associated equipment).

⁸⁵ *See* Verizon Comments at 16. *See also* AT&T Comments at 10 (arguing that limiting the categorical exclusion to antennas “would frustrate the purpose of the exemption, as it would exclude equipment, mountings, and other components needed to operate the antennas”); Towerstream Comments at 31 (arguing that application of “stringent” environmental requirements to “the other equipment necessary to operate these wireless technologies would not provide effective relief”).

⁸⁶ *See, e.g.,* Letter from Edna Branch Jackson, Mayor, Savannah, Georgia, to Jane Jackson, FCC, WT Docket No. 13-238, filed April 8, 2014 (*Savannah Ex Parte*), at 2; San Antonio Reply Comments at 27; Tempe Comments at 5-7. *See also* Alexandria *et al.* Comments at 4 (arguing that if Commission were to read Section 6409(a) of the Spectrum Act to broadly preempt local review of modification requests that present environmental and historic preservation concerns, then the Commission’s proposed actions on Note 1 would be inappropriate).

⁸⁷ *See Savannah Ex Parte* at 2; *see also* San Antonio Reply Comments at 27 (objecting to inclusion of associated equipment because “many additional equipment deployments will be swept out of the reach of NEPA” as a result).

⁸⁸ *See* Tempe Comments at 5-7.

⁸⁹ We also amend the text of Note 1 to codify the clarification. *See infra*, App. B.

antenna, including transceivers, cables, wiring, converters, power supplies, equipment cabinets and shelters, and other comparable equipment. We conclude that this is the only logically consistent interpretation of the term, as associated equipment is a standard part of such collocations, and the antennas subject to NEPA review cannot operate without it.⁹⁰ Thus, interpreting the term “antenna” as omitting associated equipment would eviscerate the categorical exclusion by requiring routine NEPA review for nearly every collocation. Such an interpretation would therefore frustrate the categorical exclusion’s purpose.⁹¹ We also note that our interpretation of “antenna” in this context is consistent with how the Commission has defined the term “antenna” in the comparable context of our process for reviewing effects of proposed deployments on historic properties. Specifically, and as discussed in detail in the next section, the Commission’s Section 106 historic preservation review is governed by two programmatic agreements, and in both, the term “antenna” encompasses all associated equipment.⁹²

42. Further, if associated equipment presented significant concerns, we would expect that otherwise excluded collocations that included such equipment would, at some point over the past 40 years, have been subject to environmental objections or petitions to deny. We are unaware of any such objections or petitions directed at backup generators or any other associated equipment, or of any past EAs that found any significant environmental effect from such equipment.⁹³ Given this long history, we find some commenters’ generalized assertions of a risk of environmental effects to be unpersuasive, and we reaffirm that the collocations covered by Note 1, including the collocation of associated equipment addressed by our clarification, will not individually or cumulatively have a significant effect on the human environment.⁹⁴

⁹⁰ See, e.g., AT&T Comments at 4, 10; Verizon Comments at 15-16.

⁹¹ See, e.g., AT&T Comments at 10; Towerstream Comments at 31; see also 47 C.F.R. § 1.1306 Note 1.

⁹² The first agreement, the 2001 Nationwide Programmatic Agreement for the Collocation of Wireless Antennas, provides that most collocations of antennas on existing structures are excluded from routine historic preservation review, with a few defined exceptions to address potentially problematic situations. See 47 C.F.R. Part 1, App. B, Nationwide Programmatic Agreement for the Collocation of Wireless Antennas (Collocation Agreement). The second, the 2005 Nationwide Programmatic Agreement Regarding the Section 106 National Historic Preservation Act Review Process, establishes a detailed process for the review of the effects of proposed communications facilities on historic properties. See 47 C.F.R. Part 1, App. C, Nationwide Programmatic Agreement Regarding the Section 106 National Historic Preservation Act Review Process § II.A.1 (NPA) (defining “antenna” to include associated equipment). While the Collocation Agreement does not define the term “antenna,” its use of the term indicates that it necessarily encompasses the associated equipment. 47 C.F.R. Part 1, App. B, Nationwide Programmatic Agreement for the Collocation of Wireless Antennas. For example, the Collocation Agreement specifies that a collocation of an “antenna” on a tower constitutes a “substantial increase in the size of the tower” if “[t]he mounting of the proposed antenna would involve the installation of more than the standard number of new equipment cabinets for the technology involved.” Collocation Agreement § I.C(2). We note that this intuitive interpretation of “antenna” in the context of wireless facility collocations is also reflected in certain local ordinances. For example, Montgomery County, Maryland, recently adopted an amendment to its zoning ordinance to provide, *inter alia*, that an “Antenna on Existing Structure includes related equipment.” Montgomery County, Maryland Zoning Ordinance Section 59.3.5.14(C)(1). See Ordinance No.: 17-49, Zoning Text Amendment No.: 14-04, “Concerning: Accessory Commercial Uses – Antennas,” adopted July 22, 2014, effective Oct. 30, 2014, available at http://www.montgomerycountymd.gov/COUNCIL/Resources/Files/zta/2014/20140722_17-49.pdf.

⁹³ Cf. Nationwide Programmatic Agreement Regarding The Section 106 National Historic Preservation Act Review Process, WT Docket No. 03-128, *Report and Order*, 20 FCC Rcd 1073, 1130 para. 158 (2004) (*NPA Report and Order*) (“We are aware of no case, however, where noise from a communications facility generator has been found to have an adverse effect on a historic property.”), *aff’d*, *CTIA-The Wireless Ass’n v. F.C.C.*, 466 F.3d 105 (D.C. Cir. 2006).

⁹⁴ While Alexandria *et al.* submit a declaration from Joseph Monaco asserting that “[m]inor additions to existing facilities could have significant effects even if only incremental to past disturbances,” see Alexandria *et al.* Comments, Attach. (Monaco Declaration), at 5, we find this position is inconsistent with the Commission’s finding that the mounting of antennas on existing towers and buildings will not have significant effects, and with our

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43. Against this evidence, we find unpersuasive Tempe's argument that the NEPA categorical exclusion for collocation should not encompass backup generators in particular.⁹⁵ Tempe argues that generators cause "fumes, noise, and the potential for exposure to hazardous substances if there is a leak or a spill" and therefore "should not be allowed to be installed without the appropriate oversight."⁹⁶ To the extent Tempe raises concerns about noise from testing generators,⁹⁷ we note that the Commission has previously determined that maintenance and servicing of equipment do not constitute Commission "undertakings" subject to the Section 106 historic preservation review process,⁹⁸ and that courts have generally treated Federal actions under NEPA as closely analogous to Federal undertakings under NHPA.⁹⁹ Thus, such maintenance procedures arguably do not constitute Federal actions subject to environmental review under NEPA.¹⁰⁰ In any case, the Wireless Telecommunications Bureau addressed all of these potential impacts in its Final Programmatic Environmental Assessment for the Antenna Structure Registration Program (PEA), and did not find any to be significant.¹⁰¹ Tempe's own comments,

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experience administering the NEPA process, in which a collocation has never been identified by the Commission or the public to have caused a significant environmental effect. We further note that the proffered examples appear to confuse consideration under our NEPA process with review under local process, which we do not address here. *See, e.g.,* Monaco Declaration at 7 (stating that "[r]emoving local discretion from the process of siting and design of additions to existing structures could result in significant effects" with respect to an endangered species). To the extent that rare circumstances exist where "even the smallest change could result in a significant effect, based on the intrinsic sensitivity of a particular resource," Monaco Declaration at 11, we conclude that such extraordinary circumstances are appropriately addressed through Sections 1.1307(c) and (d), as necessary. Consistent with the requirement under CEQ regulations that an agency that establishes categorical exclusions must also provide for "extraordinary circumstances" under which an action that is normally categorically excluded may have a significant environmental effect and therefore require further NEPA review, we reaffirm that under Sections 1.1307(c) and (d) of our rules, if the relevant Bureau determines on its own motion or in response to a public objection that a proposed deployment that falls under this categorical exclusion may have a significant environmental impact, it will require the preparation of an EA. 47 C.F.R. § 1.1307(c), (d).

⁹⁵ We note that the National Park Service adopted a categorical exclusion for proposed tower construction in Yellowstone National Park that included the installation of a backup generator based on a determination that the action would result in "no or minor impacts." *See* National Park Service, U.S. Department of the Interior, Categorical Exclusion Form, PEPC Project Number 43426, Oct. 13, 2012, *available at* <http://parkplanning.nps.gov/document.cfm?parkID=111&projectID=43426&documentID=50144>.

⁹⁶ Tempe Comments at 5-6.

⁹⁷ *See* Tempe Reply Comments at 3.

⁹⁸ *NPA Report and Order*, 20 FCC Rcd at 1088 para. 39 (citing NPA § I.B. ("Many changes to tower sites . . . are in the nature of service or maintenance and are not federal undertakings. Thus, the Nationwide Agreement provides explicitly that Undertakings do not include maintenance and servicing of equipment.")).

⁹⁹ *See, e.g., Karst Environmental Educ. and Protection, Inc. v. Environmental Protection Agency*, 475 F.3d 1291, 1295-96 (D.C. Cir. 2007); *Sac and Fox Nation of Missouri v. Norton*, 240 F.3d 1250, 1263 (10th Cir. 2001).

¹⁰⁰ *But see* 47 C.F.R. § 1.1311(b) (specifying that "[i]n the case of wilderness areas, wildlife preserves, or other like areas, the [EA] shall discuss the effect of any continuing pattern of human intrusion into the area (*e.g.,* necessitated by the operation and maintenance of the facilities).").

¹⁰¹ *See* Final Programmatic Environmental Assessment For the Antenna Structure Registration Program, *Public Notice*, 2012 WL 871792 (WTB Mar. 13, 2012) (PEA), at 8 ("Several resources were determined to not be affected by or to be affected negligibly by the No Action Alternative, Alternative 1, and the three options under Alternative 2. These resources include: geology, soils, farmlands, groundwater, coastal zones/barriers, designated wilderness areas (which are already protected under FCC rules), air quality, noise, and land use."), 38 (finding that all considered options for registration of antenna structures taking into account emissions from backup generators, would have negligible impact on air quality), *id.* (finding that registered antenna structures would create no long-term differences in the frequency, magnitude, or duration of noise at the project site(s) and therefore all options "are expected to have negligible impacts on noise"), 70 (finding that potential that a spill or leak from a fuel-burning

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moreover, confirm that backup generators are already subject to extensive local, State, and Federal regulation, suggesting that further oversight from the Commission would not meaningfully augment existing environmental safeguards. For example, as Tempe notes, local building and fire codes often regulate the deployment of generators.¹⁰² In addition, the Environmental Protection Agency and many localities regulate emissions from and use of backup generators to alleviate environmental concerns,¹⁰³ and generators must comply with any applicable noise ordinances and laws as well.¹⁰⁴ In assessing environmental effect, an agency may factor in an assumption that the action is performed in compliance with other applicable regulatory requirements in the absence of a basis in the record beyond mere speculation that the action threatens violations of such requirements.¹⁰⁵ Tempe's comments support our conclusion that such regulations applicable to backup generators address Tempe's concerns.¹⁰⁶ Further,

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generator would occur is small, and the amount of fuel onsite would not be sufficient to cause widespread contamination" and that, therefore, "[s]pills or leaks would likely result in short-term negligible to minor adverse impacts on surface water resources").

¹⁰² See Tempe Comments at 6-7.

¹⁰³ See Environmental Protection Agency, "Nonroad Diesel Engines," available at <http://www.epa.gov/otaq/nonroad-diesel.htm> (noting that Environmental Protection Agency (EPA) has "adopted a comprehensive national program to reduce emissions from non-road diesel engines by [systemically] integrating engine and fuel controls"); see also Diesel Technology Forum, "Diesel at Work," available at <http://www.dieselforum.org/diesel-at-work/power-generation> (noting that "[d]iesel generators are covered by a wide range of federal, state and local requirements regarding emissions performance and operating conditions").

¹⁰⁴ Cf. "City of Palo Alto, California, Staff Report 2393," available at http://paloaltocityca.ig2.com/Citizens/Detail_LegiFile.aspx?Frame=&ID=2393&CssClass= (finding Palo Alto DAS installation compliant with local noise ordinance). Moreover, any noise from such generators is unlikely to have a significant effect on the environment, as they will be used only on the comparatively infrequent occasions when power has been lost or during brief periodic testing. Cf. Gray Tower Environmental Assessment, available at <http://www.ntia.doc.gov/legacy/psic/MSCommNet%20PSIC%20EA%20report%20final.pdf> (finding no significant long-term noise impacts from generator as "use of the generator would be limited and would only occur during equipment maintenance and testing as a backup for primary power equipment and during interruption of the primary (grid) power supply").

¹⁰⁵ See, e.g., *PEA*, 2012 WL 871792, at *38 (assessing environmental impact of noise, the Wireless Telecommunications Bureau concluded that, "because tower construction is a private activity that is subject to state and local regulations, such as requirements to perform work during day-time business hours, the Bureau expects that any short-term impacts to adjacent land uses and populations would be mitigated" and further that "[c]onstruction workers also are required to comply with Occupational Safety and Health Administration noise regulations"); National Telecommunications and Information Administration, "Finding of No Significant Impact for Proposed Gray Tower," available at http://www.ntia.doc.gov/legacy/psic/Gray%20Tower_ME_09-01-11.pdf (approving Gray Tower EA, which found no significant impact from tower that included generator in part because "Federal regulations limit the use of backup generators to 500 hours per year"); *Lone Tree Council v. U.S. Army Corp. of Engineers*, 2007 WL 1520904 (E.D. Mich. May 24, 2007) (upholding agency's Finding of No Significant Impact, where argument that its action might involve release of pollutant in violation of Clean Water Act certification was nothing more than "speculation"). See also *Sierra Club v. Van Antwerp*, 661 F.3d 1147, 1155 (D.C. Cir. 2012) (upholding agency's FONSI, finding that agency reasonably found that past violation from similar action did not "threaten" future violations where previous violation was result of error and "not a problem of design"); *Audubon Naturalist Society of the Central Atlantic States, Inc. v. U.S. Dept. of Transp.*, 524 F.Supp.2d 642 (D.Md. 2007) (affirming Department of Transportation's reliance in its environmental assessment on EPA standards regarding emissions).

¹⁰⁶ See Tempe Comments at 6-7.

we find that cell sites with such generators will rarely if ever be grouped in sufficient proximity to present a risk of cumulative effects.¹⁰⁷

44. Accordingly, we find no reason to interpret “antenna” in the Note 1 NEPA collocation categorical exclusion to omit backup generators or other kinds of backup power equipment. Rather, as discussed above, we find that the term “antenna” as used in the categorical exclusion should be interpreted to encompass the on-site equipment associated with the antenna, including backup power sources. Further, the need for such power sources at tower sites is largely undisputed, as backup power is critical for continued service in the event of natural disasters or other power disruptions—times when the need and demand for such service is often at its greatest.¹⁰⁸ We therefore amend Note 1 to clarify that the categorical exclusion encompasses equipment associated with the antenna, including the critical component of backup power.

45. Finally, we note once again that Sections 1.1306(b)(1)-(3) and 1.1307(c) and (d) of our rules provide for situations where environmental concerns are presented and, as called for by the requirement that categorical exclusions include consideration of extraordinary circumstances, closer scrutiny and potential additional environmental review are appropriate. Sections 1.1306(b)(1)-(3) expressly cross reference the factors in Section 1.1307 that trigger the need for an EA. Further, under Sections 1.1307(c) and (d) of our rules, even otherwise categorically excluded applications are subject to environmental review if the bureau responsible for processing the application determines on its own motion or in response to a public objection that the proposed deployment may have a significant environmental impact for which an EA must be prepared.¹⁰⁹ We conclude that individual cases presenting extraordinary circumstances in which collocated generators or other associated equipment may have a significant effect on the environment, including cases in which closely spaced generators may have a significant cumulative effect or where the deployment of such generators would violate local codes in a manner that raises environmental concerns, will be adequately addressed through these provisions.¹¹⁰

b. Antennas Mounted in the Interior of Buildings

46. *Background.* The *Infrastructure NPRM* also sought comment on whether the Commission should clarify that the existing NEPA categorical exclusion for mounting antennas on buildings applies not only to installations on rooftops and facades but also to installations in the interior of buildings.¹¹¹ As noted above, interior placements play an increasingly important role in providing access to wireless networks from inside buildings and other indoor environments.

47. No commenters oppose the proposed clarification, although Tempe objects to any categorical exclusion that would allow a diesel generator inside an existing building or other structure based on concerns about fumes, noise, and the potential for exposure to hazardous substances if there is a leak or a spill.¹¹² Industry commenters support the clarification, arguing that no special environmental

¹⁰⁷ See, e.g., American Tower Corporation, Generator Site List, *available at* http://www.americantower.com/Assets/uploads/files/Excel/Variable-related/Americantower_backup-power_site-list.xls.

¹⁰⁸ See Improving 9-1-1 Reliability; Reliability and Continuity of Communications Networks, Including Broadband Technologies, PS Docket Nos. 13-75, 11-60, *Notice of Proposed Rulemaking*, 28 FCC Rcd 3414 (2013) (seeking comment on approaches to ensure the reliability and resiliency of the communications infrastructure necessary to ensure continued availability of the Nation’s 9-1-1 system, particularly during times of major disaster).

¹⁰⁹ See 47 C.F.R. § 1.1307(c), (d).

¹¹⁰ Cf. *NPA Report and Order*, 20 FCC Rcd at 1130 para. 158 (finding that reliance on public complaint is best approach to address “unusual case” of a generator having an adverse impact on historic properties).

¹¹¹ See *Infrastructure NPRM*, 28 FCC Rcd at 14254 para. 41.

¹¹² See Tempe Comments at 6.

effects arise from collocations in the interior of buildings as opposed to collocations on the exterior.¹¹³ Towerstream argues that this clarification is necessary to advance the goal of facilitating DAS and small-cell deployments that often operate inside buildings.¹¹⁴ AT&T argues that, “regardless of the manner or location of antenna placements on an existing structure, collocations meet the goals of the” categorical exclusion—namely, encouraging collocations and minimizing new tower construction.¹¹⁵

48. *Discussion.* We adopt the proposal and clarify that the existing NEPA categorical exclusion for mounting antennas “on” existing buildings applies to installations in the interior of existing buildings.¹¹⁶ An antenna mounted on a surface inside a building is as much “on” the building as an antenna mounted on a surface on the exterior, and we find nothing in the language of the categorical exclusion, in the adopting order, or in the current record supporting a distinction between collocations on the exterior or in the interior that would limit the scope of the categorical exclusion to exterior collocations.¹¹⁷ To the contrary, it is even more likely that indoor installations will have no significant environmental effects in the environmentally sensitive areas in which proposed deployments would generally trigger the need to prepare an EA, such as wilderness areas, wildlife preserves, and flood plains.¹¹⁸ Specifically, the existing Note 1 collocation categorical exclusion reflects a finding that collocations do not individually or cumulatively have a significant effect on the human environment, even if they would otherwise trigger the requirement of an EA under the criteria identified in Sections 1.1307(a)(1)-(3) and (5)-(8). We find that this conclusion applies equally or even more strongly to an antenna deployed inside a building than to one on its exterior, since the building’s exterior structure would serve as a buffer against any effects.¹¹⁹ In addition, we note that FirstNet, the National Telecommunications and Information Administration (NTIA), and other agencies have adopted categorical exclusions covering internal modifications and equipment additions inside buildings and structures. For example, in adopting categorical exclusions as part of its implementation of the Broadband Technology Opportunities Program, NTIA noted that excluding interior modifications and equipment additions reflects long-standing categorical exclusions and administrative records, including in particular “the legacy categorical exclusions from the U.S. Department of Agriculture, U.S. Department of Homeland Security, and the Federal Emergency Management Agency.”¹²⁰ While a Federal agency cannot apply another agency’s categorical exclusion to a proposed Federal action, it may substantiate a categorical exclusion of its own based on another agency’s experience with a comparable categorical

¹¹³ See, e.g., UTC Comments at 4; WISPA Comments at 14.

¹¹⁴ See Towerstream Comments at 31.

¹¹⁵ See AT&T Comments 10.

¹¹⁶ In the *Infrastructure NPRM*, the Commission also sought comment on whether to codify this clarification by amending Note 1. See *Infrastructure NPRM*, 28 FCC Rcd at 14255 para. 41 (seeking comment on whether to “amend the first sentence of Note 1 to clarify that the collocation exclusion applies to installations in the interior of buildings”).

¹¹⁷ See, e.g., AT&T Comments at 10; UTC Comments at 4; WISPA Comments at 14.

¹¹⁸ See, e.g., ACUTA Comments at 4.

¹¹⁹ For example, Section 1.1307(a)(2) normally requires an EA for facilities in wildlife preserves, 47 C.F.R. § 1.1307(a)(2), but under Note 1, this provision does not encompass collocations on buildings. We find it evident that interior deployments have, if anything, less potential to impact such environments than exterior deployments.

¹²⁰ Department of Commerce, National Telecommunications and Information Administration, National Environmental Policy Act—Categorical Exclusions covering the Broadband Technology Opportunities Program (BTOP), Docket No. 0906221081-91339-02, 74 Fed. Reg. 52456, 52458 (Oct. 13, 2009); see also Department of Commerce, National Telecommunications and Information Administration, First Responder Network Authority, National Environmental Policy Act Categorical Exclusions, Docket Number 131219999-4338-02, 79 Fed. Reg. 23945, 23949 (April 29, 2014) (similar).

exclusion.¹²¹ This long-standing practice of numerous agencies that conduct comparable activities, reflecting experience that confirms the propriety of the categorical exclusion, provides further support for the conclusion that internal collocations will not individually or cumulatively have a significant effect on the human environment.¹²² With respect to Tempe's concern about generators being placed inside buildings as the result of collocations, as noted above, we rely on local building, noise, and safety regulations to address these concerns, and we anticipate that such regulations will almost always require generators to be outside of any residential buildings where their use would present health or safety concerns or else place very strict requirements on any placement in the interior.¹²³ For all of these reasons, we find it appropriate to amend Note 1 to clarify that the Note 1 collocation categorical exclusion applies to the mounting of antennas in the interior of buildings as well as the exterior.

49. We emphasize that the NEPA categorical exclusion we address here does not encompass deployments that may significantly affect historic properties, nor does it cover the review required if exposure to RF emissions would exceed specified levels.¹²⁴ Measures to promote efficiencies in Section 106 processing, including processing of certain interior deployments, are discussed in Section III.C below.

c. Antennas Mounted on Other Structures

50. *Background.* The Commission also asked whether it should expand the Note 1 categorical exclusion, which currently extends to deployments on existing buildings or antenna towers, to deployments on other existing structures, including but not limited to utility poles, water tanks, and road signs.¹²⁵ The Commission tentatively concluded that its prior determination that collocations on antenna towers and buildings are individually and cumulatively unlikely to have significant environmental effects applies equally to collocations on other structures.¹²⁶ In addition, and in support of this conclusion, the Commission noted that the NHPA Collocation Agreement and the NPA do not distinguish between buildings and other non-tower structures in applying exclusions from Section 106 review.¹²⁷

¹²¹ See Council On Environmental Quality, "Final Guidance for Federal Departments and Agencies on Establishing, Applying, and Revising Categorical Exclusion under the National Environmental Policy Act," 75 FR 75628, 75634 (Dec. 6, 2010).

¹²² See, e.g., First Responder Network Authority; National Environmental Policy Act Implementing Procedures and Categorical Exclusions, 79 FR 639, 640 (Jan. 6, 2014) (drawing on NTIA exclusions after finding, *inter alia*, that its projects are comparable and that, in the 100 cases where excluded projects were subject to review due to extraordinary circumstances, NTIA had made a Finding of No Significant Impact in 99 cases and was still in the process of reviewing one project).

¹²³ See, e.g., University of Colorado Boulder Fire and Life-Safety Group, "A Code Review for Emergency Generators and Indoor Use of Portable Generators," available at <http://www.colorado.edu/firelifesafety/sites/default/files/attached-files/EmergencyandIndoorGenerators.pdf>; Norwall Power Systems, "Choosing a Location for Standby Home Generator Installation," available at <http://www.norwall.com/blog/generator-information/locating-standby-home-generator-installation/>; eHow, "Indoor Emergency Generator Requirements," available at http://www.ehow.com/list_7707300_indoor-emergency-generator-requirements.html; David Gries, E-A-R Specialty Composites, "Noise Control Solutions for Standby Power Generators," available at <http://www.earsc.com/pdfs/StandbyGeneratorsWhitePaper.pdf>.

¹²⁴ See 47 C.F.R. § 1.1307(b). Specifically, with regard to antennas that are deployed pursuant to the NEPA collocation categorical exclusion, Note 1 provides: "Such antennas are subject to § 1.1307(b) of this part and require EAs if their construction would result in human exposure to radiofrequency radiation in excess of the applicable health and safety guidelines cited in § 1.1307(b) of this part." 47 C.F.R. § 1.1306 Note 1. See also *supra*, n.36.

¹²⁵ See *Infrastructure NPRM*, 28 FCC Rcd at 14253-54 paras. 37-39.

¹²⁶ *Id.* at 14253 para. 38.

¹²⁷ *Id.* (citing Collocation Agreement § V, Collocation of Antennas on Buildings and Non-Tower Structures Outside of Historic Districts).

51. Industry commenters broadly support the proposal.¹²⁸ They argue that collocations by placement on existing structures other than towers and buildings are unlikely to have any greater environmental effects than collocations on towers or buildings, and that facilitating such collocations will speed deployment of broadband wireless facilities without impacting the environment.¹²⁹ Mesquite also supports the proposal, but other municipalities oppose it.¹³⁰ The municipalities in opposition (including Mendham, Phoenix, Savannah, Tempe, High Point, West Palm Beach, and Coconut Creek) argue that the categorical exclusion should not extend to collocations on water tanks in particular because of concerns about water safety.¹³¹ Some, such as Tempe, express concern that collocations on road signs should not be categorically excluded because they could distract drivers and affect vehicular safety.¹³²

52. *Discussion.* We adopt the proposal to extend the categorical exclusion for collocations on towers and buildings to collocations on other existing man-made structures.¹³³ After review of the record, we conclude that deployments covered by this extension will not individually or cumulatively have a significant impact on the human environment. Through this measure, we update the categorical exclusion adopted as part of Note 1 in 1986 to reflect the modern development of wireless technologies that can be collocated on a much broader range of existing structures. This measure will facilitate collocations and speed deployment of wireless broadband to consumers without significantly affecting the environment.¹³⁴

53. In finding that it is appropriate to broaden the categorical exclusion contained in Section 1.1306 Note 1 to apply to other structures, we rely in part on the Commission's prior findings regarding the environmental effects of collocations. In implementing NEPA requirements in 1974, for example, the Commission found that mounting an antenna on an existing building or tower "has no significant aesthetic effect and is environmentally preferable to the construction of a new tower, provided there is compliance with radiation safety standards."¹³⁵ In revising its NEPA rules in 1986, the Commission found that antennas mounted on towers and buildings are among those deployments that will normally have no significant impact on the environment.¹³⁶ We note in particular that collocations will typically add only marginal if any extra height to a structure, and that in 2011, in a proceeding addressing the

¹²⁸ See, e.g., AT&T Comments at 4, 9; AT&T Reply Comments at 2, 4; PCIA Comments at 17; PCIA Reply Comments at 8; Sprint Comments at 6; TIA Comments at 3; UTC Comments at 1-4; UTC Reply Comments at 2-3; Verizon Comments at 4; WISPA Comments at 12-13; WISPA Reply Comments at 11.

¹²⁹ See, e.g., Sprint Comments at 6; UTC Reply Comments at 2-3; Verizon Comments at 15-16; WISPA Comments at 13.

¹³⁰ Compare Mesquite Comments at 1 with Mendham Comments at 4; Phoenix Comments at 3; Savannah *Ex Parte* at 1.

¹³¹ See, e.g., High Point Comments at 2; Tempe Comments at 5 (expressing concerns about collocations on water tanks as they are critical infrastructure); West Palm Beach Comments at 2 (stating that proposal is not objectionable in concept but should not apply to water tank collocations); see also Coconut Creek Comments at 2 (same); Steel in the Air Comments at 2 (same).

¹³² See Tempe Comments at 5.

¹³³ We extend the categorical exclusion to other existing structures subject to the same limitations that apply to the existing categorical exclusion. Namely, the categorical exclusion does not apply to review for effects on historic properties nor to review for compliance with our RF exposure limits. Further, we retain authority under Sections 1.1307(c) and (d) of our rules to address individual cases where there may be significant environmental effects. See 47 C.F.R. §§ 1.1306(a), 1.1307(c), (d).

¹³⁴ See, e.g., Improving Performance of Federal Permitting and Review of Infrastructure Projects, Exec. Order No. 13604, 77 Fed. Reg. 18887 (Mar. 22, 2012).

¹³⁵ 1974 NEPA Order, 49 FCC 2d at 1324 para. 27.

¹³⁶ See 1986 NEPA Order, 60 Rad. Reg. 2d at 15 para. 6; Environmental Notification Order on Remand, 26 FCC Rcd at 16708 para. 19.

Commission's NEPA requirements with respect to migratory birds, the Commission reaffirmed that collocations on towers and buildings are unlikely to have environmental effects and thus such collocations are categorically excluded from review for impact on birds.¹³⁷ Further, given that towers and buildings are typically much taller than other man-made structures on which antennas will be collocated, we expect that there will be even less potential for significant effects on birds from collocations on such other structures.

54. In the *Infrastructure NPRM*, we tentatively concluded that the same determination applies with regard to collocations on other structures such as utility poles and water towers.¹³⁸ Numerous commenters support this determination,¹³⁹ and opponents offer no persuasive basis to distinguish the environmental effects of collocations on antenna towers and buildings from the effects of collocations on other existing structures. Indeed, in this regard, we note that buildings and towers, which are already excluded under Note 1, are typically taller than structures such as utility poles and road signs.¹⁴⁰ While some commenters raise concerns about possible water-tank contamination or driver distraction,¹⁴¹ these concerns do not present persuasive grounds to limit the categorical exclusion. Under Sections 1.1306(a) and (b), collocations on structures such as water tanks and road signs are already categorically excluded from the obligation to file an EA unless they occur in the environmentally sensitive circumstances identified in Sections 1.1307(a) or (b) (such as in wildlife preserves or flood plains).¹⁴² Nothing in the record leads us to find that collocations in such sensitive areas that currently require EAs present greater risks of water tank contamination or driver distraction than collocations outside such areas.¹⁴³

55. We also find support for expanding this categorical exclusion for collocations in our approach to historic preservation review and in other agencies' approach to environmental review. We note in particular that the exclusion from Section 106 review in the Collocation Agreement is not limited to collocations on towers and buildings but also specifically includes collocations on other existing non-tower structures.¹⁴⁴ Further, the U.S. Fish and Wildlife Service has found collocations on existing non-

¹³⁷ See *Environmental Notification Order on Remand*, 26 FCC Rcd at 16708 para. 19 & n.57.

¹³⁸ See *Infrastructure NPRM*, 28 FCC Rcd at 14253 para. 38.

¹³⁹ See, e.g., AT&T Comments at 4, 9; PCIA Comments at 17; Sprint Comments at 6; UTC Comments at 4; Verizon Comments at 15-16; WISPA Comments at 13.

¹⁴⁰ According to statistics published by the Florida Public Service Commission, the standard utility pole is 35 feet tall, though poles can range from 20 to 100 feet tall. See Florida Public Service Commission, "What's on a Utility Pole?" available at <http://www.psc.state.fl.us/consumers/utilitypole/en/AllUtilityPoleInfo.aspx>. By contrast, antenna structures, e.g., towers, must be registered if the tower is taller than 200 feet above ground level or may interfere with the flight path of a nearby airport. See FCC, "Antenna Structure Registration (ASR) – Help," available at <http://www.fcc.gov/help/antenna-structure-registration-asr-help>.

¹⁴¹ See *supra*, n.131.

¹⁴² Under the existing rules, actions not within the categories for which EAs are required under Sections 1.1307(a) and (b) of the Commission's rules "are deemed individually and cumulatively to have no significant effect on the quality of the human environment and are categorically excluded from environmental processing . . . [e]xcept as provided in Sections 1.1307(c) and (d)." 47 C.F.R. § 1.1306(a).

¹⁴³ For similar reasons, we are also not persuaded by Springfield's argument that extending the categorical exclusion to other structures without "qualifying delimitations for how DAS facilities are defined and where they may be installed may have unacceptable impacts on historic and other sensitive neighborhoods." Springfield Comments at 4. Springfield offers no argument to explain why the NEPA categorical exclusion for collocations on utility poles should be more restrictive than the exclusion for collocations on buildings. Moreover, we note that the NEPA categorical exclusion we address here does not exclude the proposed collocation from NHPA review for effects on historic properties or historic districts.

¹⁴⁴ See Collocation Agreement § I.A (defining "collocation" covered by the Agreement as "the mounting or installation of an antenna on an existing tower, building or structure for the purpose of transmitting and/or receiving [RF] signals for communications purposes"). We note that the phrase "for the purpose of transmitting and/or

(continued....)

tower structures to be environmentally desirable with regard to impacts on birds, noting that they will in virtually every circumstance have less impact than would construction of a new tower.¹⁴⁵

56. As the Commission noted in the *Infrastructure NPRM*, non-tower and non-building structures are vitally important to the deployment of broadband and other services,¹⁴⁶ particularly via DAS and small-cell facilities.¹⁴⁷ As we noted above, small facility deployments are increasing dramatically, and they are typically located on utility poles or similar structures rather than on towers.¹⁴⁸ Further, the Note 1 categorical exclusion reflects our long-held position that collocations are environmentally desirable because they obviate the need for construction of new towers,¹⁴⁹ and broadening the category of excluded structures advances this policy. Considering that collocating on these structures is necessary for broadband deployment, and in light of the environmental benefits of encouraging collocation rather than the construction of new structures and our analysis above, we find that extending the categorical exclusion to other structures advances the public interest and meets our obligations under NEPA.

3. Categorical Exclusion of Deployments in Communications or Utilities Rights-of-Way

57. *Background.* In the *Infrastructure NPRM*, the Commission sought comment on whether to adopt a categorical exclusion for small facilities located in communications or utility rights-of-way.¹⁵⁰ Noting that the NPA excludes wireless deployments (including deployments on new structures) from routine Section 106 review when they are located in or near above-ground utility or telecommunications rights-of-way, the Commission sought comment on whether to adopt a similar categorical exclusion from routine NEPA review. Further, in the event it were to adopt such a categorical exclusion, the Commission sought comment on whether to apply any of the conditions that are applicable under the NPA rights-of-way exclusion, such as limiting it to facilities that do not constitute a substantial increase in size relative

(Continued from previous page)

receiving [RF] signals for communications purposes” is intended to modify “an antenna” rather than “an existing tower, building or structure.” This is evident because, if the phrase were to modify “an existing tower, building or structure,” then such buildings and structures would themselves qualify as towers under the definition of tower in the Collocation Agreement, rendering “building or structure” redundant. Collocation Agreement § I.B.

¹⁴⁵ See, e.g., Recommendations to Avoid Adverse Impacts to Migratory Birds, Federally Listed Species and Other Wildlife from Communications Towers and Antennae, Guidance prepared by the U.S. Fish and Wildlife Service, available at <http://www.dgif.virginia.gov/environmental-programs/files/USFWS-tower-recommendations.pdf>, at 1 (“Collocate communication antennae and other equipment on existing structures whenever possible to avoid new tower construction. Antennae have been mounted on rooftops; flagpoles; bell, cross, and clock towers; road signs; silos; and water and power line towers. Where attachment to an existing non-tower structure is not feasible, collocate antennae on existing communication towers.”).

¹⁴⁶ See *Infrastructure NPRM*, 28 FCC Rcd at 14253 para. 38 & n.91 (citing Implementation of Section 224 of the Act; A National Broadband Plan For Our Future, WC Docket No. 07-245, GN Docket No. 09-51, *Report and Order and Order on Reconsideration*, 26 FCC Rcd 5240, 5241-42 (2011)).

¹⁴⁷ *Id.* at 14253 para. 38, n.92 (citing, e.g., Letter from Tamara Preiss, Verizon, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 11-59, filed May 14, 2013; Letter from Colleen Thompson, AT&T, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 11-59, filed June 17, 2013)).

¹⁴⁸ See, e.g., “the DAS forum: Distributed Antenna Systems (DAS) And Small Cell Technologies Distinguished,” available at http://www.thedasforum.org/wp-content/uploads/2013/02/DAS-And-Small-Cell-Technologies-Distinguished-2_4_13.pdf, at 3.

¹⁴⁹ See 47 C.F.R. § 1.1306 Note 1 (“The use of existing buildings, towers or corridors is an environmentally desirable alternative to the construction of new facilities and is encouraged.”); 1988 *NEPA Order*, 3 FCC Rcd 4986, 4986 para. 7 (citing 1974 *NEPA Order*, 49 FCC 2d at 1320, 1324).

¹⁵⁰ See *Infrastructure NPRM*, 28 FCC Rcd at 14256-57 para. 50.

to existing nearby structures in the right-of-way.¹⁵¹ The Commission also sought comment on whether to expand the categorical exclusion in Section 1.1306 Note 1, which currently covers “the installation of aerial wire or cable over existing aerial corridors of prior or permitted use or the underground installation of wire or cable along existing underground corridors of prior or permitted use, established by the applicant or others.”¹⁵² The *Infrastructure NPRM* sought comment on extending the categorical exclusion to cover components of DAS or small-cell deployments, including new support structures, in such corridors.¹⁵³

58. Industry commenters support the adoption of a categorical exclusion for installations in the rights-of-way.¹⁵⁴ WISPA recommends that we “adopt a categorical exclusion from routine NEPA review for all communications facilities” in communications and utilities rights-of-way, with conditions similar to the rights-of-way exclusion in the NPA.¹⁵⁵ AT&T similarly recommends that we adopt a rights-of-way NEPA categorical exclusion for all communications facilities, not just DAS and small-cell installations, in or within 50 feet of rights-of-way, including new support structures of comparable size to other structures in the right-of-way.¹⁵⁶ Some industry commenters also support a categorical exclusion for installations in existing aerial or underground corridors.¹⁵⁷

59. Eugene opposes any expansion of the current NEPA categorical exclusions.¹⁵⁸ While not generally objecting to a rights-of-way categorical exclusion, Tempe argues that we should “limit the number of non-substantial increases in size over existing structures to only one,” and that all subsequent increases in size should be subject to Section 106 review.¹⁵⁹ Tempe argues that “[m]ultiple incremental increases could create a negative impact.”¹⁶⁰ Coconut Creek indicates it is not opposed to exclusions in existing aerial corridors, where infrastructure is attached to existing equipment, but expresses concern with any exclusion of above-ground deployments where there is no existing above-ground infrastructure.¹⁶¹ Further, it asserts that installing new wireless infrastructure within rights-of-way may cause hazards to pedestrian and vehicular traffic, and it notes that a “substantial increase in size” criterion does not resolve this concern.¹⁶²

60. *Discussion.* We adopt a categorical exclusion for certain wireless facilities deployed in above-ground utility and communications rights-of-way. We find that such deployments will not individually or cumulatively have a significant effect on the environment. Given that DAS and small-cell nodes are often deployed in communications and utilities rights-of-way, we conclude that the categorical

¹⁵¹ *Id.*

¹⁵² 47 C.F.R. § 1.1306 Note 1.

¹⁵³ See *Infrastructure NPRM*, 28 FCC Rcd at 14257 para. 51.

¹⁵⁴ See, e.g., AT&T Comments at 6, 17-18; Joint Venture Comments at 4; Fibertech Comments at 10-11; PCIA Comments at 18-19; WISPA Comments at 16.

¹⁵⁵ See WISPA Comments at 16.

¹⁵⁶ See AT&T Comments at 6, 17-18.

¹⁵⁷ See, e.g., Fibertech Comments at 10-11 (supporting a categorical exclusion for DAS and small-cell installations along “existing aerial and underground corridors (e.g., public rights-of-way and utility easements)”; PCIA Comments at 18-19; WISPA Comments at 16. See also AT&T Comments at 17.

¹⁵⁸ See Eugene Comments at 28-29.

¹⁵⁹ Tempe Comments at 9.

¹⁶⁰ *Id.*

¹⁶¹ See Coconut Creek Comments at 3.

¹⁶² *Id.*

exclusion will significantly advance the deployment of such facilities in a manner that safeguards environmental values.¹⁶³

61. Specifically, this categorical exclusion, which we incorporate into our rules as Note 4 to Section 1.1306, covers construction of wireless facilities, including deployments on new or replacement poles, only if: (1) the facility will be located in a right-of-way that is designated by a Federal, State, local, or Tribal government for communications towers, above-ground utility transmission or distribution lines, or any associated structures and equipment; (2) the right-of-way is in active use for such designated purposes; and (3) the facility will not constitute a substantial increase in size over existing support structures that are located in the right-of-way within the vicinity of the proposed construction.¹⁶⁴

62. Although the Commission sought comment, in the *Infrastructure NPRM*, on whether to adopt a categorical exclusion that covered facilities also located within fifty feet of a communications or utility right-of-way, similar to the exclusion from Section 106 review in Section III.E. of the NPA,¹⁶⁵ we limit our NEPA categorical exclusion to facilities deployed within existing communications and utility rights-of-way. Industry commenters that support applying the categorical exclusion to deployments within fifty feet of a right-of-way do not explain why the conclusion that deployments in the right-of-way will not have a significant effect on the human environment also apply outside of a right-of-way.¹⁶⁶ Such ground would not necessarily be in active use for the designated purposes, and there could well be a greater potential outside the right-of-way for visual impact or new or significant ground disturbance that might have the potential for significant environmental effects. Finally, the record supports the conclusion that a categorical exclusion limited to deployments within the rights-of-way will address most of the deployments that would be covered by a categorical exclusion that also encompassed deployments nearby. Sprint, for example, emphasizes that “many DAS and small cells will be attached to existing structures and installed *within utility rights-of-way corridors*.”¹⁶⁷

63. For purposes of this categorical exclusion, we define a substantial increase in size in similar fashion to how it is defined in the Collocation Agreement.¹⁶⁸ Thus, a deployment would result in a substantial increase in size if it would: (1) exceed the height of existing support structures that are

¹⁶³ For example, the categorical exclusion addresses Crown Castle’s concern that the existing rules, which require EAs for facilities located in 100-year flood plains, could result in the preparation of an EA for each new utility pole installed in a 100-year flood plain to support the deployment of a DAS or small cell network, despite the facts that: (i) the utility poles will be located within the previously disturbed public right-of-way; (ii) the same utility poles would not require such environmental review if installed for another public utility purpose; and (iii) the placement of utility poles within the right-of-way will not significantly impact the 100-year floodplain. According to Crown Castle, “much of the area along the Gulf Coast and other coastal regions falls within 100-year flood plains,” and deployment of DAS or small cell networks in coastal rural areas with little or no existing coverage could therefore require individual EAs for hundreds of new utility poles in the right-of-way. See Crown Castle Comments at 3-4. See also “the DAS forum: Distributed Antenna Systems (DAS) And Small Cell Technologies Distinguished,” available at http://www.thedasforum.org/wp-content/uploads/2013/02/DAS-And-Small-Cell-Technologies-Distinguished-2_4_13.pdf, at 6. We note that facilities subject to this categorical exclusion are still required to undergo review for compliance with our RF exposure limits, and for effects on historic properties to the extent the deployment is not excluded under the Collocation Agreement, the NPA, or the Section 106 exclusions adopted in this Report and Order.

¹⁶⁴ See NPA § III.E. The NPA imposes two additional conditions, that: (1) the facility would not be located within the boundaries of a historic property, and (2) the applicant has successfully completed the process established in the NPA for Tribal and Native Hawaiian Organization participation. These conditions are relevant to Section 106 review, not NEPA review, and there is no need to include them here.

¹⁶⁵ See *Infrastructure NPRM*, 28 FCC Rcd at 14256-57 para. 50.

¹⁶⁶ See, e.g., AT&T Comments at 6, 17-18.

¹⁶⁷ Sprint Comments at 5 (emphasis added).

¹⁶⁸ See Collocation Agreement § I.C.

located in the right-of-way within the vicinity of the proposed construction by more than 10% or twenty feet, whichever is greater; (2) involve the installation of more than four new equipment cabinets or more than one new equipment shelter; (3) add an appurtenance to the body of the structure that would protrude from the edge of the structure more than twenty feet, or more than the width of the structure at the level of the appurtenance, whichever is greater (except that the deployment may exceed this size limit if necessary to shelter the antenna from inclement weather or to connect the antenna to the tower via cable); or (4) involve excavation outside the current site, defined as the area that is within the boundaries of the leased or owned property surrounding the deployment or that is in proximity to the structure and within the boundaries of the utility easement on which the facility is to be deployed, whichever is more restrictive.

64. We note that we have found a similar test appropriate in other contexts, including under our environmental rules. In particular, the first three criteria that we specify above to define the scope of the NEPA rights-of-way categorical exclusion also define the scope of the rights-of-way exclusion from historic preservation review under the NPA.¹⁶⁹ Similarly, for purposes of Antenna Structure Registration, we do not require environmental notice for a proposed tower replacement if, among other criteria, the deployment will not cause a substantial increase in size under the first three criteria of the Collocation Agreement, and there will be no construction or excavation more than 30 feet beyond the existing antenna structure property.¹⁷⁰ Further, given that the industry now has almost a decade of experience applying this substantial increase test to construction in the rights-of-way under the NPA exclusion, and in light of the efficiencies to be gained from using a similar test here, we find the Collocation Agreement test, as modified here, to be appropriate in this context.

65. We conclude that facilities subject to this categorical exclusion will not have a significant effect on the environment either individually or cumulatively, and that the categorical exclusion is therefore appropriate. In the *NPA Report and Order*, the Commission found that excluding construction in utilities or communications rights-of-way from historic preservation review was warranted because, “[w]here such structures will be located near existing similar poles, . . . the likelihood of an incremental adverse impact on historic properties is minimal.”¹⁷¹ We find that the potential incremental impacts on the environment are similarly minimal. Indeed, deploying these facilities should rarely involve more than minimal new ground disturbance, given that constructing the existing facilities likely disturbed the ground already and given the limitations on the size of any new poles. Moreover, any new pole will also cause minimal visual effect because by definition comparable structures must already exist in the vicinity of the new deployment in that right-of-way, and new poles covered by this categorical exclusion will not be substantially larger.¹⁷² Further, because such corridors are already employed for utility or

¹⁶⁹ See NPA § III.E. We note that the *NPA Report and Order*, 20 FCC Rcd at 1098 paras. 63-64, in establishing a substantial increase in size test for the partial exclusion from Section 106 review for deployments in the rights-of-way, omitted the fourth prong of the Collocation Agreement’s test without explanation. The fourth prong provides that a substantial increase in size occurs when the mounting of an antenna would involve excavation outside the current tower site, defined as the current boundaries of the leased or owned property surrounding the tower or the utility easement and any access or utility easements currently related to the site. See Collocation Agreement § I.C.4. Notwithstanding the omission of any excavation criteria from the rights-of-way exclusion in the NPA, we find that it is appropriate to include a modified limitation on excavation for purposes of the NEPA rights-of-way categorical exclusion. Our modified criterion reflects the fact that deployments in the rights-of-way will generally be deployed not on “leased or owned property” but on an easement that constitutes the designated right-of-way, and our conclusion that excavations that are in that right-of-way and in proximity to the structure, where the right-of-way is already in active use for utility or communications purposes, will not have a significant effect on the human environment.

¹⁷⁰ See 47 C.F.R. § 17.4(c)(1)(iv); see also NPA § III.B (applying same test for exclusion of replacement towers from Section 106 review).

¹⁷¹ *NPA Report and Order*, 20 FCC Rcd at 1098 para. 63.

¹⁷² See, e.g., AT&T Comments at 6, 17-18; Crown Castle Comments at 3-4.

communications uses, and the new deployments will be comparable in size to such existing uses, these additional uses are unlikely to trigger new NEPA concerns. Any such concerns would have already been addressed when such corridors were established, and the size of the deployments we categorically exclude will not be substantial enough to raise the prospect of cumulative effects.

66. We also find support for these conclusions in the categorical exclusions adopted by other agencies, including FirstNet. In establishing its own categorical exclusions, FirstNet noted as part of its Administrative Record that its anticipated activities in constructing a nationwide public safety broadband network would primarily include “the installation of cables, cell towers, antenna collocations, buildings, and power units,” for example in connection with “Aerial Plant/Facilities,” “Towers,” “Collocations,” “Power Units,” and “Wireless Telecommunications Facilit[ies.]”¹⁷³ It defined a “Wireless Telecommunications Facility” as “[a]n installation that sends and/or receives radio frequency signals, including directional, omni-directional, and parabolic antennas, structures, or towers (no more than 199 feet tall with no guy wires), to support receiving and/or transmitting devices, cabinets, equipment rooms, accessory equipment, and other structures, and the land or structure on which they are all situated.”¹⁷⁴ To address its NEPA obligations in connection with these activities, FirstNet adopted a number of categorical exclusions, including a categorical exclusion for “[c]onstruction of wireless telecommunications facilities involving no more than five acres (2 hectares) of physical disturbance at any single site.”¹⁷⁵ In adopting this categorical exclusion, FirstNet found that it was “supported by long-standing categorical exclusions and administrative records. In particular, these include categorical exclusions from the U.S. Department of Commerce, U.S. Department of Agriculture, and U.S. Department of Energy.”¹⁷⁶

67. We find that FirstNet’s anticipated activities encompass the construction of wireless facilities and support structures in the rights-of-way, and are therefore comparable to the wireless facility deployments we address here. Further, we note that the categorical exclusions adopted by FirstNet are broader in scope than the categorical exclusion we adopt for facilities deployed within existing rights-of-way.¹⁷⁷ We further note that several other agencies have found it appropriate to categorically exclude other activities in existing rights-of-way unrelated to telecommunications.¹⁷⁸

68. We find that the categorical exclusion addresses some concerns raised by municipalities, and we find that other concerns they raise are not relevant to the environmental review process. First, we note that the categorical exclusion we adopt addresses Coconut Creek’s objection to above-ground deployments in areas with no above-ground infrastructure because we limit it to rights-of-way in active use for above-ground utility structures or communications towers. Second, concerns about hazards to vehicular or pedestrian traffic are logically inapplicable.¹⁷⁹ As we noted above in connection with

¹⁷³ See Department of Commerce, National Telecommunications and Information Administration, First Responder Network Authority, National Environmental Policy Act Categorical Exclusions, Docket Number 131219999-4338-02, 79 Fed. Reg. 23945, 23946-47 (April 29, 2014) (*FirstNet Categorical Exclusions*).

¹⁷⁴ *Id.*

¹⁷⁵ *Id.* at 23947.

¹⁷⁶ *Id.* at 23949.

¹⁷⁷ *Id.* See also 7 C.F.R. § 1794.22(a)(2) (U.S. Department of Agriculture, Rural Utilities Services (RUS) categorical exclusion of construction of buried and aerial telecommunications lines, cables, and related facilities).

¹⁷⁸ See, e.g., Environmental Impact and Related Procedures, 79 Fed. Reg. 2107 (Jan. 13, 2014) (establishing Federal Highway Administration and Federal Transit Administration categorical exclusion for transportation projects within existing operational rights-of-way); 36 C.F.R. § 1010.7(a)(36) (Presidio Trust categorical exclusion for “[i]nstallation of underground utilities in previously disturbed areas having stable soils, or in an existing utility right-of-way”). While these categorical exclusions do not apply to communications facilities, they reflect and are consistent with the conclusion that ground-disturbing construction in a right-of-way that is in active use will generally not have a significant effect on the human environment.

¹⁷⁹ See Coconut Creek Comments at 3.

deployments on structures other than communications towers and buildings, such concerns do not currently warrant the submission of an EA. Rather, EAs are routinely required for deployments in communications or utility rights-of-way only if they meet one of the criteria specified in Section 1.1307(a) or (b).¹⁸⁰ Deployments in the communications or utility rights-of-way have never been identified in our rules as an environmentally sensitive category; indeed, the use of such rights-of-way for antenna deployments is environmentally desirable as compared to deployments in other areas.¹⁸¹ Finally, we find it unnecessary to adopt Tempe's proposed limitation, whether it is properly understood as a proposal to categorically exclude only one non-substantial increase at a particular site or in the same general vicinity, as such limitation has proven unnecessary in the context of historic preservation review. Having concluded that wireless facility deployments in communications or utility rights-of-way have no potentially significant environmental effects individually or cumulatively, we find no basis to limit the number of times such a categorical exclusion is used either at a particular site or in the same general vicinity. Indeed, the categorical exclusion encourages an environmentally responsible approach to deployment given that, as Notes 1 and 4 make clear, the use of existing corridors "is an environmentally desirable alternative to the construction of new facilities."¹⁸² And, apart from environmental considerations, it would be contrary to the public interest to unnecessarily limit the application of this categorical exclusion.

69. We note that this categorical exclusion is separate from and in addition to the current categorical exclusion in Note 1 for installation of wire and cable along existing aerial and underground corridors.¹⁸³ To the extent that commenters propose extending the Note 1 aerial and underground corridor categorical exclusion to include components of telecommunications systems other than wires and cables, we decline to do so.¹⁸⁴ We find that the new Note 4 categorical exclusion we adopt for deployments in communications or utilities rights-of-way will provide substantial and appropriate relief,¹⁸⁵ and that the record in this proceeding does not justify a further expansion of the Note 1 categorical exclusion.¹⁸⁶ Further, the existing Note 1 categorical exclusion for wires and cables in underground and aerial corridors is broader than the categorical exclusion for installations on existing buildings or antenna towers because it is not limited by Section 1.1307(a)(4) (Section 106 review) or 1.1307(b) (RF emissions), while collocations on existing buildings or towers are subject to these provisions.¹⁸⁷ We note that even parties advocating an extension of the categorical exclusion for installation of wire and cable to additional telecommunications components concede that the extension should not apply to review of RF emissions

¹⁸⁰ See 47 C.F.R. § 1.1307(a), (b).

¹⁸¹ See 47 C.F.R. § 1.1306 Note 1 ("The use of existing . . . corridors is an environmentally desirable alternative to the construction of new facilities and is encouraged.").

¹⁸² *Id.*

¹⁸³ *Id.*

¹⁸⁴ See, e.g., Fibertech Comments at 10-11 (supporting a categorical exclusion for DAS and small cell installations along existing aerial and underground corridors (e.g., public rights-of-way and utility easements)); Joint Venture Comments at 4 (public rights-of-way); PCIA Comments at 18-19.

¹⁸⁵ Indeed, one commenter proposes an extension of the aerial and underground corridors categorical exclusion in a manner that would create essentially the NEPA categorical exclusion we adopt today. See AT&T Comments at 6 (proposing extension to categorically exempt all facilities in or within 50 feet of a right-of-way, including new support structures of comparable size to other structures in the right-of-way).

¹⁸⁶ Fibertech treats the term "aerial or underground corridors" as encompassing "public rights-of-way." Fibertech Comments at i, 10-11. While such corridors will often run along public rights-of-way, the terms are not synonymous, as aerial or underground corridors run horizontally only in an elevated or underground space, while rights-of-way are not so limited. While one can deploy cable in an underground or aerial corridor, it is apparent that a pole could not be so deployed.

¹⁸⁷ See 47 C.F.R. § 1.1306 Note 1.

exposure, as the existing categorical exclusion does.¹⁸⁸ This distinction underscores that the existing categorical exclusion of cables and wires in aerial and underground corridors is based on an analysis that does not directly apply to other communications facilities.

C. NHPA Exclusions

1. Regulatory Background

70. Section 106 of NHPA requires Federal agencies to take into account the effects of their “undertaking[s]” on historic properties included or eligible for inclusion in the National Register of Historic Places (National Register).¹⁸⁹ NHPA does not require the Commission to engage in any particular preservation activities; rather, Section 106 requires that the Commission consult the applicable State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Officer (THPO) and ACHP, and consider the impacts of its proposed undertakings.¹⁹⁰ Similar to a “Federal action” in the NEPA context, an “undertaking” for purposes of Section 106 includes, among other things, projects, activities, or programs that “requir[e] a Federal permit, license, or approval.”¹⁹¹ The Commission has generally interpreted the scope of its Federal undertakings under NHPA as coextensive with its Federal actions under NEPA.¹⁹²

71. NHPA charges ACHP with promulgating rules to govern the Section 106 process.¹⁹³ ACHP’s rules generally specify the process under which Federal agencies perform their historic preservation reviews.¹⁹⁴ Section 800.3 of ACHP’s rules, entitled “Initiation of the section 106 process,” provides that the agency official shall first “determine whether the proposed Federal action is an undertaking . . . and, if so, whether it is a type of activity that has the potential to cause effects on historic properties.”¹⁹⁵ Section 800.3(a)(1) specifies that “[i]f the undertaking is a type of activity that does not have the potential to cause effects on historic properties, assuming such historic properties were present, the agency official has no further obligations under section 106 or this part.”¹⁹⁶ Agencies rely upon this regulatory process to establish that certain types of activities are excluded from Section 106 review.¹⁹⁷

72. This is not the only mechanism under ACHP’s rules for establishing deviations from ACHP’s routine Section 106 procedures, however. Section 800.14 of ACHP’s rules provides for several types of “program alternatives” by which Federal agencies, in consultation with ACHP and other stakeholders in the historic preservation process, may develop alternative Section 106 procedures tailored

¹⁸⁸ See, e.g., AAR Comments at 13; Fibertech Comments at 11.

¹⁸⁹ 16 U.S.C. § 470f.

¹⁹⁰ See, e.g., *Davis v. Latschar*, 202 F.3d 359, 370 (D.C. Cir. 2000).

¹⁹¹ 16 U.S.C. § 470w(7).

¹⁹² See, e.g., *NPA Report and Order*, 20 FCC Rcd at 1083-84 paras. 25-28. Courts also generally treat similarly “Federal actions” under NEPA and “Federal undertakings” under NHPA. See, e.g., *Karst Environmental Educ. and Protection, Inc. v. Environmental Protection Agency*, 475 F.3d 1291, 1295-96 (D.C. Cir. 2007); *Sac and Fox Nation of Missouri v. Norton*, 240 F.3d 1250, 1263 (10th Cir. 2001).

¹⁹³ See 16 U.S.C. § 470s (“The Council is authorized to promulgate such rules and regulations as it deems necessary to govern the implementation of section 470f of this title in its entirety.”).

¹⁹⁴ See 36 C.F.R. Part 800.

¹⁹⁵ 36 C.F.R. § 800.3(a).

¹⁹⁶ 36 C.F.R. § 800.3(a)(1).

¹⁹⁷ See, e.g., *Save Our Heritage, Inc. v. F.A.A.*, 269 F.3d 49 (1st Cir. 2001).

to their particular programs and undertakings.¹⁹⁸ For example, an agency, ACHP, and the relevant SHPO/THPO or, if nationwide, the National Conference of State Historic Preservation Officers (NCSHPO) may “negotiate a programmatic agreement to govern the implementation of a particular program or the resolution of adverse effects from certain complex project situations or multiple undertakings.”¹⁹⁹ Compliance with the procedures set forth in an approved programmatic agreement satisfies the Federal agency’s Section 106 responsibilities for individual undertakings covered by the agreement.²⁰⁰

73. To fulfill its responsibilities under Section 106, the Commission has incorporated the requirements of NHPA into its environmental rules.²⁰¹ Specifically, if a proposed facility has the potential to affect properties listed in or eligible for listing in the National Register, Section 1.1307(a)(4) requires the applicant to submit an EA prior to construction.²⁰² Section 1.1307(a)(4) directs licensees and applicants, when determining whether a proposed action may affect historic properties, to follow the procedures in ACHP’s rules as modified by the Collocation Agreement and the NPA, two programmatic agreements that took effect in 2001 and 2005, respectively.²⁰³

74. The Collocation Agreement addresses historic preservation review for collocations on existing towers, buildings, and other non-tower structures.²⁰⁴ Under the Collocation Agreement, most antenna collocations on existing structures are excluded from routine historic preservation review, with a few defined exceptions to address potentially problematic situations. Thus, in addition to excluding collocations on towers, with certain limitations,²⁰⁵ the Collocation Agreement excludes collocations on buildings or other non-tower structures outside of historic districts from routine Section 106 review unless: (1) the structure is inside the boundary of a historic district, or it is within 250 feet of the boundary of a historic district and the antenna is visible from ground level within the historic district; (2) the structure is a designated National Historic Landmark or is listed in or eligible for listing in the National Register; (3) the structure is over 45 years old; or (4) the proposed collocation is the subject of a pending complaint alleging adverse effect on historic properties.²⁰⁶

¹⁹⁸ 36 C.F.R. § 800.14; *see also* “Program Alternatives,” available at <http://www.achp.gov/progalt/>. Specifically, Section 800.14 authorizes development of alternatives to the review procedures set forth in 36 C.F.R. Part 800, Subpart B.

¹⁹⁹ 36 C.F.R. § 800.14(b).

²⁰⁰ *See* 36 C.F.R. § 800.14(b)(2)(iii).

²⁰¹ *See* 47 C.F.R. § 1.1307(a)(4) (providing that applicants must submit an EA for proposed facilities that may affect historic properties listed in or eligible to be listed in the National Register of Historic Places (National Register) and must follow ACHP’s Section 106 procedures as modified and supplemented by the Collocation Agreement and the NPA to ascertain whether their proposed facilities may affect historic properties).

²⁰² *Id.* For a full discussion of our historic preservation rules and processes, *see* FCC, “Tower and Antenna Siting,” available at <http://wireless.fcc.gov/siting/npa/npa.html>.

²⁰³ *See* 47 C.F.R. § 1.1307(a)(4).

²⁰⁴ *See* Collocation Agreement; Wireless Telecommunications Bureau Announces Execution of Programmatic Agreement with Respect to Collocating Wireless Antennas on Existing Structures, *Public Notice*, 16 FCC Rcd 5574 (WTB 2001). The Collocation Agreement was codified under Section 1.1307(a)(4) as of the effective date of the NPA. *See NPA Report and Order*, 20 FCC Rcd at 1134 paras. 168-169.

²⁰⁵ *See* Collocation Agreement §§ III.A, IV.A.

²⁰⁶ *Id.* at § V (“Collocation Of Antennas On Buildings And Non-Tower Structures Outside Of Historic Districts”).

75. The NPA establishes detailed procedures that are better tailored than ACHP's general rules for reviewing the effects caused by communications towers.²⁰⁷ In particular, the NPA establishes a process for pre-construction consultation and initial review by the relevant SHPO or THPO and, if necessary, subsequent Commission review of the proposed tower.²⁰⁸ The NPA also outlines procedures for Tribal participation, public participation, identifying and evaluating historic properties within the area of potential effects, and assessing effects on historic properties.

2. New Exclusions

76. *Background.* As noted above, the Collocation Agreement, while excluding most collocations from Section 106 review, provides that collocations on existing buildings and other non-tower structures that are over 45 years old are not excluded.²⁰⁹ This is the case even if the building or non-tower structure itself has not been listed (or determined eligible for listing) on the National Register and is not located in or near a historic district; the age of the structure alone is sufficient to trigger review.

77. In addition to seeking comment on whether the Commission should add an exclusion from Section 106 review for DAS and small cells generally, the *Infrastructure NPRM* sought comment on whether to expand the existing categorical exclusion for collocations to cover collocations on structures subject to review solely because of the structure's age—that is, to deployments that are more than 45 years old but that are not (1) inside the boundary of a historic district, or within 250 feet of the boundary of a historic district; (2) located on a structure that is a designated National Historic Landmark or is listed in or eligible for listing in the National Register; or (3) the subject of a pending complaint alleging adverse effect on historic properties.²¹⁰ The *Infrastructure NPRM* noted that, because utility poles are maintained for long periods of time, many eventually fall out of the exclusion due to the 45-year limitation.²¹¹ It sought comment on whether to clarify or otherwise provide that the exclusion covers collocations on utility poles over 45 years of age. It further sought comment on excluding collocations on other categories of non-tower structures, such as street lamps or water towers, from the 45-year trigger for review. The Commission also asked whether, alternatively, it should conclude that deployments of small wireless facilities such as DAS or small cells do not qualify as Federal undertakings under NHPA.

78. Industry commenters support the exclusion of collocations on utility poles over 45 years old where the age of the pole is the only reason for review.²¹² WISPA states that there is no evidence that utility poles possess any historic value or that collocations on such structures could result in adverse effects to any historic value.²¹³ Verizon argues that we should apply such an exclusion to collocations on both utility poles and other utility structures, including electric transmission structures.²¹⁴ Verizon asserts

²⁰⁷ See NPA; *NPA Report and Order*, 20 FCC Rcd at 1079 para. 15, 1080-81 para. 19. For an overview of the history of and processes established by the NPA, see "Tower and Antenna Siting," available at <http://wireless.fcc.gov/siting/npa/intro.html>.

²⁰⁸ See *NPA Report and Order*, 20 FCC Rcd at 1127-30 paras. 149-57.

²⁰⁹ See Collocation Agreement § V.A.1.

²¹⁰ See *Infrastructure NPRM*, 28 FCC Rcd at 14260-63 paras. 60-67.

²¹¹ It also noted PCIA's assertion that the percentage of utility poles that are 45 years or older is significant and growing and that, as a consequence, collocations of small wireless facilities on utility poles will increasingly be subject to review. See *Infrastructure NPRM*, 28 FCC Rcd at 14260 para. 60 (citing PCIA Mar. 19, 2013 *Ex Parte*, Attach. (Dr. Amos J. Loveday, "DAS/Small Cells & Historic Preservation: An Analysis of the Impact of Historic Preservation Rules on Distributed Antenna Systems and Small Cell Deployment," Feb. 27, 2013, at 3 (Loveday Report))).

²¹² See, e.g., AT&T Comments at 12; PCIA Comments at 21-22; UTC Comments at 8; WISPA Comments at iv, 17-18.

²¹³ See WISPA Comments at 18.

²¹⁴ See Verizon Comments at 13.

that a structure originally designed to host telegraph, telephone, or power equipment is likely to have changed over time in any event (*e.g.*, as utilities add equipment with the advent of new technologies), and that these changes do not harm its historic characteristics, if any.²¹⁵

79. Some SHPOs do not oppose the exclusion and note that the addition of DAS facilities and small cells to existing poles would not cause an adverse effect on historic properties, unless a pole is a contributing element to the eligibility of a historic property.²¹⁶ Other localities and SHPOs state that the exclusion is unnecessary as a practical matter because utility poles are generally not deemed historic.²¹⁷ The Colorado SHPO, on the other hand, urges caution and argues that a blanket exemption for collocations on “utility poles” could sweep in other structures that may be more problematic from a historic preservation perspective, such as water tanks or clock towers.²¹⁸ Some Tribal Nations support exclusion from Section 106 review of certain installations with no potential to affect historic properties, including those of cultural and religious significance to Tribal Nations.²¹⁹ One Tribal Nation argues, however, that DAS systems may have an adverse visual effect on culturally important landscapes and historic properties in the vicinity, and that their cumulative effects “may be significantly greater than anticipated.”²²⁰

80. In addition to supporting an exclusion for collocations on utility structures over 45 years old, Verizon also proposes an exclusion for collocations on any building or other structure over 45 years old if: (1) the antenna will be added in the same location as other antennas previously deployed; (2) the height of the new antenna will not exceed the height of the existing antennas by more than three feet, or the new antenna will not be visible from the ground regardless of the height increase; and (3) the new antenna will comply with any requirements placed on the existing antennas by the State or local zoning authority or as a result of any previous historic preservation review process.²²¹ In a subsequently filed *ex parte* letter, Verizon further clarifies its proposal by suggesting how to determine whether the new antenna is in the “same location” as an existing antenna.²²²

²¹⁵ See Verizon Comments at 14.

²¹⁶ See, *e.g.*, AHPP Comments at 2 (asserting that placement of DAS on utility poles will not cause adverse effects even in historic districts except where the pole is a contributing element to a historic property or district); CAOHP Comments at 2 (recommending exemption of collocations on utility poles over 45 years of age from Section 106 review).

²¹⁷ See, *e.g.*, OHPO Comments at 1.

²¹⁸ COSHPO Comments at 2.

²¹⁹ See Letter from Cynthia Stacy, Peoria Tribe of Indians of Oklahoma, WT Docket No. 13-238, filed Sept. 5, 2014, at 1 (supporting the proposal “to exclude certain additional installations from Section 106 review depending on the location and the size of the equipment at issue and the need for any new excavation” and indicating that changes targeted at installations with no potential to affect historic properties will “help to streamline consultation so that our limited time and resources can be wisely spent.”); Letter from Franklin Dancy, Tribal Council of the Morongo Band of Mission Indians, WT Docket No. 13-238, filed Aug. 29, 2014, at 1 (indicating no concerns with proposed Section 106 changes in light of its view that “any impact that could potentially occur from telecommunications projects involving the replacement and/or collocation or addition of new equipment/antennas on existing facilities has already occurred and no further impacts will occur” but arguing that it should retain the right to review projects “that extend beyond or otherwise exceed a previously impacted project site or that could be considered a new project”).

²²⁰ See Letter from Cassandra Rippee, Coquille Indian Tribe, WT Docket No. 13-238, filed Oct. 10, 2014, at 1.

²²¹ See Verizon Comments at 18.

²²² See Letter from Tamara Preiss, Verizon, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 13-238, filed July 14, 2014 (Verizon July 14, 2014 *Ex Parte*), at 1-2. Verizon suggests that we define the same location as follows. For rooftop antennas, the new antenna must also be mounted on the roof, and the center point of the new antenna must be no more than 10 feet from the center point of the outermost existing antenna(s). For antennas mounted on the facade or facades of a building, the new antenna must be mounted on the same facade or facades,

(continued....)

81. Verizon asserts that its proposal would remove obstacles to wireless broadband facility siting without adversely affecting any historic property. According to Verizon, even if the structure itself is historic, the effect of adding antennas of a similar size to equipment that already exists at the same location on the structure will not be different than the effects, if any, already created by the existing facilities. Similarly, it adds, if the facilities to be added are visible from a nearby historic district, they would not have an additional visual effect on the historic district beyond any effects created by the existing antennas.²²³

82. AT&T, Sprint, and PCIA support Verizon's proposal.²²⁴ AT&T states that adopting this limited exclusion would remove unnecessary obstacles to wireless broadband facility siting without adversely affecting any historic property. AT&T also states that this proposal would afford significant relief because the vast majority of AT&T's LTE deployments involve adding antennas to structures that already support wireless facilities.²²⁵

83. As an alternative to adopting an exclusion in this rulemaking, PCIA asks us to determine that DAS and small-cell deployments are not "undertakings."²²⁶ PCIA states that the Federal government does not assist in funding DAS and small-cell deployments, issue licenses or approvals for them, or provide other assistance related to them.²²⁷ Notwithstanding these arguments, PCIA asserts that excluding these facilities from review would be less time-consuming and complex than finding them not to be undertakings.²²⁸ AT&T agrees with PCIA that an exclusion from review is the preferable course over a finding that such facility deployments are not undertakings.²²⁹ UTC argues that the Commission may find that small-cell and DAS deployments are not undertakings because they "are less intrusive than traditional macro sites" and based on other unspecified differences from macrocells.²³⁰ Localities and SHPOs oppose a determination that DAS and small-cell deployments are not undertakings, based on FCC

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with a center point no more than 10 feet from the center point of the existing antenna(s). Alternatively, new antennas may be mounted anywhere on the same roof or facade(s), as the case may be, so long as they are not significantly more visible from ground level. Under Verizon's proposal, satisfying either alternative would satisfy the same location criterion. *See id.*

²²³ *See* Verizon Comments at 18-19.

²²⁴ *See* AT&T Reply Comments at 8; CTIA Reply Comments at 11-12; PCIA Reply Comments at ii, 12-13; Sprint Reply Comments at 4.

²²⁵ *See* AT&T Reply Comments at 8-9.

²²⁶ PCIA Comments at i, 15-17.

²²⁷ *See* PCIA Comments at 16.

²²⁸ *See id.*

²²⁹ *See* AT&T Comments at 13-14 (asserting that adoption of an exclusion under Section 800.3(a)(1) is more efficient and timely than a finding that covered deployments are not undertakings).

²³⁰ *See* UTC Comments at 8-9.

precedent as well as the assertion that such installations can affect historic properties.²³¹ NCSHPO notes the Commission's history of finding that the installation of an antenna is an undertaking.²³²

84. *Discussion.* As an initial matter, we find no basis to hold categorically that small wireless facilities such as DAS and small cells are not Commission undertakings. As the Commission discussed in the *Infrastructure NPRM*, Section 319 of the Communications Act gives us authority to regulate and require preconstruction approval for the construction of any facility for which a license is required, which in turn extends to any "apparatus for the transmission of energy, or communications, or signals by radio."²³³ Further, while the Commission has generally waived the requirement of preconstruction approval for geographic-area licensees, as permitted by Section 319(d), the Commission has also retained authority under Section 1.1312 of the Commission's rules to review the environmental effects of all "facilities," including their effects on historic properties.²³⁴ The Commission has found, given this retained approval authority, that macrocell deployments, including both new tower sites and collocations, are appropriately classified as Federal undertakings, a conclusion affirmed by the United States Court of Appeals for the District of Columbia.²³⁵ While PCIA argues that small facilities could be distinguished, it does not identify any characteristic of such deployments that logically removes them from the analysis applicable to other facilities.²³⁶ Others argue in conclusory fashion that the size of these facilities is a distinguishing factor without explaining how smaller facilities deployments cease to be undertakings simply because of their size.²³⁷ We note, however, that ACHP's rules clearly contemplate that the determination of whether a proposed Federal action is an undertaking is separate from the determination of whether that action is the type that could have effects on historic properties.²³⁸ Thus, the extent of any potential effects is not relevant to determining whether any agency action constitutes a

²³¹ See, e.g., AHPP Comments at 1 (arguing that installation of DAS and small-cell facilities is an undertaking); CAOHP Comments at 1 (asserting that "[t]he deployment of a DAS or other small cell system is an Undertaking pursuant to 36 CFR part 800.16(y)" (emphasis in original)); Des Moines Comments at 4-5; Minneapolis Comments at 14 (arguing that DAS and small cells are "undertakings" that "have the potential to cause effects on historic properties"); OHPO Comments at 2 (arguing that a finding that DAS and small-cell deployments are not undertakings would be contrary to longstanding FCC precedent, and the advancement of technology does not change the fact that the installation of cell equipment may affect historic properties).

²³² See NCSHPO Comments at 1 (arguing that, given the Commission's past acceptance that installations of antennas, cell towers, and other types of facilities using various technologies are undertakings, and given the number of variables to consider depending on the method of installation, it is impossible to support a determination that DAS installations are not undertakings).

²³³ 47 U.S.C. §§ 301, 319. We note that DAS nodes and small cells transmit the signals of Commission licensees in technically the same manner as traditional macrocells.

²³⁴ 47 C.F.R. § 1.1312.

²³⁵ See *NPA Report and Order*, 20 FCC Rcd at 1083 para. 24 (finding that "our existing policies treating tower construction as an undertaking under the NHPA reflect a permissible interpretation of the Commission's authority under Section 319(d) of the Act to issue construction permits for radio towers"); *CTIA—The Wireless Ass'n*, 466 F.3d at 114-15. See also NPA § I.C (providing that "[t]his Agreement does apply to collocations that are not exempt from Section 106 review under the Collocation Agreement").

²³⁶ See PCIA Comments at 15-17.

²³⁷ See, e.g., UTC Comments at 8-9.

²³⁸ See 36 C.F.R. § 800.3(a) (providing that agency official first determines whether the activity is an undertaking and "if so, whether it is a type of activity that has the potential to cause effects on historic properties"); 36 C.F.R. § 800.16(y) ("Undertaking means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval.").

Federal undertaking.²³⁹ Based on the record before us, we accordingly decline to find that DAS and small-cell deployments are not undertakings for purposes of Section 106 review.²⁴⁰

85. Having determined that DAS and small cell deployments constitute Federal undertakings subject to Section 106, we consider our authority based on Section 800.3(a)(1) of ACHP's rules to exclude such small facility deployments from Section 106 review. It is clear under the terms of Section 800.3(a)(1) that a Federal agency may determine that an undertaking is a type of activity that does not have the potential to cause effects to historic properties, assuming historic properties were present, in which case, "the agency has no further obligations under section 106 or this part [36 Part 800, Subpart B]."

86. The commenters that propose a general exclusion for DAS and small cell deployments assert that under any circumstances, such deployments have the potential for at most minimal effects, but they do not provide evidence to support such a broad conclusion.²⁴¹ Moreover, several commenters, including several SHPOs, express concerns that such deployments do have the potential for effects in some cases.²⁴² Accordingly, we cannot find on this record that DAS and small-cell facilities qualify for a general exclusion, and we therefore conclude, after consideration of the record, that any broad exclusion of such facilities must be implemented at this time through the development of a "program alternative" as defined under ACHP's rules.²⁴³ We are committed, however, to making deployment processes as efficient as possible without undermining the values that Section 106 protects. As noted above, Commission staff are working on a program alternative that, through consultation with stakeholders, will ensure thorough consideration of all applicable interests, and will culminate in a system that eliminates additional bureaucratic processes for small facilities to the greatest extent possible consistent with the purpose and requirements of Section 106.

87. We further conclude, however, that it is in the public interest to immediately adopt targeted exclusions from our Section 106 review process that will apply to small facilities (and in some instances larger antennas) in many circumstances and thereby substantially advance the goal of facilities deployment. As noted above, we may exclude activities from Section 106 review upon determining that they have no potential to cause effects to historic properties, assuming such properties are present.²⁴⁴ As discussed in detail below, we find two targeted circumstances that meet this test, one applicable to utility

²³⁹ See 16 U.S.C. § 470w(7)(C) (defining undertaking to include a project or activity under the jurisdiction of a Federal agency "requiring a Federal permit license, or approval").

²⁴⁰ See, e.g., *supra*, nn.231, 232.

²⁴¹ See, e.g., Crown Castle Comments at 3; Fibertech Comments at 25; PCIA Comments at 7, 9-10; Sprint Comments at 6; UTC Comments at 5; Verizon Comments at 13.

²⁴² See, e.g., AHPP Comments at 1-2; COSHPO Comments at 1-2; NCSHPO Comments at 1.

²⁴³ Similarly, we do not, at this time, take action on certain other proposals on which the Commission sought comment in the *Infrastructure NPRM*, including whether to expand the current Section 106 exclusion for poles in communications or utilities rights-of-way to encompass such rights-of-way even where they are designated historic districts, and whether to provide an exclusion for replacements of some or all non-tower structures. See *Infrastructure NPRM*, 28 FCC Rcd at 14261-62 paras. 62-63. We also note that the *Infrastructure NPRM* sought comment on whether the Commission should develop a process that would enable more efficient review under Section 106, such as by defining circumstances in which individual communication nodes (e.g., the separate antenna nodes of a single DAS deployment) can be grouped together and reviewed as a single undertaking. *Id.* at 14262 para. 64. Various parties have indicated support for this proposal, see, e.g., AHPP Comments at 1; Mendham Comments at 4; Minneapolis Comments at 14, but none has suggested how to implement it. We will consider these options further in the context of our efforts to develop a program alternative.

²⁴⁴ 36 C.F.R. § 800.3(a)(1); see, e.g., *Save Our Heritage, Inc. v. F.A.A.*, 269 F.3d 49, 62 (1st Cir. 2001); *Preservation Society of Charleston v. U.S. Army Corp. of Engineers*, 2013 WL 6488282, at *4 (D.S.C. Sept. 18, 2013).

structures and the other to buildings and any other non-tower structures. Pursuant to these findings we establish two exclusions.

88. First, we exclude collocations on existing utility structures, including utility poles and electric transmission towers, to the extent they are not already excluded in the Collocation Agreement, if: (1) the collocated antenna and associated equipment, when measured together with any other wireless deployment on the same structure, meet specified size limitations; and (2) the collocation will involve no new ground disturbance. Second, we exclude collocations on a building or other non-tower structure, to the extent they are not already excluded in the Collocation Agreement, if: (1) there is an existing antenna on the building or other structure; (2) certain requirements of proximity to the existing antenna are met, depending on the visibility and size of the new deployment; (3) the new antenna will comply with all zoning conditions and historic preservation conditions on existing antennas that directly mitigate or prevent effects, such as camouflage or concealment requirements; and (4) the deployment will involve no new ground disturbance. With respect to both of these categories—utility structures and other non-tower structures—we extend the exclusion only to deployments that are not (1) inside the boundary of a historic district, or within 250 feet of the boundary of a historic district; (2) located on a structure that is a designated National Historic Landmark or is listed in or eligible for listing in the National Register; or (3) the subject of a pending complaint alleging adverse effect on historic properties. In other words, these exclusions address collocations on utility structures and other non-tower structures where historic preservation review would otherwise be required under existing rules only because the structures are more than 45 years old. Our action here is consistent with our determination in the NPA to apply a categorical exclusion based upon a structure’s proximity to a property listed in or eligible to be listed in the National Register rather than whether a structure is over 45 years old regardless of eligibility.²⁴⁵ In our analysis below, consistent with Section 800.3(a)(1), we find collocations meeting the conditions stated above have no potential to affect historic properties even if such properties are present. We nevertheless find it appropriate to limit the adopted exclusions as described above. Given the sensitivities articulated in the record, particularly those from NCSHPO and other individual commenting SHPOs, regarding deployments in historic districts or on historic properties, we conclude that any broader exclusions require additional consultation and consideration, and are more appropriately addressed and developed through the program alternative process that Commission staff have already begun.²⁴⁶

89. While these exclusions will expedite small wireless facilities deployments in many cases, we reiterate that the measures discussed below are only initial steps. These measures will tailor and substantially improve our Section 106 review process for small wireless facilities. We note again that there is room for additional improvement in this area, and we are committed to relieving all stakeholders of unnecessary and nonproductive obligations. Therefore, Commission staff have engaged in discussions about broader reforms, and we expect that an ACHP-approved program alternative for Section 106 review will be concluded between 18 and 24 months after the release of this Report and Order.

a. Collocations on Utility Structures

90. Pursuant to Section 800.3(a)(1) of ACHP’s rules, we find that antennas mounted on existing utility structures have no potential for effects on historic properties, assuming such properties are present, where the deployment meets the following conditions: (1) the antenna and any associated equipment, when measured together with any other wireless deployments on the same structure, meets specified size limitations; and (2) the deployment will involve no new ground disturbance.

²⁴⁵ See NPA.III.D; *NPA Report and Order*, 20 FCC Rcd at 1094 para. 56 (reasoning that the exclusion’s applicability should depend on whether the property or a property within 500 feet is listed in or eligible to be listed in the National Register rather than the age of the property or of nearby properties regardless of eligibility).

²⁴⁶ See, e.g., AHPP Comments at 1-2; CASHPO Comments at 2; COSHPO Comments at 1-2; NCSHPO Comments at 1. See also DC Comments at 24-26 (opposing general exclusion of DAS and small cell deployments but indicating that “the DC State Historic Preservation Office . . . would not need to review installations on sites that have not been listed in or determined eligible for listing in the National Register”).

Notwithstanding this finding of no potential for effects even assuming historic properties are present, we limit this exclusion (as described above) in light of the particular sensitivities related to historic properties and districts. Accordingly, this exclusion does not apply to deployments that are (1) inside the boundary of a historic district, or within 250 feet of the boundary of a historic district; (2) located on a structure that is a designated National Historic Landmark or is listed in or eligible for listing in the National Register; or (3) the subject of a pending complaint alleging adverse effect on historic properties. In other words, this new targeted exclusion addresses collocations on utility structures where historic preservation review would otherwise be required under existing rules only because the structures are more than 45 years old.

91. For purposes of this exclusion, we define utility structures as utility poles or electric transmission towers in active use by a “utility” as defined in Section 224 of the Communications Act, but not including light poles, lamp posts, and other structures whose primary purpose is to provide public lighting. Utility structures are, by their nature, designed to hold a variety of electrical, communications, or other equipment, and they already hold such equipment. Their inherent characteristic thus incorporates the support of attachments, and their uses have continued to evolve with changes in technology since they were first used in the mid-19th century for distribution of telegraph services.²⁴⁷ Indeed, we note that other, often larger facilities are added to utility structures without review. For example, deployments of equipment supporting unlicensed wireless operations like Wi-Fi access occur without our Section 106 review in any case, as do installations of non-communication facilities such as municipal traffic management equipment²⁴⁸ or power equipment such as electric distribution transformers.²⁴⁹ The addition of DAS or small cell facilities to these structures is therefore fully consistent with their existing use.²⁵⁰

92. While the potential for effects from any deployments on utility structures is therefore remote at most, we conclude that the additional conditions described above support a finding that there is no such potential at all, assuming the presence of historic properties. First, we limit the size of equipment covered by this exclusion. In doing so, we draw on a PCIA proposal, which includes separate specific volumetric limits for antennas and for enclosures of associated equipment, but we modify the definition in certain respects to meet the standard in ACHP’s rules that the undertaking must have no potential for effects.²⁵¹ Specifically, we provide that the deployment may include covered antenna enclosures no more

²⁴⁷ The first utility poles were erected in the mid-19th century in the United States for telegraph lines. See History Wired, “History of the Telegraph,” available at <http://historywired.si.edu/detail.cfm?ID=324>. The kinds of equipment placed on poles have adapted and evolved with the evolution of technology to include electrical and all manner of communications equipment.

²⁴⁸ See NPA § II.A.1 (providing that the antennas subject to the NPA “do[] not include . . . devices authorized under Part 15 of the Commission’s rules.”). See also Dayton Daily News, “Local cities using advanced traffic signals to cut wait times,” July 31, 2014, available at <http://www.mydaytondailynews.com/news/news/local/local-cities-using-advanced-traffic-signals-to-cut/ngrxG/> (reporting that City of Moraine is using cameras mounted on utility poles to track traffic and adjust signal times); AT&T Reply Comments at 7 (“DAS and small cells have no more of an impact on historic property than any of the many other attachments placed on poles, including traffic cameras, wireless transmitters, and other devices installed by many local governments”); PCIA Comments at 11.

²⁴⁹ See Wikipedia, “Distribution Transformer,” http://en.wikipedia.org/wiki/Distribution_transformer (describing utility pole-mounted transformers).

²⁵⁰ See Fibertech Comments at 25 (noting the “practical reality that small cells are the same size or smaller than other types of infrastructure deployed in the public rights-of-ways”).

²⁵¹ As noted in the *Infrastructure NPRM*, PCIA proposed excluding small facilities from review if they meet the following criteria:

- 1) Equipment Volume. An equipment enclosure shall be no larger than seventeen (17) cubic feet in volume.
- 2) Antenna Volume. Each antenna associated with the installation shall be in an antenna enclosure of no more than three (3) cubic feet in volume. Each antenna that has exposed elements shall fit within an imaginary enclosure of no more than three (3) cubic feet.

(continued....)

than three cubic feet in volume per enclosure, or exposed antennas that fit within an imaginary enclosure of no more than three cubic feet in volume per imaginary enclosure, up to an aggregate maximum of six cubic feet. We further provide that all equipment enclosures (or imaginary enclosures) associated with the collocation on any single structure, including all associated equipment but not including separate antennas or enclosures for antennas, must be limited cumulatively to seventeen cubic feet in volume. Further, collocations under this rule will be limited to collocations that cause no new ground disturbance.

93. Because we find that multiple collocations on a utility structure could have a cumulative impact, we further apply the size limits defined above on a cumulative basis taking into account all pre-existing collocations. Specifically, if there is a pre-existing wireless deployment on the structure, and any of this pre-existing equipment would remain after the collocation, then the volume limits apply to the cumulative volume of such pre-existing equipment and the new collocated equipment. Thus, for the new equipment to come under our exclusion, the sum of the volume of all pre-existing associated equipment that remains after the collocation and the new equipment must be no greater than seventeen cubic feet, and the sum of the volume of all collocated antennas, including pre-existing antennas that remain after the collocation, must be no greater than six cubic feet. We further provide that the cumulative limit of seventeen cubic feet for wireless equipment applies to all equipment on the ground associated with an antenna on the structure as well as associated equipment physically on the structure. Thus, application of the limit is the same regardless of whether equipment associated with a particular deployment is deployed on the ground next to a structure or on the structure itself.²⁵² Consistent with a proposal by PCIA, however, we find that certain equipment should be omitted from the calculation of the equipment volume, including: (1) vertical cable runs for the connection of power and other services, the volume of which may be impractical to calculate and which should in any case have no effect on historic properties, consistent with our established exclusion of cable in pre-existing aerial or underground corridors; (2) ancillary equipment installed by other entities that is outside of the applicant's ownership or control, such as a power meter installed by the electric utility in connection with the wireless deployment, and (3) comparable equipment from pre-existing wireless deployments on the structure.²⁵³

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3) Infrastructure Volume. Associated electric meter, concealment, telecom demarcation box, ground-based enclosures, battery back-up power systems, grounding equipment, power transfer switch, and cut-off switch may be located outside the primary equipment enclosure(s) and are not included in the calculation of Equipment Volume.

Volume is a measure of the exterior displacement, not the interior volume of the enclosures. Any equipment that is concealed from public view in or behind an otherwise approved structure or concealment, is not included in the volume calculations.

See Infrastructure NPRM, 28 FCC Rcd at 14256 para. 49, n.99. *See also* PCIA Comments at 7-9. A number of industry commenters also support this definition, or a close variation of it. *See, e.g.,* AT&T Comments at 15-16; Cox Reply Comments at 2-3; Crown Castle Comments at 5-6 (proposing a limit of 5 cubic feet for antennas because "Crown Castle currently deploys antennas in its DAS and Small Cell networks that are significantly larger than three cubic feet in volume in order to accommodate multiple carriers"); Verizon Comments at 10-11; WISPA Comments at 15-16 (proposing a limit of six cubic feet for antennas).

²⁵² While some commenters oppose an exclusion based solely on PCIA's volumetric definition, we find that our exclusion addresses their concerns. For example, Tempe and the CA Local Governments express concern that PCIA's definition would allow an unlimited number of ground-mounted cabinets. *See* CA Local Governments Reply Comments at 6; Tempe Comments at 8. Our approach provides that any associated ground equipment must also come within the volumetric limit for equipment enclosures, however, and therefore does not allow for unlimited ground-based equipment. Further, because we apply the size limit on a cumulative basis, our exclusion directly addresses concerns that the PCIA definition would allow multiple collocations that cumulatively exceed the volumetric limits. *See* CA Local Governments Reply Comments at 6; Tempe Comments at 8.

²⁵³ *See* Letter from Jonathan M. Campbell, PCIA-The Wireless Infrastructure Association, to Marlene H. Dortch, Secretary, FCC, filed Oct. 10, 2014 (PCIA Oct. 10, 2014 *Ex Parte*), at 2; *see also* Letter from Brian M. Josef, CTIA-

(continued....)

94. To meet the standard under Section 800.3(a)(1), we further impose a requirement of no new ground disturbance, consistent for the most part with the NPA standard. Under the NPA standard, no new ground disturbance occurs so long as the depth of previous disturbance exceeds the proposed construction depth (excluding footings and other anchoring mechanisms) by at least two feet.²⁵⁴ We find, however, that footings and anchorings should be included in this context to ensure no potential for effects. Therefore, our finding is limited to cases where there is no ground disturbance or the depth and width of previous disturbance exceeds the proposed construction depth and width, including the depth and width of any proposed footings or other anchoring mechanisms, by at least two feet.²⁵⁵

95. Adoption of this exclusion will provide significant efficiencies in the Section 106 process for DAS and small-cell deployments. Many DAS and small-cell installations involve collocations on utility structures.²⁵⁶ According to one estimate, there were 120 million utility poles in service in the United States in 2005,²⁵⁷ the overwhelming majority of which are made of wood.²⁵⁸ The North American Wood Pole Council states that a properly maintained wood pole will have a service life of 75 years or more.²⁵⁹ PCIA estimates that approximately 12% of wooden poles—between 19 and 22 million poles—are 45 years or older, with the number growing as pole preservation technology improves. PCIA also estimates that excluding collocations on these wooden poles would increase the estimated number of excluded collocation structures by a factor of 10—which would dramatically advance wireless infrastructure deployment without impacting historic preservation values.²⁶⁰

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The Wireless Association, to Marlene H. Dortch, Secretary, FCC, filed Oct. 10, 2014 (CTIA Oct. 10, 2014 *Ex Parte*), at 2.

²⁵⁴ See NPA §§ III.C, VI.D.2.c.i.

²⁵⁵ Some Tribal Nations have indicated that exclusions of small facilities from Section 106 review might be reasonable if there is no excavation but that any ground disturbance would be cause for concern. See Spectrum and Competition Policy Division, Wireless Telecommunications Bureau, Ex-parte summary, WT Docket 13-238 (filed Sept. 4, 2014). We find that the restrictions we place on both of our new Section 106 exclusions are sufficient to address this concern and ensure that there is no potential for effects on historic properties of Tribal religious or cultural significance. As discussed in detail in this Report and Order, these restrictions include a strict requirement for both exclusions of no new ground disturbance and restrictions on the size and placement of equipment. Furthermore, both exclusions are limited to collocations (and therefore do not include new or replacement support structures).

²⁵⁶ Tracy Ford, “FCC Utility Poles rules to Help Broadband, DAS Deployments,” May 25, 2010, *available at* <http://www.rcrwireless.com/article/20100525/tower/fcc-utility-poles-rules-to-help-broadband-das-deployments/>; Kevin White, Small Cells: Small, but Valuable Addition to 4G LTE Network, May 21, 2013, *available at* <http://www.verizonwireless.com/news/article/2013/05/4G-LTE-network-small-cells.html>.

²⁵⁷ See Environmental Literacy Council, “Wood Utility Pole Life Cycle,” *available at* <http://enviroliteracy.org/article.php/1311.html>. The American Iron and Steel Institute estimates that there are 185 million utility poles across North America. See Steel Works, “Utility Poles,” *available at* http://www.steel.org/en/SMDISteel_org/Web%20Root/Content/Overview/Utility%20Poles.aspx. According to the North American Wood Pole Council, there are about 130 million wood utility poles in use across North America. See North American Wood Pole Council, “Frequently Asked Questions,” *available at* <http://www.woodpoles.org/FAQ-America.html>.

²⁵⁸ The American Iron and Steel Institute estimates that since 1998, close to one million steel distribution poles have been installed and are now being used by over 600 of 3100 U.S. electric utilities. See Steel Works, “Utility Poles,” *available at* <http://www.steel.org/en/The%20New%20Steel/Utility%20Poles/Utility%20Poles.aspx>. We note that our exclusion is not limited to wood poles, and encompasses collocations on these steel utility poles as well.

²⁵⁹ See North American Wood Pole Council, “Frequently Asked Questions,” *available at* <http://www.woodpoles.org/FAQ-America.html>.

²⁶⁰ See Loveday Report at 3.

b. Collocations on Buildings and Other Non-tower Structures

96. As discussed above, Section 800.3(a)(1) of ACHP rules authorizes an exclusion only where the undertaking does not have the potential to cause effects on historic properties, assuming such historic properties are present.²⁶¹ While we conclude that this standard allows for an exclusion applicable to many collocations on buildings and other structures that already house collocations, we find insufficient support in the record to adopt Verizon's proposed exclusion in its entirety. While Verizon states that adding an antenna to a building within the scope of its proposal would not have an effect that differs from those caused by existing antennas, we must also consider the cumulative effects of additional deployments on the integrity of a historic property to the extent that they add incompatible visual elements.²⁶² Further, while Verizon relies heavily on the requirement that any new deployment must meet the same conditions as the existing deployment, we cannot assume that conditions placed on a previous deployment are always sufficient to prevent any effects, particularly in the event of multiple additional deployments. Indeed, it is often the case that mitigating conditions are designed to offset effects rather than eliminate or reduce them entirely. We conclude, however, that with certain modifications to Verizon's proposal, deployments covered by the test would have no potential for effects.

97. Specifically, we find that collocations on buildings or other non-tower structures over 45 years old will have no potential for effects on historic properties if: (1) there is an existing antenna on the building or structure; (2) one of the following criteria is met: (a) the new antenna will not be visible from any adjacent streets or surrounding public spaces and will be added in the same vicinity as a pre-existing antenna; (b) the new antenna will be visible from adjacent streets or surrounding public spaces, provided that (i) it will replace a pre-existing antenna, (ii) the new antenna will be located in the same vicinity as the pre-existing antenna, (iii) the new antenna will be visible only from adjacent streets and surrounding public spaces that also afford views of the pre-existing antenna, (iv) the new antenna will not be more than three feet larger in height or width (including all protuberances) than the pre-existing antenna, and (v) no new equipment cabinets will be visible from the adjacent streets or surrounding public spaces; or (c) the new antenna will be visible from adjacent streets or surrounding public spaces, provided that (i) it will be located in the same vicinity as a pre-existing antenna, (ii) the new antenna will be visible only from adjacent streets and surrounding public spaces that also afford views of the pre-existing antenna, (iii) the pre-existing antenna was not deployed pursuant to the exclusion based on this finding, (iv) the new antenna will not be more than three feet larger in height or width (including all protuberances) than the pre-existing antenna, and (v) no new equipment cabinets will be visible from the adjacent streets or surrounding public spaces; (3) the new antenna will comply with all zoning conditions and historic preservation conditions applicable to existing antennas in the same vicinity that directly mitigate or prevent effects, such as camouflage or concealment requirements; and (4) the deployment of the new antenna will involve no new ground disturbance. Notwithstanding our finding of no potential for effects even assuming historic properties are present, we limit this exclusion in light of many parties' particular sensitivities related to historic properties and districts. Accordingly, as with the exclusion for collocations on utility poles, this exclusion does not apply to deployments that are (1) inside the boundary of a historic district, or within 250 feet of the boundary of a historic district; (2) located on a structure that is a designated National Historic Landmark or is listed in or eligible for listing in the National Register; or (3) the subject of a pending complaint alleging adverse effect on historic properties. In other words, this new targeted exclusion addresses collocations on non-tower structures where historic preservation review would otherwise be required under existing rules only because the structures are more than 45 years old.

²⁶¹ See 36 C.F.R. § 800.3(a)(1).

²⁶² See 36 C.F.R. § 800.5(a)(1). Integrity is the ability of a property to convey its significance, based on its location, design, setting, materials, workmanship, feeling, and association. Adverse effects can be direct or indirect and can include introduction of incompatible visual, atmospheric, or audible elements. See Advisory Council on Historic Preservation, A Citizen's Guide to Section 106 Review, *available at* <http://www.achp.gov/docs/CitizenGuide.pdf>, at 7.

98. Consistent with the Verizon proposal, we require that there must already be an antenna on the building or other structure and that the new antenna be in the same vicinity as the pre-existing antenna. For this purpose, a non-visible new antenna is in the “same vicinity” as a pre-existing antenna if it will be collocated on the same rooftop, façade or other surface, and a visible new antenna is in the “same vicinity” as a pre-existing antenna if it is on the same rooftop, façade, or other surface and the centerpoint of the new antenna is within 10 feet of the centerpoint of the pre-existing antenna. Combined with the other criteria discussed below, this requirement is designed to assure that a new antenna will not have any incremental effect on historic properties, assuming they exist, as there will be no additional incompatible elements.

99. In addition to Verizon’s proposed requirement that the deployment be in the same vicinity as an existing antenna, we also adopt a condition of no-visibility from adjoining streets or any surrounding public spaces,²⁶³ with two narrow exceptions. For the general case, our no-effects finding will apply only to a new antenna that is not visible from any adjacent streets or surrounding public spaces and is added in the same vicinity as a pre-existing antenna.²⁶⁴

100. We make a narrow exception to the no-visibility requirement where the new antenna would replace an existing antenna in the same vicinity and where the addition of the new antenna would not constitute a substantial increase in size over the replaced antenna. In this situation, no additional incompatible visual element is being added, as one antenna is a substitution for the other. We permit an insubstantial increase in size in this situation.²⁶⁵ For purposes of this criterion, the replacement facility would represent a substantial increase in size if it is more than three feet larger in height or width (including all protuberances) than the existing facility, or if it involves any new equipment cabinets that are visible from the street or adjacent public spaces. We decline to adopt the NPA definition of “substantial increase,” which allows greater increases in height or width in some cases, because it applies to towers, not to antenna deployments, and it is therefore overbroad with respect to the replacement of an

²⁶³ In adopting this standard, we are informed by the record, *see, e.g.*, AHPP Comments at 1 (supporting exclusion of collocations on non-tower structures in an area not visible from the ground), and also in part by General Services Administration (GSA) Preservation Note 41, entitled “Administrative Guide for Submitting Antenna Projects for External Review,” *available at* http://www.gsa.gov/portal/content/104184?utm_source=PBS&utm_medium=print-radio&utm_term=technicalpreservationnote&utm_campaign=shortcuts. The Preservation Notes are a series of technical briefs prepared by the GSA National Capital Region Historic Preservation staff as a resource on preservation project design, contracting, construction, and historic property management issues. Preservation Note 41 recommends that an agency may recommend a finding of no effect where the antenna will not be visible from the surrounding public space or streets and the antenna will not harm original historic materials or their replacements-in-kind. We note that, in addition to the measures ensuring that there are no incremental visual effects from covered facilities, our finding of no effects in this case is also implicitly based on a requirement, as the GSA Note recommends, that the deployment will not harm original historic materials. Even assuming a building is historic, however, as required by Section 800.3(a)(1), this “no harm” criterion would be satisfied by ensuring that any anchoring on the building was not performed on the historic materials of the property or their replacements-in-kind. *See id.* It is therefore unnecessary to expressly impose a “no harm” condition in this case, as the exclusion we adopt does not apply to historic properties. Necessarily, any anchoring of deployments subject to the exclusion will not be in any historic materials of the property. We also note that, under the criteria we adopt, the deployment will occur only where another antenna has already been reviewed under Section 106 and approved for deployment in the same vicinity, and any conditions imposed on that prior deployment to minimize or eliminate historic impact, including specifications of where, how, or under what conditions to construct, are part of our “no effect” finding and would apply as a condition of the exclusion.

²⁶⁴ Line-of-sight evaluations as referenced by the General Services Administration’s Preservation Note 41 may be used to determine visibility. *See* GSA, “NCR Preservation Note Series,” *available at* http://www.gsa.gov/portal/content/104184?utm_source=PBS&utm_medium=print-radio&utm_term=technicalpreservationnote&utm_campaign=shortcuts.

²⁶⁵ By comparison, under the NPA, a replacement for a tower that results in an insubstantial increase in size is excluded from Section 106 review. *See* NPA § III.B.

existing antenna. We further note that no one has objected to Verizon's proposed limit on increases of three feet in this context. Also, since we are required to ensure no potential for effects on historic properties assuming such properties are present, we find it appropriate to adopt a more stringent test than in the context of a program alternative.²⁶⁶ For these reasons, any increase in the number of equipment cabinets that are visible from the street or adjacent public spaces in connection with a replacement antenna constitutes a substantial increase in size. In combination with the requirements that the new antenna be within 10 feet of the replaced antenna and that the pre-existing antenna be visible from any ground perspective that would afford a view of the new antenna, these requirements ensure that the replacement deployment will not have an additional visual effect.

101. Under our second partial exception to the no-visibility requirement, the new antenna may be in addition to, rather than a replacement of, a pre-existing antenna, but must meet the other requirements applicable to replacement antennas noted above. In addition, we require that the pre-existing antenna itself not have been deployed pursuant to this exception. While this exception will allow an additional visual element to be added, the element is again limited to a comparably-sized antenna in the same viewshed (and again does not include any new visible associated equipment). Further, because the pre-existing antenna may not itself have been deployed pursuant to this no-effects finding, deployments cannot be daisy-chained across the structure, which might present a potential for cumulative effects.

102. Consistent with the Verizon proposal, we require that the new antenna comply with all zoning and historic preservation conditions applicable to existing antennas in the same vicinity that directly mitigate or prevent effects, such as camouflage, concealment, or painting requirements. We do not extend that requirement to conditions that have no direct relationship to the facility's effect or how the facility is deployed, such as a condition that requires the facility owner to pay for historic site information signs or other conditions intended to offset harms rather than prevent them. Our goal is to assure that any new deployments have no effects on historic properties. Payments or other forms of mitigation applied to antennas previously deployed on the building or structure that were intended to compensate for any adverse effect on historic properties caused by those antennas but were not intended to prevent that effect from occurring do not advance our goal of assuring no effects from such collocations. Accordingly, we do not require that the new antenna comply with such conditions.

103. As with the exclusion we adopt above for collocations on utility structures, we impose a strict requirement of no new ground disturbance. Thus, the exclusion will permit ground disturbance only where the depth and width of previous disturbance exceeds the proposed construction depth and width (including footings and other anchoring mechanisms) by at least two feet.

3. Antennas Mounted in the Interior of Buildings

104. The Collocation Agreement provides that "[a]n antenna may be mounted on a building" without Section 106 review except under certain circumstances, *e.g.*, the building is a historic property or over 45 years of age.²⁶⁷ In Section III.B.2.b. of this Report and Order, we clarify that the NEPA categorical exclusion codified in Note 1 for "antenna(s) mounted on an existing building" applies to

²⁶⁶ ACHP promulgated its program alternative regulation, 36 C.F.R. § 800.14, pursuant to Section 214 of NHPA, 16 U.S.C. § 470v, which authorizes ACHP to exempt Federal undertakings from any provision of NHPA "when such exemption is determined consistent with the purposes of this Act, taking into consideration the magnitude of the exempted undertaking or program and the likelihood of impairment of historic properties." *See also NPA Report and Order*, 20 FCC Rcd at 1081-82 para. 21 (interpreting these provisions to mean that, in formulating exemptions and prescribing Section 106 processes in a program alternative, ACHP and the action agency need not ensure that every possible effect on historic properties is considered under all circumstances but should be guided by a standard of reasonableness that takes into account both the likelihood that adverse effects will not be considered in all instances and the overall benefits to be obtained from streamlining measures).

²⁶⁷ Collocation Agreement § V.A.

collocations in the interior of buildings.²⁶⁸ Because of the growing use of and reliance on small wireless facility deployments in the interior of buildings to improve coverage, we take this opportunity to similarly remove any uncertainty with regard to the Section 106 requirements related to interior collocations.

105. We therefore clarify that Section V of the Collocation Agreement covers collocations in buildings' interiors. Given the limited scope of the exclusion of collocations on buildings under the Collocation Agreement (*e.g.*, the building may not itself be listed in or eligible for listing in the National Register or in or near a historic district), there is no reason to distinguish interior collocations from exterior collocations for purposes of assessing impacts on historic properties.

IV. ENVIRONMENTAL NOTIFICATION EXEMPTION FOR REGISTRATION OF TEMPORARY TOWERS

106. In this section, consistent with a waiver previously granted by the Commission, we adopt a narrow exemption from the Commission's requirement that owners of proposed towers requiring antenna structure registration (ASR) provide 30 days of national and local notice to give members of the public an opportunity to comment on the proposed tower's potential environmental effects. The exemption applies only to proposed temporary towers meeting defined criteria that reduce the likelihood of any significant environmental effects. Specifically, the exemption applies only to antenna structures that (1) will be in place for 60 days or less; (2) require notice of construction to the FAA; (3) do not require marking or lighting under FAA regulations; (4) will be less than 200 feet above ground level; and (5) will involve minimal or no ground excavation. We emphasize that this exemption only relieves applicants of the need to complete the process of public notice; it is not a categorical exclusion, and therefore does not relieve applicants of the obligation under our NEPA rules to file an EA in the circumstances identified by our rules. Further, the exemption from notice requirements does not apply to proposed deployments where an EA is in fact required under our rules. Rather, all EAs will continue to be put out on public notice in accordance with existing process to provide the public opportunity for engagement.²⁶⁹

107. We find that allowing licensees to deploy temporary towers meeting these criteria without first having to complete the Commission's environmental notification process or seek a site-specific waiver of that process will enable them to more effectively respond to emergencies, natural disasters, and other planned and unplanned short-term spikes in demand without undermining the purposes of the notification process. Thus, this exemption will "remove an administrative obstacle to the availability of broadband and other wireless services during major events and unanticipated periods of localized high demand"²⁷⁰ where expanded or substitute service is needed quickly.²⁷¹

A. Background

108. Under its rules, the FAA requires notification of the construction or alteration of any antenna structure that exceeds 200 feet in height above ground level, or where certain other conditions are met, including where the structure is located in a flight path near an airport and exceeds a height

²⁶⁸ See *supra*, Section III.B.2.b.

²⁶⁹ To the extent a party constructs a tower that does not require antenna structure registration, but does require an EA under our rules, that party typically registers the tower by filing an FCC Form 854 as a vehicle for submitting the EA. See *Environmental Notification Order on Remand*, 26 FCC Rcd at 16707 para. 18. All EAs that are filed with Form 854 go through environmental notice under our environmental notification procedures. See *id.* at 16723 para. 57. Applications submitted through the Universal Licensing System (ULS) that are not also filed on Form 854 and that contain EAs are placed on public notice for 30 days by the appropriate processing division. See *Weekly Status Public Notices in the Universal Licensing System (ULS)*, available at <http://www.fcc.gov/help/weekly-status-public-notices-universal-licensing-system-uls>.

²⁷⁰ CTIA Comments at 6 (*quoting Infrastructure NPRM*, 28 FCC Rcd at 14263-64 para. 68).

²⁷¹ See *Waiver Order*, 28 FCC Rcd 7758 para. 1.

determined using a formula based on its distance from the runway.²⁷² The owner of a proposed antenna structure must file notice with the FAA on FAA Form 7460-1, and that agency in turn determines whether the construction or alteration is subject to lighting or marking specifications prescribed in the current version of an FAA Advisory Circular entitled “Obstruction Marking and Lighting.”²⁷³ The FAA sends an acknowledgment to the antenna structure owner describing how the structure should be marked and lighted, which constitutes an FAA study and determination of “no hazard to air navigation.”²⁷⁴ This means that the FAA has determined that the structure will not pose a hazard to aircraft provided that the structure is marked and/or lighted consistent with its recommendations.

109. If pre-construction notice to the FAA is required,²⁷⁵ the Commission’s rules also require the tower owner to register the antenna structure in the Commission’s ASR system, prior to construction or alteration as the case may be.²⁷⁶ As part of such registration, the applicant must submit the FAA’s study and “no hazard” determination, including any associated marking and lighting specifications.²⁷⁷ If the Commission accepts the application, it registers the structure, issuing an ASR form that typically incorporates the FAA’s “no hazard” marking and/or lighting specifications.²⁷⁸

110. The Commission has found that ASR application processing constitutes an action that triggers the Commission’s review responsibilities under NEPA and Section 106 of NHPA.²⁷⁹ Among

²⁷² See 14 C.F.R. § 77.13; 47 C.F.R. § 17.7.

²⁷³ Federal Aviation Administration, “Advisory Circular: Obstruction Marking and Lighting,” FAA AC 70/7460-1K (2007), available at http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC%2070%207460-1K.pdf (FAA Obstruction Marking and Lighting Circular).

²⁷⁴ See *Part 17 Report and Order*, FCC 14-117, at para. 3.

²⁷⁵ See 14 C.F.R. § 77.13; 47 C.F.R. § 17.7.

²⁷⁶ See 47 C.F.R. § 17.4. As defined in the Commission’s rules, “antenna structures” include “the radiating and/or receive system, its supporting structures and any appurtenances mounted thereon.” 47 C.F.R. § 17.2. We note that the Commission has recently changed its Part 17 rules. See *Part 17 Report and Order*, FCC 14-117. Under these changes, which will be effective October 24, 2014, see 79 Fed. Reg. 56968 (Sept. 24, 2014), an “antenna structure” is defined as “a structure that is constructed or used to transmit radio energy, or that is constructed or used for the primary purpose of supporting antennas to transmit and/or receive radio energy, and any antennas and other appurtenances mounted thereon, from the time construction of the supporting structure begins until such time as the supporting structure is dismantled.” *Id.* In this section, we use the terms “antenna structures” and “towers” interchangeably.

²⁷⁷ 47 C.F.R. § 17.4(b). The registration process is generally completed online at the Commission’s ASR Online System website, available at <http://wireless.fcc.gov/antenna/>. This website provides comprehensive information about the registration process and the applicable rules.

²⁷⁸ The Wireless Telecommunications Bureau recently released a Public Notice announcing enhancements to the Commission’s ASR System to allow ASR registrants electronic access to their current official authorizations in “Active” status, and that the electronic version of an authorization stored in the ASR System will be deemed as the official Commission document. See “Wireless Telecommunications Bureau Announces Enhancements to the Commission’s Universal Licensing System and Antenna Structure Registration System for Providing Access to Official Electronic Authorizations and Seeks Comment on Final Procedures,” WT Docket No. 14-161, *Public Notice*, DA 14-1478, at 2 (WTB rel. Oct. 10, 2014).

²⁷⁹ See *Streamlining the Commission’s Antenna Structure Clearance Procedure; Revision of Part 17 of the Commission’s Rules Concerning Construction, Marking, and Lighting of Antenna Structures*, WT Docket No. 95-5, *Report and Order*, 11 FCC Rcd 4272, 4289 para. 41 (1995) (*Antenna Structure Clearance R&O*) (finding that the registration of an antenna structure is subject to NEPA). Accord, *NPA Report and Order*, 20 FCC Rcd at 1084 para. 27 (explaining that the Commission’s treatment of tower registrations as Federal undertakings within the meaning of Section 106 of the National Historic Preservation Act, 16 U.S.C. § 470f, is a permissible interpretation in light of the preconstruction approval process that it has implemented to assure that communications towers are not a risk to air safety under Section 303(q) of the Communications Act).

other obligations, NEPA requires agencies to facilitate public involvement in agency decisions that may affect the environment.²⁸⁰ To fulfill this responsibility, the Commission requires owners of proposed towers, including temporary towers, that must be registered in the ASR system to provide local and national notice prior to submitting a completed ASR application.²⁸¹ Typically, the ASR notice process takes approximately 40 days,²⁸² as applicants must provide public notice, allow 30 days for the filing of any requests for further environmental review, and then wait for the Commission to clear the tower for construction.

111. The public notification requirements are subject to certain exemptions, such as an exemption for replacement towers meeting certain criteria.²⁸³ In addition, the Commission has provided that applicants may request site-specific waivers of the notification requirement in emergency situations, such as where a tower needs to be deployed quickly to restore lost communications.²⁸⁴ Such requests must be made and approved pre-construction, and the Commission has further provided that the reviewing bureau should ordinarily require in such cases that the applicant provide public notice within a short period after authorization or construction, unless the bureau concludes in a particular case that notice would be impracticable or not in the public interest.²⁸⁵

112. On December 21, 2012, CTIA filed a Petition for Expedited Rulemaking asking the Commission to add a new exemption from the public notice requirements for temporary towers that (1) will be in use for 60 days or less, (2) require the filing of a Form 7460-1 with the FAA, (3) do not require marking or lighting pursuant to FAA regulations, and (4) will be less than 200 feet in height (Temporary Towers Petition).²⁸⁶ CTIA also asked the Commission for an interim waiver of its environmental notification rules for the same class of temporary towers pending the outcome of the rulemaking.²⁸⁷

113. On May 15, 2013, in the *Environmental Notification Waiver Order*, the Commission granted an interim waiver of the ASR environmental notification requirements for substantially all of the class of temporary towers that CTIA identified, with the additional criterion that the construction entail no or only minimal ground disturbance.²⁸⁸ The Commission provided that the interim waiver would remain in effect pending the completion of a rulemaking to address the issues raised in the petition.²⁸⁹

²⁸⁰ See 40 C.F.R. § 1506.6(a) (requiring agencies to make “diligent efforts to involve the public in preparing and implementing their NEPA procedures”); see also 40 C.F.R. § 1500.2(d) (“Federal agencies shall to the fullest extent possible . . . [e]ncourage and facilitate public involvement in decisions which affect the quality of the human environment.”).

²⁸¹ See *Environmental Notification Order on Remand*, 26 FCC Rcd 16700; see also “Wireless Telecommunications Bureau Provides Guidance on the Implementation of the Environmental Notification Process for the Registration of Antenna Structures,” *Public Notice*, 27 FCC Rcd 5082 (WTB 2012) (*ASR Guidance PN*).

²⁸² See *ASR Guidance PN*, 27 FCC Rcd at 5082.

²⁸³ See *Environmental Notification Order on Remand*, 26 FCC Rcd at 16720-21 para. 53. See also 47 C.F.R. § 17.14. Other exemptions address, for example, objects shielded by existing permanent structures, structures that are 20 feet or less in height, airport landing aids, and meteorological devices.

²⁸⁴ See *Environmental Notification Order on Remand*, 26 FCC Rcd at 16717 n.117.

²⁸⁵ *Id.*

²⁸⁶ See Petition of CTIA—The Wireless Association for Expedited Rulemaking and Blanket Waiver Regarding Public Notice Procedures for Temporary Towers, RM-11688, filed Dec. 21, 2012 (Temporary Towers Petition), at 1.

²⁸⁷ *Id.* at 11-12.

²⁸⁸ *Id.* More specifically, the Commission provided that the interim waiver would not apply to a temporary tower that requires excavation unless the ground was previously disturbed to a depth that exceeds the proposed construction depth by at least 2 feet. See *Waiver Order*, 28 FCC Rcd at 7763 para. 12.

²⁸⁹ *Id.* at 7763 para. 13.

114. In the *Infrastructure NPRM*, the Commission proposed to adopt a permanent exemption from the ASR pre-construction environmental notification requirements consistent with the interim exemption granted in the *Waiver Order*.²⁹⁰ It noted that, according to commenters, situations frequently arise where there is insufficient time to complete the notification process before a temporary tower must be deployed to meet near-term demand, including (1) newsworthy events that occur without any prior notice and require immediate deployments, such as natural disasters; (2) other events that occur with less than 30 days advance notice, such as certain political events and parades for sports teams; (3) events for which the timing and general location are known in advance, but where the specific locations for temporary towers are unknown until days before the event, such as state fairs and major sporting events; and (4) situations in which unexpected difficulties with permanent structures require the deployment of temporary towers while permanent facilities are repaired.²⁹¹ Therefore, it found that absent an exemption, application of the ASR notice process to these temporary towers would apparently prevent service providers from meeting important short-term coverage and capacity needs, and sought comment on its analysis.²⁹²

115. The Commission further sought comment on how it should define the scope of the exemption, and whether the criteria set out in the *Waiver Order* were sufficient and appropriate for this purpose.²⁹³ The Commission further proposed not to require post-construction environmental notice for towers that qualify for the new exemption.²⁹⁴ While noting that the Commission ordinarily requires post-construction notification in those cases where pre-construction notice is waived due to an emergency situation, the Commission observed that post-construction public notice for towers deployed for the short periods of time addressed by the exemption would seem to serve little purpose.²⁹⁵

116. The Commission also proposed, however, to continue to require owners of towers eligible for the exemption to comply with the Commission's other NEPA requirements, including the obligations to certify environmental compliance on a completed ASR application and to file an EA in appropriate cases.²⁹⁶ It further proposed that if an applicant determines that it needs to complete an EA for a temporary tower otherwise eligible for the exemption, or if the relevant bureau makes this determination pursuant to Section 1.1307(c) or (d) of the Commission's rules, the tower would not be exempt from public notice requirements.²⁹⁷ Thus, for example, if a proposed temporary tower would have significant environmental effects on migratory birds, the tower owner would not be able to claim the exemption from the Commission's environmental notification process that we adopt today.

117. The Commission also sought comment on whether to provide for an extension if an applicant determines, subsequent to registering a tower under the temporary towers notification exemption, that the tower will or may be needed beyond the maximum period for the exemption.²⁹⁸ In particular, it sought comment on whether the Commission should establish a process for extending the period the tower may remain in place without environmental notice.²⁹⁹

²⁹⁰ See *Infrastructure NPRM*, 28 FCC Rcd at 14263-64 para. 68.

²⁹¹ *Id.* at 14268 para. 80.

²⁹² *Id.*

²⁹³ *Id.* at 14267 para. 78.

²⁹⁴ *Id.* at 14270 para. 85.

²⁹⁵ *Id.*

²⁹⁶ *Id.* at 14270-71 para. 86.

²⁹⁷ *Id.*

²⁹⁸ *Id.* at 14271 para. 88.

²⁹⁹ *Id.*

118. The vast majority of parties that commented on this issue support the adoption of an exemption from the environmental notification process for temporary towers.³⁰⁰ Most of the supporting commenters also agree that the Commission should rely on the criteria from the *Waiver Order* to define the scope of the exemption,³⁰¹ while some propose different or additional criteria.³⁰²

119. A few parties raise objections. Orange County recommends the Commission not exempt temporary towers from “antenna registration and notification requirements,” asserting that temporary towers may have the same environmental effects as permanent towers.³⁰³ Lee County states that the Commission should not exempt temporary towers “from review.”³⁰⁴ Tempe argues that temporary towers should not be included as part of any “environmental exemption” because such towers may include generators that could have significant environmental effects.³⁰⁵

B. Discussion

120. For the reasons set forth below, and essentially as proposed in the *Infrastructure NPRM*, we adopt a permanent exemption from our ASR environmental notification requirements for temporary towers that meet the criteria set forth in the *Waiver Order*. Specifically, we exempt proposed new antenna structures that do not require EAs from the ASR public notice requirements if they: (1) will be in place for no more than 60 days; (2) require notice of construction to the FAA; (3) do not require marking or lighting under FAA regulations; (4) will be less than 200 feet in height; and (5) will either involve no excavation or involve excavation only where the depth of previous disturbance exceeds the proposed construction depth (excluding footings and other anchoring mechanisms) by at least two feet.

121. We recognize that one of our responsibilities under NEPA is to facilitate public involvement in agency decisions that may affect the environment. CEQ regulations direct that agencies shall “make diligent efforts to involve the public in preparing and implementing their NEPA procedures” and “solicit appropriate information from the public.”³⁰⁶ At the same time, an agency has “‘wide discretion in fashioning its own procedures’ to implement its environmental obligations,”³⁰⁷ and “considerable discretion [under CEQ regulations] to decide the extent to which such public involvement

³⁰⁰ See, e.g., AT&T Comments at 6-7; CalWA Comments at 2; CCA Reply Comments at 12; CTIA Comments at 4-6; Coconut Creek Comments at 4; Joint Venture Comments at 4-5; Mesquite Comments at 1-2; PCIA Comments at 59-60; Springfield Comments at 7-8; Sprint Comments at 6-7; Steel in the Air Comments at 4; TIA Comments at 4; UTC Comments at 9-10; Verizon Comments at 24-25; West Palm Beach Comments at 4.

³⁰¹ See, e.g., AT&T Comments at 19; Steel in the Air Comments at 4.

³⁰² For example, Springfield and Mesquite argue that the maximum tower height eligible for the exemption should be reduced. See Springfield Comments at 8; Mesquite Comments at 2. Sprint argues that the exemption should apply to temporary towers in place for up to six months rather than 60 days. See Sprint Comments at 7. Mendham argues that applicants claiming the exemption should be required to provide notice to the municipality and county where the temporary tower is to be located. See Mendham Comments at 5.

³⁰³ Orange Reply Comments at 4-5.

³⁰⁴ Lee Comments at 1-2.

³⁰⁵ See Tempe Comments at 10. See also Savannah *Ex Parte* at 4 (arguing that the flight hazard from towers over 100 feet in height is greater locally than in most of the nation and that the proposed exemption would “needlessly increase the risk to our public, and to our pilots in particular.”).

³⁰⁶ 40 C.F.R. § 1506.6(a), (d); see also 40 C.F.R. § 1500.2(d) (“Federal agencies shall to the fullest extent possible . . . [e]ncourage and facilitate public involvement in decisions which affect the quality of the human environment.”); *American Bird Conservancy v. FCC*, 516 F.3d 1027, 1035 (D.C. Cir. 2008).

³⁰⁷ *Environmental Notification Order on Remand*, 26 FCC Rcd at 16717 para. 45 (quoting *American Bird Conservancy*, 516 F.3d at 1035).

is ‘practicable.’”³⁰⁸ As discussed below, we find that establishing the proposed exemption is consistent with our obligations under NEPA and CEQ regulations, and will serve the public interest.³⁰⁹

122. As the Commission observed in the *Infrastructure NPRM*, the ASR notice process takes approximately 40 days and can take as long as two months.³¹⁰ The record confirms that absent the exemption, situations would arise where there is insufficient time to complete this process before a temporary tower must be deployed to meet near-term demand.³¹¹ The record, as well as our own experience in administering the environmental notice rule, shows that a substantial number of temporary towers that would qualify for the exemption require registration.³¹² We find that, absent an exemption, application of the ASR notice process to these temporary towers will interfere with the ability of service providers to meet important short term coverage and capacity needs.

123. At the same time, the benefits of environmental notice are limited in the case of temporary towers meeting these criteria. The purpose of environmental notice is to facilitate public discourse regarding towers that may have a significant environmental impact.³¹³ We find that towers meeting the specified criteria are highly unlikely to have significant environmental effects due to their short duration, limited height, absence of marking or lighting, and minimal to no excavation.³¹⁴ As the Commission explained in the *Waiver Order*, our experience in administering the ASR public notice process confirms that antenna structures meeting the waiver criteria rarely if ever generate public comment regarding potentially significant environmental effects or are determined to require further environmental processing.³¹⁵ In particular, since the *Waiver Order* has been in place, we have seen no evidence that a temporary tower exempted from notification by the waiver has had or may have had a significant environmental effect.³¹⁶ We find that the limited benefits of notice in these cases do not outweigh the potential detriment to the public interest of prohibiting the deployment of towers in circumstances in which the notification process cannot be completed quickly enough to address short-term deployment needs. Further, having concluded that pre-construction environmental notification is categorically unnecessary in the situations addressed here, we find it would be inefficient to require the

³⁰⁸ *Brodsky v. U.S. Nuclear Regulatory Comm’n*, 704 F.3d 113, 121 (2d Cir. 2013) (noting that the reviewing court properly considers “whether the lack of public input prevented the agency from weighing all the factors essential to exercising its judgment [under NEPA] in a reasonable manner” if the issuance of a FONSI without public comment is challenged) (internal quotations omitted); *TOMAC, Taxpayers of Mich. Against Casinos v. Norton*, 433 F.3d 852, 861 (D.C. Cir. 2006); 40 C.F.R. § 1501.4(b).

³⁰⁹ Cf. Amendment of Environmental Rules in Response to New Regulations Issues by the Council on Environmental Quality, GEN Docket No. 79-163, *Report and Order*, 60 Rad. Reg. 2d (P&F) 13 para. 17 (1986) (finding that for “temporary proposals that are encompassed within § 1.1307,” the Commission “may assess the environmental factors and grant the authorization without awaiting public comment if it finds no likelihood of a long-term, significant environmental impact”).

³¹⁰ See *ASR Guidance PN*, 27 FCC Rcd at 5082.

³¹¹ See, e.g., Temporary Towers Petition at 5-6; AT&T Comments, RM-11688, at 5-6; CTIA Reply Comments, RM-11688, at 3-4; NTCH Comments, RM-11688, at 1; PCIA Comments, RM-11688, at 2-4; Verizon Comments, RM-11688, at 3-4, 7-8.

³¹² For example, we received at least six requests for relief under the *Waiver Order* in a three month period, indicating that there may be 20 or more registrations a year that meet the criteria for the exemption. See also *Infrastructure NPRM*, 28 FCC Rcd at 14268 para. 80 & n.174.

³¹³ See *Environmental Notification Order on Remand*, 26 FCC Rcd at 16719 para. 50; 47 C.F.R. § 1.1307(c).

³¹⁴ See, e.g., AT&T Comments at 18. We therefore disagree with Orange County that the potential for impacts from eligible temporary structures is the same as from permanent structures. See Orange Reply Comments at 4.

³¹⁵ See *Waiver Order*, 28 FCC Rcd at 7762-63 para. 11.

³¹⁶ See, e.g., AT&T Comments at 7. Thus, we have had no reason to consider requiring an EA for any of these structures.

filing and adjudication of individual waiver requests for these temporary towers. Accordingly, we conclude that adoption of the exemption is warranted.

124. We also adopt the proposal to require no post-construction environmental notice for temporary towers that qualify for the exemption. Ordinarily, when pre-construction notice is waived due to an emergency situation, we require environmental notification shortly after construction because such a deployment may be for a lengthy or indefinite period of time. We find, however, that requiring post-construction notification for towers intended to be in place for the limited duration covered by the exemption is not in the public interest as the exempted period is likely to be over or nearly over by the time the notice period ends. Additionally, we note again that we have rarely seen temporary antenna structures generate public comment regarding potentially significant environmental effects.³¹⁷ We further note that of the many commenters supporting an exemption, none opposed our proposal to exempt qualifying temporary towers from post-construction environmental notification.

125. We find that the objections to the proposed exemption raised by Lee County, Tempe, and Orange County are misplaced. They express concerns that a temporary towers exemption would eliminate local review (including local environmental review) and antenna structure registration requirements. The exemption we adopt today, however, does neither of these things. First, the temporary towers measure does not exempt any deployment from any otherwise applicable requirement under our rules to provide notice to the FAA, to obtain an FAA “no-hazard” determination, or to complete antenna structure registration.³¹⁸ Nor does the exemption impact any local requirements. Further, we provide, as proposed in the *Infrastructure NPRM*, that towers eligible for the notification exemption are still required to comply with the Commission’s other NEPA requirements, including filing an EA in any of the environmentally sensitive circumstances identified by our rules.³¹⁹ We further provide that if an applicant determines that it needs to complete an EA for a temporary tower otherwise eligible for the exemption, or if the relevant bureau makes this determination pursuant to Section 1.1307(c) or (d) of the Commission’s rules, the application will not be exempt from the environmental notice requirement. No commenter objects to these proposals, which are consistent with limitations the Commission imposed in connection with the existing exemption from the notification process for replacement towers.³²⁰ In short, today’s exemption, to the extent it applies, only relieves an applicant of the obligation to go through the Commission’s ASR public notice process, and only in cases where an EA is not required.³²¹

126. Some parties, while supporting a temporary towers exemption, argue that we should establish criteria different from those the Commission relied upon in adopting the interim waiver. Some assert, for example, that the maximum tower height should be something less than 200 feet above ground level.³²² Mesquite asserts the maximum tower height should be 120 feet above ground level.³²³

³¹⁷ See *Infrastructure NPRM*, 28 FCC Rcd at 14270 para. 85.

³¹⁸ In raising its concern, Orange County notes that it “operates . . . a large regional airport that has recently expanded through construction of a third terminal.” Orange Reply Comments at 4. We find the exemption poses no threat to air safety. As noted, deployments remain subject to all applicable requirements to notify the FAA and register the structure in the ASR system. If the Commission or the FAA requires either painting or lighting, *i.e.*, because of a potential threat to aviation, the exemption does not apply.

³¹⁹ See 47 C.F.R. §§ 1.1301-1.1319.

³²⁰ See *Environmental Notification Order on Remand*, 26 FCC Rcd at 16720-21 para. 53 (providing that where an EA is required to be filed for a replacement tower, such a tower is not exempted from the environmental notification process).

³²¹ See *Waiver Order*, 28 FCC Rcd at 7763 para. 11 (“Further, the interim waiver does not relieve ASR applicants from having to comply with the Commission’s other NEPA rules, including the obligation to certify environmental compliance on a completed ASR application. Under those rules, if an applicant determines that it needs to complete an EA, environmental notification will be required.”).

³²² See, *e.g.*, Mesquite Comments at 2; Springfield Comments at 8.

Springfield argues that, generally, most temporary towers are only 100 feet tall and that, currently, the tallest available temporary tower model is 150 feet tall.³²⁴

127. We conclude that making the exemption available for towers less than 200 feet above ground level is appropriate and adequate to ensure that the exemption serves the public interest both by minimizing potential significant environmental effects and by enabling wireless providers to more effectively respond to large or unforeseen spikes in demand for service. CTIA indicates that carriers deploy temporary towers more than 150 feet tall to replace damaged towers of similar height, and that having to use shorter towers to stand in for damaged towers may reduce coverage and thereby limit the availability of service during emergencies.³²⁵ We agree with CTIA that reducing the maximum tower height could undermine the intended purpose of the exemption. Further, the proposed limit of less than 200 feet will allow appropriate flexibility for taller temporary models, as they become available.

128. Sprint recommends adopting a time limit longer than 60 days for operation of the exempted towers. Sprint argues that at least six months is necessary for temporary towers that stand in for damaged permanent towers.³²⁶ We conclude, however, that 60 days is an appropriate time limit for the deployment of towers under this exemption. This time limit, as noted above, has substantial support in the record, and we find that 60 days strikes the proper balance between making this exemption a useful and effective tool for facilitating urgently needed short term communications deployments and facilitating public involvement in Commission decisions that may affect the environment. As discussed, the brief duration of the covered deployments renders post-construction notification unnecessary in the public interest because the deployment will be removed by the time a post-construction notice period is complete or shortly thereafter. As the intended deployment period grows, however, the applicability of that reasoning erodes. For emergency deployments that may last up to six months or even longer, post-construction notice will generally be warranted, as the Commission has indicated previously.³²⁷ Thus, we find that the existing procedure—*i.e.*, site-specific waivers that are generally conditioned on post-construction notice—remains appropriate for emergency towers that will be deployed for longer periods than those covered by the narrow exemption we establish today.

129. Commenters differ on whether and on what terms the Commission should provide that an applicant that deploys a tower pursuant to this exemption may subsequently obtain an extension of the time limit for deployment. AT&T suggests that a single 60-day extension, upon a timely request accompanied by a showing of compelling justification, is appropriate.³²⁸ CTIA similarly proposes that, “[t]o ensure the integrity of the 60-day limit, a carrier should only be permitted to keep a tower deployed for more than 60 days pursuant to the exemption” if it (1) submits an extension request at least 10 days prior to the expiration of the initial 60-day period, and (2) provides a “compelling justification in support of keeping the temporary tower deployed for up to an additional 60 days.”³²⁹ Steel in the Air and West Palm Beach, on the other hand, assert that if a tower is needed for more than 60 days, then “the existing rules should apply” and post-construction notification should be required.³³⁰ Minneapolis expresses concern about the exemption being misused as a loophole to provide long-term service or as a bridge to

(Continued from previous page)

³²³ See Mesquite Comments at 2.

³²⁴ See Springfield Comments at 8.

³²⁵ See CTIA Reply Comments at 4.

³²⁶ See Sprint Comments at 7.

³²⁷ See *Environmental Notification Order on Remand*, 26 FCC Rcd at 16717 n.117.

³²⁸ See AT&T Comments at 20.

³²⁹ CTIA Comments at 9.

³³⁰ Steel in the Air Comments at 4; West Palm Beach Comments at 4.

the eventual establishment of a permanent facility, and says that extensions should not be allowed routinely.³³¹

130. While flexibility is important when compelling cases arise, we recognize that permitting long-term or multiple extensions could invite or allow misuse of the exemption. Therefore, we will permit a single extension of up to 60 days, and only upon a showing that the need to keep the exempted temporary tower in place beyond the initial 60 days is due to changed circumstances or information that emerged after the exempted temporary tower was deployed.

131. Some parties argue that concerns about potential misuse of the exemption justify additional enforcement measures. Mendham asks the Commission to define the consequences that would apply when an applicant uses the exemption for a non-qualifying tower or fails to remove a tower before the exemption expires.³³² Springfield asks the Commission to regulate the number of times an exempt temporary tower may be deployed within a single service area in order to prevent abuse of the exemption by consecutive deployments.³³³ CTIA and PCIA, however, oppose such measures.³³⁴

132. We decline to define consequences or to adopt special enforcement mechanisms for misuse of the exemption we adopt today, as we find the Commission's general enforcement mechanisms sufficient. We agree with Springfield, however, that we should adopt a measure to prevent the use of consecutive deployments under the exemption to effectively exceed the time limit.³³⁵ We therefore require that at least 30 days must pass following the removal of one exempted temporary tower before the same applicant may rely on the exemption for another temporary tower covering substantially the same service area. While AT&T argues that the Commission should not adopt measures to prevent "speculative abuses,"³³⁶ we conclude that this narrow limitation on the consecutive use of the exemption will help to ensure that it applies only to deployments of brief duration, as intended. Further, we are not persuaded by CTIA's argument that such a restriction would interfere with a carrier's flexibility to respond to unforeseen events.³³⁷ The restriction places no limit on the number of exempt towers that can be deployed at any one time to cover a larger combined service area. We also note that our rule provides for extensions of the 60-day period in appropriate cases, which should further ensure that applicants have sufficient flexibility to respond to unforeseen events.

133. We further clarify that under appropriate conditions, such as natural disasters or national emergencies, the relevant bureau may grant waivers of this limitation applicable to defined geographic regions and periods. In addition, a party subject to this limitation at a particular site may still request a site-specific waiver of the notice requirements for a subsequent temporary deployment at that site.

134. To implement the new temporary towers exemption, Commission staff will modify FCC Form 854 to provide a checkbox for applicants to indicate that they are claiming the exemption and to require such applicants to provide documentation that supports such claim. We note that the modification of the form is subject to approval by the Office of Management and Budget (OMB). To ensure clarity, we provide that the exemption will take effect only when the Wireless Telecommunications Bureau issues a Public Notice announcing OMB's approval. We further provide that, until the new exemption is effective, the interim waiver of notification requirements for temporary towers remains available.

³³¹ See Minneapolis Comments at 15.

³³² See Mendham Comments at 5.

³³³ See Springfield Comments at 8-9.

³³⁴ See CTIA Reply Comments at 3-4; PCIA Reply Comments at 33.

³³⁵ See Springfield Comments at 7-8.

³³⁶ PCIA Reply Comments at 33.

³³⁷ See CTIA Reply Comments at 3-4.

V. IMPLEMENTATION OF SECTION 6409(A)

135. In this section, we adopt rules to implement and enforce Section 6409(a) of the Spectrum Act.³³⁸ Section 6409(a) provides, in pertinent part, that “[n]otwithstanding [47 U.S.C. § 332(c)(7)] or any other provision of law, a State or local government may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station.”³³⁹ Ambiguities in many of the terms in this provision and its accompanying definition of “eligible facilities request” are likely to generate disputes about its proper application, which could in turn undermine the goal of Title VI of the Spectrum Act of advancing wireless broadband service for both public safety and commercial users.³⁴⁰ We therefore conclude that it will serve the public interest to establish rules clarifying the requirements of Section 6409(a) and implementing and enforcing this provision.³⁴¹ The rules we adopt today will provide guidance to all stakeholders on their rights and responsibilities under the provision, facilitate the review process for wireless infrastructure modifications, and accelerate wireless broadband deployment consistent with our statutory responsibilities.

A. Background

136. Congress adopted Section 6409 in 2012 as a provision of Title VI of the Middle Class Tax Relief and Job Creation Act, which is more commonly known as the Spectrum Act.³⁴² The Spectrum Act required the Commission to allocate specific additional bands of spectrum for commercial use (including the H Block and the AWS-3 band) and to auction and grant new licenses for this spectrum by February 2015.³⁴³ The Spectrum Act also authorized the Commission to conduct an incentive auction of broadcast television spectrum in order to make additional spectrum available for commercial broadband service.³⁴⁴ Finally, the Spectrum Act established the First Responder Network Authority (FirstNet) to oversee the construction and operation of a nationwide public safety wireless broadband network (PSBN) and provided dedicated spectrum and other resources for this purpose, including funding from the proceeds of the auctions that the Spectrum Act required and authorized.³⁴⁵ Congress specifically directed FirstNet to “encourag[e]... leverag[ing] to the maximum extent economically desirable, existing

³³⁸ See Spectrum Act § 6409(a).

³³⁹ Spectrum Act § 6409(a)(1).

³⁴⁰ Conference Report at 136.

³⁴¹ See *Infrastructure NPRM*, 28 FCC Rcd at 14274 para. 95

³⁴² See, generally, Spectrum Act, Title VI.

³⁴³ See Spectrum Act § 6401. The H Block auction closed in February 2014, and the Commission issued licenses for construction and operation over H Block spectrum in April 2014. Auction of H Block Licenses in the 1915-1920 MHz and 1995-2000 MHz Band Closes; Winning Bidder Announced for Auction 96, *Public Notice*, 29 FCC Rcd 2044 (WTB 2014); Wireless Telecommunications Bureau Grants H Block (1915-1920 MHz and 1995-2000 MHz) Licenses, Auction No. 96, *Public Notice*, 29 FCC Rcd 4782 (WTB 2014). The AWS-3 auction is scheduled for November 2014. Auction of Advanced Wireless Services (AWS-3) Licenses Scheduled for November 13, 2014; Notice and Filing Requirements, Reserve Prices, Minimum Opening Bids, Upfront Payments and Other Procedures for Auction 97, *Public Notice*, 29 FCC Rcd 8386 (WTB 2014).

³⁴⁴ See Spectrum Act §§ 6402, 6403. See also Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, Docket No. 12-268, *Notice of Proposed Rulemaking*, 27 FCC Rcd 12357 (2012); Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions, GN Docket No. 12-268, *Report and Order*, 29 FCC Rcd 6567 (2014) (*Incentive Auction Report and Order*).

³⁴⁵ See Spectrum Act §§ 6201, 6202, 6206. See also Implementing Public Safety Broadband Provisions of the Middle Class Tax Relief and Job Creation Act of 2012; Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band; Service Rules for the 698-746, 747-762 and 777-792 MHz Bands, PS Docket No. 12-94, PS Docket No. 06-229, WT Docket No. 06-150, *Notice of Proposed Rulemaking*, 28 FCC Rcd 2715 (2013).

commercial wireless infrastructure to speed deployment of the network.”³⁴⁶ And it authorized the Commission to “take any action necessary to assist [FirstNet] in effectuating its duties and responsibilities” under the Spectrum Act.³⁴⁷

137. In the context of these goals, Congress included Section 6409, which contributes to the twin goals of commercial and public safety wireless broadband deployment through several measures that promote the deployment of the network facilities needed to provide broadband wireless services. These measures include Section 6409(a), entitled “Facility Modifications,” which has three provisions. As noted above, Subsection (a)(1) provides that “[n]otwithstanding section 704 of the Telecommunications Act of 1996 [codified as 47 U.S.C. § 332(c)(7)] or any other provision of law, a State or local government may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station.”³⁴⁸ Subsection (a)(2) defines the term “eligible facilities request” as any request for modification of an existing wireless tower or base station that involves (a) collocation of new transmission equipment; (b) removal of transmission equipment; or (c) replacement of transmission equipment.³⁴⁹ Subsection (a)(3) provides that “[n]othing in paragraph (a) shall be construed to relieve the Commission from the requirements of the National Historic Preservation Act or the National Environmental Policy Act of 1969.”³⁵⁰ Aside from the definition of “eligible facilities request,” Section 6409(a) does not define any of its terms. Similarly, neither the definitional section of the Spectrum Act nor that of the Communications Act contains definitions of the Section 6409(a) terms.³⁵¹

138. After the adoption of the Spectrum Act, Commission staff received inquiries from service providers, facilities owners, and State and local governments seeking guidance as to how Section 6409(a) should be applied, leading the Wireless Telecommunications Bureau to issue a Public Notice in January of 2013 (*Section 6409(a) PN*).³⁵² Although the *Section 6409(a) PN* provided interpretive guidance on certain questions, the Bureau left other issues unaddressed, and parties also raised questions and concerns regarding the *Section 6409(a) PN* guidance itself.³⁵³ Therefore, in the *Infrastructure NPRM*, the Commission sought comment on whether to address the provision more conclusively and comprehensively.³⁵⁴ The Commission found that it would serve the public interest to seek comment on implementing rules to define terms that the provision left undefined, and to fill in other interstices that may serve to delay the intended benefits of Section 6409(a). The Commission anticipated that, in the absence of definitive guidance, the uncertainties under Section 6409(a) might lead to protracted and costly litigation, adversely affect the timely deployment of the PSBN, and undermine the Spectrum Act’s goal of advancing broadband deployment.³⁵⁵ In addition, the Commission expressed its belief that the various stakeholders, including State and local governments, FirstNet, Commission licensees, and tower companies, would benefit from having settled interpretations on which they could rely in determining

³⁴⁶ Spectrum Act § 6206(b)(1)(C).

³⁴⁷ Spectrum Act § 6213.

³⁴⁸ *Id.* § 6409(a)(1).

³⁴⁹ *Id.* § 6409(a)(2).

³⁵⁰ *Id.* § 6409(a)(3).

³⁵¹ See *Infrastructure NPRM*, 28 FCC Rcd at 14272-73 para. 92 (citing Spectrum Act § 6001; 47 U.S.C. § 153).

³⁵² See Wireless Telecommunications Bureau Offers Guidance on Interpretation of Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012, *Public Notice*, 28 FCC Rcd 1 (WTB 2013) (*Section 6409(a) PN*). See also *Infrastructure NPRM*, 28 FCC Rcd at 14273 para. 93.

³⁵³ See *id.* at 14275 para. 96.

³⁵⁴ See *id.*

³⁵⁵ See *id.*

how to comply with the new law. It therefore sought comment on the interpretation of various terms, and on other implementing issues under the provision. The Commission also sought comment on any reasons it should limit or decline to take regulatory action to clarify Section 6409(a) in this proceeding.³⁵⁶

139. In response to the *Infrastructure NPRM*, a broad range of parties from within the communications industry, including carriers, cable companies, tower companies and other infrastructure providers, wireless equipment providers, and industry associations representing, among others, utilities, broadcasters, and wireless Internet service providers, submitted comments arguing that the Commission should adopt rules clarifying the terms of Section 6409(a) to reduce uncertainty and litigation and to facilitate deployment of broadband services.³⁵⁷ These commenters assert that some jurisdictions have adopted varying and often narrow interpretations of the provision, and that failure to adopt such rules will likely result in an inconsistent patchwork of requirements and undermine the efficiencies the provision was crafted to create.³⁵⁸ They contend that Commission action is necessary to eliminate ambiguities that have caused delay or denial of applications for broadband facilities deployment.³⁵⁹

140. Most municipality commenters, however, oppose adoption of rules and recommend instead that the Commission encourage the wireless industry and local governments to collaborate on development of best practices.³⁶⁰ They argue that it is not necessary to adopt rules at this time because there is no evidence of a widespread problem in deployment of modified facilities covered by Section 6409(a).³⁶¹ They also contend that local governments and the wireless industry work well together on siting issues in most cases, and where problems arise, they can be and are addressed on a case-by-case basis.³⁶² They argue that additional informal guidance would address the concerns raised in the *Infrastructure NPRM* more productively than adopting rules, particularly if the supplemental guidance encouraged cooperative efforts between interested parties and the development of best practices.³⁶³ Some localities, however, support adoption of rules, arguing that a clear statement from the Commission would resolve the divergent views of industry and regulatory authorities.³⁶⁴

141. Some industry associations have affirmatively committed to working “with municipal government representatives . . . on developing materials and gathering information that will foster a greater understanding of Section 6409(a) and facilitate timely and consistent wireless facility

³⁵⁶ See *id.*

³⁵⁷ See, e.g., AT&T Comments at 21; AT&T Reply Comments at 12-13; CTIA Reply Comments at 5; PCIA Comments at 24-25; Sprint Comments at 7-8; Verizon Comments at 26-27.

³⁵⁸ See, e.g., AT&T Comments at 7; PCIA Comments at 24-25; Verizon Comments at 26-27.

³⁵⁹ See, e.g., AT&T Comments at 7; Verizon Comments at 26-27 (providing examples of narrow interpretation of the provision by States and local jurisdictions); see also Coconut Creek Comments at 5 (arguing that it is appropriate for the Commission to adopt rules interpreting the Congressional intent behind Section 6409(a) because of the divergent views already taken by industry and local government in the absence of clarity).

³⁶⁰ See, e.g., Alexandria *et al.* Comments at 5-13; CA Local Governments Comments at 1; CCUA *et al.* Comments at 4-5; DC Comments at 7; Fairfax Comments at 6-7; IAC Comments at 2; Long Beach Comments at 1; NATOA *et al.* Comments at 7-11; NJSLSM Comments at 2.

³⁶¹ See, e.g., CCUA *et al.* Comments at 4, 17-18; see also CA Local Governments Comments at 1; DC Comments at 6 (arguing that there is no record of State and local governments being unresponsive to requests for collocations or reasonable modification of existing towers); Fairfax Comments at 6-7 (asserting that in the last five years, Fairfax County has approved 99.8% of all collocation applications).

³⁶² See, e.g., CCUA *et al.* Comments at 4-5.

³⁶³ See, e.g., Alexandria *et al.* Comments at 13-22; CCUA *et al.* Comments at 4-5.

³⁶⁴ See, e.g., Coconut Creek Comments at 5; MDIT Comments at 2; West Palm Beach Comments at 5.

modifications.”³⁶⁵ In particular, CTIA and PCIA pledge to start working with representative national associations shortly after release of this Report and Order to assist resource-constrained municipalities “during the transition and implementation of any rules the FCC may adopt pertaining to the application review process pursuant to Section 6409(a).”³⁶⁶ They also have committed to distributing best practices to resource-constrained jurisdictions, holding webinars regarding the application process for resource-constrained jurisdictions, and “[p]roviding assistance in drafting a model ordinance and application for reviewing eligible facilities requests under Section 6409(a).”³⁶⁷ Finally, they have committed to “[c]reating a Checklist that local government officials can use to help streamline review processes.”³⁶⁸

B. Discussion

142. After reviewing the voluminous record in this proceeding, we decide to adopt rules clarifying the requirements of Section 6409(a), and implementing and enforcing these requirements, in order to prevent delay and confusion in such implementation. As the Commission noted in the *Infrastructure NPRM*, collocation on existing structures is often the most efficient and economical solution for mobile wireless service providers that need new cell sites to expand their existing coverage area, increase their capacity, or deploy new advanced services.³⁶⁹ We agree with industry commenters that clarifying the terms in Section 6409 will eliminate ambiguities in interpretation and thus facilitate the zoning process for collocations and other modifications to existing towers and base stations.³⁷⁰ Although these issues could be addressed over time through judicial decisions, we conclude that addressing them now in a comprehensive and uniform manner will ensure that the numerous and significant disagreements over the provision do not delay its intended benefits.

143. The record demonstrates very substantial differences in the views advanced by local government and wireless industry commenters on a wide range of interpretive issues under the provision. While many localities recommend that the Commission defer to best practices to be developed on a collaborative basis,³⁷¹ we find that there has been little progress in that effort since enactment of Section 6409(a) well over two years ago. And while we generally encourage the development of voluntary best practices, we are also concerned that voluntary best practices, on their own, may not effectively resolve many of the interpretive disputes or ensure uniform application of the law in this instance.³⁷² In light of these disputes, we take this opportunity to provide additional certainty to parties.

144. *Authority.* We find that we have authority under Section 6003 of the Spectrum Act to adopt rules to clarify the terms in Section 6409(a) and to establish procedures for effectuating its

³⁶⁵ Letter from Jonathan M. Campbell, PCIA-The Wireless Infrastructure Association, and Brian M. Josef, CTIA-The Wireless Association, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 13-238, filed Oct. 16, 2014 (PCIA and CTIA Oct. 16, 2014 *Ex Parte*). See 47 C.F.R. §§ 1.1204(a)(10), 1.1203(a)(1).

³⁶⁶ PCIA and CTIA Oct. 16, 2014 *Ex Parte* at 1.

³⁶⁷ *Id.* at 2.

³⁶⁸ *Id.*

³⁶⁹ See *Infrastructure NPRM*, 28 FCC Rcd at 14274 para. 95 (citing *Sixteenth Competition Report*, 28 FCC Rcd at 3909 para. 331). PCIA estimates that the average cost to build a new tower is between \$250,000 and \$300,000, whereas the average deployment cost for a collocation is between \$25,000 and \$30,000. See PCIA Comments, WT Docket 11-186, at 7.

³⁷⁰ See, e.g., AT&T Comments at 7; Joint Venture Comments at 5; PCIA Comments at 24-25; San Diego PDS Comments at 2; Sprint Comments at 7-8; Verizon Comments at 26-27.

³⁷¹ See, e.g., Alexandria *et al.* Comments at 11; CA Local Governments Comments at 1; CCUA *et al.* Comments at 4-5; DC Comments at 7; Fairfax Comments at 6-7; IAC Comments at 2; NATOA *et al.* Comments at 7-11; NJSMLM Comments at 2.

³⁷² See, e.g., PCIA Comments at 25-26. See also AT&T Reply Comments at 12-13.

requirements.³⁷³ Section 6003 requires the Commission to “implement and enforce this title as if this title is a part of the Communications Act of 1934,”³⁷⁴ bringing its interpretation directly within several provisions granting the Commission broad authority to promulgate rules implementing that Act.³⁷⁵ As noted above, we also have broad authority to “take any action necessary to assist [FirstNet] in effectuating its duties and responsibilities” to construct and operate a nationwide public safety broadband network.³⁷⁶ The rules we adopt reflect the authority conferred by these provisions, as they will facilitate and expedite infrastructure deployment in qualifying cases and thus advance wireless broadband deployment by commercial entities as well as FirstNet.

1. Definition of Terms in Section 6409(a)

145. Section 6409(a) includes a number of undefined terms that bear directly on how the provision applies to infrastructure deployments. Below, we address the meaning of “wireless tower or base station,” “transmission equipment,” “collocation,” and “substantially changes the physical dimensions.”

a. Scope of Covered Services

146. *Background.* We first address the scope of wireless services to which the provision applies through the definitions of both “transmission equipment” and “wireless tower or base station.” In the *Infrastructure NPRM*, the Commission observed that Section 6409(a) refers to “transmission equipment” without referencing any particular service, and similarly refers generally to a “wireless” tower or base station, rather than specifying towers and base stations used for particular services.³⁷⁷ The Commission therefore proposed to find that Section 6409(a) applies to equipment used in connection with any Commission-authorized wireless transmission, licensed or unlicensed, terrestrial or satellite, including commercial mobile, private mobile, broadcast, and public safety services, as well as fixed wireless services such as microwave backhaul or fixed broadband.³⁷⁸ The Commission further proposed to define a “wireless” tower or base station to include one used for any such purpose (*i.e.*, to cover the same scope of services as “transmission equipment”).³⁷⁹

147. Wireless and broadcast industry commenters generally support this proposed interpretation.³⁸⁰ For example, NAB argues that an interpretation of Section 6409(a) encompassing broadcast service, towers, and equipment is fundamentally consistent with Congress’s intent to improve the facilities application process; it contends further that this interpretation will make broadcast towers more readily available for collocation, especially for public safety communications equipment.³⁸¹ UTC similarly argues that “[b]ecause of the ubiquity of utility and CII (‘critical infrastructure industries’)

³⁷³ See Spectrum Act § 6003.

³⁷⁴ Spectrum Act § 6003.

³⁷⁵ See 47 U.S.C. §§ 154(i), 201(b), 303(r).

³⁷⁶ Spectrum Act § 6213, *codified at* 47 U.S.C. § 1433.

³⁷⁷ *Infrastructure NPRM*, 28 FCC Rcd at 14277 para. 103.

³⁷⁸ See *id.* at 14277 para. 104.

³⁷⁹ *Id.*

³⁸⁰ See, e.g., AT&T Comments at 23; CCA Reply Comments at 4-5; Cox Reply Comments at 5; CTIA Reply Comments at 7; ExteNet Comments at 4; Fibertech Comments at 19; NCTA Reply Comments at 3; PCIA Comments at 29-30; Sprint Comments at 8-9; TIA Comments at 5; T-Mobile Reply Comments at 5-6; UTC Comments at 12; Verizon Comments at 27.

³⁸¹ See NAB Reply Comments at 3-4.

communications networks, operators of small cell and DAS networks can use collocation on these facilities to . . . bring advanced communications capabilities throughout the United States.”³⁸²

148. Municipal commenters generally favor a narrower scope of covered services.³⁸³ Several urge the Commission to interpret the term “wireless” in Section 6409(a) to cover only “personal wireless services” consistent with Section 332(c)(7).³⁸⁴ In a joint submission of proposed definitions (Local Government Definitions),³⁸⁵ several municipal commenters urge us to find that the provision covers “personal wireless services” and “wireless ‘public safety services.’”³⁸⁶ Some municipal commenters object in particular to the inclusion of broadcast services, arguing that treating “broadcast” as a “wireless” service conflicts with the usage of those terms in the Spectrum Act and in other Commission orders.³⁸⁷

149. *Discussion.* After considering the arguments in the record, we conclude that Section 6409(a) applies both to towers and base stations and to transmission equipment used in connection with any Commission-authorized wireless communications service. We find strong support in the record for this interpretation.³⁸⁸ With respect to towers and base stations, we conclude that this interpretation is warranted given Congress’s selection of the broader term “wireless” in Section 6409(a) rather than the narrow term “personal wireless service” it previously used in Section 332(c)(7), as well as Congress’s express intent that the provisions of the Spectrum Act “advance wireless broadband service,” promoting “billions of dollars in private investment,” and further the deployment of FirstNet.³⁸⁹ We find that interpreting “wireless” in the narrow manner that some municipal commenters suggest would substantially undermine the goal of advancing the deployment of broadband facilities and services,³⁹⁰ and that interpreting Section 6409(a) to facilitate collocation opportunities on a broad range of suitable structures will far better contribute to meeting these goals, and is particularly important to further the deployment of FirstNet. As noted above, the Spectrum Act directs the FirstNet authority, in carrying out its duty to deploy and operate a nationwide public safety broadband network, to “enter into agreements to utilize, to the maximum extent economically desirable, existing . . . commercial or other communications

³⁸² UTC Comments at 3.

³⁸³ See, e.g., Alexandria *et al.* Comments at 26; Coconut Creek Comments at 6; San Antonio Comments at 16; Springfield Comments at 14-15; West Palm Beach Comments at 6.

³⁸⁴ See, e.g., Alexandria *et al.* Comments at 26 (arguing that in using the term “wireless,” Congress “was concerned with the sorts of services that are the subject of Section 332(c)(7)” and not, for example, broadcast towers).

³⁸⁵ See Letter from Gerard Lederer, Best Best & Krieger LLP, to Marlene Dortch, Secretary, FCC, WT Docket No. 13-238, filed July 21, 2014 (Local Governments July 21, 2014 *Ex Parte*), Attach. B; Letter from Kenneth S. Fellman, Kissinger & Fellman, P.C., to Marlene Dortch, Secretary, FCC, WT Docket No. 13-238, filed July 17, 2014 (CCUA *et al.* July 17, 2014 *Ex Parte*), Attach. A. Because these two sets of definitions are identical, and because their proponents confirmed as much, we refer to them collectively as the “Local Government Definitions.”

³⁸⁶ See Local Government Definitions. The Local Government Definitions propose to define “public safety services” in the manner that term is defined in Section 1401(27) of the Spectrum Act, but they do not propose how to define “wireless.”

³⁸⁷ See, e.g., Alexandria *et al.* Comments at 26; San Antonio Comments at 16.

³⁸⁸ See, e.g., AT&T Comments at 23; CCA Reply Comments at 4-5; Cox Reply Comments at 3-4; NAB Reply Comments at 6; PCIA Comments at 29; Sprint Comments at 8-9.

³⁸⁹ See Conference Report at 136 (discussing the purposes of the public safety and spectrum provisions of the Conference substitute, stating that “[t]hese provisions also deliver on one of the last outstanding recommendations of the 9/11 Commission by creating a nationwide interoperable broadband communications network for first responders.”).

³⁹⁰ As some commenters note, Section 332(c)(7) defines “personal wireless services” as “commercial mobile [radio] services, unlicensed wireless [telecommunications] services, and common carrier wireless exchange access services.” 47 U.S.C. § 332(c)(7).

infrastructure; and . . . Federal, State, tribal, or local infrastructure.”³⁹¹ For all of these reasons, we find it appropriate to interpret Section 6409(a) as applying to collocations on infrastructure that supports equipment used for all Commission-licensed or authorized wireless transmissions.

150. We are not persuaded that Congress’s use of the term “base station” implies that the provision applies only to mobile service.³⁹² As noted in the *Infrastructure NPRM*, our rules define “base station” as a feature of a mobile communications network, and the term has commonly been used in that context.³⁹³ It is important, however, to interpret “base station” in the context of Congress’s intention to advance wireless broadband service generally, including both mobile and fixed broadband services.³⁹⁴ We note, for example, that the Spectrum Act directs the Commission to license the new commercial wireless services employing H Block, AWS-3, and repurposed television broadcast spectrum under “flexible-use service rules”—*i.e.*, for fixed as well as mobile use.³⁹⁵ Moreover, in the context of wireless broadband service generally, the term “base station” describes fixed stations that provide fixed wireless service to users as well as those that provide mobile wireless service.³⁹⁶ Indeed, this is particularly true with regard to Long Term Evolution (LTE), in which base stations can support both fixed and mobile service.³⁹⁷ Accordingly, we find that, in the context of Section 6409(a), the term “base station” encompasses both mobile and fixed services.

³⁹¹ Spectrum Act § 6206(c)(3). We further note Congress’s direction to FirstNet that, in issuing requests for proposals to private sector entities for the purposes of building and operating the public safety network, FirstNet should “encourage[e] that such requests leverage, to the maximum extent economically desirable, existing commercial wireless infrastructure to speed deployment of the network.” *Id.* at § 6206(b)(1)(C).

³⁹² See, e.g., IAC Comments at 5 (citing Intergovernmental Advisory Committee to the Federal Communications Commission: Advisory Recommendation Number 2013-9, “Response to Wireless Telecommunications Bureau’s Guidance on Interpretation of Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012,” dated July 31, 2013 (“IAC Recommendation”), at 3). The IAC Recommendation has been filed in WC Docket No. 11-59 (Aug. 2, 2013) and is also available at <http://www.fcc.gov/encyclopedia/intergovernmental-advisory-committee-comments>).

³⁹³ *Infrastructure NPRM*, 28 FCC Rcd at 14278 para. 107 (citing 47 C.F.R. § 90.7, which defines “base station” in Part 90 of the Commission’s rules as a “station at a specified site authorized to communicate with mobile stations.”); 47 C.F.R. §§ 2.1(c), 24.5 (defining “base station” as “[a] land station in the land mobile service.”).

³⁹⁴ See WISPA Reply Comments at 7.

³⁹⁵ Spectrum Act §§ 6401(b)(1)(B), 6403 (codified at 47 U.S.C. §§ 1451(b)(1)(B), 1452).

³⁹⁶ See, e.g., Amendment of Part 27 of the Commission’s Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band, WT Docket No. 07-293, *Report and Order and Second Report and Order*, 25 FCC Rcd 11710, n.92 (2010) (stating that, “[i]n fixed WiMAX networks, both the base stations and subscriber stations are stationary during use”); Unlicensed Operation in the TV Broadcast Bands, ET Docket No. 04-186, *Additional Spectrum For Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, ET Docket No. 02-380, *Second Report and Order and Memorandum Opinion and Order*, 23 FCC Rcd 16807, 16846 para. 104 (2009) (adopting rules to allow unlicensed wireless broadband services, and noting that “[a] fixed system will consist of a permanently located base station transmitting to one or more fixed devices or to personal/portable end user devices”); Pacific Wireless, “Fixed Wireless Broadband,” available at <http://www.pacificwireless.com.au/fixed-wireless-broadband.html> (noting that “[i]n all wireless networks, base stations do not move—*i.e.* they are in a fixed location—but in a mobile broadband network, the [Subscriber Unit] can move”).

³⁹⁷ See, e.g., “PLDT Rolls-Out 5,000 New 4G LTE Base Stations,” available at <http://www.policychargingcontrol.com/1824-pldt-rolls-out-5-000-new-lte-base-stations> (noting one service provider has “deployed nearly 2,000 fixed wireless LTE base stations to serve high-speed wireless broadband services to homes”); “LTE to Bring Fixed-Wireless Broadband to Rural Australia,” available at <http://www.ericsson.com/news/1520376> (noting that “[f]ixed-wireless networks are used to connect stationary points – in this case LTE base stations to several households or businesses”).

151. We are also not persuaded that we should exclude “broadcast” from the scope of Section 6409(a), both with respect to “wireless” towers and base stations and with respect to transmission equipment. While we acknowledge that the term “wireless providers” appears in other sections of the Spectrum Act that do not encompass broadcast services,³⁹⁸ we do not agree that use of the word “wireless” in Section 6409’s reference to a “tower or base station” can be understood without reference to context.³⁹⁹ We therefore interpret the term “wireless” as used in Section 6409(a) in light of the purpose of this provision in particular and the larger purposes of the Spectrum Act as a whole. We find that Congress intended the provision to facilitate collocation in order to advance the deployment of commercial and public safety broadband services, including the deployment of the FirstNet network. We agree with NAB that including broadcast towers significantly advances this purpose by “supporting the approximately 25,000 broadcast towers as collocation platforms.”⁴⁰⁰ We note that a variety of industry and municipal commenters likewise support the inclusion of broadcast towers for similar reasons.⁴⁰¹ Finally, we observe that this approach is consistent with the Collocation Agreement and the NPA, both of which define “tower” to include broadcast towers. These agreements address “wireless” communications facilities and collocation for any “communications” purposes. They extend to any “tower” built for the sole or primary purpose of supporting any “FCC-licensed” facilities.⁴⁰² We find these references particularly persuasive in ascertaining congressional intent, since Section 6409(a) expressly references the Commission’s continuing obligations to comply with NEPA and NHPA, which form the basis for these agreements.⁴⁰³

³⁹⁸ See, e.g., Spectrum Act § 6203 (“Public Safety Interoperability Board”). This section provides that “4 members [of the board] shall be representatives of wireless providers,” of whom two members must represent “national wireless providers,” one must represent “regional wireless providers,” and one must represent “rural wireless providers.” We agree that the phrase “wireless providers” in the context of this separate Subtitle B of the Spectrum Act, in establishing a board charged with developing recommended minimum technical interoperability requirements for the nationwide public safety broadband network, was not intended to include providers of broadcast services. See also San Antonio Comments at 16, n.19. San Antonio argues that the Commission has used the terms “wireless” and “broadcast” to refer to two different categories of service, citing the Commission’s decisions that distinguish between “wireless” and “broadcast” licensees. The Commission decisions cited by San Antonio are in the context of establishing different regulatory requirements for wireless services and broadcast services, and do not address the context of facilitating access to infrastructure. As discussed further below, for example, the Collocation Agreement uses the term “wireless” broadly to refer to the use of “wireless antenna” for any “communications” purpose, including broadcast. See Collocation Agreement (entitled “National Programmatic Agreement for the Collocation of Wireless Antennas”) § I.A (encompassing all antennas for the “purpose of transmitting and/or receiving radio frequency signals for communications purposes”).

³⁹⁹ As the Supreme Court has cautioned, “[m]ost words have different shades of meaning and consequently may be variously construed, not only when they occur in different statutes, but when used more than once in the same statute or even in the same section.” *Environmental Defense v. Duke Energy Corp.*, 549 U.S. 561, 574 (2007). Thus, the same word in the same statute “may take on distinct characters from association with distinct statutory objects calling for different implementation strategies.” *Id.*

⁴⁰⁰ NAB Reply Comments at 3-4 (stating that anecdotal evidence suggests that as many as 85% of the approximately 25,000 existing broadcast towers are being used for collocation today).

⁴⁰¹ See, e.g., Coconut Creek Comments at 6; NAB Reply Comments at 3; NCTA Reply Comments at 2-3; Springfield Comments at 15; West Palm Beach Comments at 5.

⁴⁰² 47 C.F.R. Part 1 App. B (Collocation Agreement) (introductory clause and part I definitions of “collocation” and “tower”). Under the NPA, “tower” is defined as “[a]ny structure built for the sole or primary purpose of supporting Commission-licensed or authorized Antennas, including the on-site fencing, equipment, switches, wiring, cabling, power sources, shelters, or cabinets associated with that Tower but not installed as part of an Antenna as defined herein.” 47 C.F.R. Part 1 App. C § II.A.14 (NPA).

⁴⁰³ See Spectrum Act § 6409(c).

152. We further conclude that a broad interpretation of “transmission equipment” is similarly appropriate in light of the purposes of Section 6409(a) in particular and the Spectrum Act more generally.⁴⁰⁴ The statute’s Conference Report expresses Congress’s intention to advance wireless broadband service generally,⁴⁰⁵ and as PCIA states, a broad definition of this term will ensure coverage for all wireless broadband services, including future services not yet contemplated.⁴⁰⁶ Defining “transmission equipment” broadly will therefore facilitate the deployment of wireless broadband networks and will “minimize the need to continually redefine the term as technology and applications evolve.”⁴⁰⁷ We also note that a broad definition reflects Congress’s definition of a comparable term in the context of directly related provisions in the same statute; in Section 6408, the immediately preceding provision addressing uses of adjacent spectrum, Congress defined the term “transmission system” broadly to include “any telecommunications, broadcast, satellite, commercial mobile service, or other communications system that employs radio spectrum.”⁴⁰⁸

153. We disagree with commenters who contend that including broadcast equipment within covered transmission equipment does not advance the goals of the Spectrum Act.⁴⁰⁹ While broadcast equipment does not itself transmit wireless broadband signals, its efficient collocation pursuant to Section 6409(a) will expedite and minimize the costs of the relocation of broadcast television licensees that are reassigned to new channels in order to clear the spectrum that will be offered for broadband services through the incentive auction, as mandated by the Spectrum Act.⁴¹⁰ Accordingly, we conclude that inclusion of broadcast service equipment in the scope of transmission equipment covered by the provision furthers the goals of the legislation and will contribute in particular to the success of the post-incentive auction transition of television broadcast stations to their new channels. In any event, we note that the language of Section 6409(a) is broader than that used in Section 332(c)(7), and it is therefore reasonable to construe it in a manner that does not differentiate among various Commission-regulated services, particularly in the context of mandating approval of facilities that do not result in any substantial increase in physical dimensions.

154. We further reject arguments that Congress intended these terms to be restricted to equipment used in connection with personal wireless services and public safety services.⁴¹¹ The Communications Act and the Spectrum Act already define those narrower terms, and Congress chose not to employ them in Section 6409(a), determining instead to use the broader term, “wireless.” The

⁴⁰⁴ See, e.g., AT&T Comments at 23; CCA Reply Comments at 4-5; NAB Reply Comments at 3-4; PCIA Comments at 29-31; Sprint Comments at 8-9; TIA Comments at 5; WISPA Reply Comments at 4.

⁴⁰⁵ See Conference Report at 136.

⁴⁰⁶ See PCIA Comments at 29. See also, e.g., CCA Reply Comments at 4-5.

⁴⁰⁷ Towerstream Comments at 10-11; CCA Reply Comments at 5.

⁴⁰⁸ Spectrum Act § 6408.

⁴⁰⁹ See, e.g., Alexandria *et al.* Comments at 26; CA Local Governments Comments at 2-3; CCUA *et al.* Comments at 9; Local Government Definitions.

⁴¹⁰ See *Incentive Auction Report and Order*, 29 FCC Rcd 6133, at paras. 1 (establishing rules to, among other thing, reorganize the broadcast television bands in order to “recover a portion of ultra-high frequency (‘UHF’) spectrum for a ‘forward auction’ of new, flexible-use licenses suitable for providing mobile broadband services”), 581 (providing that “[t]he following circumstances may justify an extension of a station’s construction deadline: . . . delays faced by broadcast stations that must obtain government approvals, such as land use or zoning approvals”). We further note that Section 6403 allows broadcasters subject to relocation in the incentive auction process to accept, in lieu of reimbursement for relocation cost, a waiver of the applicable service rules to permit the licensee to make flexible use of its assigned spectrum to provide services other than broadcast television services, so long as the licensee provides “at least 1 broadcast television program stream on such spectrum at no charge to the public.” Spectrum Act § 6403(b)(4)(B).

⁴¹¹ See Local Government Definitions.

legislative history supports the conclusion that Congress intended to employ broader language. In the Conference Report, Congress emphasized that a primary goal of the Spectrum Act was to “advance wireless broadband service,” which would “promot[e] billions of dollars in private investment, and creat[e] tens of thousands of jobs.”⁴¹² In light of its clear intent to advance wireless broadband deployment through enactment of Section 6409(a), we find it implausible that Congress meant to exclude facilities used for such services.

b. Transmission Equipment

155. *Background.* In addition to seeking comment on the scope of services supported by covered “transmission equipment,” the Commission further proposed to define “transmission equipment” to encompass antennas and other equipment associated with and necessary to their operation, including power supply cables and backup power equipment.⁴¹³ It sought comment in particular on including backup power equipment in light of the public interest in continued service during emergencies. It further sought comment on whether to use the NPA’s definition of “antenna” as the definition of “transmission equipment.”⁴¹⁴

156. Industry commenters support the Commission’s proposal.⁴¹⁵ They argue that the definition of “transmission equipment” must include backup power equipment and other power supply equipment in light of the public interest in maintaining uninterrupted service during emergencies.⁴¹⁶ AT&T recommends that we base the definition on the definition of “antenna” in the NPA, which includes the transmission device and any on-site equipment, switches, wiring, cabling, power sources, shelters, or cabinets.⁴¹⁷

157. Several local government commenters oppose the proposed definition, urging the Commission to limit its scope to electronic components that actually transmit or receive communications signals.⁴¹⁸ In particular, they oppose inclusion of backup power generators, arguing that some generators raise environmental, safety and zoning issues more properly suited to a discretionary review process.⁴¹⁹ Tempe argues further that backup power equipment should not be included in the definition because it is not “necessary” to wireless operations.⁴²⁰

158. *Discussion.* We adopt the proposal in the *Infrastructure NPRM* to define “transmission equipment” to encompass antennas and other equipment associated with and necessary to their operation, including power supply cables and backup power equipment.⁴²¹ We find that this definition reflects Congress’s intent to facilitate the review of collocations and minor modifications, and it recognizes that

⁴¹² See Conference Report at 136.

⁴¹³ *Infrastructure NPRM*, 28 FCC Rcd at 14277-78 para. 105.

⁴¹⁴ *Id.* at 14278 para. 106.

⁴¹⁵ See, e.g., AT&T Comments at 23; CCA Reply Comments at 4-5; CTIA Reply Comments at 7; Fibertech Comments at 18; PCIA Comments at 29-31; Sprint Comments at 8-9; TIA Comments at 5.

⁴¹⁶ See, e.g., AT&T Comments at 23; PCIA Comments at 29-30; Sprint Comments at 8-9.

⁴¹⁷ AT&T Comments at 23.

⁴¹⁸ See, e.g., CA Local Governments Comments at 2-3; CCC Comments at 3 (arguing “transmission equipment” should not include “ancillary or support equipment that is uninvolved in transmission, such as back-up power generators”); CCUA *et al.* Comments at 9; Coconut Creek Comments at 5-6; Tucson Comments at 5.

⁴¹⁹ See, e.g., CA Local Governments Comments at 3; Coconut Creek Comments at 5-6; Fairfax Comments at 7-8; Tucson Comments at 5; West Palm Beach Comments at 5-6.

⁴²⁰ Tempe Comments at 11.

⁴²¹ *Infrastructure NPRM*, 28 FCC Rcd at 14277-78 para. 105.

Congress used the broad term “transmission equipment” without qualifications that would logically limit its scope.⁴²²

159. We are further persuaded by wireless industry commenters that power supplies, including backup power, are a critical component of wireless broadband deployment and that they are necessary to ensure network resiliency.⁴²³ Indeed, including backup power equipment within the scope of “transmission equipment” under Section 6409(a) is consistent with Congress’s directive to the FirstNet Authority to “ensure the . . . resiliency of the network.”⁴²⁴ Tempe’s assertion that backup power is not technically “necessary” because transmission equipment can operate without it is unpersuasive. Backup power is certainly necessary to operations during those periods when primary power is intermittent or unavailable.⁴²⁵ We also conclude that “transmission equipment” should be interpreted consistent with the term “antenna” in the NPA and, given that the NPA term encompasses “power sources” without limitation, we find that “transmission equipment” includes backup power sources.⁴²⁶ Finally, while we recognize the concerns raised by local government commenters regarding the potential hazards of backup power generators, we find that these concerns are fully addressed in the standards applicable to collocation applications discussed below.⁴²⁷

160. Therefore, we define “transmission equipment” under Section 6409(a) as any equipment that facilitates transmission for any Commission-licensed or authorized wireless communication service, including, but not limited to, radio transceivers, antennas and other relevant equipment associated with and necessary to their operation, including coaxial or fiber-optic cable, and regular and backup power supply.⁴²⁸ This definition includes equipment used in any technological configuration associated with any Commission-authorized wireless transmission, licensed or unlicensed, terrestrial or satellite, including commercial mobile, private mobile, broadcast, and public safety services, as well as fixed wireless services such as microwave backhaul or fixed broadband.

c. Existing Wireless Tower or Base Station

161. *Background.* In addition to seeking comment on the scope of the word “wireless” as used in the phrase “wireless tower or base station,” as discussed above, the Commission sought comment more generally on how to define “existing wireless tower or base station” in order to determine the scope of

⁴²² *Id.* See also CCA Reply Comments at 4-5; PCIA Comments at 29; Sprint Comments at 8-9; TIA Comments at 5.

⁴²³ See, e.g., PCIA Comments at 29-30; Sprint Comments at 8-9; TIA Comments at 5; CCA Reply Comments at 4-5. See also CTIA Comments at 23 (“Several significant storm-related disasters over the past three years have underscored the importance of infrastructure . . . hardening as [it] relate[s] to wireless carriers’ ability to maintain communications at the very time it is needed by public safety to assist recovery efforts and by the public to find out the fates of loved ones.”).

⁴²⁴ Spectrum Act § 6206(b)(2)(A). See also “Why FirstNet,” available at <http://www.firstnet.gov/about/why> (stating that “Reliability Must Be Built In” and emphasizing that “[a]s wind speeds rise and electrical power beings to fail, cell sites need ample power backup to address outages”).

⁴²⁵ For a history of the Commission’s concerns about the availability of backup power to ensure the resiliency of wireless services, see, generally, Improving the Resiliency of Mobile Wireless Communications Networks, PS Docket Nos. 13-139, 11-50, *Notice of Proposed Rulemaking*, 28 FCC Rcd 14373 (2013).

⁴²⁶ See NPA § II.A.1. The NPA defines “antenna” in part as “[a]n apparatus designed for the purpose of emitting radio frequency (‘RF’) radiation, to be operated or operating from a fixed location pursuant to Commission authorization, for the transmission of writing, signs, signals, data, images, pictures, and sounds of all kinds, including the transmitting device and any on-site equipment, switches, wiring, cabling, power sources, shelters or cabinets associated with that antenna and added to a Tower, structure, or building as part of the original installation of the antenna.” *Id.*

⁴²⁷ See *infra*, para. 202.

⁴²⁸ Spectrum Act § 6409(a).

support structures covered by Section 6409(a).⁴²⁹ Based on the existing definitions in comparable contexts in the Collocation Agreement, the NPA, and the Commission's rules, the Commission proposed to define a "tower" as any structure built for the sole or primary purpose of supporting antennas used for any FCC-licensed or authorized wireless communications service.⁴³⁰ The Commission proposed to define "base station" as "[a] station at a specified site that enables wireless communication between user equipment and a communications network, including any associated equipment such as, but not limited to, radio transceivers, antennas, coaxial or fiber-optic cable, and regular and backup power supply."⁴³¹ In addition, recognizing the Commission's efforts to encourage collocations on non-tower structures to enhance capacity for wireless networks,⁴³² and consistent with the Bureau's guidance in the *Section 6409(a) PN* on the scope of "base station," the Commission proposed to find that "wireless tower or base station" should be interpreted to encompass structures that support or house equipment that constitutes part of a base station, even if they were not built for the sole or primary purpose of providing such support.⁴³³ Further, the Commission proposed to interpret "base station" as encompassing the relevant equipment in any technological configuration, including DAS.⁴³⁴

162. The Commission also sought comment on how to interpret the term "existing" in this context. It sought comment on whether the term, as applied to "wireless tower or base station," requires only that a structure exist at the time of a collocation application or whether it also requires that the structure is in use at that time as a tower or base station. In particular, the Commission asked whether an "existing" base station only includes a structure that currently supports or houses base station equipment. It sought comment on which interpretation of the word would both facilitate deployments that are unlikely to conflict with local land use policies and also preserve State and local authority to review construction proposals that may have impacts.⁴³⁵

163. Industry commenters agree that "wireless tower" means a structure built for the sole or primary purpose of supporting Commission-licensed or authorized antennas.⁴³⁶ Many industry commenters also support interpreting "base station" to include structures that support or house an antenna, transceiver, or other associated equipment that constitutes part of a base station, even if the structure was not built for the sole or primary purpose of supporting that equipment.⁴³⁷ Some industry commenters propose that the definition of "wireless tower or base station" should also include other structures that are "similar to wireless towers" or otherwise suitable for wireless deployment, such as

⁴²⁹ *Infrastructure NPRM*, 28 FCC Rcd at 14278-80 paras. 107-112.

⁴³⁰ *Id.* at 14278-9 para. 108, 14300 App. A, Proposed Rule § 1.30001 (b)(6); *see also* NPA § II.A.14.

⁴³¹ *See Infrastructure NPRM*, 28 FCC Rcd at 14299-302 App. A.

⁴³² *See, generally*, Implementation of Section 224 of the Act; A National Broadband Plan for Our Future, WC Docket No. 07-245, GN Docket No. 09-51, *Report and Order and Order on Reconsideration*, 26 FCC Rcd 5240 (2011), *aff'd sub nom. American Elec. Power Service Corp. v. FCC*, 708 F.3d 183 (D.C. Cir. 2013) (*Pole Attachment Order*).

⁴³³ *Infrastructure NPRM*, 28 FCC Rcd at 14278-80 paras. 108, 111.

⁴³⁴ *Id.* at 14279-80 para. 110. As noted above, DAS configuration differs from a traditional base station configuration in that transceiver equipment supporting an antenna is typically located not at the antenna site, but at a remote hub site typically connected to the antenna by fiber-optic cable. *See supra*, para. 31.

⁴³⁵ *See Infrastructure NPRM*, 28 FCC Rcd at 14280 para. 111.

⁴³⁶ *See, e.g.*, AT&T Comments at 22; PCIA Comments at 34.

⁴³⁷ *See, e.g.*, AT&T Comments at 22; AT&T Reply Comments at 10-11; CCA Reply Comments at 5-6; Cox Reply Comments at 3-5; PCIA Comments at 31-32; Sprint Comments at 8-9; TIA Comments at 5; T-Mobile Reply Comments at 6-8; WISPA Reply Comments at 6-7.

water towers, light stanchions, and utility poles, even if they do not currently house or support transmission equipment.⁴³⁸

164. Industry commenters urge the Commission not to limit the scope of equipment and structures encompassed by the term “base station,” arguing that it should extend to associated equipment buildings, shelters, and cabinets even if they are not located immediately adjacent to the support structure.⁴³⁹ Sprint further argues that the word “base station” should cover DAS and small cell facilities, consistent with the guidance in the *Section 6409(a) PN*.⁴⁴⁰

165. Municipal commenters suggest narrower definitions. They argue that the definition of “wireless tower” should be limited to structures built for the sole or primary purpose of housing wireless facilities and should not include structures that have not previously been considered wireless towers, such as utility poles, light poles, or buildings.⁴⁴¹ Municipal commenters further argue that the term “base station” does not logically apply to any structures at all; they contend that a “wireless tower” is a structure, but a “base station” is a system of transmission equipment distinct from the structure that supports or houses it.⁴⁴² In addition, some commenters argue that a deployment at a particular site should not be considered a base station unless it includes all the components of a base station. Alexandria *et al.* thus assert that Section 6409(a) does not apply to most DAS facilities, arguing that DAS providers have stated that their facilities, including the distributed antenna, fiber optic connections, and hub site, do not constitute a “wireless . . . base station” at all except for the radio transmitters and reception equipment at the system’s hub.⁴⁴³

166. *Discussion.* We adopt the definitions of “tower” and “base station” proposed in the *Infrastructure NPRM* with certain modifications and clarifications, in order to give independent meaning to both of these statutory terms, and consistent with Congress’s intent to promote the deployment of wireless broadband services. First, we conclude that the term “tower” is intended to reflect the meaning of that term as it is used in the Collocation Agreement. Accordingly, we define “tower” to include any

⁴³⁸ See, e.g., Sprint Comments at 8-9; Verizon Comments at 27-28. See also CCA Reply Comments at 5-6; Cox Reply Comments at 4; NCTA Reply Comments at 3; WISPA Reply Comments at 6-7 (arguing that excluding structures such as water tanks and grain silos that are traditionally utilized to support wireless equipment in rural areas would sharply limit the benefits intended by the statute).

⁴³⁹ See, e.g., AT&T Comments at 23; Cox Reply Comments at 5.

⁴⁴⁰ Sprint Comments at 9. See also AT&T Comments at 22; PCIA Comments at 33 (asserting that while DAS and small cells may be deployed differently than macrocells, their core components and functionality are the same and they should therefore be the subject to the same streamlined processing); Verizon Comments at 27-28.

⁴⁴¹ See, e.g., Alexandria *et al.* Comments at 22-26; Alexandria *et al.* Reply Comments at 9-12; CA Local Governments Comments at 4-6; CCUA *et al.* Reply Comments at 11; DC Comments at 8-9; DC Reply Comments at 7-8; Fairfax Reply Comments at 5; Henderson Comments at 2; CCUA *et al.* Comments at 7-8; Minneapolis Comments at 12; NATOA *et al.* Comments at 12-13; NATOA *et al.* Reply Comments at 4; RCRC Comments at 2; San Antonio Reply Comments at 3; St. Paul Reply Comments at 1-2; Tempe Reply Comments at 4.

⁴⁴² See, e.g., Alexandria *et al.* Comments at 29; CA Local Governments Comments at 3, 7; CCUA *et al.* Comments at 9; DC Reply Comments at 8-9; NATOA *et al.* Comments at 12-13; NATOA *et al.* Reply Comments at 4; PEC Comments at 8-9. See also Alexandria *et al.* Reply Comments at 11 (contending that a “base station” is a “network element in [a] radio access network responsible for radio transmission and reception in one or more cells to or from the user equipment,” not a structure that supports that network element) (internal quotation omitted).

⁴⁴³ Alexandria *et al.* Reply Comments at 12-13, n.34 (citing CTC Report at 20) (“In a DAS, to the extent that any portion of the system may be considered a ‘base station,’ that base station is limited to the radio transmission and reception equipment in the headend building.”). See also Fairfax Comments at 8-9; RCRC Comments at 2; St. Paul Reply Comments at 1-2.

structure built for the sole or primary purpose of supporting any Commission-licensed or authorized antennas and their associated facilities.⁴⁴⁴

167. As proposed in the *Infrastructure NPRM*, we interpret “base station” to extend the scope of the provision to certain support structures other than towers. Specifically, we define that term as the equipment and non-tower supporting structure at a fixed location that enable Commission-licensed or authorized wireless communications between user equipment and a communications network. We find that the term includes any equipment associated with wireless communications service including, but not limited to, radio transceivers, antennas, coaxial or fiber-optic cable, regular and backup power supply, and comparable equipment.⁴⁴⁵ We note that this definition reflects the types of equipment included in our definition of “transmission equipment,” and that the record generally supports this approach.⁴⁴⁶ For example, DC argues that the Commission should define a base station as “generally consist[ing] of radio transceivers, antennae, coaxial cable, a regular and backup power supply, and other associated electronics.”⁴⁴⁷ TIA concurs that the term “base station” encompasses transmission equipment, including antennas, transceivers, and other equipment associated with and necessary to their operation, including coaxial cable and regular and backup power equipment.⁴⁴⁸

168. We further find, consistent with the Commission’s proposal, that the term “existing . . . base station” includes a structure that, at the time of the application, supports or houses an antenna, transceiver, or other associated equipment that constitutes part of a “base station” as defined above, even if the structure was not built for the sole or primary purpose of providing such support.⁴⁴⁹ As the Commission noted in the *Infrastructure NPRM*, while “tower” is defined in the Collocation Agreement and the NPA to include only those structures built for the sole or primary purpose of supporting wireless communications equipment, the term “base station” is not used in these agreements.⁴⁵⁰ However, we reject the proposal to define a “base station” to include any structure that is merely capable of supporting wireless transmission equipment, whether or not it is providing such support at the time of the application.⁴⁵¹ We agree with municipalities’ comments that by using the term “existing,” Section 6409(a) preserves local government authority to initially determine what types of structures are appropriate for supporting wireless transmission equipment if the structures were not built (and thus were not previously approved) for the sole or primary purpose of supporting such equipment.⁴⁵² Some wireless industry commenters also support our interpretation that, while a tower that was built for the primary purpose of housing or supporting communications facilities should be considered “existing” even if it does not currently host wireless equipment, other structures should be considered “existing” only if they support or house wireless equipment at the time the application is filed.⁴⁵³

169. We find that the alternative definitions proposed by many municipalities are unpersuasive. First, we reject arguments that a “base station” includes only the transmission system

⁴⁴⁴ Collocation Agreement § I.B.

⁴⁴⁵ *Infrastructure NPRM*, 28 FCC Rcd at 14300 App. A, Proposed Rule § 1.30001(b)(1).

⁴⁴⁶ See, e.g., AT&T Comments at 22; DC Comments at 9; PCIA Comments at 32-33; Sprint Comments at 8-9; TIA Comments at 6.

⁴⁴⁷ DC Comments at 9.

⁴⁴⁸ TIA Comments at 6.

⁴⁴⁹ *Infrastructure NPRM*, 28 FCC Rcd at 14278-79 para. 108; see also *Section 6409(a) PN*, 28 FCC Rcd at 3.

⁴⁵⁰ *Infrastructure NPRM*, 28 FCC Rcd at 14278 para. 107; Collocation Agreement § V.A (referring to “building or non-Tower structure”); NPA § II.A.14. See also AT&T Comments at 22; AT&T Reply Comments at 10-11.

⁴⁵¹ See, e.g., NCTA Reply Comments at 3; Sprint Comments at 9; Verizon Comments at 27-28.

⁴⁵² See, e.g., Coconut Creek Comments at 6; IAC Recommendation at 3; Salem Comments at 10.

⁴⁵³ See, e.g., AT&T Comments at 22-23; PCIA Comments at 31-32; TIA Comments at 5.

equipment, not the structure that supports it. This reading conflicts with the full text of the provision, which plainly contemplates collocations on a base station as well as a tower. As noted above, Section 6409(a) defines an “eligible facilities request” as a request to modify an existing wireless tower *or base station* by collocating on it (among other modifications).⁴⁵⁴ This statutory structure precludes us from limiting the term “base station” to transmission equipment; collocating on base stations, which the statute envisions, would be conceptually impossible unless the structure is part of the definition as well. We further disagree that defining “base station” to include supporting structures will deprive “tower” of all independent meaning.⁴⁵⁵ As discussed above, we interpret “base station” not to include wireless deployments on towers. Further, we interpret “tower” to include all structures built for the sole or primary purpose of supporting Commission-licensed or authorized antennas, and their associated facilities, regardless of whether they currently support base station equipment at the time the application is filed. Thus, “tower” denotes a structure that is covered under Section 6409(a) by virtue of its construction. In contrast, a “base station” includes a structure that is not a wireless tower only where it already supports or houses such equipment.

170. We are also not persuaded by arguments that “base station” refers only to the equipment compound associated with a tower and the equipment located upon it. First, no commenters presented evidence that “base station” is more commonly understood to mean an equipment compound as opposed to the broader definition of all equipment associated with transmission and reception and its supporting structures. Furthermore, the Collocation Agreement’s definition of “tower,” which we adopt in this Report and Order, treats equipment compounds as part of the associated towers for purposes of collocations;⁴⁵⁶ if towers include their equipment compounds, then defining base stations as equipment compounds alone would render the term superfluous. We also note that none of the State statutes and regulations implementing Section 6409(a) has limited its scope to equipment and structures associated with towers.⁴⁵⁷ In addition, we agree with commenters who argue that limiting the definition of “base station” (and thus the scope of Section 6409(a)) to structures and equipment associated with towers would compromise the core policy goal of bringing greater efficiency to the process for collocations.⁴⁵⁸ Other structures are increasingly important to the deployment of wireless communications infrastructure; omitting them from the scope of Section 6409(a) would mean the statute’s efficiencies would not extend to many if not most wireless collocations, and would counterproductively exclude virtually all of the small cell collocations that have the least impact on local land use.

171. Some commenters arguing that Section 6409(a) covers no structures other than those associated with towers point to the Conference Report, which, in describing the equivalent provision in the House bill, states that the provision “would require approval of requests for modification of cell towers.”⁴⁵⁹ We do not find this ambiguous statement sufficient to overcome the language of the statute as enacted, which refers to “modification of an existing wireless tower *or base station*.”⁴⁶⁰ Moreover, this

⁴⁵⁴ Spectrum Act § 6409(a)(2).

⁴⁵⁵ See, e.g., Alexandria *et al.* Comments at 29.

⁴⁵⁶ NPA § II.A.14.

⁴⁵⁷ See, e.g., GA. ST §36-66B (“Mobile Broadband Infrastructure Leads to Development Act”) (GA BILD Act); MI ST. 125.3514; MO ST 67.5090 *et seq.*, MO LEGIS S.B. 650 (2014) (“Uniform Wireless Communications Infrastructure Deployment Act”); NH Rev Stat § 12-K:10 (2013); NC ST § 160A-400.50 *et seq.* (“Wireless Telecommunications Facilities”); PA ST 53 P.S. § 11702.1 *et seq.* (“Municipalities - Wireless Broadband Collocation Act”); WI ST 66-0404 (2014) (“Mobile Tower Siting Regulations”).

⁴⁵⁸ *Infrastructure NPRM*, 28 FCC Rcd at 14278-80 paras. 107-110; AT&T Comments at 22; PCIA Comments at 31-33; Sprint Comments at 8-9; TIA Comments at 5; T-Mobile Reply Comments at 6-8; WISPA Reply Comments at 6-7.

⁴⁵⁹ Conference Report at 133.

⁴⁶⁰ Spectrum Act § 6409(a) (emphasis added).

statement from the report does not expressly state a limitation on the provision, and thus may reasonably be read as a simplified reference to towers as an important application of its mandate. Therefore, we do not view this language as indicating Congress's intention that the provision encompasses only modifications of structures that qualify as wireless towers.

172. We thus adopt the proposed definition of "base station" to include a structure that currently supports or houses an antenna, transceiver, or other associated equipment that constitutes part of a base station at the time the application is filed.⁴⁶¹ Consistent with the Bureau's guidance in the *Section 6409(a) PN*, we also find that "base station" encompasses the relevant equipment in any technological configuration, including DAS and small cells.⁴⁶² We disagree with municipalities that argue that "base station" should not include DAS or small cells.⁴⁶³ As the record supports, there is no statutory language limiting the term "base station" in this manner. Our definition is sufficiently flexible to encompass, as appropriate to Section 6409(a)'s intent and purpose, future as well as current base station technologies and technological configurations, using either licensed or unlicensed spectrum.⁴⁶⁴

173. While we do not accept municipal arguments to limit Section 6409(a) to equipment or structures associated with towers, we reject industry arguments that Section 6409(a) should apply more broadly to include certain structures that neither were built for the purpose of housing wireless equipment nor have base station equipment deployed upon them.⁴⁶⁵ We find no persuasive basis to interpret the statutory provision so broadly. We agree with Alexandria *et al.* that the scope of Section 6409(a) is different from that of the Collocation Agreement, as the statutory provision clearly applies only to collocations on an existing "wireless tower or base station" rather than any existing "tower or structure."⁴⁶⁶ Further, interpreting "tower" to include structures "similar to a tower" would be contrary to the very Collocation Agreement to which these commenters point us, which defines "tower" in the narrower fashion that we adopt. We also agree with municipalities as a policy matter that local governments should retain authority to make the initial determination (subject to the constraints of Section 332(c)(7)) of which non-tower structures are appropriate for supporting wireless transmission equipment; our interpretations of "tower" and "base station" preserve that authority.⁴⁶⁷

174. Finally, we agree with Fairfax that the term "existing" requires that wireless towers or base stations have been reviewed and approved under the applicable local zoning or siting process or that the deployment of existing transmission equipment on the structure received another form of affirmative State or local regulatory approval (*e.g.*, authorization from a State public utility commission).⁴⁶⁸ Thus, if a tower or base station was constructed or deployed without proper review, was not required to undergo siting review, or does not support transmission equipment that received another form of affirmative State or local regulatory approval, the governing authority is not obligated to grant a collocation application under Section 6409(a). We further clarify that a wireless tower that does not have a permit because it was not in a zoned area when it was built, but was lawfully constructed, is an "existing" tower. We find that our interpretation of "existing" is consistent with the purposes of Section 6409(a) to facilitate

⁴⁶¹ *Infrastructure NPRM*, 28 FCC Rcd at 14300 App. A., Proposed Rules §1.30001(b)(1).

⁴⁶² *Id.* at 14279-80 para. 110. *See also* Sprint Comments at 9.

⁴⁶³ *See, e.g.*, Alexandria *et al.* Reply Comments at 12; Fairfax Comments at 8-9; RCRC Comments at 2.

⁴⁶⁴ *See, e.g.*, CTIA Reply Comments at 12; Sprint Comments at 8-9.

⁴⁶⁵ *See, e.g.*, PCIA Comments at 31-32; Sprint Comments at 9; Verizon Comments at 27-28; WISPA Reply Comments at 6. *See also* CCA Reply Comments at 5-6; Cox Reply Comments at 4; NCTA Reply Comments at 3; WISPA Reply Comments at 6-7.

⁴⁶⁶ Alexandria *et al.* Comments at 30-31.

⁴⁶⁷ *See e.g.*, Coconut Creek Comments at 6; IAC Recommendation at 3; Salem Comments at 10.

⁴⁶⁸ Fairfax Comments at 5; *See also* Fairfax Reply Comments at 7 ("A tower or structure illegally constructed is not sanitized by § 6409(a).").

deployments that are unlikely to conflict with local land use policies and preserve State and local authority to review proposals that may have impacts. First, it ensures that a facility that was deployed unlawfully does not trigger a municipality's obligation to approve modification requests under Section 6409(a). Further, it guarantees that the structure has already been the subject of State or local review. This interpretation should also minimize incentives for governing authorities to increase zoning or other regulatory review in cases where minimally intrusive deployments are currently permitted without review. For example, under this interpretation, a homeowner's deployment of a femtocell that is not subject to any zoning or other regulatory requirements will not constitute a base station deployment that triggers obligations to allow deployments of other types of facilities at that location under Section 6409(a). By thus preserving State and local authority to review the first base station deployment that brings any non-tower structure within the scope of Section 6409(a), we ensure that subsequent collocations of additional transmission equipment on that structure will be consistent with congressional intent that deployments subject to Section 6409(a) will not pose a threat of harm to local land use values.

175. On balance, we find that the foregoing definitions are consistent with congressional intent to foster collocation on various types of structures, while addressing municipalities' valid interest in preserving their authority to determine which structures are suitable for wireless deployment, and under what conditions.⁴⁶⁹

d. Collocation, Replacement, Removal, Modification

176. *Background.* The Commission also sought comment on how to define or interpret the terms "collocation," "removal," "replacement," and "modification" as they are used in the statutory definition of "eligible facilities request."⁴⁷⁰ It sought comment on whether to interpret "collocation" consistent with the Collocation Agreement, where it is defined as "the mounting or installation of an antenna on an existing tower, building or structure for the purpose of transmitting and/or receiving radio frequency signals for communications purposes."⁴⁷¹ It further proposed to interpret a "modification" of a wireless tower or base station to include collocation, removal, or replacement of an antenna or any other transmission equipment associated with the supporting structure, even if the equipment is not physically located upon the structure.⁴⁷² In this regard, the Commission observed that the Collocation Agreement similarly construes the mounting of an antenna "on a tower" to encompass installation of associated equipment cabinets or shelters on the ground.⁴⁷³ The Commission also sought comment on whether the definition should apply to a request to replace or harden a tower or other covered structure if, for example, replacement or hardening of the tower or structure is necessary to support an otherwise covered collocation.⁴⁷⁴

177. Industry commenters generally agree with the Commission's proposed definition of "collocation."⁴⁷⁵ Several municipalities, on the other hand, argue that the term "collocation" should not include the first wireless installation on a given structure.⁴⁷⁶ In addition, PCIA and AT&T argue that

⁴⁶⁹ See, e.g., WISPA Reply Comments at 7.

⁴⁷⁰ *Infrastructure NPRM*, 28 FCC Rcd at 14280 para. 113.

⁴⁷¹ *Id.*

⁴⁷² *Id.* at 14280 para. 114.

⁴⁷³ *Id.*

⁴⁷⁴ See *id.* at 14281 para. 115.

⁴⁷⁵ See, e.g., AT&T Comments at 24; PCIA Comments at 36; Sprint Comments at 9-10; TIA Comments at 6.

⁴⁷⁶ See, e.g., Alexandria *et al.* Comments at 30-31 (arguing that the definitions in the Commission's programmatic agreements do not define the scope of Section 6409(a)); CA Local Governments Comments at 9-11; CA Local Governments Reply Comments at 9-10 ("Whether a permit request constitutes a 'collocation' should depend on whether a legally established wireless use already exists on the structure."); CCUA *et al.* Comments at 10; CCUA *et al.* Reply Comments at 11-12; Tempe Reply Comments at 4.

replacing or hardening a supporting structure should fall under Section 6409(a) if it does not substantially change the physical dimensions of the tower.⁴⁷⁷ However, Alexandria *et al.* argue that replacing or hardening of a tower should not be included as an “eligible facilities request” under Section 6409(a).⁴⁷⁸

178. *Discussion.* We conclude again that it is appropriate to look to the Collocation Agreement for guidance on the meaning of analogous terms, particularly in light of Section 6409(a)(3)’s specific recognition of the Commission’s obligations under NHPA and NEPA. Accordingly, as proposed in the *Infrastructure NPRM* and supported by the record, we conclude that the definition of “collocation” for purposes of Section 6409(a) should be consistent with its definition in the Collocation Agreement.⁴⁷⁹ We therefore define “collocation” under Section 6409(a) as “the mounting or installation of transmission equipment on an eligible support structure for the purpose of transmitting and/or receiving radio frequency signals for communications purposes.”⁴⁸⁰ The term “eligible support structure” means any structure that falls within the definitions of “tower” or “base station,” as discussed above. Consistent with the language of Section 6409(a)(2)(A)-(C), we also find that a “modification” of a “wireless tower or base station” includes collocation, removal, or replacement of an antenna or any other transmission equipment associated with the supporting structure.

179. We therefore disagree with municipal commenters who argue that collocations are limited to mounting equipment on structures that already have transmission equipment on them.⁴⁸¹ That limitation is not consistent with the Collocation Agreement’s definition of “collocation,” and would not serve any reasonable purpose as applied to towers built for the purpose of supporting transmission equipment. Nevertheless, we observe that our approach leads to the same result in the case of “base stations,” since our definition of that term includes only structures that already support or house base station equipment, Section 6409(a) will not apply to the first deployment of transmission equipment on such structures. Thus, we disagree with CA Local Governments that adopting our proposed definition of collocation would require local governments to approve deployments on anything that could house or support a component of a base station.⁴⁸² Rather, Section 6409(a) will apply only where a State or local government has approved the construction of a structure with the sole or primary purpose of supporting covered transmission equipment (*i.e.*, a wireless tower) or, with regard to other support structures, where the State or local government has previously approved the siting of transmission equipment that is part of a base station on that structure.⁴⁸³ In both cases, the State or local government must decide that the site is suitable for wireless facility deployment before Section 6409(a) will apply.

180. We find that the term “eligible facilities request” encompasses hardening through structural enhancement where such hardening is necessary for a covered collocation, replacement, or removal of transmission equipment, but does not include replacement of the underlying structure. We

⁴⁷⁷ See AT&T Comments at 24; PCIA Comments at 36-37. See also Tucson Comments at 6 (arguing that replacement or hardening of a tower should be covered if the tower already supports wireless equipment); UTC Comments at 15.

⁴⁷⁸ Alexandria *et al.* Comments at 31; Alexandria *et al.* Reply Comments at 15. See also Tempe Comments at 20-21 (arguing that any new structures, including replacement structures, should be subject to review).

⁴⁷⁹ *Infrastructure NPRM*, 28 FCC Rcd at 14280 para. 113.

⁴⁸⁰ *Id.* at 14300 App. A, Proposed Rule § 1.30001(b)(2). As discussed above, “transmission equipment” includes antennas and other equipment associated with and necessary to their operation, including power supply cables and backup power equipment.

⁴⁸¹ See, e.g., Alexandria *et al.* Comments at 30-31; CCUA *et al.* Comments at 10.

⁴⁸² See CA Local Governments Comments at 10.

⁴⁸³ Thus, as noted above, if a tower or base station equipment was constructed or deployed without proper review or was not required to undergo siting review, the governing authority is not obligated to grant a collocation application under Section 6409(a).

note that the term “eligible facilities request” encompasses any “modification of an existing wireless tower or base station that involves” collocation, removal, or replacement of transmission equipment. Given that structural enhancement of the support structure is a modification of the relevant tower or base station,⁴⁸⁴ we find that such modification is part of an eligible facilities request so long as the modification of the underlying support structure is performed in connection with and is necessary to support a collocation, removal, or replacement of transmission equipment. We further clarify that, to be covered under Section 6409(a), any such structural enhancement must not constitute a substantial change as defined below.

181. We agree with Alexandria *et al.*, however, that “replacement,” as used in Section 6409(a)(2)(C), relates only to the replacement of “transmission equipment,” and that such equipment does not include the structure on which the equipment is located.⁴⁸⁵ Even under the condition that it would not substantially change the physical dimensions of the structure, replacement of an entire structure may affect or implicate local land use values differently than the addition, removal, or replacement of transmission equipment, and we find no textual support for the conclusion that Congress intended to extend mandatory approval to new structures. Thus, we decline to interpret “eligible facilities requests” to include replacement of the underlying structure.

e. Substantial Change and Other Conditions and Limitations

182. *Background.* In the *Infrastructure NPRM*, the Commission sought comment on whether and how to determine when a collocation or other eligible modification will “substantially change the physical dimensions” of a wireless tower or base station under Section 6409(a).⁴⁸⁶ The Commission noted that the Collocation Agreement establishes a four-prong test to determine whether a collocation will effect a “substantial increase in the size of a tower,”⁴⁸⁷ and sought comment on whether to adopt this as the test

⁴⁸⁴ We note that permitting structural enhancement as a part of a covered request may be particularly important to ensure that the relevant infrastructure will be available for use by FirstNet because of its obligation to “ensure the safety, security, and resiliency of the [public safety broadband] network . . .” Spectrum Act § 6206(b)(2)(A). See also “FirstNet, Guiding Principles,” available at <http://www.firstnet.gov/about/guiding-principles> (providing that “FirstNet will harden the network to assist with resiliency during natural disasters, incidents and man-made threats”). In addition to hardening for Public Safety, commercial providers may seek structural enhancement for many reasons, for example, to increase load capacity or to repair defects due to corrosion or other damage. See, e.g., “Refurbishment – Structural Enhancement,” available at <http://m.rohnproducts.com/tower-upgrade.html>.

⁴⁸⁵ Alexandria *et al.* Comments at 31 (arguing that replacement of a tower is not a “modification” of it and that Congress knew how to address “replacement” when that was its intent).

⁴⁸⁶ See *Infrastructure NPRM*, 28 FCC Rcd at 14281-82 paras. 116-122.

⁴⁸⁷ Collocation Agreement § I.C. Under this test, a “substantial increase in the size of the tower” occurs if:

- 1) [t]he mounting of the proposed antenna on the tower would increase the existing height of the tower by more than 10%, or by the height of one additional antenna array with separation from the nearest existing antenna not to exceed twenty feet, whichever is greater, except that the mounting of the proposed antenna may exceed the size limits set forth in this paragraph if necessary to avoid interference with existing antennas; or
- 2) [t]he mounting of the proposed antenna would involve the installation of more than the standard number of new equipment cabinets for the technology involved, not to exceed four, or more than one new equipment shelter; or
- 3) [t]he mounting of the proposed antenna would involve adding an appurtenance to the body of the tower that would protrude from the edge of the tower more than twenty feet, or more than the width of the tower structure at the level of the appurtenance, whichever is greater, except that the mounting of the proposed antenna may exceed the size limits set forth in this paragraph if necessary to shelter the antenna from inclement weather or to connect the antenna to the tower via cable; or

(continued....)

for a “substantial change” under Section 6409(a) and whether to modify or clarify any of the prongs.⁴⁸⁸ The Commission further sought comment on how to address situations where the tower or other structure has been previously modified since it was originally approved, and specifically whether to measure any physical change in dimensions resulting from a proposed new modification based on the structure’s original dimensions or the existing dimensions taking into account all modifications that have occurred previously.⁴⁸⁹ The Commission also sought comment on whether the test should differ depending on the type of structure and whether a different test should apply to “stealth structures”—i.e., those that have been constructed to blend in with their surroundings.⁴⁹⁰ In particular, it sought comment on whether changes that would undermine stealth characteristics should be considered substantial.⁴⁹¹ The Commission further sought comment on the recommendation of the Commission’s Intergovernmental Advisory Committee (IAC) that the question of substantiality cannot be resolved by applying inflexible numerical rules, but rather must be evaluated in the context of each specific installation and each community’s land use requirements and decisions.⁴⁹²

183. The Commission also sought comment on whether there are implicit circumstances other than “substantial changes” under which Section 6409(a) would permit a State or local government to deny an otherwise covered request.⁴⁹³ It also sought comment on whether States and localities may impose conditions or require alterations when granting a covered request and, if so, what types of conditions or alterations they could require. In particular, the Commission asked whether States and local governments could require covered requests to comply with State or local building codes and other laws reasonably related to health and safety, and whether States and localities are required to approve an otherwise covered modification of a tower or base station that has legal, non-conforming status,⁴⁹⁴ or when the modification does not conform to a condition or restriction that the State or locality imposed as a prerequisite to its original approval of the tower or base station.⁴⁹⁵ The Commission further sought

(Continued from previous page) _____

4) [t]he mounting of the proposed antenna would involve excavation outside the current tower site, defined as the current boundaries of the leased or owned property surrounding the tower and any access or utility easements currently related to the site.

⁴⁸⁸ *Infrastructure NPRM*, 28 FCC Rcd at 14281-82 paras. 117-19.

⁴⁸⁹ *See id.* at 14282 para. 120.

⁴⁹⁰ *Id.* at 14282 para. 121.

⁴⁹¹ *See id.*

⁴⁹² *See id.* at 14282 para. 122 (citing Intergovernmental Advisory Committee to the Federal Communications Commission: Advisory Recommendation Number 2013-9, “Response to Wireless Telecommunications Bureau’s Guidance on Interpretation of Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012,” dated July 31, 2013 (“IAC Recommendation”), at 2). This document has been filed in WC Docket No. 11-59 (Aug. 2, 2013) and is also available at <http://www.fcc.gov/encyclopedia/intergovernmental-advisory-committee-comments>. Subsequently, the IAC also filed comments on the *Infrastructure NPRM*. *See, generally*, IAC Comments. The IAC, comprised of fifteen representatives from local, State, and Tribal governments, advises the Commission on a range of telecommunications issues for which these governments share responsibility with the Commission. *See FCC Announces The Reauthorization Of The Intergovernmental Advisory Committee And Seeks Nominations, Public Notice*, 28 FCC Rcd 14749 (2013).

⁴⁹³ *Infrastructure NPRM*, 28 FCC Rcd at 14283 para. 124.

⁴⁹⁴ *See id.* at 14283-84 paras. 124, 126. Legal, non-conforming status refers to a structure that was approved at the time of construction but is not presently in conformance due to subsequent changes to the governing zoning ordinance. *Id.*

⁴⁹⁵ *See id.* at 14283-84 paras. 124, 127.

comment generally on the legal basis for any of these asserted grounds for potential denial—for example, whether they should be understood as factors under the “substantial change” test.⁴⁹⁶

184. Industry commenters generally oppose the contextual, subjective approach to determining “substantial change” advocated by the IAC and instead support an objective test based on the Collocation Agreement’s four-prong test, on the grounds that it will provide greater certainty and avoid delay.⁴⁹⁷ Some of these commenters propose modifications to particular prongs of the test.⁴⁹⁸ Industry commenters also support applying the “substantial change” test as a limit on cumulative increases by comparing changes to the state of the structure at some fixed point in time.⁴⁹⁹ While some advocate using the same four-prong test for all structures, others argue that the Commission should consider a different test for some or all non-tower structures.⁵⁰⁰ Several industry commenters agree that modifications that undermine the concealment elements of a stealth facility or defeat a stealth condition should be considered substantial,⁵⁰¹ and some argue that we should treat a change as “substantial” if it conflicts with any condition on the structure’s original zoning approval.⁵⁰² Industry commenters generally oppose including

⁴⁹⁶ *Id.* at 14285 para. 128.

⁴⁹⁷ See, e.g., AT&T Comments at 24 (arguing that a uniform approach to “substantial change” will provide certainty and avoid the delay in broadband deployment that will result from case-by-case determinations); AT&T Reply Comments at 9-10; PCIA Comments at 37; Sprint Comments at 10; Towerstream Comments at 21 (arguing that the IAC approach would be subject to abuse and “would undermine the intended purpose of Section 6409(a) to facilitate the rapid deployment of public safety and commercial wireless broadband networks”); Verizon Comments at 29-30; WISPA Reply Comments at 7-8.

⁴⁹⁸ See, e.g., AT&T Comments at 24 (proposing that the test should consider only changes with a visual effect and not equipment concealed from public view through screening or other camouflage techniques); Fibertech Comments at 27 (proposing an alternate substantial change test for small cells of 25 cubic feet or less); PCIA Comments at 37-38 (proposing that the Commission apply the test as modified in the NPA, allowing expansion outside the existing tower site that does not expand the boundaries of the leased or owned property by more than 30 feet in any direction or involve excavation outside these expanded boundaries or outside any existing access or utility easement related to the site); WISPA Reply Comments at 7-8.

⁴⁹⁹ See, e.g., PCIA Comments at 39 (proposing all changes be measured from the tower’s last zoning approval or the effective date of the rules, whichever is later); Verizon Comments at 29-30 (proposing that changes be measured against the structure as of the date the rule becomes effective).

⁵⁰⁰ See, e.g., CCA Reply Comments at 6 (Commission should consider “a secondary set of standards for structures other than those ‘built for the sole or primary purpose of supporting FCC-licensed antennas and their associated facilities’”); UTC Comments at 13 (arguing that the Commission should adopt a “higher threshold” for utility poles, because increases in height exceeding 10% are often necessary to meet utility safety codes); Verizon Comments at 30 (arguing that same test should apply to all structures, but that if the Commission adopts a different test for buildings, it should accommodate collocations on the sides or facades of buildings as well as roof-top collocations that extend some allowable height above the roof or that are not visible from the street). In an *ex parte* letter filed after its comments, Verizon suggests the definition of substantial change for towers should at least apply to utility structures, while a different definition could apply to other non-tower structures. See Letter from Tamara Preiss, Verizon, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 13-238, filed Sept. 17, 2014, at 2 (Verizon Sept. 17, 2014 *Ex Parte*). For non-tower structures, Verizon proposes that the substantial change test allow new facilities to extend “up to six feet wider than the widest point on the structure,” including an appurtenance attached to the structure, and “up to 15 feet above the highest point on the structure (which may be an appurtenance attached to the structure).” See *id.* Verizon also proposes that, if the Commission adopts a height limitation stated in terms of a percentage of the height of the structure, it should adopt “a minimum allowable height increase” that is “no less than ten feet above [the] highest point of the structure.” Verizon Oct. 8, 2014 *Ex Parte*, at 3.

⁵⁰¹ See, e.g., Crown Castle Comments at 14; PCIA Comments at 39; PCIA Reply Comments at 18-19.

⁵⁰² See, e.g., AT&T Reply Comments at 12, 16.

other considerations in determining whether a modification is a “substantial change,” such as whether a structure has legal, non-conforming status.⁵⁰³

185. Industry commenters generally agree that States and localities may require or otherwise condition approval of a covered request on compliance with building codes and other non-discretionary structural and safety codes, but they argue that States and localities may not otherwise impose conditions.⁵⁰⁴ In particular, PCIA argues that States and municipalities may ensure that a modification is consistent with existing stealth requirements, but may not impose new stealth requirements when granting a covered request.⁵⁰⁵

186. Most municipalities support the IAC recommendation, arguing that a “substantial change” will mean different things depending on the particular structure and context, and therefore that the analysis does not lend itself to an objective or numerical formula.⁵⁰⁶ They oppose adoption of the Collocation Agreement’s four-prong test or another numerical test, arguing that it will inevitably require approval of modifications that cause significant harms to aesthetics, safety, or other local concerns.⁵⁰⁷ They further object to any test that considers only “increases in size,” arguing that the test should consider all physical dimensions, including height, width, depth, volume, surface area, weight, and visual impact.⁵⁰⁸ Many support the test proposed in the Local Government Definitions, which provides that “substantially change the physical dimensions” means to “alter the physical dimensions of a wireless tower or base station in a manner that has a significant impact given the surroundings, characteristics of, and any conditions on, the wireless tower or base station.”⁵⁰⁹ In support of a context-specific approach, they argue that an objective and mechanical test will discourage States and municipalities from approving

⁵⁰³ See, e.g., Crown Castle Comments at 14; CTIA Reply Comments at 8; Fibertech Reply Comments at 16-17; PCIA Comments at 43-45.

⁵⁰⁴ See, e.g., AT&T Comments at 26; AT&T Reply Comments at 11-12; PCIA Comments at 40-41 (supporting requirement of compliance with general building codes or other objective ministerial laws reasonably related to health and safety so long as they are clearly related to structural standards); PCIA Reply Comments at 18; Sprint Comments at 11; T-Mobile Reply Comments at 15-16. But see PCIA Comments at 45 (arguing that fall zones and setbacks, while appropriate when approving new towers, should not be grounds for denying an otherwise covered request, because they can be too easily adjusted retroactively to transform compliant towers into legal, non-conforming towers).

⁵⁰⁵ See PCIA Comments at 45-46.

⁵⁰⁶ See, e.g., Alexandria *et al.* Comments at 32-33; CA Local Governments Comments at 11-12 (arguing that whether modification is a substantial change depends on the character and circumstances of the particular tower or base station; issue therefore does not lend itself to a national standard); CCUA *et al.* Comments at 11-15; San Antonio Reply Comments at 3, 12-13 (arguing that “substantial change” must be “construed in a factual context that includes the historical or environmental surroundings, structural and public safety considerations, and generally applicable zoning requirements”). Certain municipalities support numerical standards, however. See, e.g., Coconut Creek Comments at 6 (arguing that the four-prong test will lend uniformity and certainty to localities’ application of Section 6409(a)). Savannah proposes that any increase in height or width be considered substantial. See Savannah *Ex Parte* at 7.

⁵⁰⁷ See, e.g., Alexandria *et al.* Comments at 33-36; Long Beach Comments at 2; Michaud Comments at 1 (arguing that numerical test ignores “local regulations on visual impact and building codes [and] regulations”); Minneapolis Comments at 11-12; MML Comments at 2; NJSLM Comments at 5.

⁵⁰⁸ See, e.g., CA Local Governments Comments at 14-15; CCUA *et al.* Comments at 14-15. CA Local Governments also highlight other aspects of the four-prong test as problematic, including exceptions to the size limits to avoid interference or accommodate weather conditions. See CA Local Governments Comments at 15.

⁵⁰⁹ See, e.g., Local Governments July 21, 2014 *Ex Parte*, Attach. B; CCUA *et al.* July 17, 2014 *Ex Parte*, Attach. A.

initial wireless facility deployments, because such deployments, even if unobjectionable on their own, would open the door to potentially objectionable collocations covered by Section 6409(a).⁵¹⁰

187. State and local commenters also offer certain considerations that the Commission should incorporate into any test for substantial change. Similar to the position of some industry commenters, many municipalities propose that a change should be treated as substantial if it violates any existing conditions applicable to the tower or base station.⁵¹¹ Many also contend that any request subject to Section 6409(a) must nonetheless comply with regulations related to health and safety, such as building, structural or safety codes, arguing that compliance with these codes is a factor in determining whether a change is substantial.⁵¹² Municipal commenters also agree with industry commenters that “substantial change” should be measured as a cumulative limit on all changes from a fixed point in time but, unlike most industry commenters, they argue that the changes should be measured from the dimensions of the structure as originally approved.⁵¹³ In addition, the IAC suggests that any change in physical dimensions that would violate a federal law or regulation (such as FAA requirements or Commission RF exposure standards) should be considered substantial.⁵¹⁴ Alexandria *et al.* argue that a proposed change should be considered “substantial” if it would make a facility unsafe, create hazards or environmental harms, render public streets or sidewalks less accessible, damage a historically significant area or structure, expose a “stealth” facility, or otherwise defeat conditions applicable to the original regulatory approval of the underlying tower or base station.⁵¹⁵

188. *Discussion.* After careful review of the record, we adopt an objective standard for determining when a proposed modification will “substantially change the physical dimensions” of an existing tower or base station. Specifically, and for the reasons discussed below, we provide that a modification substantially changes the physical dimensions of a tower or base station if it meets any of the following criteria: (1) for towers outside of public rights-of-way, it increases the height of the tower by more than 10%, or by the height of one additional antenna array with separation from the nearest existing antenna not to exceed twenty feet, whichever is greater; for those towers in the rights-of-way and for all base stations, it increases the height of the tower or base station by more than 10% or 10 feet, whichever is greater; (2) for towers outside of public rights-of-way, it protrudes from the edge of the tower more than twenty feet, or more than the width of the tower structure at the level of the appurtenance, whichever is greater; for those towers in the rights-of-way and for all base stations, it protrudes from the edge of the structure more than six feet; (3) it involves installation of more than the

⁵¹⁰ See, e.g., IAC Comments at 5-6.

⁵¹¹ See, e.g., Alexandria *et al.* Comments at 41; CA Local Governments Reply Comments at 13-14; CCUA *et al.* Comments at 13, 20; CCUA *et al.* Reply Comments at 12; Henderson Comments at 2; Minneapolis Comments at 11-13; RCRC Comments at 2.

⁵¹² See, e.g., Alexandria *et al.* Comments at 37-39; CCUA *et al.* Comments at 18; Fairfax Comments at 14-15; NATOA *et al.* Comments at 13; Springfield Comments at 13.

⁵¹³ See, e.g., Alexandria *et al.* Comments at 19; CA Local Governments Comments at 16-17 (arguing that a cumulative limit should take the form of a boundary on the physical dimensions of the wireless tower or base station, but not necessarily a limit on the number of changes a wireless service provider may request within that cumulative limit); Coconut Creek Comments at 6-7 (arguing that height increase should be calculated from the original tower or structure height prior to any previous additions).

⁵¹⁴ See IAC Comments at 5.

⁵¹⁵ Alexandria *et al.* Comments at 42. See also CA Local Governments Comments at 12. Alexandria *et al.* further argue that modifications that would violate load-bearing limits, undermine hardening standards, or violate fall zone or set-back distances should fail the test as well. See Alexandria *et al.* Comments at 42-43. See also CA Local Governments Comments at 17 (arguing that a modification is a “substantial change” if it violates a “generally applicable law”); CCUA *et al.* Comments at 12 (arguing that a modification is a “substantial change” if it would create a public safety hazard or otherwise violate any local, State, or Federal law, or negatively impact the aesthetics of a community).

standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets; (4) it entails any excavation or deployment outside the current site of the tower or base station; (5) it would defeat the existing concealment elements of the tower or base station; or (6) it does not comply with conditions associated with the prior approval of construction or modification of the tower or base station unless the non-compliance is due to an increase in height, increase in width, addition of cabinets, or new excavation that does not exceed the corresponding “substantial change” thresholds identified above. We further provide that the changes in height resulting from a modification should be measured from the original support structure in cases where the deployments are or will be separated horizontally, such as on buildings’ rooftops; in other circumstances, changes in height should be measured from the dimensions of the tower or base station inclusive of originally approved appurtenances and any modifications that were approved prior to the passage of the Spectrum Act. Beyond these standards for what constitutes a substantial change in the physical dimensions of a tower or base station, we further provide that for applications covered by Section 6409(a), States and localities may continue to enforce and condition approval on compliance with generally applicable building, structural, electrical, and safety codes and with other laws codifying objective standards reasonably related to health and safety.

189. We initially conclude that we should adopt a test that is defined by specific, objective factors rather than the contextual and entirely subjective standard advocated by the IAC and municipalities. As we discuss in detail below, Congress took care to refer, in excluding certain modifications from mandatory approval requirements, to those that would substantially change the tower or base station’s “physical dimensions.” We also find that Congress intended approval of covered requests to occur in a timely fashion.⁵¹⁶ While we acknowledge that the IAC approach would provide municipalities with maximum flexibility to consider potential effects, we are concerned that it would invite lengthy review processes that conflict with Congress’s intent. Indeed, some municipal commenters anticipate their review of covered requests under a subjective, case-by-case approach could take even longer than their review of collocations absent Section 6409(a).⁵¹⁷ We also anticipate that disputes arising from a subjective approach would tend to require longer and more costly litigation to resolve given the more fact-intensive nature of the IAC’s open-ended and context-specific approach. We find that an objective definition, by contrast, will provide an appropriate balance between municipal flexibility and the rapid deployment of covered facilities. We find further support for this approach in State statutes that have implemented Section 6409(a), all of which establish objective standards.⁵¹⁸

190. We further find that the objective test for “substantial increase in size” under the Collocation Agreement should inform our consideration of the factors to consider when assessing a “substantial change in physical dimensions.” This reflects our general determination that definitions in the Collocation Agreement and NPA should inform our interpretation of similar terms in Section 6409(a). Further, as noted in the *Infrastructure NPRM*, the Commission has previously relied on the Collocation Agreement’s test in comparable circumstances, concluding in the *2009 Declaratory Ruling* that collocation applications are subject to a shorter shot clock under Section 332(c)(7) to the extent that they do not constitute a “substantial increase in size of the underlying structure.”⁵¹⁹ The Commission has also applied a similar objective test to determine whether a modification of an existing registered tower requires public notice for purposes of environmental review.⁵²⁰ We note that some municipalities support

⁵¹⁶ See *infra*, Section V.B.2.

⁵¹⁷ See, e.g., CA Local Governments Comments at 21-22.

⁵¹⁸ See *infra*, n.522.

⁵¹⁹ *Infrastructure NPRM*, 28 FCC Rcd at 14281 para. 117 (citing *2009 Declaratory Ruling*, 24 FCC Rcd at 14012 para. 46).

⁵²⁰ See 47 C.F.R. § 17.4(c)(1)(B); *Environmental Notification Order on Remand*, 26 FCC Rcd at 16720-21 para. 53.

this approach,⁵²¹ and we further observe that the overwhelming majority of State collocation statutes adopted since the passage of the Spectrum Act have adopted objective criteria similar to the Collocation Agreement test for identifying collocations subject to mandatory approval.⁵²² We note as well that there is nothing in the record indicating that any of these objective State-law tests have resulted in objectionable collocations that might have been rejected under a more subjective approach. Therefore, we are persuaded that it is reasonable to look to the Collocation Agreement test as a starting point in interpreting the very similar “substantial change” standard under Section 6409(a). We further decide, however, to modify and supplement the factors to establish an appropriate balance between promoting rapid wireless facility deployment and preserving States’ and localities’ ability to manage and protect local land-use interests.

191. First, we decline to adopt the Collocation Agreement’s exceptions that allow modifications to exceed the usual height and width limits when necessary to avoid interference or shelter the antennas from inclement weather.⁵²³ We agree with CA Local Governments that these issues pose technically complex and fact-intensive questions that many local governments cannot resolve without the aid of technical experts; modifications that would not fit within the Collocation Agreement’s height and width exceptions are thus not suitable for expedited review under Section 6409(a).⁵²⁴

192. Second, we conclude that the limit on height and width increases should depend on the type and location of the underlying structure. Under the Collocation Agreement’s “substantial increase in size” test, which applies only to towers, a collocation constitutes a substantial increase in size if it would increase a tower’s height by 10% or by the height of one additional antenna array with separation from the nearest existing antenna not to exceed twenty feet, whichever is greater.⁵²⁵ In addition, the Collocation Agreement authorizes collocations that would protrude by twenty feet, or by the width of the tower structure at the level of the appurtenance, whichever is greater.⁵²⁶ We find that the Collocation Agreement’s height and width criteria are generally suitable for towers, as was contemplated by the Agreement.

193. These tests were not designed with non-tower structures in mind, however, and we find that they may often fail to identify substantial changes to non-tower structures such as buildings or poles, particularly insofar as they would permit height and width increases of 20 feet under all circumstances. Instead, considering the proposals and arguments in the record and the purposes of the provision, we conclude that a modification to a non-tower structure that would increase the structure’s height by more than 10% or 10 feet, whichever is greater, constitutes a substantial change under Section 6409(a).

⁵²¹ See, e.g., San Diego Comments at 3. Other municipalities, including Coconut Creek and West Palm Beach, also support adoption of a standard based on the Collocation Agreement’s test. See Coconut Creek Comments at 6; West Palm Beach Comments at 6.

⁵²² See, e.g., GA. ST § 36-66B-4(b) (establishing a four-prong test for mandatory streamlined process, barring any increase in height or width and requiring compliance with pre-existing conditions and weight limits); MI ST § 125.3514(1)(c) (establishing a four-prong test for “substantial change” similar to the Collocation Agreement test); MO ST § 67.5092(13) (establishing a four-prong test for “substantial modification” similar to the Collocation Agreement test); NC. ST § 160A-400.51(7a) (establishing a three-prong test for “substantial modification,” imposing limits on height and width increases and on increases to the equipment compound area); N.J.S.A. 40:55 D-46.2.a.(2) (establishing a three-prong test, including limits on increases to height and compound size and barring any increases in width); PA ST 53 P.S. § 11702.2 (establishing a two-prong test for “substantial change”); WI ST 66-0404(1)(s) (establishing a four-prong test for “substantial modification”).

⁵²³ See Collocation Agreement § I.C.

⁵²⁴ See CA Local Governments Comments at 15.

⁵²⁵ Collocation Agreement § I.C(1).

⁵²⁶ See Collocation Agreement § I.C(3).

Permitting increases of up to 10% has significant support in the record.⁵²⁷ Further, we find that the adoption of a fixed minimum best serves the intention of Congress to advance broadband service by expediting the deployment of minor modifications of towers and base stations. Without such a minimum, we find that the test will not properly identify insubstantial increases on small buildings and other short structures, and may undermine the facilitation of collocation, as vertically collocated antennas often need 10 feet of separation and rooftop collocations may need such height as well.⁵²⁸ Further, the fact that the 10-foot minimum is substantially less than the 20-foot minimum limit under the Collocation Agreement and many State statutes or the 15-foot limit proposed by some commenters provides us additional assurance that our interpretation of what is considered substantial under Section 6409(a) is reasonable.⁵²⁹

194. We also provide, as suggested by Verizon and PCIA, that a proposed modification of a non-tower structure constitutes a “substantial change” under Section 6409(a) if it would protrude from the edge of the structure more than six feet.⁵³⁰ We find that allowing for width increases up to six feet will promote the deployment of small facility deployments by accommodating installation of the mounting brackets/arms often used to deploy such facilities on non-tower structures, and that it is consistent with small facility deployments that municipalities have approved on such structures.⁵³¹ We further note that it is significantly less than the limits in width established by most State collocation statutes adopted since the Spectrum Act.⁵³² We therefore find that six feet is the appropriate objective standard for substantial changes in width for non-tower structures, rather than the alternative proposals in the record.

195. We decline to apply the same substantial change criteria to utility structures as apply to towers. While Verizon argues in an *ex parte* that this approach is justified because of the “significant similarities” between towers and utility structures, its own comments note that in contrast to “macrocell

⁵²⁷ See, e.g., PEC Comments at 7-8 (proposing that the test allow for one increase of 10% over the initially approved height); Tucson Comments at 9 (“Typically those increases should be 10% or less than what was originally approved for the facility to receive an expedited review.”); San Diego Comments at 3 (“[I]f a project results in a change of more than 10% beyond the baseline condition, it would be substantial.”).

⁵²⁸ See Kenmore Municipal Code, § 18.60.130 (“Minor communication facilities – Collocation”), available at <http://www.codepublishing.com/wa/Kenmore/html/Kenmore18/Kenmore1860.html> (requiring support structures to have the “structural strength to allow the collocation of additional antennas from other service providers at the standard 10-foot separation”); American Planning Association, Planning and Urban Design Standards, 358 (2006) (“A 10-foot vertical separation between antennas of different carriers is typically required to avoid interference”); Letter from Tamara Preiss, Verizon, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 13-238, filed Oct. 10, 2014 (Verizon Oct. 10, 2014 *Ex Parte*) at 2 (stating that a minimum allowance of ten feet would “accommodate the height of panel antennas and their mounting brackets, to enable the antennas to clear other structures on roof-tops, such as parapet walls and HVAC facilities – which can limit the coverage provided by the facilities, and to reduce the radiofrequency emissions produced by antennas on the surface of the roof.”).

⁵²⁹ MI ST. 125.3514(1)(c) (20 feet or 10%); MO ST 67.5092(12) (same); NH Rev Stat § 12-K:2(XXV) (same); NC ST § 160A-400.51(7a) (same); PA ST 53 P.S. § 11702.1 *et seq.* (same); WI ST 66-0404(1) (same).

⁵³⁰ See Verizon Oct. 10, 2014 *Ex Parte* at 2; Letter from Jonathan M. Campbell, PCIA-The Wireless Infrastructure Association, to Marlene H. Dortch, Secretary, FCC, filed Oct. 9, 2014 (PCIA Oct. 9, 2014 *Ex Parte*) at 1-2.

⁵³¹ See Verizon Oct. 10, 2014 *Ex Parte* at 2 (asserting that the six-foot allowance is needed to account for both the width of the antenna panels and the mounting arms that attach the antenna panels to the structure); PCIA Oct. 9, 2014 *Ex Parte* at 1-2 (proposing that the mounting of the proposed antenna may protrude six feet or less from the structure). See also, e.g., Letter from Tamara Preiss, Verizon, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 11-59, filed May 14, 2013 (providing dimensions to small-cell and DAS equipment used on poles with depths of 19 or 20 inches); Letter from Colleen Thompson, AT&T, to Marlene H. Dortch, Secretary, FCC, WC Docket No. 11-59, filed June 17, 2013 (providing small cell and DAS dimensions reflecting depths of 2.08 inches, 3.75 inches, 8.25 inches, 11.2 inches, and 18 inches).

⁵³² See *supra*, n.529 (citing to statutes).

towers,” utility structures are “smaller sites[.]”⁵³³ Because utility structures are typically much smaller than traditional towers, and because utility structures are often located in easements adjacent to vehicular and pedestrian rights-of-way where extensions are more likely to raise aesthetic, safety, and other issues, we do not find it appropriate to apply to such structures the same substantial change criteria applicable to towers. We further find that towers in the public rights-of-way should be subject to the more restrictive height and width criteria applicable to non-tower structures rather than the criteria applicable to other towers. We note that, to deploy DAS and small-cell wireless facilities, carriers and infrastructure providers must often deploy new poles in the rights-of-way. Because these structures are constructed for the sole or primary purpose of supporting Commission-licensed or authorized antennas, they fall under our definition of “tower.” They are often identical in size and appearance, however, to utility poles in the area, which do not constitute towers.⁵³⁴ As a consequence, applying the tower height and width standards to these poles constructed for DAS and small-cell support would mean that two adjacent and nearly identical poles could be subject to very different standards. To ensure consistent treatment of structures in the public rights-of-way, and because of the heightened potential for impact from extensions in such locations,⁵³⁵ we provide that structures qualifying as towers that are deployed in public rights-of-way will be subject to the same height and width criteria as non-tower structures.

196. We agree with commenters that our substantial change criteria for changes in height should be applied as limits on cumulative changes; otherwise, a series of permissible small changes could result in an overall change that significantly exceeds our adopted standards.⁵³⁶ Specifically, we find that whether a modification constitutes a substantial change must be determined by measuring the change in height from the dimensions of the “tower or base station” as originally approved or as of the most recent modification that received local zoning or similar regulatory approval prior to the passage of the Spectrum Act, whichever is greater.

197. We decline to provide that changes in height should always be measured from the original tower or base station dimensions, as suggested by some municipalities. As with the original tower or base station, discretionary approval of subsequent modifications reflects a regulatory determination of the extent to which wireless facilities are appropriate, and under what conditions. At the same time, we decline to adopt industry commenters’ proposal always to measure changes from the last approved change or the effective date of the rules.⁵³⁷ Measuring from the last approved change in all cases would provide no cumulative limit at all. In particular, since the Spectrum Act became law, approval of covered requests has been mandatory and therefore, approved changes after that time may not establish an appropriate baseline because they may not reflect a siting authority’s judgment that the modified structure is consistent with local land use values. Because it is impractical to require parties, in measuring cumulative impact, to determine whether each pre-existing modification was or was not required by the Spectrum Act, we provide that modifications of an existing tower or base station that occur after the passage of the Spectrum Act will not change the baseline for purposes of measuring

⁵³³ Verizon Comments at 2-3. *See also id.* at 6 (arguing that historic preservation review should distinguish “[macrocells] on large towers from small cells on utility poles”).

⁵³⁴ *See, e.g.,* Jefferson Comments at 2 (noting that facilities disguised as light poles but constructed for the primary purpose of supporting antennas would “seem to meet the proposed definition of a tower”).

⁵³⁵ *See, e.g.,* St. Paul Reply Comments at 2 (stating that, although “St. Paul wishes to leave open the possibility of allowing implementation of DAS or other small scale wireless technology in the public right-of-way,” it is unlikely to pursue that route because of concerns about the impact of potential multiple collocations); *see also* Alexandria *et al.* Reply Comments at 4.

⁵³⁶ *See, e.g.,* Alexandria *et al.* Comments at 36; Alexandria *et al.* Reply Comments at 19; CA Local Governments Comments at 16; PCIA Comments at 38; Verizon Comments at 29-30. We note that it is unnecessary to impose any cumulative limit on increases to width because, consistent with the Collocation Agreement, all changes in width are measured from the original structure.

⁵³⁷ *See, e.g.,* PCIA Comments at 39; Verizon Comments at 29-30.

substantial change. Consistent with our determination above that a tower or base station is not covered by Section 6409(a) unless it received such approval,⁵³⁸ this approach will in all cases limit modifications that are subject to mandatory approval to the same modest increments over what the relevant governing authority has previously deemed compatible with local land use values. We further find that, for structures where collocations are separated horizontally rather than vertically (such as building rooftops), substantial change is more appropriately measured from the height of the original structure, rather than the height of a previously approved antenna. Thus, for example, the deployment of a 10-foot antenna on a rooftop would not mean that a nearby deployment of a 20-foot antenna would be considered insubstantial.

198. Again drawing on the Collocation Agreement's test, we further provide that a modification is a substantial change if it entails any excavation or deployment outside the current site of the tower or base station. As in the Collocation Agreement, we define the "site" for towers outside of the public rights-of-way as the current boundaries of the leased or owned property surrounding the tower and any access or utility easements currently related to the site. For other towers and all base stations, we further restrict the site to that area in proximity to the structure and to other transmission equipment already deployed on the ground.

199. We also reject the PCIA and Sprint proposal to expand the Collocation Agreement's fourth prong, as modified by the 2004 NPA, to allow applicants to excavate outside the leased or licensed premises.⁵³⁹ Under the NPA, certain undertakings are excluded from the Section 106 review, including "construction of a replacement for an existing communications tower and any associated excavation that . . . does not expand the boundaries of the leased or owned property surrounding the tower by more than 30 feet in any direction or involve excavation outside these expanded boundaries or outside any existing access or utility easement related to the site."⁵⁴⁰ The NPA exclusion from Section 106 review, however, applies to replacement of "an existing communications tower." In contrast, as discussed above, "replacement," as used in Section 6409(a)(2)(C), relates only to the replacement of "transmission equipment,"⁵⁴¹ not the replacement of the supporting structures. Thus, the activities covered under Section 6409(a) are more nearly analogous to those covered under the Collocation Agreement than under the replacement towers exclusion in the NPA. We therefore agree with localities comments that any eligible facilities requests that involve excavation outside the premises should be considered a substantial change, as under the fourth prong of the Collocation Agreement's test.⁵⁴²

200. Based on our review of the record and various state statutes, we further find that a modification constitutes a substantial change in physical dimensions under Section 6409(a) if the change (1) would defeat the existing concealment elements of the tower or base station, or (2) does not comply with pre-existing conditions associated with the prior approval of construction or modification of the tower or base station.⁵⁴³ The first of these criteria is widely supported by both wireless industry and

⁵³⁸ See *supra*, para. 174.

⁵³⁹ See PCIA Comments at 37-38; Sprint Comments at 10.

⁵⁴⁰ NPA § III.B.

⁵⁴¹ See *supra*, para. 181.

⁵⁴² See, e.g., CA Local Governments Reply Comments at 12; San Antonio Reply Comments at 15.

⁵⁴³ See, e.g., Alexandria *et al.* Comments at 37-39; CCUA *et al.* Comments at 11-15; GA. Code Ann. §36-66B-4(b)(3) ("The proposed modification or collocation shall comply with applicable conditions of approval, if any, applied to the initial wireless facilities and wireless support structure."); Mich. Comp. Laws Serv. § 125.3514 (2012) ("The proposed collocation complies with the terms and conditions of any previous final approval of the support structure or compound."). We recognize that issues may arise under these two criteria that do not relate to a change in physical dimensions. For example, a replacement of exactly the same dimensions could still violate concealment elements if it does not have the same camouflaging paint as the replaced facility. We expect, however, that failures to meet these criteria will generally relate to changes in physical dimensions, and taking into account the support in

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municipal commenters, who generally agree that a modification that undermines the concealment elements of a stealth wireless facility, such as painting to match the supporting façade or artificial tree branches, should be considered substantial under Section 6409(a).⁵⁴⁴ We agree with commenters that in the context of a modification request related to concealed or “stealth”-designed facilities—*i.e.*, facilities designed to look like some feature other than a wireless tower or base station—any change that defeats the concealment elements of such facilities would be considered a “substantial change” under Section 6409(a).⁵⁴⁵ Commenters differ on whether any other conditions previously placed on a wireless tower or base station should be considered in determining substantial change under Section 6409(a). After consideration, we agree with municipal commenters that a change is substantial if it violates any condition of approval of construction or modification imposed on the applicable wireless tower or base station,⁵⁴⁶ unless the non-compliance is due to an increase in height, increase in width, addition of cabinets, or new excavation that does not exceed the corresponding “substantial change” thresholds we identify above. In other words, modifications qualify for Section 6409(a) only if they comply, for example, with conditions regarding fencing, access to the site, drainage, height or width increases that exceed the thresholds we adopt above, and other conditions of approval placed on the underlying structure. This approach, we find, properly preserves municipal authority to determine which structures are appropriate for wireless use and under what conditions, and reflects one of the three key priorities identified by the IAC in assessing substantial change.⁵⁴⁷

201. We agree with PCIA that legal, non-conforming structures should be available for modification under Section 6409(a), as long as the modification itself does not “substantially change” the physical dimensions of the supporting structure as defined here.⁵⁴⁸ We accordingly reject municipal arguments that any modification of an existing wireless tower or base station that has “legal, non-conforming” status should be considered a “substantial change” to its “physical dimensions.”⁵⁴⁹ As PCIA argues, the approach urged by municipalities could thwart the purpose of Section 6409(a) altogether, as simple changes to local zoning codes could immediately turn existing structures into legal, non-conforming uses unavailable for collocation under the statute.⁵⁵⁰ Considering Congress’s intent to

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the record for including these criteria, we find it appropriate to include them as criteria of the substantial change test. Further, we find that, as with building codes, Congress did not intend to exempt covered modifications from compliance with such elements and conditions or to undermine such conditions, whether or not they affect the physical dimensions of the wireless tower or base station, and that Section 6409(a) in any case permits States and localities to condition a covered request on compliance with such criteria or otherwise require a covered request to meet these criteria. Thus, as discussed below, even if we were not persuaded that a modification that violates one of these criteria should be considered a substantial change, we would nevertheless conclude that States and localities may require covered requests to meet these criteria.

⁵⁴⁴ See, e.g., Alexandria *et al.* Comments at 42; CCA Comments at 5; CCUA *et al.* Comments at 20; PCIA Comments at 39, 46.

⁵⁴⁵ See, e.g., Coconut Creek Comments at 7; West Palm Beach Comments at 7; see also PCIA Comments at 46 (arguing that for an eligible facilities request involving previously concealed or “stealth” facilities, the modification should qualify as an insubstantial increase as long as the concealment elements are maintained).

⁵⁴⁶ See, e.g., Alexandria *et al.* Comments at 12-13, 40-42; CCUA *et al.* Comments at 20; Henderson Comments at 2; NJSML Comments at 6; RCRC Comments at 2.

⁵⁴⁷ See IAC Comments at 5 (recommending that any change that would violate the conditions of approval under which the site construction was initially authorized should be considered a substantial change in physical dimensions).

⁵⁴⁸ PCIA Comments at 43-45. See also Crown Castle Comments at 14; CTIA Reply Comments at 8; Fibertech Reply Comments at 16-17.

⁵⁴⁹ See, e.g., Alexandria *et al.* Comments at 21-23.

⁵⁵⁰ See PCIA Reply Comments at 18-19.

promote wireless facilities deployment by encouraging collocation on existing structures, and considering the requirement in Section 6409(a) that States and municipalities approve covered requests “[n]otwithstanding . . . any other provision of law,” we find the municipal commenters’ proposal to be unsupportably restrictive.⁵⁵¹

202. The record also reflects general consensus that wireless facilities modification under Section 6409(a) should remain subject to building codes and other non-discretionary structural and safety codes.⁵⁵² As municipal commenters indicate, many local jurisdictions have promulgated code provisions that encourage and promote collocations and replacements through a streamlined approval process, while ensuring that any new facilities comply with building and safety codes and applicable Federal and State regulations.⁵⁵³ Consistent with that approach on the local level, we find that Congress did not intend to exempt covered modifications from compliance with generally applicable laws related to public health and safety.⁵⁵⁴ We therefore conclude that States and localities may require a covered request to comply with generally applicable building, structural, electrical, and safety codes or with other laws codifying objective standards reasonably related to health and safety, and that they may condition approval on such compliance. In particular, we clarify that Section 6409(a) does not preclude States and localities from continuing to require compliance with generally applicable health and safety requirements on the placement and operation of backup power sources, including noise control ordinances if any.

203. We further clarify that eligible facility requests covered by Section 6409(a) must still comply with any relevant Federal requirement, including any applicable Commission, FAA, NEPA, or Section 106 requirements. We find that this interpretation is supported in the record, addresses a concern raised by several municipal commenters and the IAC, and is consistent with the express direction in Section 6409(a) that the provision is not intended to relieve the Commission from the requirements of NEPA and NHPA.⁵⁵⁵

* * *

204. In sum, we find that the definitions, criteria, and related clarifications we adopt for purposes of Section 6409(a) will provide clarity and certainty, reducing delays and litigation, and thereby facilitate the rapid deployment of wireless infrastructure and promote advanced wireless broadband services. At the same time, we conclude that our approach also addresses concerns voiced by municipal commenters and reflects the priorities identified by the IAC.⁵⁵⁶ We conclude that this approach reflects a reasonable interpretation of the language and purposes of Section 6409(a) and will serve the public interest.

2. Application Review Process, Including Timeframe for Review

205. *Background.* In the *Infrastructure NPRM*, the Commission sought comment on whether Section 6409(a) places any particular limitations on the application filing and review process, and if so, how to implement such limitations.⁵⁵⁷ The Commission proposed to find that State or local governments

⁵⁵¹ Spectrum Act § 6409(a)(1) (emphasis added).

⁵⁵² See, e.g., PCIA Comments at 41; Sprint Comments at 11.

⁵⁵³ See, e.g., CCUA *et al.* Comments at 18.

⁵⁵⁴ See, e.g., Alexandria *et al.* Comments at 42; CA Local Governments Comments at 17; CCUA *et al.* Comments at 25; Gallina Comments at 1; Haddon Heights Comments at 1.

⁵⁵⁵ See Spectrum Act § 6409(a)(3).

⁵⁵⁶ See IAC Comments at 5. The IAC recommended that any change in physical dimensions constitutes a “substantial change” if it would violate (1) a building or safety code; (2) a federal law or regulation, including environmental law, historic preservation law, Commission RF exposure standards, or FAA requirements; or (3) the conditions of approval under which the site construction was initially authorized.

⁵⁵⁷ See *Infrastructure NPRM*, 28 FCC Rcd at 14285-86 para.130. See also *Section 6409(a) PN*, 28 FCC Rcd at 3-4.

at a minimum may require the submission of applications (so that the State or local government can determine whether Section 6409(a) applies),⁵⁵⁸ and it sought comment on whether Section 6409(a) warrants rules limiting applicable fees, review procedures, or time for review.⁵⁵⁹ In particular, the Commission sought comment on whether to limit State and local application review to resolving whether the request is in fact covered by Section 6409(a).⁵⁶⁰ In this regard, the Commission sought comment on whether to impose limits on the kinds of information and documentation that States and localities may require in connection with an application that the applicant asserts is covered by Section 6409(a).⁵⁶¹ It specifically sought comment on whether to clarify that, when an applicant asserts that its application falls under Section 6409(a), States and localities may not require the submission of information or documents that are not relevant to determining whether the provision applies.⁵⁶²

206. The Commission further sought comment on whether, in the event it decides to adopt a time limit for State or local review, it should establish 90 days as a presumptively reasonable period of time for reviewing requests or if a shorter period is warranted in light of the narrow scope of review under Section 6409(a).⁵⁶³ It further sought comment on whether a State or municipality may toll the review period if it notifies the applicant in writing that an application is incomplete and specifies the additional information or documentation required to complete the application.⁵⁶⁴ In addition, given Congress's explicit language that a State or local government "may not deny, and shall approve" a covered application "[n]otwithstanding . . . any other provision of law," the Commission proposed to preempt the application of any moratoria to covered requests under Section 6409(a).⁵⁶⁵

207. Industry commenters generally argue that the Commission should adopt procedural restrictions on State or local review of applications subject to Section 6409(a). In particular, many industry commenters propose restrictions on the information that a State or municipality can require in connection with eligible facilities requests.⁵⁶⁶ Several argue that we should permit States or localities to require only the information needed to confirm that the request is covered under Section 6409(a).⁵⁶⁷ Some commenters assert that the Commission should expressly clarify that certain types of information—such as information to demonstrate "proof of need" or the business case for the proposed modification, an authorization or a valid lease agreement from the property owner and/or tower owner, and surveys—are not relevant for this narrow purpose.⁵⁶⁸ Others argue that jurisdictions should not be permitted to impose documentation requirements that vary from or exceed the requirements expressly identified in applicable

⁵⁵⁸ *See id.*

⁵⁵⁹ *See id.* at 14286 para. 131.

⁵⁶⁰ *See id.* at 14286 para. 132.

⁵⁶¹ *See id.* at 14286-87 para.133.

⁵⁶² *See id.*

⁵⁶³ *See id.* at 14287 para.134.

⁵⁶⁴ *See id.*

⁵⁶⁵ *Id.* at 14287-88 para.135.

⁵⁶⁶ *See, e.g.,* AT&T Comments at 25; CCA Reply Comments at 7-8; PCIA Comments at 46-47; PCIA Reply Comments at 20-21; PWA Comments at 2-3; T-Mobile Reply Comments at 12-14; Towerstream Reply Comments at 5-7; WISPA Reply Comments at 9.

⁵⁶⁷ *See, e.g.,* CCA Reply Comments at 7-8; PCIA Comments at 46-47; PCIA Reply Comments at 20-21; WISPA Reply Comments at 9. *See also* T-Mobile Reply Comments at 13-14.

⁵⁶⁸ *See, e.g.,* PCIA Comments at 47; T-Mobile Reply Comments at 13-14; *see also* CCA Reply Comments at 7-8; PCIA Reply Comments at 20-21; PWA Comments at 2-3; Towerstream Reply Comments at 5-6; WISPA Reply Comments at 9.

regulations.⁵⁶⁹ CCA argues that, because a deployment of DAS or small-cell wireless technology to serve even a medium-sized city could require hundreds of modification applications, the Commission should adopt a mechanism for applicants to submit multiple modification requests using a single application.⁵⁷⁰ Some industry commenters further argue that the Commission should preempt any unreasonable or non-cost based fees that may be associated with applications covered by Section 6409(a).⁵⁷¹

208. Industry commenters also generally urge the Commission to place a time limit on State or local review of an eligible facilities request.⁵⁷² Many of these commenters argue for a 45-day timeframe,⁵⁷³ while others argue for 60 days.⁵⁷⁴ These commenters argue that a time period shorter than 90 days is warranted in light of the limited scope of review permitted for such applications and Congress's goal of expediting the facilities siting process.⁵⁷⁵ They further argue that the timeframe should not in any case exceed 90 days, the presumptively reasonable timeframe for review of collocation applications under the *2009 Declaratory Ruling*.⁵⁷⁶ Some industry commenters propose that 90 days is the appropriate period,⁵⁷⁷ and Fibertech proposes 90 days for collocations but argues that 45 days should "be adequate for the administrative review for transmission equipment replacement"⁵⁷⁸ Many industry commenters also support the Commission's proposals regarding treatment of moratoria under Section 6409(a).⁵⁷⁹ Further, while many industry commenters agree that the review period should be tolled when a State or locality determines an application is incomplete, they recommend that the Commission set reasonable limits on the ability of States or localities to require additional information or documentation.⁵⁸⁰ For example, T-Mobile and PCIA argue that tolling is appropriate only if the State or locality notifies the applicant that its application is incomplete within 30 days of its submission, as under the *2009 Declaratory Ruling*.⁵⁸¹

⁵⁶⁹ See, e.g., AT&T Comments at 25 (arguing that Section 6409(a) "requires State and local jurisdictions to promulgate rules that identify the specific limited documentation that applicants must include to demonstrate that they qualify for Section 6409 approval" and that the Commission should not interpret the provision to permit State and local jurisdictions to "impose [documentation] standards that are inconsistent with State or local laws").

⁵⁷⁰ See CCA Reply Comments at 8. See also Towerstream Reply Comments at 6-7 ("Wi-Fi and small cell technologies, however, often require tens of thousands of facilities sitings to cover a geographic area and provide effective and reliable broadband service").

⁵⁷¹ See, e.g., CCA Reply Comments at 7-8; PCIA Comments at 46-49; PWA Comments at 2-3; T-Mobile Reply Comments at 13; WISPA Reply Comments at 9.

⁵⁷² See, e.g., AT&T Comments at 30-31; CTIA Reply Comments at 9; NYSWA Comments at 2; PCIA Comments ii, 48; PCIA Reply Comments at 21-22; Sprint Comments at 10-11; Sprint Reply Comments at 6; T-Mobile Reply Comments at 12-14; Verizon Comments at 31-32; WISPA Reply Comments at 8-9.

⁵⁷³ See, e.g., CTIA Reply Comments at 9; PCIA Comments ii, 48; PCIA Reply Comments at 21; Sprint Reply Comments at 6; T-Mobile Reply Comments at 14; Verizon Comments at 31-32; WISPA Reply Comments at 8-9.

⁵⁷⁴ See, e.g., WISPA Comments at 10.

⁵⁷⁵ See, e.g., CCA Reply Comments at 8 (arguing that the "circumscribed scope of review" supports a shorter period); CTIA Reply Comments at 9.

⁵⁷⁶ See, e.g., CCA Reply Comments at 8-9; NYSWA Comments at 2; T-Mobile Reply Comments at 14. See also *2009 Declaratory Ruling*, 24 FCC Rcd at 13995, 13999 paras. 4, 18-19.

⁵⁷⁷ See, e.g., Joint Venture Comments at 7.

⁵⁷⁸ Fibertech Comments at 31.

⁵⁷⁹ See, e.g., AT&T Comments at 30; Sprint Reply Comments at 7.

⁵⁸⁰ See, e.g., PCIA Comments at ii, 48; Sprint Comments at 10-11; T-Mobile Reply Comments at 14-15.

⁵⁸¹ See PCIA Comments at ii, 48; T-Mobile Reply Comments at 14. T-Mobile contends that, whenever a State or locality rejects an applicant's claim that Section 6409(a) applies or finds its application incomplete, the State or

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209. Municipal commenters generally oppose the adoption of any procedural requirements. They argue that the statutory provision itself contains no process requirements and, accordingly, that we should not impose any.⁵⁸² They also contend that placing procedural limits on State or local governments would contravene the principles of federalism under the Tenth Amendment and would result in the incongruous application of nationwide rules to a diverse universe of government entities.⁵⁸³ Regarding application documentation, some municipal commenters assert that in order to process requests, they will require more information than the bare minimum necessary to determine whether the request falls under Section 6409(a).⁵⁸⁴ Regarding permit review fees, municipal commenters assert that while Section 6409(a) may obviate some review costs, it does not eliminate them altogether, and nothing in the statute requires local authorities to subsidize wireless service providers by internalizing administrative costs.⁵⁸⁵

210. Municipal commenters generally argue that the maximum review period, if there is one at all, should be no less than the 90-day timeframe for review under the *2009 Declaratory Ruling*.⁵⁸⁶ These commenters argue that States and localities must have sufficient time to review proposed changes, particularly in circumstances involving complex technical issues, local environmental and historic preservation concerns, local traffic and economic development patterns, and other concerns that are important to the community.⁵⁸⁷ Further, commenters assert that the review period must allow for tolling in certain instances, such as when the application is incomplete, the parties mutually consent to extend the

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locality must inform the applicant in writing in a timely manner, specifying with particularity the reasons for its conclusion. *See* T-Mobile Reply Comments at 14-16.

⁵⁸² *See, e.g.*, CA Local Governments Comments at 18 (“Section 6409(a) mandates a particular result but not any particular process to achieve that result” and therefore “does not invite the Commission to impose rules on the permit application and review process.”).

⁵⁸³ *See, e.g.*, Alexandria *et al.* Comments at 45-46; Minneapolis Comments at 15-16; Pennsauken Reply Comments at 1; Tucson Comments at 3.

⁵⁸⁴ *See, e.g.*, CA Local Governments Comments at 19-20 (“The Commission should reaffirm that State and local governments may legitimately seek information from the carriers to perform their fact finding duties and to confirm compliance with legal requirements in the wireless siting process,” including information relevant to address factual issues under Section 6409(a) and whether the applications “comply with the local requirements”); Coconut Creek Comments at 8 (arguing that the Commission should impose no document restrictions because municipalities need more than the bare minimum necessary to determine eligibility under Section 6409(a), including information demonstrating compliance with structural standards and information that will enable communities to “analyze deployment of infrastructure and plan for future needs”); MDIT Comments at 5-6; West Palm Beach Comments at 8.

⁵⁸⁵ *See, e.g.*, Alexandria *et al.* Comments at 44-45; CA Local Governments Comments at 20; Minneapolis Comments at 15; PEC Comments at 13.

⁵⁸⁶ *See, e.g.*, Alexandria *et al.* Comments at 44-45; Alexandria *et al.* Reply Comments at 23-24 (arguing that adopting a period shorter than 90 days would be premature because the Commission lacks a record about how Section 6409(a) is operating and “would only be guessing at what time period is reasonable”); CA Local Governments at 20-21; Coconut Creek Comments at 8-9; DC Comments at 18; Fairfax Reply Comments at 8; Henderson Comments at 3; NJSLM Comments at 7; San Antonio Reply Comments at 20-22; San Diego Comments at 4; West Palm Beach Comments 8. Alexandria *et al.* further argue that a local government should be able to defend the reasonableness of any review that extends beyond a 90-day period. *See* Alexandria *et al.* Comments at 44-45.

⁵⁸⁷ *See, e.g.*, CA Local Governments Comments at 20-21 (asserting that “(1) no fully developed factual record exists to show that Section 6409(a) review subjects applicants to unreasonable delays and (2) the terms of that statute require local governments to act as factfinders on complex and technical issues”); Fairfax Reply Comments at 8; Henderson Comments at 3. *See also* Alexandria *et al.* Reply Comments at 24; San Diego Comments at 5.

review period, or the municipality enacts a temporary moratorium to amend or otherwise revise its permit review process, rules, or policies.⁵⁸⁸

211. *Discussion.* As an initial matter, we find, consistent with the Commission’s proposal, that State or local governments may require parties asserting that proposed facilities modifications are covered under Section 6409(a) to file applications, and that these governments may review the applications to determine whether they constitute covered requests.⁵⁸⁹ As the Bureau observed in the *Section 6409(a) PN*, the statutory provision requiring a State or local government to approve an “eligible facilities request” implies that the relevant government entity may require an applicant to file a request for approval.⁵⁹⁰ Further, nothing in the provision indicates that States or local governments must approve requests merely because applicants claim they are covered. Rather, under Section 6409(a), only requests that do in fact meet the provision’s requirements are entitled to mandatory approval. Therefore, States and local governments must have an opportunity to review applications to determine whether they are covered by Section 6409(a), and if not, whether they should in any case be granted.

212. However, we further conclude that Section 6409(a) warrants the imposition of certain requirements with regard to application processing, including a specific timeframe for State or local government review and a limitation on the documentation States and localities may require. While Section 6409(a), unlike Section 332(c)(7), does not expressly provide for a time limit or other procedural restrictions, we conclude that certain limitations are implicit in the statutory requirement that a State or local government “may not deny, and shall approve” covered requests for wireless facility siting. In particular, we conclude that the provision requires not merely approval of covered applications, but approval within a reasonable period of time commensurate with the limited nature of the review, whether or not a particular application is for “personal wireless service” facilities covered by Section 332(c)(7).⁵⁹¹ With no such limitation, a State or local government could evade its statutory obligation to approve covered applications by simply failing to act on them, or it could impose lengthy and onerous processes not justified by the limited scope of review contemplated by the provision. Such unreasonable delays not only would be inconsistent with the mandate to approve but also would undermine the important benefits that the provision is intended to provide to the economy, competitive wireless broadband deployment, and public safety. Accordingly, pursuant to our authority to implement and enforce Section 6409(a) described above, we require that States and localities grant covered requests within a specific time limit and pursuant to other procedures outlined below.

213. We find substantial support in the record for adopting such requirements. It is clear from the record that there is significant dispute as to whether any time limit applies at all under Section 6409(a) and, if so, what that limit is. We also note that there is already some evidence in the record, albeit anecdotal, of significant delays in the processing of covered requests under this new provision, which may be partly a consequence of the current uncertainty regarding the applicability of any time limit.⁵⁹²

⁵⁸⁸ See, e.g., CA Local Governments Comments at 22-23; Coconut Creek Comments at 8-9; Henderson Comments at 3; NJSLM Comments at 8; West Palm Beach Comments at 8.

⁵⁸⁹ See *Infrastructure NPRM*, 28 FCC Rcd at 14286 para.131.

⁵⁹⁰ *Section 6409(a) PN*, 28 FCC Rcd at 3.

⁵⁹¹ Implementation of Section 621(A)(1) of the Cable Communications Policy Act of 1984 as Amended by the Cable Television Consumer Protection and Competition Act of 1992, MB Docket No. 05-311, *Report and Order and Further Notice of Proposed Rulemaking*, 22 FCC Rcd 5101, 5137 para. 73 (2006) (“*Local Franchising Order*”), *aff’d sub nom., Alliance for Community Media v. FCC*, 529 F.3d 763 (6th Cir. 2008) (finding that “[f]ailure of [a] local franchising authority to act [on a franchise application] within [specified] time frames ... constitutes a refusal to award a competitive franchise” under Section 621(a)(1) of the Communications Act); *Section 6409(a) PN*, 28 FCC Rcd at 4. See also AT&T Comments at 25 (“Section 6409 is an administrative requirement for an application that is not subject to discretionary review and must be granted in a timely manner.”).

⁵⁹² See, e.g., Verizon Comments at 31-32.

Because the statutory language does not provide guidance on these requirements, we are concerned that, without clarification, future disputes over the process could significantly delay the benefits associated with the statute's implementation. Moreover, we find it important that all stakeholders have a clear understanding of when an applicant may seek relief from a State or municipal failure to act under Section 6409(a). We find further support for establishing these process requirements in analogous State statutes, nearly all of which include a timeframe for review, as discussed below. Therefore, we adopt the following procedural requirements for processing applications under Section 6409(a).⁵⁹³

214. First, we provide that in connection with requests asserted to be covered by Section 6409(a), State and local governments may only require applicants to provide documentation that is reasonably related to determining whether the request meets the requirements of the provision. We find that this restriction is appropriate in light of the limited scope of review applicable to such requests and that it will facilitate timely approval of covered requests. At the same time, under this standard, State or local governments have considerable flexibility in determining precisely what information or documentation to require. We agree with PCIA, however, that States and localities may not require documentation proving the need for the proposed modification or presenting the business case for it.⁵⁹⁴ We anticipate that over time, experience and the development of best practices will lead to broad standardization in the kinds of information required.⁵⁹⁵

215. In addition to defining acceptable documentation requirements, we establish a specific and absolute timeframe for State and local processing of eligible facilities requests under Section 6409(a).

⁵⁹³ Contrary to the suggestion of municipalities, we disagree that the Tenth Amendment prevents the Commission from exercising its authority under the Spectrum Act to implement and enforce the limitations imposed thereunder on State and local land use authority. These limitations serve to preempt the operation of state law, not to “compel the States to enact or administer a federal regulatory program.” *Printz v. United States*, 521 U.S. 898, 900 (1997). They do not require State or local authorities to review wireless facilities siting applications, but rather preempt them from choosing to exercise such authority under their laws other than in accordance with Federal law—*i.e.*, to deny any covered requests. *See Cellular Phone Taskforce v. FCC*, 205 F.3d 823, 96-97 (2d Cir. 2000). *See also City of Arlington v. FCC*, 133 S. Ct. 1863, 1873 (2013) (dispute about FCC shot clock rules implementing Section 332(c)(7) “has nothing to do with federalism,” as that provision “explicitly supplants state authority”). *Compare Petersburg Cellular Partnership v. Board of Supervisors of Nottoway County*, 205 F.3d 688, 716 (4th Cir. 2000) (King, J., dissenting), *with id.* at 699-705 (Niemeyer, J., separate opinion). Similar arguments with respect to similar remedies were rejected by the Commission in its *Local Franchising Order*, 22 FCC Rcd at 5161-62 para. 136. Such arguments were also made by State and local authorities on judicial review of that Order. *See* Brief of Petitioners, *City of Tampa et al., Alliance for Community Media v. FCC*, No. 07-3391 (6th Cir. Nov. 1, 2007), at 20-24; Reply Brief of Petitioners, *City of Tampa et al., Alliance for Community Media v. FCC*, No. 07-3391 (6th Cir. Nov. 1, 2007), at 12-13; Brief of the Dept. of the Public Advocate, Division of Rate Counsel, *Alliance for Community Media v. FCC*, No. 07-3391 (6th Cir. July 18, 2007), at 15-17; Reply Brief of the Dept. of the Public Advocate, Division of Rate Counsel, *Alliance for Community Media v. FCC*, No. 07-3391 (6th Cir. Oct. 4, 2007), at 15-16. The Sixth Circuit rejected these arguments without discussion. *See Alliance for Community Media v. FCC*, 529 F.3d 763 (6th Cir. 2008).

⁵⁹⁴ *See* PCIA Reply Comments at 20-21.

⁵⁹⁵ As discussed above, even as to applications covered by Section 6409(a), State and local governments may continue to enforce and condition approval on compliance with non-discretionary codes reasonably related to health and safety, including building and structural codes. We find that municipalities should have flexibility to decide when to require applicants to provide documentation of such compliance, as a single documentation submission may be more efficient than a series of submissions, and municipalities may also choose to integrate such compliance review into the zoning process. *See* Coconut Creek Comments at 8 (arguing that requiring a separate documentation submission to demonstrate compliance with structural codes will introduce further delay); MML Comments at 14 (“Cities should be able to require full applications, primarily because submission of full applications up front will provide for speedier processing of all applications and, on the whole, decrease costs for all parties.”). Accordingly, we clarify that our documentation restriction does not prohibit States and local governments from requiring documentation needed to demonstrate compliance with any such applicable codes.

We find that a 60-day period for review, including review to determine whether an application is complete, is appropriate. In addressing this issue, it is appropriate to consider not only the record support for a time limit on review but also State statutes that facilitate collocation applications. Many of these statutes impose review time limits, thus providing valuable insight into States' views on the appropriate amount of time. Missouri, New Hampshire, and Wisconsin, for example, have determined that 45 days is the maximum amount of time available to a municipality to review applications,⁵⁹⁶ while Georgia, North Carolina, and Pennsylvania have adopted a 90-day review period, including review both for completeness and for approval.⁵⁹⁷ Michigan's statute provides that after the application is filed, the locality has 14 days to deem the application complete and an additional 60 days to review.⁵⁹⁸ With consideration of the time periods adopted in these statutes, and for the further reasons discussed below, we find it appropriate to adopt a 60-day time period as the time limit for review of an application under Section 6409(a).

216. We find that a period shorter than the 90-day period applicable to review of collocations under Section 332(c)(7) of the Communications Act is warranted to reflect the more restricted scope of review applicable to applications under Section 6409(a). We further find, however, that a 60-day period of review, rather than the 45-day period proposed by many industry commenters,⁵⁹⁹ is appropriate to provide municipalities with sufficient time to review applications for compliance with Section 6409(a), because the timeframe sets an absolute limit that—in the event of a failure to act—results in a deemed grant.⁶⁰⁰ Thus, whereas a municipality may rebut a claim of failure to act under Section 332(c)(7) if it can demonstrate that a longer review period was reasonable, that is not the case under Section 6409(a). Rather, if an application covered by Section 6409(a) has not been approved by a State or local government within 60 days from the date of filing, accounting for any tolling, as described below, the reviewing authority will have violated Section 6409(a)'s mandate to approve and not deny the request, and the request will be deemed granted.

217. We further provide that the foregoing Section 6409(a) timeframe may be tolled by mutual agreement or in cases where the reviewing State or municipality informs the applicant in a timely manner that the application is incomplete. As with tolling for completeness under Section 332(c)(7) (as discussed later in this Report and Order), an initial determination of incompleteness tolls the running of the period only if the State or local government provides notice to the applicant in writing within 30 days of the application's submission. We also require that any determination of incompleteness must clearly and specifically delineate the missing information in writing, similar to determinations of incompleteness under Section 332(c)(7), as discussed below.⁶⁰¹ Further, consistent with the documentation restriction established above, the State or municipality may only specify as missing information and supporting documents that are reasonably related to determining whether the request meets the requirements of Section 6409(a).

218. The timeframe for review will begin running again when the applicant makes a supplemental submission, but may be tolled again if the State or local government provides written notice to the applicant within 10 days that the application remains incomplete and specifically delineates which of the deficiencies specified in the original notice of incompleteness have not been addressed. The

⁵⁹⁶ See MO ST § 67.5100.2; NH Rev Stat § 12-K:10 (2013); WI ST § 66-0404(3)(b), (c) (providing for up to 5 days to determine completeness of application and up to 45 days to review).

⁵⁹⁷ See GA ST § 36-66B-4(d); NC ST § 160A-400.53; PA ST 53 P.S. § 11702.4(b)(2). The North Carolina statute provides a municipality up to 45 days to determine completeness, and then an additional 45 days for review, for a total of up to 90 days. See NC ST § 160A-400.53.

⁵⁹⁸ See MI ST 125.3514(2).

⁵⁹⁹ See *supra*, para. 208.

⁶⁰⁰ See *infra*, para. 226.

⁶⁰¹ See *infra*, Section VI.B.1.

timeframe for review will be tolled in this circumstance until the applicant supplies the relevant authority with the information delineated. Consistent with determinations of incompleteness under Section 332(c)(7) as described below, any second or subsequent determination that an application is incomplete may be based only on the applicant's failure to provide the documentation or information the State or municipality required in its initial request for additional information.⁶⁰² Further, if the 10-day period passes without any further notices of incompleteness from the State or locality, the period for review of the application may not thereafter be tolled for incompleteness.

219. We further find that the timeframe for review under Section 6409(a) continues to run regardless of any local moratorium. This is once again consistent with our approach under Section 332(c)(7), as discussed below, and is further warranted in light of Section 6409(a)'s direction that covered requests shall be approved "[n]otwithstanding . . . any other provision of law."⁶⁰³

220. Some additional clarification of time periods and deadlines will assist in cases where both Section 6409(a) and Section 332(c)(7) apply. In particular, we note that States and municipalities reviewing an application under Section 6409(a) will be limited to a restricted application record tailored to the requirements of that provision. As a result, the application may be complete for purposes of Section 6409(a) review but may not include all of the information the State or municipality requires to assess applications not subject to Section 6409(a). In such cases, if the reviewing State or municipality finds that Section 6409(a) does not apply (because, for example, it proposes a substantial change), we provide that the presumptively reasonable timeframe under Section 332(c)(7) will start to run from the issuance of the State's or municipality's decision that Section 6409(a) does not apply. To the extent the State or municipality needs additional information at that point to assess the application under Section 332(c)(7), it may seek additional information subject to the same limitations applicable to other Section 332(c)(7) reviews, as discussed below. We recognize that, in such cases, there might be greater delay in the process than if the State or municipality had been permitted to request the broader documentation in the first place. We find, however, that applicants are in a position to judge whether to seek approval under Section 6409(a), and we expect they will have strong incentives to do so in a reasonable manner to avoid unnecessary delays. Finally, as we proposed in the *Infrastructure NPRM*, we find that where both Section 6409(a) and Section 332(c)(7) apply, Section 6409(a) governs, consistent with the express language of Section 6409(a) providing for approval "[n]otwithstanding" Section 332(c)(7) and with canons of statutory construction that a more recent statute takes precedence over an earlier one and that "normally the specific governs the general."⁶⁰⁴

221. Beyond the guidance provided in this Report and Order, we decline to adopt the other proposals put forth by commenters regarding procedures for the review of applications under Section 6409(a) or the collection of fees. We conclude that our clarification and implementation of this statutory provision strikes the appropriate balance of ensuring the timely processing of these applications and preserving flexibility for State and local governments to exercise their rights and responsibilities. Given the limited record of problems implementing the provision, further action to specify procedures would be premature.

3. Remedies

222. *Background.* In the *Infrastructure NPRM*, the Commission sought comment on the remedies that should be available to applicants in cases where a State or locality fails to act on an

⁶⁰² See *infra*, Section VI.B.1.

⁶⁰³ Spectrum Act § 6409(a)(1); see also *infra* § VI.B.2 (discussing application of moratoria to timeframes for review under Section 332(c)(7) and the 2009 Declaratory Ruling).

⁶⁰⁴ *Infrastructure NPRM*, 28 FCC Rcd at 14290 para. 143. See also, e.g., *Long Island Care at Home, Ltd. v. Coke*, 551 U.S. 158, 170 (2007).

application covered by Section 6409(a) or issues a decision adverse to the applicant.⁶⁰⁵ The Commission sought comment on whether, for example, it should provide that a covered request is “deemed granted” by operation of law if a State or local government fails to act within a specified period of time, and if so, how a deemed granted remedy should operate and how it should be enforced.⁶⁰⁶ It also sought comment on any alternative remedies to provide recourse in cases of State or municipal inaction, including whether the Commission should preempt State or local authority after a specified period of time.⁶⁰⁷ With regard to adverse decisions, the Commission sought comment on whether it should adopt a deemed granted rule applicable in these cases as well. It further proposed to permit applicants to file petitions for declaratory ruling with the Commission in cases of alleged violations of Section 6409(a), and sought comment on whether to adopt special procedures for such petitions.

223. Many industry commenters support adoption of a deemed granted remedy if a State or municipality fails to act on an application covered under Section 6409(a) within a specified period of time,⁶⁰⁸ and some propose that this remedy should apply to application denials as well.⁶⁰⁹ PCIA further proposes that if an applicant requires an actual permit, the applicant should have the option of either (1) informing the State or municipality of the deemed grant and requesting issuance of the permit or (2) seeking a court order directing the State or municipality to issue the permit.⁶¹⁰ AT&T recommends that the applicant should have the burden of notifying the State or local government that its application is deemed granted under the rule, and that the State or local government would then have the opportunity to file a challenge with the Commission within 14 days arguing that the application is not covered by Section 6409(a). Under AT&T’s proposal, if no challenge is filed within the 14-day period the application would conclusively be deemed granted.⁶¹¹

224. Industry commenters contend that Section 6003 of the Spectrum Act and various provisions of the Communications Act authorize the Commission to adopt a deemed granted remedy, and they argue that doing so would not present constitutional concerns.⁶¹² They argue that a deemed granted remedy is necessary to effectuate congressional intent to expedite covered applications, and that judicial and administrative remedies are costly and time-consuming and would impede applicants’ ability to

⁶⁰⁵ See *Infrastructure NPRM*, 28 FCC Rcd at 14288-90 paras. 137-143.

⁶⁰⁶ *Id.* at 14288 para. 137.

⁶⁰⁷ See *id.* at 14289 para.139.

⁶⁰⁸ See, e.g., AT&T Comments at 26-28; AT&T Reply Comments at 3-4, 14-15; CCA Reply Comments at 8-9; CTIA Reply Comments at 1-2, 8-10; Fibertech Reply Comments at 19; NYSWA Comments at 2; PCIA Comments at 50-53; Sprint Comments at 11; Sprint Reply Comments at 6; Towerstream Reply Comments at 5-7; Verizon Comments at 31-33. PCIA proposes that the deemed grant should apply in cases of a failure to act on an “eligible facilities request.” PCIA Comments at 50. It is not clear from its comments whether, in this context, PCIA means an “eligible facilities request” generally as that term is used in Section 6409(a) (*i.e.*, any request for collocation, removal, or replacement of transmission equipment on an existing wireless tower or base station) or whether PCIA refers to the subset of eligible facilities requests that require mandatory approval (*i.e.*, covered requests). Given that PCIA asserts that the “plain language of Section 6409(a) requires states and localities to approve all EFR applications without exception and without discretionary review,” PCIA Comments at 40, we interpret its use of the term to refer to covered requests.

⁶⁰⁹ See, e.g., AT&T Reply Comments at 3-4; PCIA Comments at 51-52. We note that commenters do not specifically describe how or to what extent a deemed grant would apply in the context of a denial.

⁶¹⁰ See PCIA Comments at 50.

⁶¹¹ See AT&T Comments at 26-27.

⁶¹² See, e.g., PCIA Comments at 51-53.

deploy wireless facilities.⁶¹³ Several industry commenters also argue that applicants should be permitted to bring complaints alleging violations of Section 6409(a) to the Commission through petitions for declaratory ruling or otherwise, either challenging a State or municipal action on a specific application or alleging that a particular State or local requirement violates the provision.⁶¹⁴

225. Municipal commenters addressing this issue oppose a deemed granted remedy and argue that the courts should resolve Section 6409(a) disputes.⁶¹⁵ These commenters argue that a deemed granted remedy would contravene the Tenth Amendment as well as the approach developed in the 2009 *Declaratory Ruling*.⁶¹⁶ For support, these commenters assert that such a remedy would pose an unnecessary intrusion into State and local governments' longstanding zoning authority and would be inconsistent with traditional notions of Federal and state jurisdiction.⁶¹⁷ Municipal commenters further contend that resolving Section 6409(a) disputes via Commission action rather than in court—whether through the Commission's adoption of a deemed granted approach or its review of specific applications—would conflict with the Commission's stated intention not to become a “national zoning board.”⁶¹⁸ They argue as well that the Commission lacks expertise in zoning disputes, that requiring adjudication at the Commission would significantly and unreasonably burden municipalities, and that local courts are better equipped to identify applicable precedents and assess the particular facts and circumstances of individual disputes.⁶¹⁹ Alexandria *et al.* argue that Section 6409(a) neither specifies a judicial cause of action nor directs the Commission to review disputes, and that Congress is therefore “best understood to have elected to rely on existing avenues of relief.”⁶²⁰ They therefore propose that applicants follow the normal state-law procedures for challenging local zoning decisions or that they seek judicial review under Section

⁶¹³ See, e.g., AT&T Comments at 8, 25-26; CTIA Reply Comments at 1-2, 7-8; Verizon Comments at 32-33. See also PCIA Comments at 50 (arguing that deemed grant is a “reasonable and appropriate way of enforcing” the “shall approve” requirement).

⁶¹⁴ See, e.g., AT&T Comments at 27-28; Fibertech Comments at 33; Towerstream Comments at 27-28; Towerstream Reply Comments at 7.

⁶¹⁵ See, e.g., Alexandria *et al.* Comments at 45-48; Alexandria *et al.* Reply Comments at 25-28; CA Local Governments Comments at 24-26; CA Local Governments Reply Comments at iv, 19-23; CalWA Reply Comments at 3, 10-11; CCA Reply Comments at 9-10; Coconut Creek Comments at 9; DC Comments at 20; IAC Comments at 2; RCRC Comments at 4; San Antonio Reply Comments at 3-4, 21-23; Springfield Comments at 16; Tucson Comments at 9-10; West Palm Beach Comments at 9.

⁶¹⁶ See, e.g., Alexandria *et al.* Comments at 46-47; Alexandria *et al.* Reply Comments at 27-28; CA Local Governments Comments at 25-26; Coconut Creek Comments at 9; Fairfax Comments at 19; San Antonio Reply Comments at 3-4; Tucson Comments at 10; West Palm Beach Comments at 9. Some commenters also contend that a deemed granted remedy would violate the Due Process Clause. See, e.g., Alexandria *et al.* Reply Comments at 25-28; Springfield Comments at 16.

⁶¹⁷ See, e.g., Alexandria *et al.* Reply Comments at 27-28; Coconut Creek Comments at 9; DC Comments at 20; Fairfax Comments at 19; San Antonio Reply Comments at 22; Tucson Comments at 10; West Palm Beach Comments at 9.

⁶¹⁸ See, e.g., Alexandria *et al.* Comments at 47-48; Fairfax Comments at 19-20; Tucson Comments at 10.

⁶¹⁹ See, e.g., Alexandria *et al.* Comments at 47-48; CA Local Governments Comments at 24 (asserting an “express Congressional intent to allow federal courts to craft individualized remedies”), 27-28; CA Local Governments Reply Comments at 19-20; CCUA *et al.* Comments at 15; Coconut Creek Comments at 9; IAC Comments at 2; RCRC Comments at 4; San Antonio Reply Comments at 23; Tucson Comments at 10. Commenters point out that localities generally do not have Washington, D.C.-based counsel available for representation before the Commission. See, e.g., Alexandria *et al.* Comments at 47-48; CCUA *et al.* Comments at 15; Coconut Creek Comments at 9; IAC Comments at 2 (“Localities should not be required to incur the expense of retaining legal counsel in Washington, D.C. and traveling long distances to defend local zoning decisions”), 8 (noting in particular the costs and burden on smaller communities); RCRC Comments at 4; Tucson Comments at 10.

⁶²⁰ Alexandria *et al.* Comments at 47.

332(c)(7), which they believe “has proven effective.”⁶²¹ Coconut Creek argues that Section 6409(a) disputes should be raised through causes of action brought in court under Section 332(c)(7).⁶²²

226. *Discussion.* After a careful assessment of the statutory provision and a review of the record, we establish a deemed granted remedy for cases in which the applicable State or municipal reviewing authority fails to issue a decision within 60 days (subject to any tolling, as described above) on an application submitted pursuant to Section 6409(a). We further conclude that a deemed grant does not become effective until the applicant notifies the reviewing jurisdiction in writing, after the time period for review by the State or municipal reviewing authority as prescribed in our rules has expired, that the application has been deemed granted.

227. Our reading of Section 6409(a) supports this approach. The provision states without equivocation that the reviewing authority “may not deny, and shall approve” any qualifying application.⁶²³ This directive leaves no room for a lengthy and discretionary approach to reviewing an application that meets the statutory criteria; once the application meets these criteria, the law forbids the State or local government from denying it. Moreover, while State and local governments retain full authority to approve or deny an application depending on whether it meets the provision’s requirements, the statute does not permit them to delay this obligatory and non-discretionary step indefinitely. In this Report and Order, we have defined objectively the statutory criteria for determining whether an application is entitled to a grant under this provision. Given the objective nature of this assessment, then, we conclude that withholding a decision on an application indefinitely, even if an applicant can seek relief in court or in another tribunal, would be tantamount to denying it, in contravention of the statute’s pronouncement that reviewing authorities “may not deny” qualifying applications. We therefore find that the text of Section 6409(a) supports adoption of a deemed granted remedy, which will directly serve the broader goal of promoting the rapid deployment of wireless infrastructure. We note as well that our approach is consistent with other Federal agencies’ processes to address inaction by State and local authorities.⁶²⁴

228. As noted above, many municipalities oppose the adoption of a deemed granted remedy primarily on the ground that it arguably represents an intrusion into local decision-making authority.⁶²⁵ We fully acknowledge and value the important role that local reviewing authorities play in the siting process, and, as the Commission stated in the *Infrastructure NPRM*, “our goal is not to ‘operate as a national zoning board.’”⁶²⁶ At the same time, our authority and responsibility to implement and enforce Section 6409(a) as if it were a provision of the Communications Act obligate us to ensure effective enforcement of the congressional mandate reflected therein. To do so, given our “broad grant of rulemaking authority,”⁶²⁷ the importance of ensuring rapid deployment of commercial and public safety wireless broadband services as reflected in the adoption of the Spectrum Act, and in light of the record of disputes in this proceeding, as well as the prior experience of the Commission with delays in municipal

⁶²¹ *Id.*

⁶²² See Coconut Creek Comments at 9. See also CA Local Governments Reply Comments at 23, 27-28; CUA *et al.* Reply Comments at 5; San Antonio Reply Comments at 3-4, 21-22; Tucson Comments at 9-10.

⁶²³ Spectrum Act § 6409(a)(1).

⁶²⁴ See, e.g., 42 C.F.R. § 438.56(e)(2) (Centers for Medicare and Medicaid Services rule providing that an application to disenroll from a Medicaid managed care plan shall be “considered approved” if not acted on by a State agency within the regulatory deadline). See also 47 U.S.C. § 160(c) (petition for forbearance deemed granted if Commission fails to deny within the regulatory deadline).

⁶²⁵ See *supra*, para. 225.

⁶²⁶ See *Infrastructure NPRM*, 28 FCC Rcd at 14276 para. 99 (quoting Preemption of Local Zoning or Other Regulation of Receive-Only Satellite Earth Stations, CC Docket No. 85-87, 59 Rad. Reg. 2d (P&F) 1073, para. 39 (1986)).

⁶²⁷ *City of Arlington v. FCC*, 133 S.Ct. 1863, 1874 (2013).

action on wireless facility siting applications that led to the *2009 Declaratory Ruling*, we conclude it is necessary to balance these federalism concerns against the need for ensuring prompt action on Section 6409(a) applications.⁶²⁸ We therefore adopt this approach in tandem with several measures that safeguard the primacy of State and local government participation in local land use policy, to the extent consistent with the requirements of Section 6409(a). First, we have adopted a 60-day time period for States and localities to review applications submitted under Section 6409(a).⁶²⁹ While many industry commenters proposed a 45-day review period based on the non-discretionary analysis that the provision requires,⁶³⁰ we have provided more time in part to ensure that reviewing authorities have sufficient time to assess the applications.

229. Second, we are establishing a clear process for tolling the 60-day period when an applicant fails to submit a complete application, thus ensuring that the absence of necessary information does not prevent a State or local authority from completing its review before the time period expires.⁶³¹

230. Third, even in the event of a deemed grant, the Section 106 historic preservation review process—including coordination with State and Tribal historic preservation officers—will remain in place with respect to any proposed deployments in historic districts or on historic buildings (or districts and buildings eligible for such status).⁶³²

231. Fourth, as explained below, a State or local authority may challenge an applicant's written assertion of a deemed grant in any court of competent jurisdiction when it believes the underlying application did not meet the criteria in Section 6409(a) for mandatory approval, would not comply with applicable building codes or other non-discretionary structural and safety codes, or for other reasons is not appropriately "deemed granted."⁶³³

232. Finally, and perhaps most importantly, the deemed granted approach does not deprive States and localities of the opportunity to determine whether an application is covered; rather, it provides a remedy for a failure to act within the fixed but substantial time period within which they must determine, on a non-discretionary and objective basis, whether an application fits within the parameters of Section 6409(a).

233. We emphasize as well that we expect deemed grants to be the exception rather than the rule. To the extent there have been any problems or delays due to ambiguity in the provision, we anticipate that the framework we have established, including the specification of substantive and procedural rights and applicable remedies, will address many of these problems. We anticipate as well that the prospect of a deemed grant will create significant incentives for States and municipalities to act in a timely fashion.

⁶²⁸ See *2009 Declaratory Ruling*, 24 FCC Rcd at 14004-06 paras. 32-34. See also, e.g., T-Mobile Comments, Sullivan Decl. at 1-5 (stating that "wireless siting permit issues are so prevalent that T-Mobile has had to bring or defend more than 300 lawsuits in state and federal courts," and describing several disputes over land use regulation of wireless facility modifications, including two cases that remain pending in trial court after more than three years), 3 ("Even in the absence of litigation, T-Mobile experiences substantial delays in obtaining local approvals to collocate on existing towers and base stations, or to modify such facilities as part of the company's modernization efforts.").

⁶²⁹ See *supra*, para. 216.

⁶³⁰ See *supra*, para. 208.

⁶³¹ See *supra*, paras. 217-219.

⁶³² See *supra*, para. 88 (excluding collocations from Section 106 review under certain circumstances, but not when they would be located on buildings that are listed in or eligible for listing in the National Register or in or near a historic district).

⁶³³ See, e.g., *infra*, paras. 234-236.

234. With respect to the appropriate forum for redress or for resolving disputes, including disputes over the application of the deemed grant rule, we find that the most appropriate course for a party aggrieved by operation of Section 6409(a) is to seek relief from a court of competent jurisdiction. Although we find that we have authority to resolve such disputes under our authority to implement and enforce that provision, we also find that requiring that these disputes be resolved in court, and not by the Commission, will better accommodate the role of the States and local authorities and serve the public interest for the reasons the municipal commenters identify and as discussed below.⁶³⁴

235. A number of factors persuade us to require parties to adjudicate claims under Section 6409(a) in court rather than before the Commission. First, we find that Commission adjudication would impose significant burdens on localities, many of which are small entities with no representation in Washington, D.C. and no experience before the Commission. The possible need for testimony to resolve disputed factual issues, which may occur in these cases, would magnify the burden. We are also concerned that the Commission may simply lack the resources to adjudicate these matters in a timely fashion if we enable parties to seek our review of local zoning disputes arising in as many as 38,000 jurisdictions, thus thwarting Congress's goal of speeding up the process.⁶³⁵ We also agree with municipalities that the Commission does not have any particular expertise in resolving local zoning disputes, whereas courts have been adjudicating claims of failure to act on wireless facility siting applications since the adoption of Section 332(c)(7).⁶³⁶

236. Accordingly, we require parties to bring claims related to Section 6409(a) in a court of competent jurisdiction. Such claims would appear likely to fall into one of three categories. First, if the State or local authority has denied the application, an applicant might seek to challenge that denial. Second, if an applicant invokes its deemed grant right after the requisite period of State or local authority inaction, that reviewing authority might seek to challenge the deemed grant. Third, an applicant whose application has been deemed granted might seek some form of judicial imprimatur for the grant by filing a request for declaratory judgment or other relief that a court may find appropriate. In light of the policy underlying Section 6409(a) to ensure that covered requests are granted promptly, and in the self-interest of the affected parties, we would expect that these parties would seek judicial review of any such claims relating to Section 6409(a) expeditiously. The enforcement of such claims is a matter appropriately left to such courts of competent jurisdiction. However, given the foregoing Federal interest reflected in Section 6409(a), it would appear that the basis for equitable judicial remedies would diminish significantly absent prompt action by the aggrieved party. In our judgment, based on the record established in this proceeding, we find no reason why (absent a tolling agreement by parties seeking to resolve their differences) such claims cannot and should not be brought within 30 days of the date of the

⁶³⁴ Section 6003 of the Spectrum Act, 47 U.S.C. § 1403, directs us to enforce the provisions of Title VI as though they were part of the Communications Act. We adopt the approach described in the text—namely, adjudication in court rather than before the Commission—pursuant to our well-established discretion in matters of enforcement, including in determining whether it is appropriate for the Commission to resolve a controversy. See National Association of Regulatory Utility Commissioners' Petition for Clarification or Declaratory Ruling That No FCC Order or Rule Limits State Authority to Collect Broadband Data, *Memorandum Opinion and Order*, 25 FCC Rcd 5051, 5053 para. 5 (2010) (noting that the Commission has broad discretion whether to issue a ruling to terminate a controversy or remove uncertainty); *Heckler v. Chaney*, 470 U.S. 821, 831 (1985) (“[A]n agency’s decision not to prosecute or enforce, whether through civil or criminal process, is a decision generally committed to an agency’s absolute discretion.”); *New York State Dept. of Law v. FCC*, 984 F.2d 1209, 1213 (D.C. Cir. 1993) (upholding the Commission’s exercise of its enforcement discretion) (citing *Heckler*, 470 U.S. at 831).

⁶³⁵ See “Government Organization Summary Report: 2012,” available at http://www2.census.gov/govs/cog/g12_org.pdf (finding 38,910 general purpose local governments). See also CA Local Governments Comments at 11.

⁶³⁶ As we note in connection with Section 332(c)(7), see *infra*, para. 284, a party pursuing a claim under Section 6409(a) may seek injunctive relief, which may be appropriate in many cases in light of Congress’s goal of advancing wireless broadband service. See Conference Report at 136.

relevant event (*i.e.*, the date of the denial of the application or the date of the notification by the applicant to the State or local authority of a deemed grant in accordance with our rules).

4. Non-application to States or Municipalities in Their Proprietary Capacities

237. *Background.* In the *Infrastructure NPRM*, the Commission sought comment on the IAC's argument that the Section 6409(a) mandate applies only to State and local governments acting in their role as land use regulators and does not apply to such entities acting in their capacities as property owners.⁶³⁷ In its Recommendations to the Commission, the IAC had asserted that "[w]here . . . a county government, as landlord rather than as land use regulator, has by contract or lease chosen, in its discretion, to authorize the installation of an antenna on a county courthouse rooftop of certain exact dimensions and specifications, Section 6409 does not require the county, acting in its capacity as landlord rather than its capacity as regulator of private land use, to allow the tenant to exceed to any extent those mutually and contractually agreed-upon exact dimensions and specifications."⁶³⁸ The Commission proposed to adopt this interpretation, and sought comment on how to determine in which capacity a government is acting and whether to address how Section 6409(a) applies where both capacities are implicated.⁶³⁹

238. Although T-Mobile argues that Section 6409(a) does not distinguish between situations in which a local government is acting as a municipal authority or as a proprietary landlord,⁶⁴⁰ the record otherwise reflects near unanimity in support of the IAC's recommendation.⁶⁴¹ Certain industry commenters argue, however, that municipal regulation of the public rights-of-way constitutes action by a government in its regulatory capacity rather than its proprietary capacity.⁶⁴² Municipal commenters argue, by contrast, that there is no need at this time to further define what is or is not proprietary action.⁶⁴³

239. *Discussion.* As proposed in the *Infrastructure NPRM* and supported by the record, we conclude that Section 6409(a) applies only to State and local governments acting in their role as land use regulators and does not apply to such entities acting in their proprietary capacities. As discussed in the record, courts have consistently recognized that in "determining whether government contracts are subject to preemption, the case law distinguishes between actions a State entity takes in a proprietary capacity—actions similar to those a private entity might take—and its attempts to regulate."⁶⁴⁴ As the Supreme Court has explained, "[i]n the absence of any express or implied implication by Congress that a State may not manage its own property when it pursues its purely proprietary interests, and when analogous private conduct would be permitted, this Court will not infer such a restriction."⁶⁴⁵ Like private property owners, local governments enter into lease and license agreements to allow parties to place antennas and other wireless service facilities on local-government property, and we find no basis for applying Section 6409(a) in those circumstances. We find that this conclusion is consistent with judicial decisions holding

⁶³⁷ See *Infrastructure NPRM*, 28 FCC Rcd at 14285 para. 129.

⁶³⁸ *Id.* (citing IAC Recommendations at 3).

⁶³⁹ See *id.*

⁶⁴⁰ See T-Mobile Reply Comments at 19.

⁶⁴¹ See, e.g., Alexandria *et al.* Comments at 49-51; CA Local Governments Comments at 16-17; Coconut Creek Comments at 7-8; CTC Reply Comments at 8; DC Comments at 19; DC Reply Comments at 14; Fairfax Comments at 15-16; IAC Comments at 2; Minneapolis Comments at 11-12; NATOA *et al.* Reply Comments at 3; NJSLM Comments at 7; PCIA Reply Comments at 22; VA DOSP Comments at 4-6.

⁶⁴² See, e.g., PCIA Reply Comments at 22; T-Mobile Reply Comments at 19.

⁶⁴³ See, e.g., Alexandria *et al.* Reply Comments at 3.

⁶⁴⁴ See, e.g., Alexandria *et al.* Comments at 49 (citing *American Airlines v. Dept. of Transp.*, 202 F.3d 788, 810 (5th Cir. 2000)).

⁶⁴⁵ *Building & Construction Trades Council of Metropolitan District v. Associated Builders & Contractors of Massachusetts/Rhode Island Inc.*, 507 U.S. 218, 231-32 (1993).

that Sections 253 and 332(c)(7) of the Communications Act do not preempt “non regulatory decisions of a state or locality acting in its proprietary capacity.”⁶⁴⁶

240. We decline at this time to further elaborate as to how this principle should apply to any particular circumstance in connection with Section 6409(a). We agree with Alexandria *et al.* that the record does not demonstrate a present need to define what actions are and are not proprietary, and we conclude in any case that such a task is best undertaken, to the extent necessary, in the context of a specific municipal action and associated record.⁶⁴⁷ Further, as discussed above, there is extensive case law on the application of this distinction in other contexts, including in connection with wireless facility siting applications under Section 332(c)(7), which can provide valuable guidance for its application under Section 6409(a).

5. Effective Date

241. *Background.* The Commission sought comment on whether, in the event it adopted rules in connection with Section 6409(a), it should provide a transition period to allow States and localities time to implement the rules in their laws, ordinances, and procedures.⁶⁴⁸ The Commission further asked how it could establish a transition period consistent with the provision’s requirements and how long any transition period should be.⁶⁴⁹ The record reflects divided views, with industry commenters arguing against a transition period and municipalities arguing for one. While PCIA argues that no transition is necessary for States and localities to implement Section 6409(a) requirements into their laws,⁶⁵⁰ municipal commenters contend that a transition period would be essential in order for them to accommodate the additional workload involved in updating regulations and procedures.⁶⁵¹ In particular, the IAC urges the Commission to provide that the rules will not take effect until 90 days after publication in the Federal Register, arguing that a transition period is necessary to allow affected State, local, and Tribal governments time to make the necessary changes to their laws and procedures.⁶⁵²

⁶⁴⁶ *Qwest Corp. v. City of Portland*, 385 F.3d 1236, 1240 (9th Cir. 2004) (recognizing that Section 253(a) preempts only “regulatory schemes”); *Sprint Spectrum v. Mills*, 283 F.3d 404, 421 (2d Cir. 2002) (finding that Section 332(c)(7) “does not preempt nonregulatory decisions of a local governmental entity or instrumentality acting in its proprietary capacity”).

⁶⁴⁷ See Alexandria *et al.* Reply Comments at 3. We note that this issue has been raised informally by parties in the context of New York City’s payphone franchising regulation. See Letter from Robert G. Scott, Jr., Davis Wright Tremaine LLP, to Marlene H. Dortch, Secretary, FCC, filed July 24, 2014 (Telebeam *Ex Parte*) at 4 (urging the Commission on behalf of Telebeam Telecommunications Corp. to avoid any statement that would “allow the City of New York . . . to evade the wireless siting rules ultimately adopted, through claims that its regulation of public telephones is an exercise of proprietary authority or otherwise”). We take no position on Telebeam’s argument in this Report and Order.

⁶⁴⁸ See *Infrastructure NPRM*, 28 FCC Rcd at 14276 para. 100.

⁶⁴⁹ See *id.*

⁶⁵⁰ See PCIA Comments at 27-28.

⁶⁵¹ See, e.g., Alexandria *et al.* Reply Comments at 24; CA Local Governments Comments at 29-30 (arguing that at least twelve months is necessary to adjust local land use ordinances, policies, and procedures to reflect any new rules adopted as a result of this proceeding); Haddon Heights Comments at 2; San Diego Comments at 3.

⁶⁵² See Letter from Kenneth S. Fellman, Intergovernmental Advisory Committee, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 13-238, filed Oct. 8, 2014 (IAC Oct. 8, 2014 *Ex Parte*), at 1-2 (asserting that it will be necessary to educate staff and elected officials throughout the country of the substance of the Order and the changes that might be required once local codes are reviewed in light of the Commission’s guidance). See also Letter from Yejin Jang, National Association of Counties, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 13-238, filed Oct. 10, 2014 (NACo Oct. 10, 2014 *Ex Parte*), at 1 (asserting that the effective date should be no earlier than 90 days after publication and that in implementing such changes to existing State and local laws and requirements, States and municipalities would need time for appropriate action, such as providing notice for official meetings and

(continued....)

242. *Discussion.* Based on our review of the record, we are persuaded that a transition period is necessary and appropriate. We agree with certain municipal commenters that affected State and local governments may need time to make modifications to their laws and procedures to conform to and comply with the rules we adopt in this Report and Order implementing and enforcing Section 6409(a), and that a transition period is warranted to give them time to do so.⁶⁵³ We therefore conclude, as proposed by the IAC and other parties, that the rules adopted to implement Section 6409(a) will take effect 90 days after Federal Register publication.

VI. SECTION 332(C)(7) AND THE 2009 DECLARATORY RULING

243. In this section, we address questions related to Section 332(c)(7) and the Commission's *2009 Declaratory Ruling*.⁶⁵⁴ In particular, we clarify when a siting application is considered complete for the purpose of triggering the presumptively reasonable timeframes for local and State review of personal wireless service facilities siting applications under the *2009 Declaratory Ruling*, and we also clarify how the presumptively reasonable timeframes apply to local moratoria and DAS or small-cell facilities. We find that these actions will resolve ambiguities and thus enable both industry and State and local jurisdictions to expedite personal wireless service facilities siting and facilitate the provision of advanced wireless services across the country.

244. With regard to certain other issues, after review of the record, we decline to take action at this time. Specifically, we decline to further clarify or amend the test for determining which applications must be reviewed under the shorter 90-day period applicable to collocations under the *2009 Declaratory Ruling*, to hold that preferences for the placement of wireless facilities on municipal property are *per se* unlawful under Section 332(c)(7), or to adopt additional remedies beyond the one articulated in the *2009 Declaratory Ruling* for failures to act in a timely manner under Section 332(c)(7).

A. Background

245. Section 332(c)(7) of the Communications Act, adopted as part of the Telecommunications Act of 1996, generally preserves State and local authority over “personal wireless service facilities” siting, while also placing important limitations on that authority.⁶⁵⁵ Three of these limits involve substantive restrictions. The first, Section 332(c)(7)(B)(i)(I), states that municipal regulation of the placement, construction, and modification of personal wireless service facilities “shall not unreasonably discriminate among providers of functionally equivalent services.”⁶⁵⁶ A second substantive limit provides that a State or local government’s siting regulations “shall not prohibit or have the effect of prohibiting the provision of personal wireless services.”⁶⁵⁷ The third provides that a State or

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agenda, informing the public, providing opportunity for comment, gathering public input and testimony, and, in some instances, action by state legislatures to support local compliance with the Commission’s order).

⁶⁵³ To the extent existing State and local laws conflict with our rules implementing Section 6409(a), they will no longer apply once the rules take effect.

⁶⁵⁴ See, generally, 47 U.S.C. § 332(c)(7); *2009 Declaratory Ruling*, 24 FCC Rcd 13994.

⁶⁵⁵ 47 U.S.C. § 332(c)(7)(A) (stating that, “[e]xcept as provided in this paragraph, nothing in this chapter shall limit or affect the authority of a State or local government or instrumentality thereof over decisions regarding the placement, construction, and modification of personal wireless services facilities”). Personal wireless services are defined as “commercial mobile services, unlicensed wireless services, and common carrier wireless exchange access services.” 47 U.S.C. § 332(c)(7)(C)(i). As discussed above, in 2012, Congress expressly modified this preservation of local and State authority by enacting Section 6409(a), which requires local or State governments to approve certain types of facilities siting applications “[n]otwithstanding section 704 of the Telecommunications Act of 1996 [codified in substantial part as Section 332(c)(7)] . . . or any other provision of law . . .” Spectrum Act § 6409(a)(1). See *supra*, Section V.

⁶⁵⁶ 47 U.S.C. § 332(c)(7)(B)(i)(I).

⁶⁵⁷ *Id.* at § 332(c)(7)(B)(i)(II).

local government may not regulate the siting of personal wireless service facilities “on the basis of the environmental effects of [RF] emissions to the extent that such facilities comply with the Commission’s regulations concerning such emissions.”⁶⁵⁸ Section 332(c)(7)(B) also imposes procedural obligations on State and local governments, including a requirement that they must act on requests for personal wireless service facilities sitings “within a reasonable period of time.”⁶⁵⁹

246. Section 332(c)(7) also sets forth a judicial remedy for violations of the provision, stating that “[a]ny person adversely affected by any final action or failure to act by a State or local government” that is inconsistent with the requirements of Section 332(c)(7) “may, within 30 days after such action or failure to act, commence an action in any court of competent jurisdiction.”⁶⁶⁰ The provision further directs the court to “decide such action on an expedited basis.”⁶⁶¹ While the statute makes this judicial remedy available for any violation of Section 332(c)(7), it also provides that applicants may petition the Commission for relief in one circumstance—where they are adversely affected by a State or local government’s action or failure to act based on the effects of RF emissions.⁶⁶²

247. In 2009, the Commission adopted a Declaratory Ruling⁶⁶³ in response to a petition requesting clarification on two points: what constitutes a “reasonable period of time” after which an aggrieved applicant may file suit asserting a failure to act under Section 332(c)(7), and whether a zoning authority may restrict competitive entry by multiple providers in a given area under Section 332(c)(7)(B)(i)(II).⁶⁶⁴ In the *2009 Declaratory Ruling*, the Commission interpreted a “reasonable period of time” under Section 332(c)(7)(B)(ii) to be 90 days for processing collocation applications, and 150 days for processing applications other than collocations.⁶⁶⁵ The Commission further determined that failure to meet the applicable timeframe presumptively constitutes a failure to act under Section 332(c)(7)(B)(v), enabling an applicant to pursue judicial relief within the next 30 days.⁶⁶⁶

248. The Commission also defined certain circumstances that would warrant adjustments to the presumptive deadlines, including when the applicant fails to submit a complete application or to file necessary additional information in a timely manner.⁶⁶⁷ Specifically, the Commission stated that “when applications are incomplete as filed, the timeframes do not include the time that applicants take to respond

⁶⁵⁸ *Id.* at § 332(c)(7)(B)(iv).

⁶⁵⁹ *Id.* at § 332(c)(7)(B)(ii). In addition, Section 332(c)(7)(B)(iii) provides that “[a]ny decision by a State or local government or instrumentality thereof to deny a request to place, construct, or modify personal wireless service facilities shall be in writing and supported by substantial evidence contained in a written record.” *Id.* at § 332(c)(7)(B)(iii). See *T-Mobile S., LLC v. City of Roswell*, 731 F.3d 1213 (11th Cir. 2013) *cert. granted* 134 S. Ct. 2136 (2014).

⁶⁶⁰ 47 U.S.C. § 332(c)(7)(B)(v).

⁶⁶¹ *Id.*

⁶⁶² See *id.*

⁶⁶³ See *2009 Declaratory Ruling*, 24 FCC Rcd 13994.

⁶⁶⁴ Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(B) to Ensure Timely Siting Review and to Preempt Under Section 253 State and Local Ordinances that Classify All Wireless Siting Proposals as Requiring a Variance, Petition for Declaratory Ruling of CTIA—The Wireless Association, WT Docket No. 08-165, filed July 11, 2008 (*CTIA Petition*). In its petition, CTIA also requested that the Commission find that a State or local regulation that requires a variance or waiver for every wireless facility siting violates Section 253(a) of the Communications Act. 47 U.S.C. § 253(a). The Commission denied this request due to a lack of a specific controversy. See *2009 Declaratory Ruling*, 24 FCC Rcd at 14019-20 paras. 66-67.

⁶⁶⁵ See *id.* at 14012 para. 45.

⁶⁶⁶ See *id.* at 14005 para. 32, 14012 para. 45.

⁶⁶⁷ See *id.* at 14010 para. 42.

to State and local governments' requests for additional information.⁶⁶⁸ This automatic tolling, however, applies only if a zoning authority notifies an applicant within the first 30 days that its application is incomplete.⁶⁶⁹ In addition, the Commission clarified that the presumptive deadlines for acting on siting applications could be extended beyond 90 or 150 days by mutual consent, and that such an agreement would toll the commencement of the 30-day period for filing suit.⁶⁷⁰

249. Finally, addressing Section 332(c)(7)(B)(i)(II)'s direction that States and localities shall not regulate in a manner that prohibits or has the effect of prohibiting the provision of personal wireless services, the Commission found that this provision prohibits a State or local government from denying a personal wireless service facility siting application solely because service is available from another provider.⁶⁷¹

250. On December 17, 2009, a Petition for Reconsideration or Clarification (Petition) was filed by the National Association of Telecommunications Officers and Advisors, the United States Conference of Mayors, the National League of Cities, the National Association of Counties, and the American Planning Association (Petitioners).⁶⁷² In August of 2010, the Commission adopted the *2010 Shot Clock Reconsideration Order*, in which it denied the requests to reconsider certain of its conclusions.⁶⁷³

251. In 2012, the United States Court of Appeals for the Fifth Circuit upheld the *2009 Declaratory Ruling* in its entirety,⁶⁷⁴ deferring to the Commission's conclusion that it had jurisdiction to address these issues. In 2013, the United States Supreme Court affirmed the Fifth Circuit's decision, finding that judicial deference under *Chevron* applies to an agency's determination of the scope its own statutory jurisdiction.⁶⁷⁵

252. Subsequent to the Supreme Court's decision, the Commission released the *Infrastructure NPRM*. While stating that the Commission would not generally revisit the *2009 Declaratory Ruling*, it

⁶⁶⁸ *Id.* at 14014 para. 52.

⁶⁶⁹ *See id.* at 14014-15 para. 53.

⁶⁷⁰ *See id.* at 14013 para. 49.

⁶⁷¹ *See id.* at 14016 para. 56.

⁶⁷² *See* Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(B) to Ensure Timely Siting Review and to Preempt under Section 253 State and Local Ordinances that Classify All Wireless Siting Proposals as Requiring a Variance, *Petition for Reconsideration or Clarification*, WT Docket No. 08-165, filed Dec. 17, 2009. Also on December 17, 2009, Petitioners filed an Emergency Motion for Stay pending Commission action on their petition. *See* Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(B) to Ensure Timely Siting Review and to Preempt under Section 253 State and Local Ordinances that Classify All Wireless Siting Proposals as Requiring a Variance, *Emergency Motion for Stay*, WT Docket No. 08-165, filed Dec. 17, 2009. On January 29, 2010, WTB denied the stay request. *See* Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(B) to Ensure Timely Siting Review and to Preempt Under Section 253 State and Local Ordinances that Classify All Wireless Siting Proposals as Requiring a Variance, WT Docket No. 08-165, *Order*, 25 FCC Rcd 1215 (WTB 2010) (*2010 Stay Denial Order*).

⁶⁷³ *See, generally*, Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(B) to Ensure Timely Siting Review and to Preempt under Section 253 State and Local Ordinances that Classify All Wireless Siting Proposals as Requiring a Variance, WT Docket No. 08-165, *Order on Reconsideration*, 25 FCC Rcd 11157 (2010) (*2010 Reconsideration Order*).

⁶⁷⁴ *See City of Arlington v. FCC*, 668 F.3d 229 (5th Cir. 2012), *aff'd*, 133 S.Ct. 1863 (2013).

⁶⁷⁵ *See City of Arlington*, 133 S.Ct. at 1874 ("[T]he preconditions to deference under *Chevron* are satisfied because Congress has unambiguously vested the FCC with general authority to administer the Communications Act through rulemaking and adjudication, and the agency interpretation at issue was promulgated in the exercise of that authority."); *see Chevron U.S.A. Inc. v. NRDC, Inc.*, 467 U.S. 837 (1984).

sought comment on six discrete issues arising under Section 332(c)(7) and the *2009 Declaratory Ruling*.⁶⁷⁶ (1) whether and how to clarify when a siting application is considered complete for the purpose of triggering the *2009 Declaratory Ruling*'s shot clock; (2) whether to clarify that the presumptively reasonable period for State or local government action on an application runs regardless of any local moratorium; (3) whether the *2009 Declaratory Ruling* applies to DAS and small-cell facilities; (4) whether to clarify the types of actions that constitute "collocations" for purposes of triggering the shorter shot clock; (5) whether local ordinances establishing preferences for deployment on municipal property violate Section 332(c)(7)(B)(i)(I); and (6) whether to adopt an additional remedy for failures to act in violation of Section 332(c)(7).⁶⁷⁷

B. Discussion

253. In order to add greater efficiency to the siting process—for the municipal and State entities that must review applications, for the applicants that file them, and for the tribunals that resolve disputes—we clarify how the *2009 Declaratory Ruling* applies in some but not all of the contexts we identified in the *NPRM*. The record demonstrates that these clarifications will promote the deployment of infrastructure necessary for advanced wireless broadband services while preserving both State and municipalities' front-line roles in the siting process. We discuss each of the six issues on which the Commission sought comment below.

1. Completeness of Applications

254. *Background.* The *2009 Declaratory Ruling* held that, when an application is incomplete as filed, the shot clock timeframe does not include the time the applicant takes to respond to a State or local government's request for additional information, provided that the State or locality makes its request within 30 days of the application's submission.⁶⁷⁸

255. The *2009 Declaratory Ruling* did not, however, define when a siting application should be considered "complete" for this purpose. PCIA has asserted that, as a result, some jurisdictions have repeatedly requested additional information to toll the shot clock and delay application processing.⁶⁷⁹ In the *Infrastructure NPRM*, the Commission sought comment on whether to clarify when a siting application is considered complete for the purpose of triggering the *2009 Declaratory Ruling* timeframe and, if so, how that should be determined.

256. Several industry commenters argue that the *2009 Declaratory Ruling* needs clarification in this area, and they suggest specific approaches.⁶⁸⁰ Crown Castle and PCIA, for example, propose that a request for additional information should toll the shot clock only if it: (1) is in writing, (2) delineates any information alleged to be missing, and (3) specifies the particular subsection of the applicable code that requires the applicant to submit the information.⁶⁸¹ Crown Castle further proposes that the clock should continue running if a jurisdiction requests information not specifically identified in the zoning application's requirements.⁶⁸² Municipalities generally oppose these clarifications.⁶⁸³

⁶⁷⁶ See *Infrastructure NPRM*, 28 FCC Rcd at 14293 para. 152.

⁶⁷⁷ *Id.* at 14293-96 paras. 153-162.

⁶⁷⁸ See *2009 Declaratory Ruling*, 24 FCC Rcd at 14014 paras. 52-53.

⁶⁷⁹ PCIA and DAS Forum *NOI* Comments, WC Docket No. 11-59, at 14.

⁶⁸⁰ See, e.g., Crown Castle Comments at 15-17; ExteNet Comments at 6-7; PCIA Comments at iii, 54-55; PCIA Reply Comments at iii, 28.

⁶⁸¹ See Crown Castle Comments at 17; PCIA Comments at iii, 54-55.

⁶⁸² See Crown Castle Comments at 17.

⁶⁸³ See, e.g., Alexandria *et al.* Comments at 57-58; Alexandria *et al.* Reply Comments at 30-35; CA Local Governments Comments at 31-32; Coconut Creek Comments at 10; DC Comments at 23; Fairfax Comments at 25;

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257. *Discussion.* We find that we should clarify under what conditions the presumptively reasonable timeframes may be tolled on grounds that an application is incomplete. We take this action not only to provide clarity in connection with a State's or municipality's first request for additional information in connection with a particular application, but also in situations where a State or municipality makes repeated requests. Indeed, the *2009 Declaratory Ruling* did not address how such repeated requests would toll the timeframes. For example, while the *2009 Declaratory Ruling* provided that a State or municipality must notify the applicant of incompleteness within 30 days, it did not indicate whether that restriction applies where the State or municipality, after receiving additional data, determines at some point after the first 30 days that the application remains incomplete. We find that this ambiguity has undermined the effectiveness of the timeframes.⁶⁸⁴

258. As an initial matter, we note that under the *2009 Declaratory Ruling*, the presumptively reasonable timeframe begins to run when an application is first submitted, not when it is deemed complete.⁶⁸⁵ Accordingly, to the extent municipalities have interpreted the clock to begin running only after a determination of completeness, that interpretation is incorrect.

259. Further, consistent with proposals submitted by Crown Castle and PCIA,⁶⁸⁶ we clarify that, following a submission in response to a determination of incompleteness, any subsequent determination that an application remains incomplete must be based solely on the applicant's failure to supply information that was requested within the first 30 days. The shot clock will begin running again after the applicant makes a supplemental submission. The State or local government will have 10 days to notify the applicant that the supplemental submission did not provide the information identified in the original notice delineating missing information. In other words, a subsequent determination of incompleteness can result in further tolling of the shot clock only if the local authority provides it to the applicant in writing within 10 days of the supplemental submission, specifically identifying the information the applicant failed to supply in response to the initial request. Once the 10-day period passes, the period for review of the application may not thereafter be tolled for incompleteness.

260. We further provide that, in order to toll the timeframe for review on grounds of incompleteness, a municipality's request for additional information must specify the code provision, ordinance, application instruction, or otherwise publically-stated procedures that require the information to be submitted.⁶⁸⁷ This requirement will avoid delays due to uncertainty or disputes over what documents or information are required for a complete application. Further, while some municipal commenters argue that "[n]ot all jurisdictions codify detailed application submittal requirements because doing so would require a code amendment for even the slightest change,"⁶⁸⁸ our approach does not restrict them to reliance on codified documentation requirements.

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Mendham Comments at 6; Springfield Comments at 17-18; Steel in the Air Comments at 10; Tempe Comments at 30; West Palm Beach Comments at 10.

⁶⁸⁴ Some commenters cite certain instances in which local authorities have significantly delayed action on applications through successive unrelated data requests. *See, e.g.*, Crown Castle Comments at 15-16 (asserting one instance in which Crown Castle went before a local reviewing board eight times, and that "with each review the Town alleged new and different 'deficiencies' with the permit applications"); PCIA Comments at 55 n.182 (asserting that in one case, "a second notice of incomplete application was provided to a member over five months after the date of the initial application"); *see also* AT&T Comments, WC Docket No. 11-59, at 15-16.

⁶⁸⁵ *See 2009 Declaratory Ruling*, 24 FCC Rcd at 14014 para. 52 (providing that the "timeframes do not include the time that applicants take to respond to State and local governments' requests for additional information").

⁶⁸⁶ *See* Crown Castle Comments at 17; PCIA Comments at 54-55.

⁶⁸⁷ *See, e.g.*, Crown Castle Comments at 17; PCIA Comments at iii, 54-55.

⁶⁸⁸ *See, e.g.*, Alexandria *et al.* Reply Comments at 35.

261. Beyond these procedural requirements, we decline to enumerate what constitutes a “complete” application. We find that, as some commenters note, State and local governments are best suited to decide what information they need to process an application.⁶⁸⁹ Differences between jurisdictions make it impractical for the Commission to specify what information should be included in an application.

262. We find that these clarifications will provide greater certainty regarding the period during which the clock is tolled for incompleteness. This in turn provides clarity regarding the time at which the clock expires, at which point an applicant may bring suit based on a “failure to act.” Further, we expect that these clarifications will result in shared expectations among parties, thus limiting potential miscommunication and reducing the potential or need for serial requests for more information. Accordingly, these clarifications will facilitate faster application processing, reduce unreasonable delay, and accelerate wireless infrastructure deployment.

2. Moratoria

263. *Background.* In the *Infrastructure NPRM*, the Commission sought comment on whether and how the presumptively reasonable timeframes under Section 332(c)(7) apply to delays in processing applications that result from a local moratorium—that is, when a State or local government freezes all siting applications across the board while, for example, it updates applicable zoning regulations.⁶⁹⁰ We proposed to find that the presumptively reasonable period continues to run regardless of any local moratorium.⁶⁹¹ We alternatively sought comment on whether a moratorium should toll the shot clock and, if so, whether the tolling period for moratoria should be limited in some manner.⁶⁹²

264. Industry commenters generally argue that moratoria should not suspend the shot clock,⁶⁹³ while localities argue that they should.⁶⁹⁴ On a more granular level, UTC proposes prohibiting moratoria over 6 months,⁶⁹⁵ while municipal commenters disagree.⁶⁹⁶

265. *Discussion.* We clarify that the shot clock runs regardless of any moratorium. This is consistent with a plain reading of the *2009 Declaratory Ruling*, which specifies the conditions for tolling and makes no provision for moratoria. Moreover, our conclusion that the clock runs regardless of any moratorium means that applicants can challenge moratoria in court when the shot clock expires without State or local government action, which is consistent with the case-by-case approach that courts have generally applied to moratoria under Section 332(c)(7).⁶⁹⁷ This approach, which establishes clearly that

⁶⁸⁹ See, e.g., CA Local Governments Comments at 31. See also Alexandria *et al.* Reply Comments at 31-32; Coconut Creek Comments at 10; DC Comments at 23; Fairfax Comments at 25; Mendham Comments at 6; Steel in the Air Comments at 10; Tempe Comments at 30; West Palm Beach Comments at 10.

⁶⁹⁰ See *Infrastructure NPRM*, 28 FCC Rcd at 14294 para. 155.

⁶⁹¹ See *id.* at 14294 para. 156.

⁶⁹² See *id.* at 14294 para. 157.

⁶⁹³ See, e.g., AT&T Comments at 30; Crown Castle Comments at 15; ExteNet Comments at 7-8; PCIA Comments at iii, 55; PCIA Reply Comments at iii, 27-28; UTC Comments at 16.

⁶⁹⁴ See, e.g., Alexandria *et al.* Comments at 53-56; Alexandria *et al.* Reply Comments at 36-37; CA Local Governments Comments at 32-34; Coconut Creek Comments at 8-10; LOC Comments at 5; Steel in the Air Comments at 8-10; West Palm Beach Comments at 8-10. See also Fairfax Comments at 25.

⁶⁹⁵ See UTC Comments at 16. See also Coconut Creek Comments at 10; Steel in the Air Comments at 10; West Palm Beach Comments at 10.

⁶⁹⁶ See, e.g., Alexandria *et al.* Comments at 55; Alexandria *et al.* Reply Comments at 37.

⁶⁹⁷ See, e.g., *Illinois Bell Telephone Co. v. Village of Itasca, Illinois*, 503 F.Supp.2d 928, 935 (N.D.Ill. 2007) (finding that moratoria, some of which were extended formally or informally, were effectively complete prohibitions on the expansion of plaintiff's telecommunications facilities); *Masterpage Communications, Inc. v. Town of Olive*,

(continued....)

an applicant can seek redress in court even when a jurisdiction has imposed a moratorium, will prevent indefinite and unreasonable delay of an applicant's ability to bring suit.

266. Some commenters argue that if moratoria do not toll the presumptively reasonable periods, this would discourage local governments from updating their regulations.⁶⁹⁸ Similarly, others contend that this approach would, in effect, improperly require municipal staff to simultaneously review and update their regulations to adapt to new technologies while also reviewing applications.⁶⁹⁹ We recognize that new technologies may in some cases warrant changes in procedures and codes, but we find no reason to conclude that the need for any such change should freeze all applications. We are confident that industry and local governments can work together to resolve applications that may require more staff resources due to complexity, pending changes to the relevant siting regulations, or other special circumstances. Moreover, in those instances in which a moratorium may reasonably prevent a State or municipality from processing an application within the applicable timeframe, the State or municipality will, if the applicant seeks review, have an opportunity to justify the delay in court. We therefore clarify that the shot clock continues to run regardless of any moratorium.

267. We decline at this time to determine that a moratorium that lasts longer than six months constitutes a *per se* violation of the obligation to take action in a reasonable period of time. Although some have argued that a six-month limit would “discourage localities from circumventing the intent of the Commission’s shot clock rules,”⁷⁰⁰ others disagree, and the record provides insufficient evidence to support a *per se* determination at this juncture.⁷⁰¹ Given our clarification that the presumptively reasonable timeframes apply regardless of moratoria, any moratorium that results in a delay of more than 90 days for a collocation application or 150 days for any other application will be presumptively unreasonable. The courts are well situated to assess whether such moratoria are in fact reasonable on a case-by-case basis, including when the moratorium extends for six months or longer.

3. Application to DAS and Small Cells

268. *Background.* In the *Infrastructure NPRM*, the Commission noted that some jurisdictions have adopted the view that the shot clocks do not apply to DAS or small-cell deployments.⁷⁰² The Commission proposed to clarify that to the extent DAS or small-cell facilities, including neutral-host deployments shared by more than one carrier, are or will be used for the provision of personal wireless services, their siting applications are subject to the same presumptively reasonable timeframes and other requirements as applications related to other personal wireless service facilities.⁷⁰³

269. Several industry commenters support our proposal, arguing that DAS and small-cell applications are covered by the *2009 Declaratory Ruling* and are subject to the same timeframes as other

(Continued from previous page) _____

NN, 418 F.Supp.2d 66,78 (N.D.N.Y. 2005) (finding that delay was unreasonable where a moratorium lasted more than two years, was extended at least once without explanation, and prohibited Masterpage from applying for more than one year); *Sprint Spectrum, L.P. v. City of Medina*, 924 F.Supp. 1036, 1039-40 (W.D.Wash. 1996) (finding a six-month moratorium was reasonable). See also CA Local Governments Comments at 34.

⁶⁹⁸ See, e.g., Coconut Creek Comments at 8, 10; Steel in the Air Comments at 8, 10; West Palm Beach Comments at 8, 10.

⁶⁹⁹ See, e.g., Alexandria *et al.* Comments at 55.

⁷⁰⁰ See, e.g., UTC Comments at 16. See also Coconut Creek Comments at 10; Steel in the Air Comments at 10; West Palm Beach Comments at 10.

⁷⁰¹ See, e.g., Alexandria *et al.* Comments at 55; Alexandria *et al.* Reply Comments at 36-37.

⁷⁰² See, e.g., PCIA and DAS Forum *NOI* Comments, WC Docket No. 11-59, at 13, 47 (asserting that the *2009 Declaratory Ruling* timeframes have not been applied to DAS projects in some jurisdictions due to the lack of clarity or consensus regarding their applicability).

⁷⁰³ See *Infrastructure NPRM*, 28 FCC Rcd at 14295 para. 158.

covered applications.⁷⁰⁴ Other commenters support the proposal with modifications. Some, for example, argue that the shot clocks apply, but also that the applicable timeline should be adjusted if a single DAS deployment entails more than 10 antenna siting applications, in light of the greater review and processing burden.⁷⁰⁵ Coconut Creek proposes that we apply a shot clock only when a DAS deployment will support multiple providers, but not where it is designed to support only one.⁷⁰⁶ Some municipalities disagree with our proposal altogether, arguing that the *2009 Declaratory Ruling* timeframes do not apply to DAS or small cells,⁷⁰⁷ while others assert this issue does not require any additional clarification.⁷⁰⁸

270. *Discussion.* We clarify that to the extent DAS or small-cell facilities, including third-party facilities such as neutral host DAS deployments, are or will be used for the provision of personal wireless services, their siting applications are subject to the same presumptively reasonable timeframes that apply to applications related to other personal wireless service facilities. We note that courts have addressed the issue and, consistent with our conclusion, have found that the timeframes apply to DAS and small-cell deployments.⁷⁰⁹

271. Some commenters argue that the shot clocks should not apply because some providers describe DAS and small-cell deployments as wireline, not wireless, facilities.⁷¹⁰ The City of Eugene, Oregon, for example, argues that the Commission should not consider DAS a personal wireless service because one DAS provider has argued that its service is “no different from, and indeed competes directly with, the fiber-based backhaul/private line service provided by Incumbent Local Exchange Carriers.”⁷¹¹ This argument is not persuasive. Determining whether facilities are “personal wireless service facilities” subject to Section 332(c)(7) does not rest on a provider’s characterization in another context; rather, the analysis turns simply on whether they are facilities used to provide personal wireless services.⁷¹² Based on our review of the record, we find no evidence sufficient to compel the conclusion that the characteristics of DAS and small-cell deployments somehow exclude them from Section 332(c)(7) and the *2009 Declaratory Ruling*. For similar reasons, we reject Coconut Creek’s argument that the shot clocks should apply only to neutral host deployments.

⁷⁰⁴ See, e.g., CalWa Comments at 3-4; CTIA Comments at 21-22; CTIA Reply Comments at 12; ExteNet Comments at 4, 7; Fibertech Comments at 33-34; Fibertech Reply Comments at 20-21; PCIA Comments at 55-56; PCIA Reply Comments at iii, 28; Sprint Comments at 12.

⁷⁰⁵ See, e.g., Coconut Creek Comments at 10; Steel in the Air Comments at 10; West Palm Beach Comments at 10. See also CA Local Governments Comments at 34 (arguing that a 150-day review period is necessary for DAS collocations because antennas will typically be installed on poles that do not, prior to the installation, host any personal wireless service equipment); Fairfax Comments at 27-28 (arguing that, due to the number of nodes proposed with many DAS systems and the fact that they are not collocations, 150 days is an appropriate time for processing applications).

⁷⁰⁶ See Coconut Creek Comments at 10; Steel in the Air Comments at 10; West Palm Beach Comments at 10.

⁷⁰⁷ See, e.g., Eugene Comments at v, 16-17; San Antonio Comments at v-vi, 18-20; San Antonio Reply Comments at 18-19; see also Tempe Comments at 30 (arguing that the shot clock should not apply to DAS and small-cell installations “where the wireless antenna portion will be going on a support structure that does not currently house a wireless facility”).

⁷⁰⁸ See, e.g., Alexandria *et al.* Reply Comments at 39; Fairfax Comments at 27-28.

⁷⁰⁹ See, e.g., *Crown Castle NG East Inc. v. Town of Greenburgh*, 2013 WL 3357169 (S.D.N.Y. 2013), *aff’d*, 552 Fed.Appx. 47 (2d Cir. 2014).

⁷¹⁰ See, e.g., Alexandria *et al.* Reply Comments at 38-39; Eugene Comments at v, 16-17; San Antonio Reply Comments at 18-19.

⁷¹¹ Eugene Comments at 16.

⁷¹² See, e.g., Alexandria *et al.* Comments at 58-59; Alexandria *et al.* Reply Comments at 38; CTIA Comments at 21-22.

272. Some commenters suggest revising our proposal on the grounds that the unique qualities of DAS and small-cell systems require longer timeframes for municipal review.⁷¹³ We decline to adjust the timelines as these commenters suggest. We note that the timeframes are presumptive, and we expect applicants and State or local governments to agree to extensions in appropriate cases. Moreover, courts will be positioned to assess the facts of individual cases—including whether the applicable time period “t[ook] into account the nature and scope of [the] request”—in instances where the shot clock expires and the applicant seeks review.⁷¹⁴ We also note that DAS and small-cell deployments that involve installation of new poles will trigger the 150-day time period for new construction that many municipal commenters view as reasonable for DAS and small-cell applications.⁷¹⁵ Accordingly, we find it unnecessary to modify the presumptive timeframes as they apply to DAS applications.

4. Definition of Collocation

273. *Background.* In the *2009 Declaratory Ruling*, the Commission held that the presumptively reasonable timeframe for review of personal wireless facility siting applications is 90 days for “collocation” applications and 150 days for all other applications.⁷¹⁶ It further determined that an application is a request for collocation for purposes of the Section 332(c)(7) shot clock if it seeks authorization to place an antenna on an existing structure and does not involve a “substantial increase in . . . size,” as that phrase is defined in the Collocation Agreement.⁷¹⁷

274. In the *Infrastructure NPRM*, the Commission sought comment on whether to revise the test for a “substantial increase in size” under Section 332(c)(7) and the *2009 Declaratory Ruling* to reflect the test we adopt in this Report and Order for a “substantial change in physical dimensions” under Section 6409(a) of the Spectrum Act.⁷¹⁸

275. We received a wide array of comments on this question. Some commenters propose that we harmonize the two tests completely,⁷¹⁹ others oppose any revisions to the current rule,⁷²⁰ and others suggest some specific revisions. Some, for example, oppose formal harmonization but support a “plain language” approach to defining “collocation,”⁷²¹ while another supports defining “substantial increase” to include changes to both the collocation site and any associated ground equipment.⁷²² Still others contend that the collocation definition should apply to mounting an antenna on any structure, including utility

⁷¹³ See, e.g., Alexandria *et al.* Comments at 60; Alexandria *et al.* Reply Comments at 39; CA Local Governments Comments at 34; Coconut Creek Comments at 10; Fairfax Comments at 27-28; Steel in the Air Comments at 10; West Palm Beach Comments at 10.

⁷¹⁴ 47 U.S.C. § 332(c)(7)(B)(ii).

⁷¹⁵ See, e.g., CA Local Governments Comments at 34; Fairfax Comments at 28.

⁷¹⁶ *2009 Declaratory Ruling*, 24 FCC Rcd at 14012 para. 45.

⁷¹⁷ *Id.* at 14012 para. 46.

⁷¹⁸ *Infrastructure NPRM*, 28 FCC Rcd at 14293-94 para. 153.

⁷¹⁹ See, e.g., AT&T Comments at 28-29; Coconut Creek Comments at 9-10; Fibertech Comments at 34 (arguing that if Commission expands the *2009 Declaratory Ruling* to collocations on existing base stations, it should adopt the same “substantial change” test as Fibertech proposed for Section 6409(a)); PCIA Comments at iii, 53-54; Steel in the Air Comments at 9-10; UTC Comments at 16; West Palm Beach Comments at 9-10.

⁷²⁰ See, e.g., MDIT Comments at 7; Springfield Comments at 17.

⁷²¹ See, e.g., CA Local Governments Comments at 30 (proposing to define “collocation” as a wireless facility placed at a location shared with an existing wireless tower or other wireless structure); Fairfax Comments at 23-24 (proposing to define “collocation” as an installation of additional antennas on an existing wireless facility that already supports one or existing antennas, with no substantial change in the existing facility’s physical dimensions).

⁷²² Tempe Comments at 30.

poles,⁷²³ while another expressly opposes this approach.⁷²⁴ Another proposes to include aggregate limits in the “substantial change” definition to avoid the cumulative impact that can result from successive changes that are individually insignificant.⁷²⁵

276. *Discussion.* After reviewing the record, we decline to make any changes or clarifications to the existing standard established in the *2009 Declaratory Ruling* for applying the 90-day shot clock for collocations. In particular, we decline to apply the “substantial change” test that we establish in this Report and Order for purposes of Section 6409(a). We observe that Sections 6409(a) and 332(c)(7) serve different purposes, and we accordingly find that the tests for “substantial change” and “substantial increase in size” are appropriately distinct.⁷²⁶ More specifically, the test for a “substantial increase in size” under Section 332(c)(7) affects only the length of time for State or local review, while the test we adopt under Section 6409(a) identifies when a State or municipality must grant an application. This is a meaningful distinction that merits a more demanding standard under Section 6409(a).

277. In further support for this conclusion, we note that while the two statutory provisions overlap in many cases, some collocation applications covered by Section 332(c)(7) do not constitute “eligible facilities requests” for purposes of Section 6409(a). Moreover, as noted above, Section 6409(a) covered requests extend to any “wireless” tower or base station modification, not just “personal wireless service” facilities. Considering that these provisions cover different (though overlapping) pools of applications, it is appropriate to apply them differently. Further, we find no compelling evidence in the record that using the same test for both provisions would provide significant administrative efficiencies or limit confusion, as some have argued.⁷²⁷ We therefore preserve distinct standards under the two provisions.

5. Preferences for Deployments on Municipal Property

278. *Background.* Some municipalities have established preferences for siting wireless facilities on municipal property.⁷²⁸ PCIA argues that these preferences violate Section 332(c)(7)(B)(i)(I),⁷²⁹ which states that regulation of the placement, construction, and modification of personal wireless service facilities “shall not unreasonably discriminate among providers of functionally equivalent services.”⁷³⁰ PCIA contends that preferences for placing wireless facilities on municipal property unreasonably discriminate among providers by limiting the siting flexibility of subsequent wireless entrants in a given area.⁷³¹ The *Infrastructure NPRM* sought comment on PCIA’s contention.⁷³²

⁷²³ See, e.g., ExteNet Comments at 6; Fibertech Comments at 34; Fibertech Reply Comments at 20-21; Joint Venture Comments at 8.

⁷²⁴ See Alexandria *et al.* Reply Comments at 38.

⁷²⁵ Pennsauken Reply Comments at 1.

⁷²⁶ MDIT Comments at 7 (“Maryland believes that there are substantial differences between the parties contemplated in 332(c)(7) . . . and 6409(a) As a result, the State believes that the test for ‘substantial change in physical dimensions’ in 6409 should be distinct from the test for ‘substantial increase in size’ under 332.”).

⁷²⁷ See, e.g., AT&T Comments at 28-29; Coconut Creek Comments at 10; Steel in the Air Comments at 10; West Palm Beach Comments at 10.

⁷²⁸ See, e.g., Seattle Resolution 29344, available at http://clerk.seattle.gov/~archives/Resolutions/Resn_29344.pdf, which allows City facilities to be used for wireless communication facilities. See CCUA *et al.* Comments at 18-19.

⁷²⁹ See PCIA and DAS Forum *NOI* Comments, WC Docket No. 11-59, at 43-44.

⁷³⁰ 47 U.S.C. § 332(c)(7)(B)(i)(I).

⁷³¹ See PCIA and DAS Forum *NOI* Comments, WC Docket No. 11-59, at 44.

⁷³² See *Infrastructure NPRM*, 28 FCC Rcd at 14295 para. 160.

279. Most commenters, including many municipal commenters and also some industry commenters, argue that municipal property preferences are not *per se* unlawful under Section 332(c)(7).⁷³³ For example, Fairfax argues that location preferences are not impermissibly discriminatory because they apply equally to all applicants and because there are many valid reasons for such preferences.⁷³⁴ Some commenters agree with Fairfax that the Commission cannot reach a *per se* conclusion because there are valid reasons for such preferences,⁷³⁵ and others assert that the courts, not the Commission, must decide whether a municipal preference is unreasonably discriminatory on a case-by-case basis.⁷³⁶ Many industry commenters, on the other hand, argue that municipal property preferences are unlawfully discriminatory under Section 332(c)(7)⁷³⁷ and that they violate the statute by effectively prohibiting the provision of wireless services.⁷³⁸

280. *Discussion.* We find insufficient evidence in the record to make a determination that municipal property preferences are *per se* unreasonably discriminatory or otherwise unlawful under Section 332(c)(7). To the contrary, most industry and municipal commenters support the conclusion that many such preferences are valid.⁷³⁹ For example, some commenters assert that such preferences are not unlawfully discriminatory as a general matter, but that they can violate Section 332(c)(7) if they effectively “pressure” applicants to use municipal property or are coupled with ordinances making it too onerous to site anywhere else.⁷⁴⁰ As an example, PCIA describes a situation where a member company had difficulty siting due to a municipal property preference that coupled high municipal lease fees with onerous regulations, making it difficult to site on non-municipal property.⁷⁴¹ As PCIA’s argument suggests, however, determining whether a particular municipal property preference violates Section 332(c)(7) depends on the specific details of the preference and related requirements.⁷⁴² We note that available court precedent further supports the conclusion that the validity of preferences is an inquiry best suited to resolution on a case-by-case basis.⁷⁴³ Therefore, consistent with the majority of comments on

⁷³³ See, e.g., Alexandria *et al.* Comments at 56-57; Alexandria *et al.* Reply Comments at 40-41; CA Local Governments Comments at 34-35; CA Local Governments Reply Comments at 24-25; Coconut Creek Comments at 10; DC Comments at 23; Eugene Comments at vi, 23-24; LOC Comments at 5; Steel in the Air Comments at 10; San Antonio Comments at vii, 25-28; San Antonio Reply Comments at 23-25; West Palm Beach Comments at 10.

⁷³⁴ See Fairfax Comments at 26-27 (citing diminished visual impact of telecommunication facilities, potential to join publicly managed communication systems with commercial wireless service antennas, greater continuity of telecommunications facilities, improved buffering from adjacent residential uses, and enhanced cell phone service in more remote parts of the County as valid reasons for preferences).

⁷³⁵ See, e.g., Alexandria *et al.* Reply Comments at 41 (asserting municipal preferences encourage wireless deployments by making municipal property available where options may be limited); CA Local Governments Comments at 35 (asserting that benefits to municipal preferences include reduced aesthetic impact, fewer land use restrictions, and quicker application approval process); CA Local Governments Reply Comments at 25.

⁷³⁶ See, e.g., Alexandria *et al.* Comments at 56-57; CA Local Governments Comments at 35; CA Local Governments Reply Comments at 24-25; DC Comments at 23.

⁷³⁷ See, e.g., PCIA Reply Comments at iii, 28-29; UTC Comments at 17.

⁷³⁸ See, e.g., PCIA Comments at iii, 56; see also 47 U.S.C. § 332(c)(7)(B)(i)(II).

⁷³⁹ See, e.g., Alexandria *et al.* Comments at 56-57; CA Local Governments Comments at 34-35; CA Local Governments Reply Comments at 24-25; CTIA Comments at 20; DC Comments at 23; PCIA Comments at 56.

⁷⁴⁰ See, e.g., CTIA Comments at 20-21; PCIA Comments at iii, 56.

⁷⁴¹ See PCIA Comments at 56, n.183. We note that St. Paul, the municipality in question, has challenged PCIA’s assertions regarding the preference. See St. Paul Reply Comments at 1. See also MACTA Reply Comments at 2.

⁷⁴² See, e.g., Alexandria *et al.* Comments at 56-57; CA Local Governments Comments at 35; DC Comments at 23.

⁷⁴³ See, e.g., *T-Mobile Northeast LLC v. Fairfax County Bd. of Sup’rs*, 672 F.3d 259 (4th Cir. 2012).

this issue, we decline at this time to find municipal property preferences *per se* unlawful under Section 332(c)(7).

6. Remedies

281. *Background.* In the *2009 Declaratory Ruling*, the Commission considered whether an application should be deemed granted when a State or local government fails to take action before the shot clock expires. The Commission declined to establish this remedy.⁷⁴⁴ Noting that Section 332(c)(7) expressly establishes a judicial remedy, the Commission concluded that “this provision indicates congressional intent that courts should have the responsibility to fashion appropriate case-specific remedies.”⁷⁴⁵ The Commission also declined to suggest that a reviewing court should presumptively issue an injunction granting the application, noting that “case law does not establish that an injunction granting the application is always or presumptively appropriate when a ‘failure to act’ occurs.”⁷⁴⁶ The Commission further noted that in cases where injunctions were granted, courts did so “only after examining all the facts in the case.”⁷⁴⁷ Although the Commission declined to adopt a presumption that the court should issue an injunction granting the application, it recognized that injunctions granting applications may be appropriate in many cases.⁷⁴⁸

282. The *Infrastructure NPRM* noted that some parties have asked the Commission to revisit this issue. In response, the Commission sought comment on whether to adopt remedies beyond the judicial remedy described in the *2009 Declaratory Ruling*.⁷⁴⁹

283. Commenters are split on the issue, with industry supporting a deemed granted remedy⁷⁵⁰ and municipalities opposing the idea.⁷⁵¹ Industry generally asserts that a deemed granted remedy is necessary to help ensure that States and localities act within the prescribed timelines,⁷⁵² and that the Commission has ample authority to adopt such a remedy.⁷⁵³ State and local governments disagree,

⁷⁴⁴ See *2009 Declaratory Ruling*, 24 FCC Rcd at 14009 para. 39.

⁷⁴⁵ *Id.*

⁷⁴⁶ *Id.*

⁷⁴⁷ *Id.*

⁷⁴⁸ See *id.*

⁷⁴⁹ See *Infrastructure NPRM*, 28 FCC Rcd at 14296 para. 162.

⁷⁵⁰ See, e.g., AT&T Comments at 8, 30-31; CalWa Comments at 3-4; CalWa Reply Comments at 3-11; Crown Castle Comments at 15-18; CTIA Comments at 19; CTIA Reply Comments at 1-2, 8-9; ExteNet Comments at 4; Fibertech Comments at 34-35; Joint Venture Comments at 8; PCIA Comments at iii, 56-59; PCIA Reply Comments at iii, 26, 29-32; Sprint Comments at 12; Sprint Reply Comments at 7-8; UTC Comments at 17; UTC Reply Comments at 6-7.

⁷⁵¹ See, e.g., Alexandria *et al.* Comments at 51-53; Alexandria *et al.* Reply Comments at 41-44; CA Local Governments Comments at 35-36; Coconut Creek Comments at 9-11; Cornelius Comments at 5-6; DC Comments at 22; Eugene Comments at v, 18-20; Fairfax Comments at 21-23; Fairfax Reply Comments at 9-10; Happy Valley Comments at 5-6; NATOA *et al.* Reply Comments at 7; Orange Reply Comments at 6; Oregon City Comments at 6; RCRC Comments at 4; San Antonio Comments at vi, 20-23; San Antonio Reply Comments at 19-20; Springfield Comments at 19-20; Steel in the Air Comments at 9-11; West Palm Beach Comments at 9-11.

⁷⁵² See, e.g., AT&T Comments at 30-31; CalWa Reply Comments at 10-11; Crown Castle Comments at 18; CTIA Reply Comments at 8-9; PCIA Comments at 56-57; PCIA Reply Comments at 30-31.

⁷⁵³ See, e.g., Crown Castle Comments at 18-19; CTIA Comments at 19-20; CTIA Reply Comments at 9-10; PCIA Comments at 57-58; PCIA Reply Comments at 32.

arguing that the Commission lacks authority to adopt a deemed granted remedy,⁷⁵⁴ that the deemed granted remedy raises Constitutional concerns,⁷⁵⁵ that failures to comply with the shot clock timelines require fact-specific inquiries from courts,⁷⁵⁶ and that there is no convincing evidence that a deemed granted remedy is warranted.⁷⁵⁷

284. *Discussion.* After reviewing the record, we decline to adopt an additional remedy for State or local government failures to act within the presumptively reasonable time limits. We also note that a party pursuing a “failure to act” claim may ask the reviewing court for an injunction granting the application. As the *2009 Declaratory Ruling* noted,⁷⁵⁸ courts have considered, and in many cases granted, such relief.⁷⁵⁹ Moreover, Congress recognized the importance of expeditious action with regard to the application process and infrastructure deployment, by directing the court to “hear and decide such action on an expedited basis.”⁷⁶⁰ While the propriety of prompt injunctive relief should be a matter for the courts to decide in light of “the specific facts of individual applications,”⁷⁶¹ such relief may be appropriate in many cases in light of the balance of equities, including the public interest reflected in the statute of promoting rapid but responsible wireless facility deployment.⁷⁶² Moreover, in the case of a failure to act within the reasonable timeframes set forth in our rules, and absent some compelling need for additional time to review the application, we believe that it would also be appropriate for the courts to treat such circumstances as significant factors weighing in favor of such relief.

⁷⁵⁴ See, e.g., Alexandria *et al.* Comments at 51-53; Alexandria *et al.* Reply Comments at 41-44; Eugene Comments at v, 18-20; Fairfax Comments at 21-22; Fairfax Reply Comments at 9-10; San Antonio Comments at vi, 20-23; San Antonio Reply Comments at 19.

⁷⁵⁵ See, e.g., Coconut Creek Comments at 10-11; Steel in the Air Comments at 10-11; West Palm Beach Comments at 10-11.

⁷⁵⁶ See, e.g., Cornelius Comments at 5-6; Happy Valley Comments at 5-6; Mendham Comments at 6; Oregon City Comments at 6.

⁷⁵⁷ See, e.g., Alexandria *et al.* Reply Comments at 42; CA Local Governments Comments at 36; Fairfax Reply Comments at 8-9; NATOA *et al.* Reply Comments at 7.

⁷⁵⁸ See *2009 Declaratory Ruling*, 24 FCC Rcd at 14009 para. 39.

⁷⁵⁹ See *Cellular Telephone Company v. The Town of Oyster Bay*, 166 F.3d 490, 497 (2d Cir.1999) (finding that Section 332(c)(7) does not specify a remedy for violations and that a majority of district courts have held that the appropriate remedy is injunctive relief in the form of an order to issue the relevant permits); *Bell Atlantic Mobile of Rochester L.P. v. Town of Irondequoit*, 848 F.Supp.2d 391, 403 (finding that further municipal review would serve no useful purpose and would cause additional delay in the applicant’s ability to provide service, and that a mandatory injunction was therefore an appropriate remedy); *Preferred Sites, LLC v. Troup County*, 296 F.3d 1210, 1222 (11th Cir. 2002) (finding that an injunction ordering a municipality to issue a permit is an appropriate remedy for a violation of Section 332(c)(7)); *Nat’l Tower, LLC v. Plainville Zoning Board of Appeals*, 297 F.3d 14, 21–22 (1st Cir. 2002) (finding that an injunction directing a zoning board to authorize construction is the proper remedy for most violations of Section 332(c)(7)); *Omnipoint Communications, Inc. v. Planning & Zoning Com’n of Town of Wallingford*, 83 F.Supp.2d 306, 312 (D.Conn. 2000) (finding that remand to board would not be appropriate as that would create further delay, especially in light of the multiple hearings that had already spanned many months). See also *Omnipoint Communications MB Operations, LLC v. Town of Lincoln*, 107 F. Supp.2d 108, 120-121 (D. Mass. 2000); *Masterpage Communications, Inc. v. Town of Olive*, 418 F.Supp.2d 66, 81 (N.D.N.Y. 2005).

⁷⁶⁰ 47 U.S.C. § 332(c)(7)(B)(v).

⁷⁶¹ *2009 Declaratory Ruling*, 24 FCC Rcd at 14009 para. 39.

⁷⁶² See *2009 Declaratory Ruling*, 24 FCC Rcd at 13994 para. 1.

VII. PROCEDURAL MATTERS

A. Final Regulatory Flexibility Analysis

285. With respect to this Report and Order, a Final Regulatory Flexibility Analysis (FRFA) is contained in Appendix C. As required by Section 603 of the Regulatory Flexibility Act, the Commission has prepared a FRFA of the expected impact on small entities of the requirements adopted in this Report and Order. The Commission will send a copy of the Report and Order, including the FRFA, to the Chief Counsel for Advocacy of the Small Business Administration.

B. Paperwork Reduction Act

286. This Report and Order contains revised information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. It will be submitted to the Office of Management and Budget (OMB) for review under Section 3507(d) of the PRA. OMB, the general public, and other Federal agencies are invited to comment on the modified information collection requirements contained in this proceeding. In addition, we note that pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, *see* 44 U.S.C. 3506(c)(4), we previously sought specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees. In addition, we have described impacts that might affect small businesses, which includes most businesses with fewer than 25 employees, in the FRFA in Appendix C, *infra*.

C. Congressional Review Act

287. The Commission will send a copy of this Report and Order in a report to be sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act (CRA), *see* 5 U.S.C. § 801(a)(1)(A).

VIII. ORDERING CLAUSES

288. ACCORDINGLY, IT IS ORDERED, pursuant to sections 1, 2, 4(i), 7, 201, 301, 303, 309, and 332 of the Communications Act of 1934, as amended, Sections 6003, 6213, and 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156, 47 U.S.C. §§ 151, 152, 154(i), 157, 201, 301, 303, 309, 332, 1403, 1433, and 1455(a), Section 102(C) of the National Environmental Policy Act of 1969, as amended, 42 U.S.C. § 4332(C), and Section 106 of the National Historic Preservation Act of 1966, as amended, 16 U.S.C. § 470f, that this Report and Order IS HEREBY ADOPTED. If any section, subsection, paragraph, sentence, clause or phrase of this Report and Order or the rules adopted herein is declared invalid for any reason, the remaining portions of this Report and Order and the rules adopted herein SHALL BE severable from the invalid part and SHALL REMAIN in full force and effect.

289. IT IS FURTHER ORDERED that Parts 1 and 17 of the Commission's Rules ARE AMENDED as set forth in Appendix B, and that these changes SHALL BE EFFECTIVE 30 days after publication in the Federal Register, except for Section 1.40001, which SHALL BE EFFECTIVE 90 days after publication in the Federal Register; provided, however, that those rules and requirements that require approval by the Office of Management and Budget (OMB) under the Paperwork Reduction Act SHALL BECOME EFFECTIVE after the Commission publishes a notice in the Federal Register announcing such approval and the relevant effective date.

290. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this Report and Order, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A

List of Comments and Replies

Comments	Short Title
Aaron Baker / City of Mesquite, Nevada	Mesquite
ACUTA - The Association for Information Communications Technology Professionals	ACUTA
Adirondack Council; Adirondack Mountain Club; Citizen's Campaign for the Environment; The Mohawk Hudson Land Conservancy; New York Public Interest Research Group; Parks and Trails New York.	Adirondack Council
Adirondack Park Agency	APA
Alex Hempton / City of San Diego	San Diego
American Cultural Resources Association	ACRA
American Public Works Association	APWA
Arkansas Historic Preservation Program	AHPP
Association of American Railroads	AAR
AT&T Services Inc.	AT&T
Ben Mulé	Mulé
Borough of Bloomingdale	Bloomingdale
California Coastal Commission	CCC
California Wireless Association	CalWA
Carolinas Wireless Association	CarWA
CCUA, RCC, Tacoma, Seattle, King County, CML and AWC	CCUA <i>et al.</i>
City of Alexandria, Virginia; City of Arlington, Texas; City of Bellevue, Washington; City of Boston, Massachusetts; City of Davis, California; City of Los Angeles, California; Los Angeles County, California; City of McAllen, Texas; Montgomery County, Maryland; City of Ontario, California; Town of Palm Beach, Florida; City of Portland, Oregon; City of Redwood City, California; City of San Jose, California; Village of Scarsdale, New York; City of Tallahassee, Florida; Texas Coalition of Cities for Utility Issues; Georgia Municipal Association; International Municipal Lawyers Association; and American Planning Association	Alexandria <i>et al.</i>
City of Chicago	Chicago
City of Coconut Creek	Coconut Creek
City of Cornelius, OR	Cornelius
City of Des Moines, Iowa	Des Moines
City of Eugene, Oregon	Eugene
City of Happy Valley, OR	Happy Valley
City of Henderson	Henderson
City of Huntsville, Alabama	Huntsville
City of Long Beach	Long Beach
City of Mount Vernon and Mount Vernon Planning Board	Mount Vernon
City of Mountlake Terrace	Mountlake Terrace
City of New York / DoITT	NYC
City of Oregon City, OR	Oregon City
City of Portland	Portland
City of Salem	Salem
City of San Antonio, Texas	San Antonio
City of Springfield	Springfield
City of Tempe, Arizona	Tempe

City of West Palm Beach, FL	West Palm Beach
Commonwealth of Virginia Department of State Police	Virginia DOSP
Corey M. Conover/City of Minneapolis	Minneapolis
County of San Diego Planning & Development Services San Diego	San Diego PDS
Crown Castle	Crown Castle
CTIA - The Wireless Association	CTIA
David Ellertson	Ellertson
David Lindsay / Society for American Archeology	SAA
Dennis Michaud	Michaud
Diana Tang / City of Long Beach	Long Beach
District of Columbia	DC
Donald G. Everist	Everist
EMR Policy Institute	EPI
Erik Hein - NCSHPO	NCSHPO
ExteNet Systems, Inc.	ExteNet
Fairfax County	Fairfax
Fibertech Networks, LLC	Fibertech
Intergovernmental Advisory Committee	IAC
Jefferson County, Colorado	Jefferson
Jennifer Imo / City of High Point	High Point
John P. Gallina	Gallina
John Strand - Strand Consult	Strand
Joint Venture: Silicon Valley	Joint Venture
Joseph Saldibar / Colorado State Historic Preservation Office	COSHPO
Karen Jackson	Jackson
Kenneth Coppage / Maryland Department of Information Technology	MDIT
League of California Cities, California State Association of Counties, and SCAN NATOA	CA Local Governments
Maja K. Haium / League of Oregon Cities	LOC
Mark Epstein/Ohio Historic Preservation Office	OHPO
Mendham Borough Planning Board	Mendham
Michael R. Schaffert / City of Phoenix	Phoenix
Missouri Municipal League	MML
Naj Wikoff	Wikoff
NATOA, NACo, NLC, USCM	NATOA <i>et al.</i>
Nettie Richardson for Lee County	Lee
New Jersey State League of Municipalities	NJSLM
New York State Wireless Association	NYSWA
California Office of Historic Preservation Department of Parks and Recreation	CAOHP
Padre Dam Municipal Water District	Padre Dam
Passaic County Planning Board	Passaic
PCIA - The Wireless Infrastructure Association & The HetNet Forum	PCIA
Pennsylvania Wireless Association	PWA
Piedmont Environmental Council	PEC
Piroschka Glinsky / City of Tucson	Tucson
Planning Board of the Borough of Haddon Heights, NJ	Haddon Heights
QUALCOMM Incorporated	QUALCOMM
Rama Communications, Inc.	Rama
Riverside County Office of Education	RCOE
Rural County Representatives of California	RCRC
Sprint Corporation	Sprint
Steel in the Air, Inc.	Steel in the Air
Stephen A. McFadden, M.S.	McFadden

Steven Magee
 Sweetwater Authority
 Telecommunications Industry Association
 Towerstream Corporation
 Town of Hillsborough, California
 Utilities Telecom Council
 Valley Center Municipal Water District
 Verizon and Verizon Wireless
 Wireless Internet Service Providers Association

Magee
 Sweetwater
 TIA
 Towerstream
 Hillsborough
 UTC
 VCMWD
 Verizon
 WISPA

Reply Comments

American Petroleum Institute
 Association of American Railroads
 AT&T Services Inc.
 Borough of Glen Gardner Planning and Zoning Board
 Brian Wahler
 California Wireless Association
 CCUA, RCC, Tacoma, Seattle, King County, CML and AWC
 Cherry Hill Township, NJ
 City of Alexandria, Virginia; City of Arlington, Texas; City of Bellevue, Washington; City of Boston, Massachusetts; City of Davis, California; City of Los Angeles, California; Los Angeles County, California; City of McAllen, Texas; Montgomery County, Maryland; City of Ontario, California; Town of Palm Beach, Florida; City of Portland, Oregon; City of Redwood City, California; City of San Jose, California; Village of Scarsdale, New York; City of Tallahassee, Florida; Texas Coalition of Cities for Utility Issues; Georgia Municipal Association; International Municipal Lawyers Association; and American Planning Association
 City of Eugene, Oregon
 City of Mesa, Arizona
 City of Saint Paul
 City of San Antonio, Texas
 City of Tempe, Arizona
 Coalition of Texas Cities
 Competitive Carriers Association
 County of Orange, California
 Cox Communications, Inc.
 CTIA-The Wireless Association
 District of Columbia
 Eric Alan DelaPena
 Fairfax County, Virginia
 Fibertech Networks, LLC
 League of California Cities, California State Association of Counties, and SCAN NATOA
 Minnesota Association of Community Telecommunications Administrators
 National Association of Broadcasters
 National Cable & Telecommunications Association
 NATOA, NLC, NACo, USCM
 Nina Beety
 Paul Benoit / City of Astoria
 PCIA - The Wireless Infrastructure Association & The HetNet Forum

Short Title

API
 AAR
 AT&T
 Glen Gardner
 Wahler
 CalWA
 CCUA *et al.*
 Cherry Hill

Alexandria *et al.*
 Eugene
 Mesa
 St. Paul
 San Antonio
 Tempe
 CTC
 CCA
 Orange
 Cox
 CTIA
 DC
 DelaPena
 Fairfax
 Fibertech

CA Local Governments
 MACTA
 NAB
 NCTA
 NATOA *et al.*
 Beety
 Astoria
 PCIA

Sprint Corporation
State Wireless Association Presidents
T-Mobile USA, Inc.
Towerstream Corporation
Township of Pennsauken
Utilities Telecom Council
Wireless Internet Service Providers Association

Sprint
SWAP
T-Mobile
Towerstream
Pennsauken
UTC
WISPA

APPENDIX B**Final Rules**

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 C.F.R. Part 1 and Part 17 as follows:

PART 1 – PRACTICE AND PROCEDURE

1. The authority citation for Part 1 is amended to read as follows:

AUTHORITY: 15 U.S.C. 79, *et seq.*; 47 U.S.C. 151, 154(i), 154(j), 155, 157, 160, 201, 225, 227, 303, 309, 332, 1403, 1404, 1451, 1452, and 1455.

2. Section 1.1306 is amended by revising NOTE 1 and adding NOTE 4 to read as follows:

§ 1.1306 Actions which are categorically excluded from environmental processing.

* * * * *

NOTE 1: The provisions of § 1.1307(a) requiring the preparation of EAs do not encompass the mounting of antenna(s) and associated equipment (such as wiring, cabling, cabinets, or backup-power), on or in an existing building, or on an antenna tower or other man-made structure, unless § 1.1307(a)(4) is applicable. Such antennas and associated equipment are subject to § 1.1307(b) and require EAs if their construction would result in human exposure to radiofrequency radiation in excess of the applicable health and safety guidelines cited in § 1.1307(b). The provisions of §§ 1.1307 (a) and (b) do not encompass the installation of aerial wire or cable over existing aerial corridors of prior or permitted use or the underground installation of wire or cable along existing underground corridors of prior or permitted use, established by the applicant or others. The use of existing structures or corridors is an environmentally desirable alternative to the construction of new facilities and is encouraged. The provisions of §§ 1.1307(a) and (b) do not encompass the construction of new submarine cable systems.

* * * * *

NOTE 4: Unless § 1.1307(a)(4) is applicable, the provisions of § 1.1307(a) requiring the preparation of EAs do not encompass the construction of wireless facilities, including deployments on new or replacement poles, if:

(a) the facilities will be located in a right-of-way that is designated by a Federal, State, local, or Tribal government for communications towers, above-ground utility transmission or distribution lines, or any associated structures and equipment;

(b) the right-of-way is in active use for such designated purposes; and

(c) the facilities would not

(1) increase the height of the tower or non-tower structure by more than 10% or twenty feet, whichever is greater, over existing support structures that are located in the right-of-way within the vicinity of the proposed construction;

(2) involve the installation of more than four new equipment cabinets or more than one new equipment shelter;

(3) add an appurtenance to the body of the structure that would protrude from the edge of the structure more than twenty feet, or more than the width of the structure at the level of the appurtenance, whichever is greater (except that the deployment may exceed this size limit if necessary to shelter the antenna from inclement weather or to connect the antenna to the tower via cable); or

(4) involve excavation outside the current site, defined as the area that is within the boundaries of the leased or owned property surrounding the deployment or that is in proximity to the structure and within the boundaries of the utility easement on which the facility is to be deployed, whichever is more restrictive.

Such wireless facilities are subject to § 1.1307(b) and require EAs if their construction would result in human exposure to radiofrequency radiation in excess of the applicable health and safety guidelines cited in § 1.1307(b).

* * * * *

3. Section 1.1307 is amended by adding a NOTE to paragraph (a)(4) to read as follows:

§ 1.1307 Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.

* * * * *

NOTE: The requirements in paragraph (a)(4) of this section do not apply to:

(a) The mounting of antennas (including associated equipment such as wiring, cabling, cabinets, or backup-power) on existing utility structures (including utility poles and electric transmission towers in active use by a “utility” as defined in Section 224 of the Communications Act, 47 U.S.C. 224, but not including light poles, lamp posts, and other structures whose primary purpose is to provide public lighting) where the deployment meets the following conditions:

(1) All antennas that are part of the deployment fit within enclosures (or if the antennas are exposed, within imaginary enclosures) that are individually no more than three cubic feet in volume, and all antennas on the structure, including any pre-existing antennas on the structure, fit within enclosures (or if the antennas are exposed, within imaginary enclosures) that total no more than six cubic feet in volume;

(2) All other wireless equipment associated with the structure, including pre-existing enclosures and including equipment on the ground associated with antennas on the structure, are cumulatively no more than seventeen cubic feet in volume, exclusive of

(i) Vertical cable runs for the connection of power and other services;

(ii) Ancillary equipment installed by other entities that is outside of the applicant’s ownership or control, and

(iii) Comparable equipment from pre-existing wireless deployments on the structure;

(3) The deployment will involve no new ground disturbance; and

(4) The deployment would otherwise require the preparation of an EA under paragraph (a)(4) of this section solely because of the age of the structure; or

(b) The mounting of antennas (including associated equipment such as wiring, cabling, cabinets, or backup-power) on buildings or other non-tower structures where the deployment meets the following conditions:

(1) There is an existing antenna on the building or structure;

(2) One of the following criteria is met:

- (i) *Non-Visible Antennas*. The new antenna is not visible from any adjacent streets or surrounding public spaces and is added in the same vicinity as a pre-existing antenna;
- (ii) *Visible Replacement Antennas*. The new antenna is visible from adjacent streets or surrounding public spaces, provided that (A) it is a replacement for a pre-existing antenna, (B) the new antenna will be located in the same vicinity as the pre-existing antenna, (C) the new antenna will be visible only from adjacent streets and surrounding public spaces that also afford views of the pre-existing antenna, (D) the new antenna is not more than 3 feet larger in height or width (including all protuberances) than the pre-existing antenna, and (E) no new equipment cabinets are visible from the adjacent streets or surrounding public spaces; or
- (iii) *Other Visible Antennas*. The new antenna is visible from adjacent streets or surrounding public spaces, provided that (A) it is located in the same vicinity as a pre-existing antenna, (B) the new antenna will be visible only from adjacent streets and surrounding public spaces that also afford views of the pre-existing antenna, (C) the pre-existing antenna was not deployed pursuant to the exclusion in this subsection (§ 1.1307(a)(4), Note (b)(2)(iii)), (D) the new antenna is not more than three feet larger in height or width (including all protuberances) than the pre-existing antenna, and (E) no new equipment cabinets are visible from the adjacent streets or surrounding public spaces;
- (3) The new antenna complies with all zoning conditions and historic preservation conditions applicable to existing antennas in the same vicinity that directly mitigate or prevent effects, such as camouflage or concealment requirements;
- (4) The deployment of the new antenna involves no new ground disturbance; and
- (5) The deployment would otherwise require the preparation of an EA under paragraph (a)(4) of this section solely because of the age of the structure.

For purposes of this Note, a non-visible new antenna is in the “same vicinity” as a pre-existing antenna if it will be collocated on the same rooftop, façade or other surface. For purposes of this Note, a visible new

antenna is in the “same vicinity” as a pre-existing antenna if it is on the same rooftop, façade, or other surface and the centerpoint of the new antenna is within ten feet of the centerpoint of the pre-existing antenna. For purposes of this Note, a deployment causes no new ground disturbance when the depth and width of previous disturbance exceeds the proposed construction depth and width by at least two feet.

* * * * *

4. Part 1 is amended by adding Subpart CC as follows:

Subpart CC—State and Local Review of Applications for Wireless Service Facility Modification

§ 1.40001 Wireless Facility Modifications

(a) *Purpose.* These rules implement § 6409 of the Spectrum Act (codified at 47 U.S.C. 1455), which requires a State or local government to approve any eligible facilities request for a modification of an existing tower or base station that does not substantially change the physical dimensions of such tower or base station.

(b) *Definitions.* Terms used in this section have the following meanings.

(1) *Base Station.* A structure or equipment at a fixed location that enables Commission-licensed or authorized wireless communications between user equipment and a communications network. The term does not encompass a tower as defined in this subpart or any equipment associated with a tower.

(i) The term includes, but is not limited to, equipment associated with wireless communications services such as private, broadcast, and public safety services, as well as unlicensed wireless services and fixed wireless services such as microwave backhaul.

(ii) The term includes, but is not limited to, radio transceivers, antennas, coaxial or fiber-optic cable, regular and backup power supplies, and comparable equipment, regardless of technological configuration (including Distributed Antenna Systems and small-cell networks).

(iii) The term includes any structure other than a tower that, at the time the relevant application is filed with the State or local government under this section, supports or houses equipment described in paragraphs (b)(1)(i)-(ii) of this section that has been

reviewed and approved under the applicable zoning or siting process, or under another State or local regulatory review process, even if the structure was not built for the sole or primary purpose of providing such support.

(iv) The term does not include any structure that, at the time the relevant application is filed with the State or local government under this section, does not support or house equipment described in paragraphs (b)(1)(i)-(ii) of this section.

(2) *Collocation.* The mounting or installation of transmission equipment on an eligible support structure for the purpose of transmitting and/or receiving radio frequency signals for communications purposes.

(3) *Eligible Facilities Request.* Any request for modification of an existing tower or base station that does not substantially change the physical dimensions of such tower or base station, involving:

- (i) collocation of new transmission equipment;
- (ii) removal of transmission equipment; or
- (iii) replacement of transmission equipment.

(4) *Eligible Support Structure.* Any tower or base station as defined in this section, provided that it is existing at the time the relevant application is filed with the State or local government under this section.

(5) *Existing.* A constructed tower or base station is existing for purposes of this section if it has been reviewed and approved under the applicable zoning or siting process, or under another State or local regulatory review process, provided that a tower that has not been reviewed and approved because it was not in a zoned area when it was built, but was lawfully constructed, is existing for purposes of this definition.

(6) *Site.* For towers other than towers in the public rights-of-way, the current boundaries of the leased or owned property surrounding the tower and any access or utility easements currently related to the site, and, for other eligible support structures, further restricted to that area in proximity to the structure and to other transmission equipment already deployed on the ground.

(7) *Substantial Change.* A modification substantially changes the physical dimensions of an eligible support structure if it meets any of the following criteria:

(i) for towers other than towers in the public rights-of-way, it increases the height of the tower by more than 10% or by the height of one additional antenna array with separation from the nearest existing antenna not to exceed twenty feet, whichever is greater; for other eligible support structures, it increases the height of the structure by more than 10% or more than ten feet, whichever is greater;

(A) Changes in height should be measured from the original support structure in cases where deployments are or will be separated horizontally, such as on buildings' rooftops; in other circumstances, changes in height should be measured from the dimensions of the tower or base station, inclusive of originally approved appurtenances and any modifications that were approved prior to the passage of the Spectrum Act.

(ii) for towers other than towers in the public rights-of-way, it involves adding an appurtenance to the body of the tower that would protrude from the edge of the tower more than twenty feet, or more than the width of the tower structure at the level of the appurtenance, whichever is greater; for other eligible support structures, it involves adding an appurtenance to the body of the structure that would protrude from the edge of the structure by more than six feet;

(iii) for any eligible support structure, it involves installation of more than the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets; or, for towers in the public rights-of-way and base stations, it involves installation of any new equipment cabinets on the ground if there are no pre-existing ground cabinets associated with the structure, or else involves installation of ground cabinets that are more than 10% larger in height or overall volume than any other ground cabinets associated with the structure;

(iv) it entails any excavation or deployment outside the current site;

- (v) it would defeat the concealment elements of the eligible support structure; or
- (vi) it does not comply with conditions associated with the siting approval of the construction or modification of the eligible support structure or base station equipment, provided however that this limitation does not apply to any modification that is non-compliant only in a manner that would not exceed the thresholds identified in § 1.40001(b)(7)(i)-(iv).

(8) *Transmission Equipment.* Equipment that facilitates transmission for any Commission-licensed or authorized wireless communication service, including, but not limited to, radio transceivers, antennas, coaxial or fiber-optic cable, and regular and backup power supply. The term includes equipment associated with wireless communications services including, but not limited to, private, broadcast, and public safety services, as well as unlicensed wireless services and fixed wireless services such as microwave backhaul.

(9) *Tower.* Any structure built for the sole or primary purpose of supporting any Commission-licensed or authorized antennas and their associated facilities, including structures that are constructed for wireless communications services including, but not limited to, private, broadcast, and public safety services, as well as unlicensed wireless services and fixed wireless services such as microwave backhaul, and the associated site.

(c) *Review of Applications.* A State or local government may not deny and shall approve any eligible facilities request for modification of an eligible support structure that does not substantially change the physical dimensions of such structure.

(1) *Documentation Requirement for Review.* When an applicant asserts in writing that a request for modification is covered by this section, a State or local government may require the applicant to provide documentation or information only to the extent reasonably related to determining whether the request meets the requirements of this section. A State or local government may not require an applicant to submit any other documentation, including but not limited to documentation intended to illustrate the need for such wireless facilities or to justify the business decision to modify such wireless facilities.

(2) *Timeframe for Review.* Within 60 days of the date on which an applicant submits a request seeking approval under this section, the State or local government shall approve the application unless it determines that the application is not covered by this section.

(3) *Tolling of the Timeframe for Review.* The 60-day period begins to run when the application is filed, and may be tolled only by mutual agreement or in cases where the reviewing State or local government determines that the application is incomplete. The timeframe for review is not tolled by a moratorium on the review of applications.

(i) To toll the timeframe for incompleteness, the reviewing State or local government must provide written notice to the applicant within 30 days of receipt of the application, clearly and specifically delineating all missing documents or information. Such delineated information is limited to documents or information meeting the standard under paragraph (c)(1) of this section.

(ii) The timeframe for review begins running again when the applicant makes a supplemental submission in response to the State or local government's notice of incompleteness.

(iii) Following a supplemental submission, the State or local government will have 10 days to notify the applicant that the supplemental submission did not provide the information identified in the original notice delineating missing information. The timeframe is tolled in the case of second or subsequent notices pursuant to the procedures identified in this paragraph (c)(3). Second or subsequent notices of incompleteness may not specify missing documents or information that were not delineated in the original notice of incompleteness.

(4) *Failure to Act.* In the event the reviewing State or local government fails to approve or deny a request seeking approval under this section within the timeframe for review (accounting for any tolling), the request shall be deemed granted. The deemed grant does not become effective until the applicant notifies the applicable reviewing authority in writing after the review period has expired (accounting for any tolling) that the application has been deemed granted.

(5) *Remedies.* Applicants and reviewing authorities may bring claims related to Section 6409(a) to any court of competent jurisdiction.

PART 17 – CONSTRUCTION, MARKING, AND LIGHTING OF ANTENNA STRUCTURES

5. The authority citation for Part 17 continues to read as follows:

AUTHORITY: Secs. 4, 303, 48 Stat. 1066, 1082, as amended; 47 U.S.C. 154, 303. Interpret or apply secs. 301, 309, 48 Stat. 1081, 1085 as amended; 47 U.S.C. 301, 309.

6. Section 17.4 is amended by revising paragraphs (c)(1)(v) and (c)(1)(vi), and adding paragraph (c)(1)(vii) to read as follows:

§ 17.4 Antenna structure registration.

* * * * *

(c) * * *

(1) * * *

* * * * *

(v) For any other change that does not alter the physical structure, lighting, or geographic location of an existing structure;

(vi) For construction, modification, or replacement of an antenna structure on Federal land where another Federal agency has assumed responsibility for evaluating the potentially significant environmental effect of the proposed antenna structure on the quality of the human environment and for invoking any required environmental impact statement process, or for any other structure where another Federal agency has assumed such responsibilities pursuant to a written agreement with the Commission (*see* §1.1311(e) of this chapter); or

(vii) For the construction or deployment of an antenna structure that will (A) be in place for no more than 60 days, (B) requires notice of construction to the FAA, (C) does not require marking or lighting under FAA regulations, (D) will be less than 200 feet in height above ground level, and (E) will either involve no excavation or involve

excavation only where the depth of previous disturbance exceeds the proposed construction depth (excluding footings and other anchoring mechanisms) by at least two feet. An applicant that relies on this exception must wait 30 days after removal of the antenna structure before relying on this exception to deploy another antenna structure covering substantially the same service area.

APPENDIX C

Final Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ the Commission incorporated an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the clarifications and rules proposed in the Notice of Proposed Rulemaking in this proceeding (*Infrastructure NPRM*).² The Commission sought written public comment on the proposals in the *Infrastructure NPRM*, including comment on the IRFA. None of the comments filed in the proceeding addressed the IRFA. Because we amend our rules in this Report and Order, we have included this Final Regulatory Flexibility Analysis (FRFA) which conforms to the RFA.³ To the extent that any statement contained in this FRFA is perceived as creating ambiguity with respect to our rules, or statements made in preceding sections of this Report and Order, the rules and statements set forth in those preceding sections shall be controlling.

A. Need for, and Objectives of, the Report and Order

2. In this Report and Order, we take important steps to promote the deployment of wireless infrastructure, recognizing that it is the physical foundation that supports all wireless communications. The Report and Order adopts and clarifies rules in four specific areas in an effort to reduce regulatory obstacles and bring efficiency to wireless facility siting and construction. We do this by eliminating unnecessary reviews, thus reducing the burden on State and local jurisdictions and also on industry, including small businesses. In particular, we update and tailor the manner in which we evaluate the impact of proposed deployments on the environment and historic properties. We also adopt rules to clarify and implement statutory requirements related to State and local government review of infrastructure siting applications, and we adopt an exemption from our environmental public notification process for towers that are in place for only short periods of time. Taken together, these steps will further facilitate the delivery of more wireless capacity in more locations to consumers throughout the United States. Our actions will expedite the deployment of equipment that does not harm the environment or historic properties, as well as recognize the limits on Federal, State, Tribal, and municipal resources available to review those cases that may adversely affect the environment or historic properties.

3. First, we adopt measures to refine our environmental and historic preservation review processes under NEPA and NHPA to account for new wireless technologies, including physically small facilities like those used in Distributed Antenna System (DAS) networks and small-cell systems that are a fraction of the size of macrocell installations. Among these, we expand an existing categorical exclusion from NEPA review so that it applies not only to collocations on buildings and towers, but also to collocations on other structures like utility poles. We also adopt a new categorical exclusion from NEPA review for some kinds of deployments in utilities or communications rights-of-way. With respect to NHPA, we create new exclusions from Section 106 review to address certain collocations that are currently subject to review only because of the age of the supporting structure. We take these steps to assure that, as we continue to meet our responsibilities under NEPA and NHPA, we also fulfill our

¹ See 5 U.S.C. § 603. The RFA, see 5 U.S.C. §§ 601-612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA), Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

² See Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies, Acceleration of Broadband Deployment: Expanding the Reach and Reducing the Cost of Broadband Deployment by Improving Policies Regarding Public Rights of Way and Wireless Facilities Siting, Amendment of Parts 1 and 17 of the Commission's Rules Regarding Public Notice Procedures for Processing Antenna Structure Registration Applications for Certain Temporary Towers, 2012 Biennial Review of Telecommunications Regulations, WT Docket Nos. 13-238, 13-32, WC Docket No. 11-59, *Notice of Proposed Rulemaking*, 28 FCC Rcd 14238, 14240, 14304-17 App. B (2013) (*Infrastructure NPRM*)

³ See 5 U.S.C. § 604.

obligation under the Communications Act to ensure that rapid, efficient, and affordable radio communications services are available to all Americans.⁴

4. Second, regarding temporary towers, we adopt a narrow exemption from the Commission's requirement that owners of proposed towers requiring antenna structure registration (ASR) provide 30 days of national and local notice to give members of the public an opportunity to comment on the proposed tower's potential environmental effects. The exemption from notification requirements applies only to proposed temporary towers meeting defined criteria, including limits on the size and duration of the installation, that greatly reduce the likelihood of any significant environmental effects. Allowing licensees to deploy temporary towers meeting these criteria without first having to complete the Commission's environmental notification process will enable them to more effectively respond to emergencies, natural disasters, and other planned and unplanned short-term spikes in demand without undermining the purposes of the notification process. This exemption will "remove an administrative obstacle to the availability of broadband and other wireless services during major events and unanticipated periods of localized high demand" where expanded or substitute service is needed quickly.⁵

5. Third, we adopt rules to implement and enforce Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012 (Spectrum Act).⁶ Section 6409(a) provides, in part, that "a State or local government may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station."⁷ By requiring timely approval of eligible requests, Congress intended to advance wireless broadband service for both public safety and commercial users.⁸ Section 6409(a) includes a number of undefined terms, however, that bear directly on how the provision applies to infrastructure deployments, and the record confirms that there are substantial disputes on a wide range of interpretive issues under the provision. We accordingly adopt rules that clarify many of these terms and enforce their requirements, thus advancing Congress's goal of facilitating rapid deployment. These rules will serve the public interest by providing guidance to all stakeholders on their rights and responsibilities under the provision, reducing delays in the review process for wireless infrastructure modifications, and facilitating the rapid deployment of wireless infrastructure and promoting advanced wireless broadband services.

6. Finally, we clarify issues related to Section 332(c)(7) of the Communications Act and the Commission's *2009 Declaratory Ruling*.⁹ Among other things, we explain when a siting application is

⁴ 47 U.S.C. § 151.

⁵ See Amendment of Parts 1 and 17 of the Commission's Rules Regarding Public Notice Procedures for Processing Antenna Structure Registration Applications for Certain Temporary Towers; 2012 Biennial Review of Telecommunications Regulations, RM-11688, WT Docket No. 13-32, *Order*, 28 FCC Rcd 7758 para. 1 (2013) (*Waiver Order*).

⁶ See Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, § 6409(a), 126 Stat. 156 (2012). We refer hereinafter to the Middle Class Tax Relief and Job Creation Act of 2012 as the "Spectrum Act." We note that Section 6409(a) has since been codified in the Communications Act as 47 U.S.C. § 1455(a). However, for consistency with the *Infrastructure NPRM*, we will continue to refer to it as Section 6409(a).

⁷ Spectrum Act § 6409(a)(1).

⁸ See H.R. Rep. 112-399, at 136 (2012) (Conference Report). We note that much of the Conference Report describes provisions in the House or Senate bills, and is not necessarily representative of Congressional intent in passing the Spectrum Act. The portions of the Conference Report that are cited in this Report and Order pertain expressly to the Act as passed.

⁹ 47 U.S.C. § 332(c)(7); Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(b) to Ensure Timely Siting Review & to Preempt Under Section 253 State & Local Ordinances That Classify All Wireless Siting Proposals As Requiring A Variance, WT Docket No. 08-165, *Declaratory Ruling*, 24 FCC Rcd 13994 (2009) (*2009 Declaratory Ruling*). Because our clarifications of the *2009 Declaratory Ruling* are themselves merely interpretive rulings, we note that the RFA does not apply to them. See *Central Texas Telephone Co-op., Inc. v. F.C.C.*, 402 F.3d 205, 211 (2005). Nevertheless, we address them in this analysis.

complete so as to trigger the presumptively reasonable timeframes for local and State review of siting applications under the *2009 Declaratory Ruling*, and how the shot clock timeframes apply to local moratoria and DAS or small-cell facilities. These clarifications will eliminate many disputes under Section 332(c)(7), provide certainty about timing related to siting applications (including the time at which applicants may seek judicial relief), and preserve State and municipal governments' critical role in the siting application process.

7. Taken together, the actions we take in this Report and Order will enable more rapid deployment of vital wireless facilities, delivering broadband and wireless innovations to consumers across the country. At the same time, they will safeguard the environment, preserve historic properties, protect the interest of Tribal Nations in their ancestral lands and cultural legacies, and address municipalities' concerns over impacts to aesthetics and other local values.

B. Summary of Significant Issues Raised by Public Comments in Response to the IRFA

8. No commenters directly responded to the IRFA. Some commenters raised issues of particular relevance to small entities, and we address those issues in this FRFA.

C. Response to Comments by the Chief Counsel for Advocacy of the Small Business Administration

9. Pursuant to the Small Business Jobs Act of 2010, the Commission is required to respond to any comments filed by the Chief Counsel for Advocacy of the Small Business Administration (SBA), and to provide a detailed statement of any change made to the proposed rules as a result of those comments. The Chief Counsel did not file any comments in response to the proposed rules in this proceeding.

D. Description and Estimate of the Number of Small Entities to Which Rules Will Apply

10. The RFA directs the Commission to provide a description of and, where feasible, an estimate of the number of small entities that will be affected by the rules, if adopted.¹⁰ The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small government jurisdiction."¹¹ In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.¹² A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.¹³

11. The Report and Order adopts rule changes regarding local and Federal regulation of the siting and deployment of communications towers and other wireless facilities. Due to the number and diversity of owners of such infrastructure and other responsible parties, including small entities that are Commission licensees as well as non-licensees, we classify and quantify them in the remainder of this section.

¹⁰ 5 U.S.C. § 603(b)(3).

¹¹ *Id.* § 601(6).

¹² *Id.* § 601(3) (incorporating by reference the definition of "small business concern" in 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register." 5 U.S.C. § 601(3).

¹³ 15 U.S.C. § 632. Application of the statutory criteria of dominance in its field of operation and independence are sometimes difficult to apply in the context of broadcast television. Accordingly, the Commission's statistical account of television stations may be over-inclusive.

12. *Small Businesses, Small Organizations, and Small Governmental Jurisdictions.* Our action may, over time, affect a variety of small entities. To assist in assessing the Report and Order's effect on these entities, we describe three comprehensive categories—small businesses, small organizations, and small governmental jurisdictions—that encompass entities that could be directly affected by the rules we adopt.¹⁴ As of 2010, there were 27.9 million small businesses in the United States, according to the SBA.¹⁵ A “small organization” is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.”¹⁶ Nationwide, as of 2007, there were approximately 1,621,315 small organizations.¹⁷ Finally, the term “small governmental jurisdiction” is defined generally as “governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand.”¹⁸ Census Bureau data for 2007 indicate that there were 89,527 governmental jurisdictions in the United States.¹⁹ We estimate that, of this total, as many as 88,761 entities may qualify as “small governmental jurisdictions.”²⁰ Thus, we estimate that most governmental jurisdictions are small.

13. *Wireless Telecommunications Carriers (except satellite).* The Census Bureau defines this category as follows: “This industry comprises establishments engaged in operating and maintaining switching and transmission facilities to provide communications via the airwaves. Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular phone services, paging services, wireless Internet access, and wireless video services.”²¹ The appropriate size standard under SBA rules is for the category Wireless Telecommunications Carriers (except Satellite). In this category, a business is small if it has 1,500 or fewer employees.²² For this category, census data for 2007 show that there were 1,383 firms that operated for the entire year.²³ Of this total, 1,368 firms had employment of 999 or fewer employees and 15 had employment of 1000 employees or more.²⁴

¹⁴ See 5 U.S.C. § 601(3)–(6).

¹⁵ See Small Business Administration, Office of Advocacy, “Frequently Asked Questions,” available at http://www.sba.gov/sites/default/files/FAQ_Sept_2012.pdf.

¹⁶ 5 U.S.C. § 601(4).

¹⁷ INDEPENDENT SECTOR, THE NEW NONPROFIT ALMANAC & DESK REFERENCE (2010).

¹⁸ 5 U.S.C. § 601(5).

¹⁹ U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES: 2011, Table 426 (2007).

²⁰ The 2007 U.S. Census data for small governmental organizations are not presented based on the size of the population in each such organization. There were 89,476 local governmental organizations in 2007. If we assume that county, municipal, township, and school district organizations are more likely than larger governmental organizations to have populations of 50,000 or less, the total of these organizations is 52,095. As a basis of estimating how many of these 89,476 local government organizations were small, in 2011, we note that there were a total of 715 cities and towns (incorporated places and minor civil divisions) with populations over 50,000. CITY AND TOWN TOTALS: VINTAGE 2011 – U.S. Census Bureau, available at <http://www.census.gov/popest/data/cities/totals/2011/index.html>. If we subtract the 715 cities and towns that meet or exceed the 50,000 population threshold, we conclude that approximately 88,761 are small. U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES: 2011, Tables 426, 427 (data cited therein are from 2007).

²¹ U.S. Census Bureau, 2012 NAICS Definitions: 517210 Wireless Telecommunications Carriers (except Satellite), <http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=517210&search=2012>.

²² 13 C.F.R. § 121.201 (NAICS code 517210).

²³ U.S. Census Bureau, Table No. EC0751SSSZ5, *Information: Subject Series - Establishment and Firm Size: Employment Size of Firms for the United States: 2007* (NAICS code 517210), http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5.

²⁴ *Id.* Available census data do not provide a more precise estimate of the number of firms that have employment of 1,500 or fewer employees; the largest category provided is for firms with 1000 employees or more.

According to Commission data, 413 carriers reported that they were engaged in the provision of wireless telephony, including cellular service, PCS, and Specialized Mobile Radio (SMR) telephony services.²⁵ Of these, an estimated 261 have 1,500 or fewer employees and 152 have more than 1,500 employees.²⁶ Consequently, the Commission estimates that approximately half or more of these firms can be considered small. Thus, using available data, we estimate that the majority of wireless firms can be considered small.

14. Personal Radio Services. Personal radio services provide short-range, low-power radio for personal communications, radio signaling, and business communications not provided for in other services. Personal radio services include services operating in spectrum licensed under Part 95 of our rules.²⁷ These services include Citizen Band Radio Service, General Mobile Radio Service, Radio Control Radio Service, Family Radio Service, Wireless Medical Telemetry Service, Medical Implant Communications Service, Low Power Radio Service, and Multi-Use Radio Service.²⁸ There are a variety of methods used to license the spectrum in these rule parts, from licensing by rule, to conditioning operation on successful completion of a required test, to site-based licensing, to geographic area licensing. Under the RFA, the Commission is required to make a determination of which small entities are directly affected by the rules we adopt. Since all such entities are wireless, we apply the definition of Wireless Telecommunications Carriers (except Satellite), pursuant to which a small entity is defined as employing 1,500 or fewer persons.²⁹ Many of the licensees in these services are individuals, and thus are not small entities. In addition, due to the mostly unlicensed and shared nature of the spectrum utilized in many of these services, the Commission lacks direct information upon which to base an estimation of the number of small entities under an SBA definition that might be directly affected by the Report and Order.

15. Public Safety Radio Services. Public safety radio services include police, fire, local government, forestry conservation, highway maintenance, and emergency medical services. There are a total of approximately 127,540 licensees within these services. Governmental entities³⁰ as well as private businesses comprise the licensees for these services. All governmental entities in jurisdictions with populations of less than 50,000 fall within the definition of a small entity.³¹

16. Private Land Mobile Radio. Private Land Mobile Radio (PLMR) systems serve an essential role in a range of industrial, business, land transportation, and public safety activities. These radios are used by companies of all sizes operating in all U.S. business categories that operate and maintain switching and transmission facilities to provide communications via the airwaves. Establishments in this industry have spectrum licenses and provide services using that spectrum, such as cellular phone services, paging services, wireless Internet access, and wireless video services.³² The SBA has not developed a definition of small entity specifically applicable to PLMR licensees due to the vast array of PLMR users. However, the Commission believes that the most appropriate classification for

²⁵ See Federal Communications Commission, *Trends in Telephone Service* (Sep. 2010) at Table 5.3, available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-301823A1.pdf (*Trends in Telephone Service*).

²⁶ See *id.*

²⁷ 47 C.F.R. Part 90.

²⁸ The Citizens Band Radio Service, General Mobile Radio Service, Radio Control Radio Service, Family Radio Service, Wireless Medical Telemetry Service, Medical Implant Communications Service, Low Power Radio Service, and Multi-Use Radio Service are governed by subpart D, subpart A, subpart C, subpart B, subpart H, subpart I, subpart G, and subpart J, respectively, of Part 95 of the Commission's rules. See, generally, 47 C.F.R. Part 95.

²⁹ 13 C.F.R. § 121.201, NAICS Code 517210.

³⁰ 47 C.F.R. § 1.1162.

³¹ 5 U.S.C. § 601(5)-(6).

³² <http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=517210&search=2007%20NAICS%20Search>.

PLMR is Wireless Communications Carriers (except satellite). The size standard for that category is that a business is small if it has 1,500 or fewer employees.³³ For this category, census data for 2007 show that there were 11,163 establishments that operated for the entire year.³⁴ Of this total, 10,791 establishments had employment of 999 or fewer employees and 372 had employment of 1000 employees or more.³⁵ Thus under this category and the associated small business size standard, the Commission estimates that the majority of PLMR licensees are small entities that may be affected by our action.³⁶

17. Similarly, according to Commission data, 413 carriers reported that they were engaged in the provision of wireless telephony, including cellular service, PCS, and SMR telephony services.³⁷ Of these, an estimated 261 have 1,500 or fewer employees and 152 have more than 1,500 employees.³⁸ Consequently, the Commission estimates that approximately half or more of these firms can be considered small. Thus, using available data, we estimate that the majority of wireless firms can be considered small.

18. The Commission's 1994 Annual Report on PLMRs³⁹ indicates that at the end of fiscal year 1994 there were 1,087,267 licensees operating 12,481,989 transmitters in the PLMR bands below 512 MHz. Because any entity engaged in a commercial activity is eligible to hold a PLMR license, the rules we adopt could potentially impact every small business in the United States.

19. Multiple Address Systems. Entities using Multiple Address Systems (MAS) spectrum, in general, fall into two categories: (1) those using the spectrum for profit-based uses, and (2) those using the spectrum for private internal uses. With respect to the first category, the Commission defines "small entity" for MAS licensees as an entity that has average annual gross revenues of less than \$15 million over the three previous calendar years.⁴⁰ "Very small business" is defined as an entity that, together with its affiliates, has average annual gross revenues of not more than \$3 million over the preceding three calendar years.⁴¹ The SBA has approved these definitions.⁴² The majority of MAS operators are licensed in bands where the Commission has implemented a geographic area licensing approach that requires the use of competitive bidding procedures to resolve mutually exclusive applications. The Commission's licensing database indicates that, as of April 16, 2010, there were a total of 11,653 site-based MAS station authorizations. Of these, 58 authorizations were associated with common carrier service. In addition, the Commission's licensing database indicates that, as of April 16, 2010, there were a total of 3,330 Economic Area market area MAS authorizations. The Commission's licensing database indicates that, as

³³ 13 C.F.R. § 121.201, NAICS Code 517210.

³⁴ U.S. Census Bureau, Subject Series: Information, Table 5, "Establishment and Firm Size: Employment Size of Firms for the United States: 2007 NAICS Code 517210" (issued Nov. 2010).

³⁵ See http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ2&prodType=table. Available census data do not provide a more precise estimate of the number of firms that have employment of 1,500 or fewer employees; the largest category provided is for firms with "1000 employees or more."

³⁶ See *id.*

³⁷ See *Trends in Telephone Service* at Table 5.3.

³⁸ See *id.*

³⁹ Federal Communications Commission, 60th Annual Report, Fiscal Year 1994.

⁴⁰ See Amendment of the Commission's Rules Regarding Multiple Address Systems, WT Docket No. 97-81, *Report and Order*, 15 FCC Rcd 11956, 12008 para. 123 (2000).

⁴¹ *Id.*

⁴² See Letter from Aida Alvarez, Administrator, Small Business Administration, to Thomas Sugrue, Chief, Wireless Telecommunications Bureau, FCC (June 4, 1999).

of April 16, 2010, of the 11,653 total MAS station authorizations, 10,773 authorizations were for private radio service. In addition, an auction for 5,104 MAS licenses in 176 EAs was conducted in 2001.⁴³ Seven winning bidders claimed status as small or very small businesses and won 611 licenses. In 2005, the Commission completed an auction (Auction 59) of 4,226 MAS licenses in the Fixed Microwave Services from the 928/959 and 932/941 MHz bands. Twenty-six winning bidders won a total of 2,323 licenses. Of the 26 winning bidders in this auction, five claimed small business status and won 1,891 licenses.

20. With respect to the second category, which consists of entities that use, or seek to use, MAS spectrum to accommodate their own internal communications needs, MAS serves an essential role in a range of industrial, safety, business, and land transportation activities. MAS radios are used by companies of all sizes, operating in virtually all U.S. business categories, and by all types of public safety entities. For the majority of private internal users, the definition developed by the SBA would be more appropriate than the Commission's definition. The applicable definition of small entity in this instance appears to be the "Wireless Telecommunications Carriers (except satellite)" definition under the SBA rules.⁴⁴ Under that SBA category, a business is small if it has 1,500 or fewer employees.⁴⁵ For this category, census data for 2007 show that there were 11,163 establishments that operated for the entire year.⁴⁶ Of this total, 10,791 establishments had employment of 99 or fewer employees and 372 had employment of 100 employees or more.⁴⁷ Thus under this category and the associated small business size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities that may be affected by our action.⁴⁸

21. *Broadband Radio Service and Educational Broadband Service.* Broadband Radio Service systems—previously referred to as Multipoint Distribution Service (MDS) and Multichannel Multipoint Distribution Service systems, and "wireless cable"—transmit video programming to subscribers and provide two-way high speed data operations using the microwave frequencies of the Broadband Radio Service (BRS) and Educational Broadband Service (EBS) (previously referred to as the Instructional Television Fixed Service).⁴⁹ In connection with the 1996 BRS auction, the Commission established a small business size standard as an entity that had annual average annual gross revenues of no more than \$40 million over the previous three calendar years.⁵⁰ The BRS auctions resulted in 67 successful bidders obtaining licensing opportunities for 493 Basic Trading Areas (BTAs). Of the 67 auction winners, 61 met the definition of a small business. BRS also includes licensees of stations authorized prior to the auction. We previously estimated that of the 61 small business BRS auction winners, based on our review of licensing records, 48 remain small business licensees. In addition to the

⁴³ See "Multiple Address Systems Spectrum Auction Closes," *Public Notice*, 16 FCC Rcd 21011 (2001).

⁴⁴ 13 C.F.R. § 121.201, NAICS Code 517210.

⁴⁵ *Id.*

⁴⁶ U.S. Census Bureau, Subject Series: Information, Table 5, "Establishment and Firm Size: Employment Size of Firms for the United States: 2007 NAICS Code 517210" (issued Nov. 2010).

⁴⁷ See http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ2&prodType=table. Available census data do not provide a more precise estimate of the number of firms that have employment of 1,500 or fewer employees; the largest category provided is for firms with "100 employees or more."

⁴⁸ See *id.*

⁴⁹ Amendment of Parts 21 and 74 of the Commission's Rules with Regard to Filing Procedures in the Multipoint Distribution Service and in the Instructional Television Fixed Service and Implementation of Section 309(j) of the Communications Act—Competitive Bidding, MM Docket No. 94-131, PP Docket No. 93-253, *Report and Order*, 10 FCC Rcd 9589, 9593 para. 7 (1995).

⁵⁰ 47 C.F.R. § 21.961(b)(1) (1996).

48 small businesses that hold BTA authorizations, there are approximately 86 incumbent BRS licensees that are considered small entities; 18 incumbent BRS licensees do not meet the small business size standard.⁵¹ After adding the number of small business auction licensees to the number of incumbent licensees not already counted, there are currently approximately 133 BRS licensees that are defined as small businesses under either the SBA's rules or the Commission's rules. In 2009, the Commission conducted Auction 86, which involved the sale of 78 licenses in the BRS areas.⁵² The Commission established three small business size standards that were used in Auction 86: (i) an entity with attributed average annual gross revenues that exceeded \$15 million and did not exceed \$40 million for the preceding three years was considered a small business; (ii) an entity with attributed average annual gross revenues that exceeded \$3 million and did not exceed \$15 million for the preceding three years was considered a very small business; and (iii) an entity with attributed average annual gross revenues that did not exceed \$3 million for the preceding three years was considered an entrepreneur.⁵³ Auction 86 concluded in 2009 with the sale of 61 licenses.⁵⁴ Of the 10 winning bidders, two bidders that claimed small business status won four licenses; one bidder that claimed very small business status won three licenses; and two bidders that claimed entrepreneur status won six licenses. We note that, as a general matter, the number of winning bidders that qualify as small businesses at the close of an auction does not necessarily represent the number of small businesses currently in service.

22. In addition, the SBA's placement of Cable Television Distribution Services in the category of Wired Telecommunications Carriers is applicable to cable-based educational broadcasting services. Since 2007, Wired Telecommunications Carriers have been defined as follows: "This industry comprises establishments primarily engaged in operating and/or providing access to transmission facilities and infrastructure that they own and/or lease for the transmission of voice, data, text, sound, and video using wired telecommunications networks. Transmission facilities may be based on a single technology or a combination of technologies."⁵⁵ Establishments in this industry use the wired telecommunications network facilities that they operate to provide a variety of services, such as wired telephony services, including VoIP services; wired (cable) audio and video programming distribution; and wired broadband Internet services. Establishments providing satellite television distribution services using facilities and infrastructure that they operate are included in this industry.⁵⁶ The SBA has determined that a business in this category is a small business if it has 1,500 or fewer employees.⁵⁷ Census data for 2007 shows that there were 3,188 firms in this category that operated for the duration of that year.⁵⁸ Of those, 3,144 had fewer than 1000 employees, and 44 firms had more than 1000 employees.

⁵¹ 47 U.S.C. § 309(j). Hundreds of stations were licensed to incumbent MDS licensees prior to implementation of Section 309(j) of the Communications Act of 1934, 47 U.S.C. § 309(j). For these pre-auction licenses, the applicable standard is SBA's small business size standard of 1500 or fewer employees.

⁵² Auction of Broadband Radio Service (BRS) Licenses, Scheduled for October 27, 2009, Notice and Filing Requirements, Minimum Opening Bids, Upfront Payments, and Other Procedures for Auction 86, AU Docket No. 09-56, *Public Notice*, 24 FCC Rcd 8277 (2009).

⁵³ *Id.* at 8296.

⁵⁴ Auction of Broadband Radio Service Licenses Closes, Winning Bidders Announced for Auction 86, Down Payments Due November 23, 2009, Final Payments Due December 8, 2009, Ten-Day Petition to Deny Period, *Public Notice*, 24 FCC Rcd 13572 (2009).

⁵⁵ U.S. Census Bureau, *2012 NAICS Definitions: 517110 Wired Telecommunications Carriers*, <http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=517110&search=2012>.

⁵⁶ *Id.*

⁵⁷ See 13 C.F.R. § 121.201 (NAICS code 517110).

⁵⁸ U.S. Census Bureau, Table No. EC0751SSSZ5, *Information: Subject Series - Establishment and Firm Size: Employment Size of Firms for the United States: 2007* (NAICS code 517110), http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ5.

Thus under this category and the associated small business size standard, the majority of such firms can be considered small. In addition to Census data, the Commission's Universal Licensing System indicates that as of July 2013, there are 2,236 active EBS licenses. The Commission estimates that of these 2,236 licenses, the majority are held by non-profit educational institutions and school districts, which are by statute defined as small businesses.⁵⁹

23. Location and Monitoring Service (LMS). LMS systems use non-voice radio techniques to determine the location and status of mobile radio units. For purposes of auctioning LMS licenses, the Commission has defined a "small business" as an entity that, together with controlling interests and affiliates, has average annual gross revenues for the preceding three years not to exceed \$15 million.⁶⁰ A "very small business" is defined as an entity that, together with controlling interests and affiliates, has average annual gross revenues for the preceding three years not to exceed \$3 million.⁶¹ These definitions have been approved by the SBA.⁶² An auction for LMS licenses commenced on February 23, 1999 and closed on March 5, 1999. Of the 528 licenses auctioned, 289 licenses were sold to four small businesses.

24. Television Broadcasting. This Economic Census category "comprises establishments primarily engaged in broadcasting images together with sound. These establishments operate television broadcasting studios and facilities for the programming and transmission of programs to the public."⁶³ The SBA has created the following small business size standard for such businesses: those having \$38.5 million or less in annual receipts.⁶⁴ The 2007 U.S. Census indicates that 2,076 television stations operated in that year. Of that number, 1,515 had annual receipts of \$10,000,000 dollars or less, and 561 had annual receipts of more than \$10,000,000. Since the Census has no additional classifications on the basis of which to identify the number of stations whose receipts exceeded \$38.5 million in that year, the Commission concludes that the majority of television stations were small under the applicable SBA size standard.

25. Apart from the U.S. Census, the Commission has estimated the number of licensed commercial television stations to be 1,387.⁶⁵ In addition, according to Commission staff review of the BIA Advisory Services, LLC's *Media Access Pro Television Database* on March 28, 2012, about 950 of an estimated 1,300 commercial television stations (or approximately 73 percent) had revenues of \$14 million or less.⁶⁶ We therefore estimate that the majority of commercial television broadcasters are small entities.

⁵⁹ The term "small entity" within SBREFA applies to small organizations (nonprofits) and to small governmental jurisdictions (cities, counties, towns, townships, villages, school districts, and special districts with populations of less than 50,000). 5 U.S.C. §§ 601(4)-(6).

⁶⁰ Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems, PR Docket No. 93-61, *Second Report and Order*, 13 FCC Rcd 15182, 15192 para. 20 (1998); *see also* 47 C.F.R. § 90.1103.

⁶¹ *Id.*

⁶² *See* Letter from Aida Alvarez, Administrator, Small Business Administration to Thomas J. Sugrue, Chief, Wireless Telecommunications Bureau, FCC (Feb. 22, 1999).

⁶³ U.S. Census Bureau, 2012 NAICS Definitions, "515120 Television Broadcasting," at <http://www.census.gov/cgi-bin/sssd/naics/naicsrch>.

⁶⁴ 13 C.F.R. § 121.201; 2012 NAICS code 515120.

⁶⁵ *See Broadcast Station Totals as of June 30, 2014*, Press Release (MB rel. July 9, 2014) ("July 9, 2014 Broadcast Station Totals Press Release"), at https://apps.fcc.gov/edocs_public/attachmatch/DOC-328096A1.pdf.

⁶⁶ We recognize that BIA's estimate differs slightly from the FCC total given *supra*.

26. We note, however, that in assessing whether a business concern qualifies as small under the above definition, business (control) affiliations⁶⁷ must be included. Our estimate, therefore, likely overstates the number of small entities that might be affected by our action because the revenue figure on which it is based does not include or aggregate revenues from affiliated companies. In addition, an element of the definition of “small business” is that the entity not be dominant in its field of operation. We are unable at this time to define or quantify the criteria that would establish whether a specific television station is dominant in its field of operation. Accordingly, the estimate of small businesses to which rules may apply does not exclude any television station from the definition of a small business on this basis and is therefore possibly over-inclusive to that extent.

27. In addition, the Commission has estimated the number of licensed noncommercial educational (NCE) television stations to be 395.⁶⁸ These stations are non-profit, and therefore considered to be small entities.⁶⁹

28. There are also 2,414 LPTV stations, including Class A stations, and 4,046 TV translator stations.⁷⁰ Given the nature of these services, we will presume that all of these entities qualify as small entities under the above SBA small business size standard.

29. Radio Broadcasting. The SBA defines a radio broadcast station as a small business if it has no more than \$35.5 million in annual receipts.⁷¹ Business concerns included in this category are those “primarily engaged in broadcasting aural programs by radio to the public.”⁷² According to review of the BIA Publications, Inc. Master Access Radio Analyzer Database as of November 26, 2013, about 11,331 (or about 99.9 percent) of 11,341 commercial radio stations have revenues of \$38.5 million or less and thus qualify as small entities under the SBA definition. The Commission notes, however, that, in assessing whether a business concern qualifies as small under the above definition, revenues from business (control) affiliations⁷³ must be included. This estimate, therefore, likely overstates the number of small entities that might be affected, because the revenue figure on which it is based does not include or aggregate revenues from affiliated companies.

30. In addition, an element of the definition of “small business” is that the entity not be dominant in its field of operation. The Commission is unable at this time to define or quantify the criteria that would establish whether a specific radio station is dominant in its field of operation. Accordingly, the estimate of small businesses to which rules may apply does not exclude any radio station from the definition of a small business on this basis and therefore may be over-inclusive to that extent. Also, as noted, an additional element of the definition of “small business” is that the entity must be independently owned and operated. The Commission notes that it can be difficult to assess this criterion in the context of media entities and the estimates of small businesses to which they apply may be over-inclusive to this extent.

31. FM translator stations and low power FM stations. The rules and clarifications we adopt could affect licensees of FM translator and booster stations and low power FM (LPFM) stations, as well

⁶⁷ “[Business concerns] are affiliates of each other when one concern controls or has the power to control the other or a third party or parties controls or has to power to control both.” 13 C.F.R. § 21.103(a)(1).

⁶⁸ See July 9, 2014 Broadcast Station Totals Press Release.

⁶⁹ See, generally, 5 U.S.C. §§ 601(4), (6).

⁷⁰ See FCC News Release, Broadcast Station Totals as of December 31, 2013 (rel. January 8, 2014), http://transition.fcc.gov/Daily_Releases/Daily_Business/2014/db0108/DOC-325039A1.pdf.

⁷¹ 13 C.F.R. § 121.201, 2012 NAICS code 515112.

⁷² U.S. Census Bureau, 2012 NAICS Definitions: 515112 Radio Broadcasting, <http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=515112&search=2012>.

⁷³ See n.14.

as potential licensees in these radio services. The same SBA definition that applies to radio broadcast licensees would apply to these stations. The SBA defines a radio broadcast station as a small business if such station has no more than \$38.5 million in annual receipts.⁷⁴ Currently, there are approximately 6,155 licensed FM translator and booster stations and 864 licensed LPFM stations.⁷⁵ Given the nature of these services, we will presume that all of these licensees qualify as small entities under the SBA definition.

32. *Multichannel Video Distribution and Data Service (MVDDS)*. MVDDS is a terrestrial fixed microwave service operating in the 12.2-12.7 GHz band. The Commission adopted criteria for defining three groups of small businesses for purposes of determining their eligibility for special provisions such as bidding credits. It defined a very small business as an entity with average annual gross revenues not exceeding \$3 million for the preceding three years; a small business as an entity with average annual gross revenues not exceeding \$15 million for the preceding three years; and an entrepreneur as an entity with average annual gross revenues not exceeding \$40 million for the preceding three years.⁷⁶ These definitions were approved by the SBA.⁷⁷ On January 27, 2004, the Commission completed an auction of 214 MVDDS licenses (Auction No. 53). In this auction, ten winning bidders won a total of 192 MVDDS licenses.⁷⁸ Eight of the ten winning bidders claimed small business status and won 144 of the licenses. The Commission also held an auction of MVDDS licenses on December 7, 2005 (Auction 63). Of the three winning bidders who won 22 licenses, two winning bidders, winning 21 of the licenses, claimed small business status.⁷⁹

33. *Satellite Telecommunications*. Two economic census categories address the satellite industry. Both establish a small business size standard of \$32.54 million or less in annual receipts.⁸⁰

34. The first category, “Satellite Telecommunications,” “comprises establishments primarily engaged in providing telecommunications services to other establishments in the telecommunications and broadcasting industries by forwarding and receiving communications signals via a system of satellites or reselling satellite telecommunications.”⁸¹ Census Bureau data for 2007 show that 607 Satellite Telecommunications establishments operated for that entire year.⁸² Of this total, 533 had annual receipts of under \$10 million, and 74 establishments had receipts of \$10 million or more.⁸³ Consequently, the

⁷⁴ See 13 C.F.R. § 121.201, NAICS Code 515112.

⁷⁵ See News Release, “Broadcast Station Totals as of December 31, 2009” (rel. Feb. 26, 2010), available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-296538A1.pdf269784A1.doc.

⁷⁶ Amendment of Parts 2 and 25 of the Commission’s Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range; Amendment of the Commission’s Rules to Authorize Subsidiary Terrestrial Use of the 12.2–12.7 GHz Band by Direct Broadcast Satellite Licensees and their Affiliates; and Applications of Broadwave USA, PDC Broadband Corporation, and Satellite Receivers, Ltd. to Provide A Fixed Service in the 12.2–12.7 GHz Band, ET Docket No. 98-206, *Memorandum Opinion and Order and Second Report and Order*, 17 FCC Rcd 9614, 9711 para. 252 (2002).

⁷⁷ See Letter from Hector V. Barreto, Administrator, U.S. Small Business Administration, to Margaret W. Wiener, Chief, Auctions and Industry Analysis Division, Wireless Telecommunications Bureau, FCC (Feb. 13, 2002).

⁷⁸ See “Multichannel Video Distribution and Data Service Spectrum Auction Closes,” *Public Notice*, 19 FCC Rcd 1834 (2004).

⁷⁹ See “Auction of Multichannel Video Distribution and Data Service Licenses Closes; Winning Bidders Announced for Auction No. 63,” *Public Notice*, 20 FCC Rcd 19807 (2005).

⁸⁰ 13 C.F.R. § 121.201, NAICS Codes 517410, 517919.

⁸¹ U.S. Census Bureau, 2007 NAICS Definition, 517410 Satellite Telecommunications.

⁸² See http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ1&prodType=table.

⁸³ See *id.*

Commission estimates that the majority of Satellite Telecommunications firms are small entities that might be affected by our action.

35. The second category, “All Other Telecommunications,” comprises “establishments primarily engaged in providing specialized telecommunications services, such as satellite tracking, communications telemetry, and radar station operation. This industry also includes establishments primarily engaged in providing satellite terminal stations and associated facilities connected with one or more terrestrial systems and capable of transmitting telecommunications to, and receiving telecommunications from, satellite systems. Establishments providing Internet services or voice over Internet protocol (VoIP) services via client-supplied telecommunications connections are also included in this industry.”⁸⁴ For this category, Census data for 2007 shows that there were a total of 2,639 establishments that operated for the entire year.⁸⁵ Of those, 2,333 operated with annual receipts of less than \$10 million and 306 with annual receipts of \$10 million or more.⁸⁶ Consequently, the Commission estimates that a majority of All Other Telecommunications establishments are small entities that might be affected by our action.

36. *Non-Licensee Tower Owners.* Although at one time most communications towers were owned by the licensee using the tower to provide communications service, many towers are now owned by third-party businesses that do not provide communications services themselves but lease space on their towers to other companies that provide communications services. The Commission’s rules require that any entity, including a non-licensee, proposing to construct a tower over 200 feet in height or within the glide slope of an airport must register the tower with the Commission on FCC Form 854.⁸⁷ Thus, non-licensee tower owners may be subject to the environmental notification requirements associated with ASR registration, and may benefit from the exemption for certain temporary antenna structures that we adopt in the Report and Order. In addition, non-licensee tower owners may be affected by our interpretations of Section 6409(a) of the Spectrum Act or by our revisions to our interpretation of Section 332(c)(7) of the Communications Act.⁸⁸

37. As of September 5, 2014, the ASR database includes approximately 116,643 registration records reflecting a “Constructed” status and 13,972 registration records reflecting a “Granted, Not Constructed” status. These figures include both towers registered to licensees and towers registered to non-licensee tower owners. The Commission does not keep information from which we can easily determine how many of these towers are registered to non-licensees or how many non-licensees have registered towers.⁸⁹ Regarding towers that do not require ASR registration, we do not collect information as to the number of such towers in use and therefore cannot estimate the number of tower owners that would be subject to the rules we adopt. Moreover, the SBA has not developed a size standard for small businesses in the category “Tower Owners.” Therefore, we are unable to determine the number of non-licensee tower owners that are small entities. We believe, however, that when all entities owning 10 or fewer towers and leasing space for collocation are included, non-licensee tower owners number in the thousands, and that nearly all of these qualify as small businesses under the SBA’s definition for “All

⁸⁴ See <http://www.census.gov/cgi-bin/sssd/naics/naicsrch?code=517919&search=2007%20NAICS%20Search>.

⁸⁵ See http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ECN_2007_US_51SSSZ4&prodType=table.

⁸⁶ See *id.*

⁸⁷ 47 C.F.R. §§ 17.4(a), 17.7(a)-(b).

⁸⁸ See *supra*, Sections IV, V.

⁸⁹ We note, however, that approximately 13,000 towers are registered to 10 cellular carriers with 1,000 or more employees.

Other Telecommunications.”⁹⁰ In addition, there may be other non-licensee owners of other wireless infrastructure, including DAS and small cells, that might be affected by the regulatory measures we adopt. We do not have any basis for estimating the number of such non-licensee owners that are small entities.

E. Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements for Small Entities

38. This Report and Order adopts a narrow exemption from the Commission’s requirement that owners of proposed towers requiring ASR registration provide 30 days of national and local notice to give members of the public an opportunity to comment on the proposed tower’s potential environmental effects. The exemption from the notice requirements applies only to applicants seeking to register temporary antenna structures meeting certain criteria that greatly reduce the likelihood of any significant environmental effects. Specifically, proposed towers exempted from the Commission’s local and national environmental notification requirement are those that (i) will be in use for 60 days or less, (ii) require notice of construction to the Federal Aviation Administration (FAA), (iii) do not require marking or lighting pursuant to FAA regulations, (iv) will be less than 200 feet in height, and (v) will involve minimal or no excavation.

39. As noted above, the Commission’s rules require that any entity, including a non-licensee, proposing to construct a tower over 200 feet in height or within the glide slope of an airport must register the tower with the Commission on FCC Form 854.⁹¹ An applicant seeking to claim the temporary towers exemption from the environmental notification process must indicate on its FCC Form 854 that it is claiming the exemption for a new, proposed temporary tower and demonstrate that the proposed tower satisfies the applicable criteria.⁹² While small entities must comply with these requirements in order to take advantage of the exemption, on balance, the relief from compliance with local and national environmental notification requirements provided by the exemption greatly reduces burdens and economic impacts on small entities.

40. The applicant may seek an extension of the exemption from the Commission’s local and national environmental notification requirement of up to sixty days through another filing of Form 854, if the applicant can demonstrate that the extension of the exemption period is warranted due to changed circumstances or information that emerged after the exempted tower was deployed. The exemption adopted in this Report and Order is intended specifically for proposed towers that are intended and expected to be deployed for no more than 60 days, and the option to apply for an extension is intended only for cases of unforeseen or changed circumstances or information. Small entities, like all applicants, are expected to seek extensions of the exemption period only rarely and therefore, any burdens or economic impacts incurred by applying for such extensions should be minimal.

F. Steps Taken to Minimize the Significant Economic Impact on Small Entities, and Significant Alternatives Considered

41. The RFA requires an agency to describe any significant alternatives that it has considered in developing its approach, which may include the following four alternatives (among others): “(1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities; (3) the use of performance rather than design standards; and (4) an exemption from coverage of the rule, or any part thereof, for such small

⁹⁰ 13 C.F.R. § 121.201, NAICS Code 517919. Under this category, a business is small if it has \$30 million or less in annual receipts.

⁹¹ 47 C.F.R. §§ 17.4(a), 17.7(a)-(b).

⁹² See 47 C.F.R. § 17.4(c)(vii).

entities.”⁹³ This FRFA incorporates by reference all discussion in the Report and Order that considers the impact on small entities of the rules adopted by the Commission. In addition, the Commission’s consideration of those issues as to which the impact on small entities was specifically discussed in the record is summarized below.

42. The actions taken in this Report and Order encourage and promote the deployment of advanced wireless broadband and other services by tailoring the regulatory review of new wireless network infrastructure consistent with the law and the public interest. We anticipate that the steps taken in this Report and Order will not impose any significant economic impacts on small entities, and will in fact help reduce burdens on small entities by reducing the cost and delay associated with the deployment of such infrastructure.

43. In this Report and Order, the Commission takes action in four major areas relating to the regulation of wireless facility siting and construction. In each area, the rules we adopt and clarifications we make will not increase burdens or costs on small entities. To the contrary, our actions will reduce costs and burdens associated with deploying wireless infrastructure.

44. First, we adopt measures with regard to our NEPA process for review of environmental effects regarding wireless broadband deployment that should reduce existing regulatory costs for small entities that construct or deploy wireless infrastructure, and will not impose any additional costs on such entities. Specifically, we clarify that the existing NEPA categorical exclusion for antenna collocations on buildings and towers includes equipment associated with the antennas (such as wiring, cabling, cabinets, or backup-power), and that it also covers collocations in a building’s interior. We also expand the NEPA collocation categorical exclusion to cover collocations on structures other than buildings and towers, and adopt a new NEPA categorical exclusion for deployments, including deployments of new poles, in utility or communications rights-of-way that are in active use for such purposes, where the deployment does not constitute a substantial increase in size over the existing utility or communications uses. We also adopt measures concerning our Section 106 process for review of impact on historic properties. First, we adopt certain exclusions from Section 106 review, and we clarify that the existing exclusions for certain collocations on buildings under the Commission’s programmatic agreements extend to collocations inside buildings. These new exclusions and clarifications will reduce environmental compliance costs of small entities by providing that eligible proposed deployments of small wireless facilities do not require the preparation of an Environmental Assessment.

45. Second, we adopt an exemption from the Commission’s requirement that ASR applicants must provide local and national environmental notification prior to submitting a completed ASR application for certain temporary antenna structures meeting criteria that makes them unlikely to have significant environmental effects. Specifically, we exempt antenna structures that (1) will be in place for 60 days or less; (2) require notice of construction to the FAA; (3) do not require marking or lighting under FAA regulations; (4) will be less than 200 feet above ground level; and (5) will involve minimal or no ground excavation. This exemption will reduce the burden on wireless broadband providers and other wireless service providers, including small entities.

46. Third, we adopt several rules to clarify and implement the requirements of Section 6409(a) of the Spectrum Act. In interpreting the statutory terms of this provision, such as “wireless tower or base station,” “transmission equipment,” and “substantially change the physical dimensions,” we generally do not distinguish between large and small entities, as the statute provides no indication that such distinctions were intended, and such distinctions have been proposed. Further, these clarifications will help limit potential ambiguities within the rule and thus reduce the burden associated with complying with this statutory provision, including the burden on small entities. Generally, however, we clarify that Section 6409(a) applies only to State and local governments acting in their regulatory role and does not apply to such entities acting in their proprietary capacities.

⁹³ 5 U.S.C. § 603(c).

47. With regard to the process for reviewing an application under Section 6409(a), we provide that a State or local government may only require applicants to provide documentation that is reasonably related to determining whether the eligible facility request meets the requirements of Section 6409(a) and that, within 60 days from the date of filing (accounting for tolling), a State or local government shall approve an application covered by Section 6409(a). Where a State or local government fails to act on an application covered under Section 6409(a) within the requisite time period, the application is deemed granted. Parties may bring claims under Section 6409(a) to a court of competent jurisdiction. We decline to entertain such disputes in a Commission adjudication, which would impose significant burdens on localities, many of which are small entities with no representation in Washington, D.C. or experience before the Commission. Limiting relief to court adjudication lessens the burden on applicants in general, and small entities specifically.

48. Lastly, we adopt clarifications of our *2009 Declaratory Ruling*, which established the time periods after which a State or local government has presumptively failed to act on a facilities siting application “within a reasonable period of time” under Section 332(c)(7) of the Act. Specifically, we clarify that the timeframe begins to run when an application is first submitted, not when it is deemed complete by the reviewing government. Further, a determination of incompleteness tolls the shot clock only if the State or local government provides notice to the applicant in writing within 30 days of the application’s submission, specifically delineating all missing information. Following a submission in response to a determination of incompleteness, any subsequent determination that an application remains incomplete must be based solely on the applicant’s failure to supply missing information that was identified within the first 30 days. These clarifications will provide greater certainty in the application process and reduce the potential or need for serial requests for more information. Accordingly, these clarifications will facilitate faster application processing, reduce unreasonable delay, and reduce the burden on regulated entities, including small businesses.

49. We also clarify that to the extent DAS or small-cell facilities, including third-party facilities such as neutral host DAS deployments, are or will be used for the provision of personal wireless services, their siting applications are subject to the same presumptively reasonable timeframes that apply to applications related to other personal wireless service facilities under Section 332(c)(7). We clarify further that the presumptively reasonable timeframes run regardless of any applicable moratoria, and that municipal property preferences are not *per se* unreasonably discriminatory or otherwise unlawful under Section 332(c)(7). Finally, we conclude that the explicit remedies under Section 332(c)(7) preclude adoption of a deemed granted remedy for failures to act. These clarifications reduce confusion and delay within the siting process which in turn reduces the burden on industry and State and local jurisdictions alike, which may include small entities.

G. Federal Rules that Might Duplicate, Overlap, or Conflict with the Rules

50. None.

H. Report to Congress

51. The Commission will send a copy of the Report and Order, including this FRFA, in a report to be sent to Congress and the Government Accountability Office pursuant to the Congressional Review Act. A copy of the Report and Order and FRFA (or summaries thereof) will also be published in the *Federal Register*.

I. Report to Small Business Administration

52. The Commission’s Consumer and Governmental Affairs Bureau, Reference Information Center, will send a copy of this Report and Order, including this FRFA, to the Chief Counsel for Advocacy of the SBA.

**STATEMENT OF
CHAIRMAN TOM WHEELER**

Re: In the Matter of Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies, WT Docket No. 13-238; Acceleration of Broadband Deployment: Expanding the Reach and Reducing the Cost of Broadband Deployment by Improving Policies Regarding Public Rights of Way and Wireless Facilities Siting, WC Docket No. 11-59; 2012 Biennial Review of Telecommunications Regulations, WT Docket No. 13-32.

Last month's record-setting launch of the new iPhone is just the latest reminder that our appetite for new mobile technologies appears to be insatiable. Mobile innovation is not only delighting U.S. consumers, it's a major force in driving economic growth, boosting U.S. competitiveness, and enabling solutions to challenges like education and health care.

As the demand for wireless technologies increases, so does the need for greater coverage and wireless network capacity. According to recent reports from the wireless industry, wireless data consumption has grown 732 percent since 2010. And Cisco forecasts that global mobile data traffic will increase 11-fold between 2013 and 2018.

The Commission has been hard at work to make more licensed and unlicensed spectrum available to keep up with the growing demand.

But making more spectrum available for broadband is just part of the Commission's wireless agenda.

High-speed mobile broadband also requires high-speed broadband buildout. However, the regulatory burdens associated with deployments can be expensive and time-consuming. This Order takes concrete steps to immediately and substantially ease those burdens.

The Order recognizes that a technological revolution with regard to infrastructure deployment has changed the landscape.

The current rules for deploying infrastructure were drafted at a time when antennas were huge and bolted to the top of enormous towers that were designed and built for the purpose of supporting those big antennas.

Today, new Distributed Antenna System (DAS) networks and other small-cell systems use components that are a fraction of the size and can be installed – unobtrusively – on utility poles, buildings, and other existing structures.

The Order we adopt today accounts for that change by crafting a more efficient process for small deployments and other installations that do not trigger concerns about environmental protection or historic preservation.

The Order also implements federal statutory directives that are intended to make State and local review more efficient for wireless deployments and modifications.

At the same time, the Order preserves our commitment to safeguard the essential roles that State, local, and Tribal governments play in this process.

For instance, the Order preserves local governments' authority to adopt and apply the zoning, safety, and concealment requirements that are appropriate for their communities.

Taken together, the rules we adopt today lay the groundwork for delivering more wireless capacity in more locations to consumers throughout the United States—while staying true to our statutory obligations to protect the environment and historic properties, and with sufficient safeguards to protect local land-use priorities as well as safety and aesthetic interests.

This Order builds on previous Commission efforts to make the regulatory approval processes for wireless infrastructure more efficient and effective.

In August, we substantially reformed tower lighting and marking requirements, which greatly eased compliance burdens for tower owners without any adverse impact on aviation safety.

And we have already started additional discussions with government and non-governmental stakeholders to further facilitate review processes and encourage collocations on existing towers. In particular, we intend to further tailor our historic preservation review process by working with the Advisory Council on Historic Preservation (ACHP) to implement broader fast-track federal reviews for small-scale wireless deployments.

Thank you to the Wireless Bureau for your continued dedication to promoting broadband infrastructure deployment.

**STATEMENT OF
COMMISSIONER MIGNON L. CLYBURN**

Re: In the Matter of Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies, WT Docket No. 13-238; Acceleration of Broadband Deployment: Expanding the Reach and Reducing the Cost of Broadband Deployment by Improving Policies Regarding Public Rights of Way and Wireless Facilities Siting, WC Docket No. 11-59; 2012 Biennial Review of Telecommunications Regulations, WT Docket No. 13-32.

When considering how best to help wireless companies meet the explosive consumer demand for mobile services, the FCC focuses a lot on its upcoming AWS-3 and incentive auctions. The reality is that, in order to meet our ever growing communications needs, carriers cannot just acquire spectrum. They must also deploy that spectrum using a hardened, robust mobile infrastructure, which includes antennas and base stations.

Too often, the process of obtaining the necessary approvals from federal, state, and local governments to deploy can be both expensive and time-consuming. Today's Order seeks to address these shortcomings by bringing about more efficiency to the process of approving wireless facilities. Since 1974, the FCC's environmental and historical review procedures have excluded collocations of antennas from most of the requirements, recognizing the benefits of using existing structures over constructing new ones. Today, in order to facilitate faster deployment of wireless infrastructure, we expand that categorical exclusion to include: equipment associated with the antennas (such as wires, cables, and backup-power equipment), utility poles and electric transmission towers that meet certain conditions, and collocations within a building. We also adopt a 60-day period of review, before a collocation application can be deemed granted, pursuant to Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012. I was able to support this time period for two reasons. First, my colleagues agreed to move the effective date for the rules adopted here, from 30 days to 90 days after Federal Register publication. Second, last night, CTIA and PCIA agreed to make a number of commitments that could help resource constrained municipalities, transition to the new streamlined rules we are adopting today. Specifically, those associations will work in good faith towards the following goals:

Informing resource-constrained municipalities of best practices, used by other jurisdictions that are able to review and approve applications in fewer than 60 days;

Providing webinars and contacts to provide education and assistance, to these municipalities regarding the application process;

Providing assistance in drafting a model ordinance and application, for reviewing eligible facilities requests under Section 6409(a); and

Creating a checklist, that local government officials can use, to help streamline review processes.

I commend those organizations for making those commitments.

By making these changes to our rules, we anticipate spurring greater deployment of new technologies, such as small cells and Distributed Antenna Systems, which multiply wireless capacity within existing spectrum resources. For example, deploying ten small cells in a coverage area that can be served by a single macrocell could result in a tenfold increase in capacity. Small cells can also be deployed relatively easily on utility poles, street lamps, water towers, or rooftops -- a big reason why they are becoming so popular.

We also adopt an exemption from the rule, that tower owners must give the public 30 days' notice to comment on a proposed tower's potential effects to the environment and to historic sites. This exemption

applies only to proposed temporary towers that meet certain criteria. Specifically, those towers must be in use for 60 days or less; be shorter than 200 feet in height; involve minimal or no excavation; and not require FAA marking or lighting. This exemption will allow communications companies, to respond more effectively to emergencies, and other planned and unplanned short-term spikes in demand.

Finally, I wish to thank Roger Sherman, Chad Breckinridge, Patty Robbins, Peter Trachtenberg, Won Kim, Mania Baghdadi, and Michael Smith as well as my wireless legal advisor Louis Peraertz for providing us with such an excellent item.

**STATEMENT OF
COMMISSIONER JESSICA ROSENWORCEL**

Re: In the Matter of Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies, WT Docket No. 13-238; Acceleration of Broadband Deployment: Expanding the Reach and Reducing the Cost of Broadband Deployment by Improving Policies Regarding Public Rights of Way and Wireless Facilities Siting, WC Docket No. 11-59; 2012 Biennial Review of Telecommunications Regulations, WT Docket No. 13-32.

If you want a wireless revolution, you need an evolution—in infrastructure.

Mindful of this truth, today the Commission significantly evolves its policies for wireless facilities siting. That means we streamline many aspects of our tower siting rules to help encourage the deployment of wireless infrastructure. But what we do goes well beyond traditional towers. That's because the rules we put in place today are our first steps to encourage deployment of infrastructure that is absolutely critical for the next generation of wireless service—5G.

This is a good thing. Because the race to 5G is on. And in the next generation of wireless networks, traffic will change. We will see more data traveling wirelessly than ever before—between people, between people and machines, and between machines themselves. To accommodate all of this traffic, we will need to look anew at spectrum that is way, way up there—well beyond our traditional 3 GHz boundary for mobile broadband. But the physics of these far-off frequencies are different. They have smaller waves, multiplying our need for antenna systems. That means we need different infrastructure here on the ground. That means exploring new technologies like massive multiple-input, multiple output antenna arrays and hetnets that could change how we think about network topology. That means we need to start with new policies to support deployment of Distributed Antenna Systems and small cells.

That is a critical part of what we do here today—and I am pleased to support it. Some revolutions begin with a bang—but this one starts with the heavy lift of hard work. So thank you to the Wireless Telecommunications Bureau for your efforts to evolve our wireless siting policies and for your commitment to support infrastructure deployment—both in this generation of technology and the next.

STATEMENT OF
COMMISSIONER AJIT PAI

Re: *In the Matter of Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies, WT Docket No. 13-238; Acceleration of Broadband Deployment: Expanding the Reach and Reducing the Cost of Broadband Deployment by Improving Policies Regarding Public Rights of Way and Wireless Facilities Siting, WC Docket No. 11-59; 2012 Biennial Review of Telecommunications Regulations, WT Docket No. 13-32.*

Removing barriers to wireless infrastructure deployment has been one of my top priorities since joining the Commission. Two years ago, I laid out a plan to do just that. It called on the Commission to modernize our environmental and historic preservation rules by exempting most distributed antenna systems (DAS) and small cell technologies, curb local moratoria on the approval of new infrastructure, and make clear that our shot-clock rules apply to DAS and small cells.¹ Five months ago, I reiterated those proposals and urged the Commission to adopt a deemed-granted remedy for violations of section 6409 of the Spectrum Act and objective standards for determining the types of modifications that qualify for treatment under that section.²

Now, I'll be the first to admit that infrastructure isn't always the most glamorous issue. Discussing categorical exclusions under the National Environmental Policy Act isn't as exciting as thinking about multi-billion dollar spectrum auctions. But wireless infrastructure is just as important as spectrum.

Consider one figure: \$35 billion. That's how much, on average, wireless operators are expected to invest on an annual basis in mobile broadband infrastructure.³ That translates into hundreds of towers, thousands of base stations, and a vast network of microcells, picocells, and DAS. And with today's *Order*, we're going to stretch those dollars farther. That will mean broader coverage, greater capacity, and ultimately better wireless broadband services for consumers.

It's a simple relationship, really. Lower costs mean greater deployment. But for far too long and in far too many places, a web of municipal, state, and federal regulations has entangled those trying to build infrastructure. Delays, needless paperwork, and moratoria all mean higher costs and accordingly less deployment. Additionally, many of these regulations ignore the realities of modern wireless technology, so some places apply the rules for constructing a 200-foot tower to swapping out a 3G antenna for a 4G one. That disserves the public interest. And if left in place, rules like this could delay the use of the AWS-3 and 600 MHz spectrum we'll soon be auctioning off and slow the build-out of FirstNet.

That's why I'm pleased we're removing some of these barriers today, and I'm grateful that the *Order* includes many of my initial proposals. For example, the *Order* amends our environmental and historic preservation rules to make it easier to deploy small cells and collocate antennas on existing structures. The *Order* also makes it clear that our shot-clock rules apply to small cells and DAS and that local moratoria cannot be used to make an end run around those rules. And it adopts a bright-line test for determining which equipment modifications qualify for section 6409's deemed-grant remedy and makes clear that an applicant can start building on day 61 if a municipality doesn't act on its application.

¹ See Remarks of Commissioner Ajit Pai at CTIA's MobileCon (2012), <http://go.usa.gov/wMG9>.

² See Remarks of Commissioner Ajit Pai at PCIA's 2014 Wireless Infrastructure Show (2014), https://apps.fcc.gov/edocs_public/attachmatch/DOC-327172A1.pdf.

³ Alan Pearce, Ph.D., J. Richard Carlson, MBA, Michael Pagano, Ph.D., *Wireless Broadband Infrastructure: A Catalyst For GDP And Job Growth 2013–2017* (Sept. 2013).

These are no small changes. American consumers stand to benefit in a big way. Today's *Order* will make it easier for carriers both large and small to maintain, upgrade, and expand their coverage and capacity.

I would also like to thank my colleagues for agreeing to accept some of my suggested changes that have improved the item. For example, the *Order* now provides greater relief to those seeking to deploy small-scale technology by expanding the permitted size of collocations that qualify under the categorical exclusions we adopt today. Similarly, the *Order* now provides that cabling and other non-telecom equipment do not count against providers when they collocate on a utility structure. And I appreciate the *Order*'s discussion of the benefit of injunctive relief in cases where localities don't comply with the Commission's shot clock. I also would like to thank Commissioner O'Rielly in particular for the important role he played in securing other positive changes to the item.

Critically, the actions we take today lie well within our statutory authority. For example, in both section 332(c)(7) of the Communications Act and section 6409 of the Spectrum Act, Congress has clearly and specifically granted the Commission the power to remove barriers to wireless infrastructure deployment.

Moving forward, there is more to be done. In 18 to 24 months—but I hope sooner—we'll have a new programmatic agreement that will further streamline the process for deploying small cell technologies. And once we have some experience in the field with a deemed-granted remedy for infrastructure deployment, I hope we consider extending that remedy to our section 332 shot clock. But this does not obscure the fact that today's *Order* is a solid step in the right direction.

Finally, I would like to thank the FCC's talented staff for all of their hard work on this item, most especially: Mania Baghdadi, Chad Breckinridge, Saurbh Chhabra, Monica DeLong, Stephen Delsordo, Jennifer Flynn, Ivy Harris, David Horowitz, Don Johnson, Aliza Katz, Won Kim, Lee Martin, Sade Oshinubi, Bill Richardson, Patty Robbins, Roger Sherman, Michael Smith, Jeff Steinberg, Joel Taubenblatt, Peter Trachtenberg, and Morasha Younger. I also want to acknowledge the dedicated efforts that PCIA, CTIA, and many players in the infrastructure industry have made to bring these issues to the fore. Finding ways to make it easier to deploy wireless infrastructure is not the easiest of tasks, but it is essential so that all Americans can enjoy the benefits of wireless broadband.

**STATEMENT OF
COMMISSIONER MICHAEL O'RIELLY**

Re: *In the Matter of Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies, WT Docket No. 13-238; Acceleration of Broadband Deployment: Expanding the Reach and Reducing the Cost of Broadband Deployment by Improving Policies Regarding Public Rights of Way and Wireless Facilities Siting, WC Docket No. 11-59; 2012 Biennial Review of Telecommunications Regulations, WT Docket No. 13-32.*

I am very pleased to support the item before us to facilitate the deployment of wireless infrastructure. It is disappointing, however, that we had to go to such great lengths to get where we are today. But that is not a slight on the Chairman or the Commission.

By way of background, section 704 of the Telecommunications Act of 1996 was designed to ensure a thoughtful process to deal with disagreements between local and state governments and wireless communications providers.¹ Many weeks of negotiations between interested parties resulted in a statutory provision that many thought provided a reasonable compromise and outcome. It balanced the market demands of wireless companies—and their then predominately voice consumers—with the interests of localities.

Unfortunately, as soon as the ink was dry on the Telecom Act, some state and local governments went to work to undermine, and in some cases, completely ignore the siting provisions in the statute. The same entities that previously struck a deal continued to impede the placement of wireless towers in their jurisdictions. We saw some impose siting moratoria, claiming that such restrictions were not a violation of the statute. We saw certain localities stretch out zoning meetings for months, require excessive documentation, intentionally delay decisions, fail to provide written rejections based on the facts, and generally do everything possible to maintain barriers to siting. And the scope of the blocking did not just focus on larger or new towers; it also extended to adjustments or additions of antennas to existing towers.

I have observed years of court filings and cases containing weak arguments as to why action on a particular siting application was unnecessary or not required. On point, the Supreme Court is expected to soon consider what qualifies as “in writing” under the statute and the timing for providing the reasons for denying an application.² Is it really too much to ask for a locality to provide written justification for denying an application at the same time it provides the reasons for denying the application? Or for a locality to spell out the exact reasons for a denial? Must an applicant get a denial one day and be forced to fish through a record issued on another to find the reasons? Of course not.

Such disruptive practices did not go unnoticed. After years of excuses, Congress acted as part of what is commonly referred to as the Spectrum Act.³ The provisions of the law, which we act upon today, provide extensive responses to lessons learned from the practices of certain state and local governments. The overall message delivered was the gig is up. Congress provided what I believed to be very clear direction to remove barriers to the siting, installation and modification process.

The benefits of today’s item will be great, and our action is essential to the development of the future of wireless communications. As wireless data continues to grow annually at a furious pace,⁴ more

¹ Telecommunications Act of 1996 § 704, 47 U.S.C. § 332(c)(7).

² T-Mobile South, LLC v. City of Roswell, 731 F.3d 1213 (11th Cir. 2013), *cert. granted* 134 S. Ct. 2136 (2014).

³ Middle Class Tax Relief and Job Creation Act of 2012 § 6409(a), 47 U.S.C. § 1455.

⁴ One wireless provider calculated its mobile data traffic growth at 30,000 percent between 2006 and 2012. HetNet Forum Seminar Presentation, Small Cell Acceleration, at 21 (July 29, 2013), <http://www.thedasforum.org/wp->

(continued....)

wireless infrastructure is needed to carry such traffic and deploy new wireless services. By removing specific practices that are unnecessary obstacles, simplifying numerous provisions in our rules and providing clarity on exactly how the Commission will implement the statutory provisions, we set the stage for an easier wireless antenna siting process. This will facilitate the hundreds of thousands of sitings in the future and greatly expand wireless service capacity and coverage. To put this in perspective, comments in the record by PCIA suggest that one provider is in the process of trying to deploy 10,000 new macro-cells, 40,000 small cells and 1,000 distributed antenna systems (DAS).⁵

Our action today is especially important for unlicensed spectrum use, and small cell and DAS siting. I have been promoting more unlicensed spectrum allocations in a number of spectrum bands. Licensed spectrum networks unload a large portion of traffic onto unlicensed networks, which also must receive approvals to place equipment. Small cell and DAS deployments are also crucial because they can expand capacity and coverage of existing wireless networks. The growth of unlicensed use and small cells means more wireless infrastructure is going to be needed. Simply put, we are going to need more towers and more antennas, and fewer legal obstacles by state and local governments.


More importantly, we need to keep in mind the types of wireless communications that can be aided by our action. As we know from other proceedings, today's wireless devices are used to communicate in times of emergency, keep in touch with friends and families, expand broadband options for an array of people, among other purposes. The Commission must remain focused on the needs of the American consumer.

Lastly, let me be clear that I see a great deal of difference between the action we take today and the effort to override state and local protections on municipal-owned and operated networks. The most important distinction is that Congress spoke directly to wireless infrastructure but not to muni-broadband. Over the years, there have been numerous efforts in Congress to address the muni-broadband issue, but those efforts were never enacted.

I thank the Chairman for moving this item and incorporating many of my edits and the staff for all of their hard work.

(Continued from previous page) _____
content/uploads/2013/07/HetNet-Forum-Small-Cell-Acceleration-Seminar-Presentations.pdf, *cited in* Comments of PCIA – The Wireless Infrastructure Association and the HetNet Forum, WT Docket No. 13-238, at 3 n.7 (Feb. 3, 2014) (“Comments of PCIA”). Mobile data traffic in the U.S. in 2013 was 51 times the amount in 2008. *See* Cisco, *VNI Mobile Forecast Highlights, 2013-2018, United States – 2013 Year in Review*, http://www.cisco.com/assets/sol/sp/vni/forecast_highlights_mobile/index.html#~Country (filtering by United States and 2013 Year in Review) (last visited Oct. 16, 2014). Annual wireless data usage more than doubled between 2012 and 2013 from approximately 1.47 trillion Megabytes to 3.23 trillion Megabytes. CTIA-The Wireless Association, *Your Wireless Life, Annual Wireless Industry Survey*, <http://www.ctia.org/your-wireless-life/how-wireless-works/annual-wireless-industry-survey> (last visited Oct. 16, 2014).

⁵ Comments of PCIA at 3.



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Legislation expected on regulation of small cell networks

AWC staff and representatives from a number of cities have held several meetings with Verizon in response to Verizon's expressed intent to introduce legislation aimed at facilitating the rollout of small cell networks and 5G wireless technology. Verizon has said they would like to address issues related to land use regulations and access to rights-of-way, costs and fees charged by local governments and the need for streamlined permitting processes. All of these issues are important to cities and potentially controversial as legislation could result in pre-emption of current city authority. The aim of the meetings has been to discuss these issues and to try to find common ground.

Cities recognize that new wireless technology and facilities are coming. At least three cities have already adopted new ordinances in response (Kirkland, Kenmore and Spokane). Another group of more than 20 cities is working together, examining and discussing regulatory options to get themselves ready for the rollout of new small cell facilities. In AWC's opinion, this is the right approach and legislation that preempts city authority is not necessary. At this point we believe Verizon intends to push forward with legislation nevertheless. We may learn more at a work session on 5G wireless technology in the Senate Energy, Environment & Telecommunications committee on January 11 at 8 am.

This could be an issue that we'll need to engage on for all of the 2017 legislative session. Stay tuned. If you would like more information or would like to be part of our work group on the issue please contact [Victoria Lincoln](#) or [Dave Catterson](#).

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5G

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5th generation mobile networks or **5th generation**



5G logo

wireless systems, abbreviated **5G**, are the proposed next telecommunications standards beyond the current **4G/IMT-Advanced** standards. Rather than faster peak Internet connection speeds, 5G planning aims at higher capacity than current 4G, allowing higher number of **mobile broadband** users per area unit, and allowing consumption of higher or unlimited data quantities in gigabyte per month and user. This would make it feasible for a large portion of the population to stream high-definition media many hours per day with their mobile devices, when out of reach of Wi-Fi hotspots. 5G research and development also aims at improved support of **Device-to-device** communication, aiming at lower cost, lower latency than 4G equipment and lower battery consumption, for better implementation of the **Internet of things**.

There is currently no standard for 5G deployments. The **Next Generation Mobile Networks Alliance** defines the following requirements that a 5G standard should fulfill:^[1]

- Data rates of tens of megabits per second for tens of thousands of users
- Data rates of 100 megabits per second for metropolitan areas
- 1 Gb per second simultaneously to many workers on the same office floor

- Several hundreds of thousands of simultaneous connections for massive **wireless sensor network**
- **Spectral efficiency** significantly enhanced compared to 4G
- Coverage improved
- Signaling efficiency enhanced
- 1-10 ms latency (limited by speed of light)
- **Latency** reduced significantly compared to **LTE**.^[2]

The **Next Generation Mobile Networks Alliance** feels that 5G should be rolled out by 2020 to meet business and consumer demands.^[3] In addition to providing simply faster speeds, they predict that 5G networks also will need to meet new **use cases**,^[4] such as the **Internet of Things** (internet connected devices) as well as broadcast-like services and lifeline communication in times of natural disaster. Carriers, chipmakers, OEMS and OSATs, such as **Advanced Semiconductor Engineering (ASE)**, have been preparing for this next-generation (5G) wireless standard, as mobile systems and base stations will require new and faster application processors, basebands and RF devices.^[5]

Although updated standards that define capabilities beyond those defined in the current 4G standards are under consideration, those new capabilities have been grouped under the current ITU-T 4G standards. The U.S. **Federal Communications Commission (FCC)** approved the spectrum for 5G, including the 28 Gigahertz, 37 GHz and 39 GHz bands, on July 14, 2016.^{[6][7]}

1 Background

A **new mobile generation** has appeared approximately every 10 years since the first 1G system, **Nordic Mobile Telephone**, was introduced in 1982. The first '2G' system was commercially deployed in 1992, and the 3G system appeared in 2001. 4G systems fully compliant with **IMT Advanced** were first standardized in 2012. The development of the 2G (GSM) and 3G (IMT-2000 and UMTS) standards took about 10 years from the official start of the R&D projects, and development of 4G systems began in 2001 or 2002.^{[8][9]} Predecessor technologies have been on the market a few years before the new mobile generation, for example the pre-3G system **CdmaOne/IS95** in

the US in 1995, and the pre-4G systems **Mobile WiMAX** in South-Korea 2006, and first release-LTE in Scandinavia 2009. In April 2008, **NASA** partnered with **Machine-to-Machine Intelligence (M2Mi) Corp** to develop 5G communication technology.^[10]

Mobile generations typically refer to non-backward-compatible cellular standards following requirements stated by ITU-R, such as **IMT-2000** for 3G and **IMT-Advanced** for 4G. In parallel with the development of the ITU-R mobile generations, **IEEE** and other standardization bodies also develop wireless communication technologies, often for higher data rates, higher frequencies, shorter transmission ranges, no support for roaming between access points and a relatively limited multiple access scheme. The first **gigabit IEEE** standard was **IEEE 802.11ac**, commercially available since 2013, soon to be followed by the multigigabit standard **WiGig** or **IEEE 802.11ad**.

2 Debate

Based on the above observations, some sources suggest that a new generation of 5G standards may be introduced in the early 2020s.^{[11][12]} However, significant debate continued, on what 5G is about exactly. Prior to 2012, some industry representatives expressed skepticism toward 5G.^[13] **3GPP** held a conference in September 2015 to plan development of the new standard.^[14]

New mobile generations are typically assigned new frequency bands and wider spectral bandwidth per frequency channel (1G up to 30 kHz, 2G up to 200 kHz, 3G up to 5 MHz, and 4G up to 20 MHz), but skeptics argue that there is little room for larger channel bandwidths and new frequency bands suitable for land-mobile radio.^[13] The higher frequencies would overlap with K-band transmissions of **communication satellites**.^[15] From users' point of view, previous mobile generations have implied substantial increase in **peak bitrate** (i.e. physical layer **net bitrates** for short-distance communication), up to 1 gigabit per second to be offered by 4G.

If 5G appears and reflects these prognoses, then the major difference, from a user point of view, between 4G and 5G must be something other than faster speed (increased peak bit rate). For example, higher number of simultaneously connected devices, higher **system spectral efficiency** (data volume per area unit), lower battery consumption, lower outage probability (better coverage), high bit rates in larger portions of the coverage area, lower latencies, higher number of supported devices, lower infrastructure deployment costs, higher versatility and scalability, or higher reliability of communication. Those are the objectives in several of the research papers and projects below.

GSMHistory.com^[16] has recorded three very distinct 5G network visions that had emerged by 2014:

- **A super-efficient mobile network** that delivers a better performing network for lower investment cost. It addresses the mobile network operators' pressing need to see the unit cost of data transport falling at roughly the same rate as the volume of data demand is rising. It would be a leap forward in efficiency based on the IET Demand Attentive Network (DAN) philosophy.^[17]
- **A super-fast mobile network** comprising the next generation of **small cells** densely clustered to give a contiguous coverage over at least urban areas and getting the world to the final frontier of true "wide-area mobility." It would require access to spectrum under 4 GHz perhaps via the world's first global implementation of **Dynamic Spectrum Access**.
- **A converged fiber-wireless network** that uses, for the first time for wireless Internet access, the **millimeter wave** bands (20 – 60 GHz) so as to allow very-wide-bandwidth radio channels able to support data-access speeds of up to 10 Gbit/s. The connection essentially comprises "short" wireless links on the end of local **fiber optic cable**. It would be more a "nomadic" service (like Wi-Fi) rather than a wide-area "mobile" service.

In its white paper, *5G Empowering Vertical Industries*, 5G PPP, the collaborative research programme organized as part of the **European Commission's Horizon 2020** programme, suggests that to support the main vertical sectors in Europe - namely automotive, transportation, health-care, energy, manufacturing, and media and entertainment - the most important 5G infrastructure performance requirements are a latency below 5 ms, support for device densities of up to 100 devices/m² and reliable coverage area, and that a successful 5G deployment will integrate telecommunication technologies including mobile, fixed, optical and satellite (both **GEO** and **MEO**).^[18]

3 Research and development projects

In 2008, the South Korean IT R&D program of "5G mobile communication systems based on beam-division multiple access and relays with group cooperation" was formed.^[19]

In 2012, the UK Government announced the establishment of a 5G Innovation Centre at the **University of Surrey** – the world's first research center set up specifically for 5G mobile research.^[20]

In 2012, **NYU WIRELESS** was established as a multi-disciplinary research center, with a focus on 5G wireless research, as well as its use in the medical and computer-science fields. The center is funded by the National Science Foundation and a board of 10 major wireless

companies (as of July 2014) that serve on the Industrial Affiliates board of the center. NYU WIRELESS has conducted and published channel measurements that show that millimeter wave frequencies will be viable for multigigabit-per-second data rates for future 5G networks.

In 2012, the European Commission, under the lead of Neelie Kroes, committed 50 million euros for research to deliver 5G mobile technology by 2020.^[21] In particular, The METIS 2020 Project was the flagship project that allowed reaching a worldwide consensus on the requirements and key technology components of the 5G. Driven by several telecommunication companies, the METIS overall technical goal was to provide a system concept that supports 1,000 times higher mobile system spectral efficiency, compared to current LTE deployments.^{[4][12]} In addition, in 2013, another project has started, called 5GrEEn,^[22] linked to project METIS and focusing on the design of green 5G mobile networks. Here the goal is to develop guidelines for the definition of a new-generation network with particular emphasis on energy efficiency, sustainability and affordability.

In November 2012, a research project funded by the European Union under the ICT Programme FP7 was launched under the coordination of IMDEA Networks Institute (Madrid, Spain): iJOIN (Interworking and JOINT Design of an Open Access and Backhaul Network Architecture for Small Cells based on Cloud Networks). iJOIN introduces the novel concept of the radio access network (RAN) as a service (RANaaS), where RAN functionality is flexibly centralized through an open IT platform based on a cloud infrastructure. iJOIN aims for a joint design and optimization of access and backhaul, operation and management algorithms, and architectural elements, integrating small cells, heterogeneous backhaul and centralized processing. Additionally to the development of technology candidates across PHY, MAC, and the network layer, iJOIN will study the requirements, constraints and implications for existing mobile networks, specifically 3GPP LTE-A.

In January 2013, a new EU project named CROWD (Connectivity management for eneRgy Optimised Wireless Dense networks) was launched under the technical supervision of IMDEA Networks Institute, to design sustainable networking and software solutions for the deployment of very dense, heterogeneous wireless networks. The project targets sustainability targeted in terms of cost effectiveness and energy efficiency. Very high density means 1000x higher than current density (users per square meter). Heterogeneity involves multiple dimensions, from coverage radius to technologies (4G/LTE vs. Wi-Fi), to deployments (planned vs. unplanned distribution of radio base stations and hot spots).

In September 2013, the Cyber-Physical System (CPS) Lab at Rutgers University, NJ, started to work on dynamic provisioning and allocation under the emerging

cloud radio-access network (C-RAN). They have shown that the dynamic demand-aware provisioning in the cloud will decrease the energy consumption while increasing the resource utilization.^[23] They also have implemented a test bed for feasibility of C-RAN and developed new cloud-based techniques for interference cancellation. Their project is funded by the National Science Foundation.

In November 2013, Chinese telecom equipment vendor Huawei said it will invest \$600 million in research for 5G technologies in the next five years.^[24] The company's 5G research initiative does not include investment to productize 5G technologies for global telecom operators. Huawei will be testing 5G technology in Malta.^{[25][26]}

In 2015, Huawei and Ericsson are testing 5G-related technologies in rural areas in northern Netherlands.^[27]

In July 2015, the METIS-II and 5GNORMA European projects were launched. The METIS-II project^[28] builds on the successful METIS project and will develop the overall 5G radio access network design and to provide the technical enablers needed for an efficient integration and use of the various 5G technologies and components currently developed. METIS-II will also provide the 5G collaboration framework within 5G-PPP for a common evaluation of 5G radio access network concepts and prepare concerted action towards regulatory and standardisation bodies. On the other hand, the key objective of 5G NORMA is to develop a conceptually novel, adaptive and future-proof 5G mobile network architecture. The architecture is enabling unprecedented levels of network customisability, ensuring stringent performance, security, cost and energy requirements to be met; as well as providing an API-driven architectural openness, fuelling economic growth through over-the-top innovation. With 5G NORMA, leading players in the mobile ecosystem aim to underpin Europe's leadership position in 5G.^[29]

Additionally, in July 2015, the European research project mmMAGIC was launched. The mmMAGIC project will develop new concepts for mobile radio access technology (RAT) for mmwave band deployment. This is a key component in the 5G multi-RAT ecosystem and will be used as a foundation for global standardization. The project will enable ultrafast mobile broadband services for mobile users, supporting UHD/3D streaming, immersive applications and ultra-responsive cloud services. A new radio interface, including novel network management functions and architecture components will be designed taking as guidance 5G PPP's KPI and exploiting the use of novel adaptive and cooperative beam-forming and tracking techniques to address the specific challenges of mm-wave mobile propagation. The ambition of the project is to pave the way for a European head start in 5G standards and to strengthen European competitiveness. The consortium brings together major infrastructure vendors, major European operators, leading research institutes and universities, measurement equipment vendors and one SME.

mmMAGIC is led and coordinated by Samsung. Ericsson acts as technical manager while Intel, Fraunhofer HHI, Nokia, Huawei and Samsung will each lead one of the five technical work packages of the project.^[30]

In July 2015, IMDEA Networks launched the Xhaul project, as part of the European H2020 5G Public-Private Partnership (5G PPP). Xhaul will develop an adaptive, sharable, cost-efficient 5G transport network solution integrating the fronthaul and backhaul segments of the network. This transport network will flexibly interconnect distributed 5G radio access and core network functions, hosted on in-network cloud nodes. Xhaul will greatly simplify network operations despite growing technological diversity. It will hence enable system-wide optimisation of Quality of Service (QoS) and energy usage as well as network-aware application development. The Xhaul consortium comprises 21 partners including leading telecom industry vendors, operators, IT companies, small and medium-sized enterprises and academic institutions.^[31]

In July 2015, the European 5G research project Flex5Gware was launched. The objective of Flex5Gware is to deliver highly reconfigurable hardware (HW) platforms together with HW-agnostic software (SW) platforms targeting both network elements and devices and taking into account increased capacity, reduced energy footprint, as well as scalability and modularity, to enable a smooth transition from 4G mobile wireless systems to 5G. This will enable that 5G HW/SW platforms can meet the requirements imposed by the anticipated exponential growth in mobile data traffic (1000 fold increase) together with the large diversity of applications (from low bit-rate/power for M2M to interactive and high resolution applications).^[32]

In July 2015, the SUPERFLUIDITY project, part of the European H2020 Public-Private Partnership (5G PPP) and led by CNIT, an Italian inter-university consortium, was started. The SUPERFLUIDITY consortium comprises telcos and IT players for a total of 18 partners. In physics, *superfluidity* is a state in which matter behaves like a fluid with zero viscosity. The SUPERFLUIDITY project aims at achieving superfluidity in the Internet: the ability to instantiate services on-the-fly, run them anywhere in the network (core, aggregation, edge) and shift them transparently to different locations. The project tackles crucial shortcomings in today's networks: long provisioning times, with wasteful over-provisioning used to meet variable demand; reliance on rigid and cost-ineffective hardware devices; daunting complexity emerging from three forms of heterogeneity: heterogeneous traffic and sources; heterogeneous services and needs; and heterogeneous access technologies, with multi-vendor network components. SUPERFLUIDITY will provide a converged cloud-based 5G concept that will enable innovative use cases in the mobile edge, empower new business models, and reduce investment and operational costs.^[33]

In September 2016, China's Ministry of Industry and Information Technology announced that the government-led 5G Phase-1 tests of key wireless technologies for future 5G networks were completed with satisfactory results.^[34] The tests were carried out in 100 cities and involved seven companies – Datang Telecom, Ericsson, Huawei, Intel, Nokia Shanghai Bell, Samsung and ZTE. The next step in 5G technology development involving trials is under way, with planned commercial deployment in 2022 or 2023.

4 Research

The first widely cited proposal for the use of millimeter wave spectrum for cellular/mobile communications appeared in the IEEE Communications Magazine in June 2011.^[35] The first reports of radio channel measurements that validated the ability to use millimeter wave frequencies for urban mobile communication were published in April and May 2013 in the *IEEE Access Journal* and *IEEE Transactions on Antennas and Propagation*, respectively.^{[36][37]}

The *IEEE Journal on Selected Areas in Communications* published a special issue on 5G in June 2014, including, a comprehensive survey of 5G enabling technologies and solutions.^[38] *IEEE Spectrum* has a story about millimeter-wave wireless communications as a viable means to support 5G in its September 2014 issue.^[39]

- Radio propagation measurements and channel models for millimeter-wave wireless communication in both outdoor and indoor scenarios in the 28, 38, 60 and 72–73 GHz bands were published in 2014.^{[40][41]}
- **Massive MIMO:** This is a transmission point equipped with a very large number of antennas that simultaneously serve multiple users. With massive MIMO multiple messages for several terminals can be transmitted on the same time-frequency resource, maximizing beamforming gain while minimizing interference.^{[42][43][44][45][46][47]}
- **Three Dimensional Beamforming (3DBF):** utilizing hundreds of antennas at base station which performs in millimeter wave spectrum results in a highly directional antenna beam that can be steered to a desired direction which optimizes some performance metric of the network.^[48]
- **Proactive content caching at the edge:** While network densification (i.e., adding more cells) is one way to achieve higher capacity and coverage, it becomes evident that the cost of this operation might not be sustainable as the dense deployment of base stations also requires high-speed expensive backhauls. In this regard, assuming that the backhaul is

capacity-limited, caching users' contents at the edge of the network (namely at the base stations and user terminals) holds as a solution to offload the backhaul and reduce the access delays to the contents.^{[49][50]}

In any case, caching contents at the edge aim to solve the problem of reducing the end-to-end delay, which is one of the requirements of 5G. Caching can be particularly enabled by leveraging user context information from sources such as mobility and social metrics.^{[51][52][53]} The upcoming special issue of IEEE Communications Magazine aims to argue massive content delivery techniques in cache-enabled 5G wireless networks.^{[54][55]}

- Advanced interference and mobility management, achieved with the cooperation of different transmission points with overlapped coverage, and encompassing the option of a flexible use of resources for uplink and downlink transmission in each cell, the option of direct **device-to-device**^[55] transmission and advanced interference cancellation techniques.^{[56][57][58][59]}
- Efficient support of machine-type devices to enable the **Internet of Things** with potentially higher numbers of connected devices, as well as novel applications, such as mission-critical control or traffic safety, requiring reduced latency and enhanced reliability.^[4]
- Use of millimeter-wave frequencies (e.g. up to 90 GHz) for wireless backhaul and/or access (IEEE rather than ITU generations).^[4]
- **Pervasive networks** providing **Internet of things**, **wireless sensor networks** and **ubiquitous computing**: The user can be connected simultaneously to several wireless access technologies and can move seamlessly between them (See **Media independent handover** or **vertical handover**, IEEE 802.21, also expected to be provided by future 4G releases. See also **multihoming**.). These access technologies can be 2.5G, 3G, 4G, or 5G mobile networks, Wi-Fi, **WPAN**, or any other future access technology. In 5G, the concept may be further developed into multiple concurrent data-transfer paths.^[60]
- **Multiple-hop networks**: A major issue in systems beyond 4G is to make the high bit rates available in a larger portion of the cell, especially to users in an exposed position in between several base stations. In current research, this issue is addressed by **cellular repeaters** and **macro-diversity** techniques, also known as **group cooperative relay**, where users also could be potential cooperative nodes, thanks to the use of direct **device-to-device** (D2D) communication.^[55]
- **Wireless network virtualization**: Virtualization will be extended to 5G mobile wireless networks. With wireless network virtualization, network infrastructure can be decoupled from the services that it provides, where differentiated services can coexist on the same infrastructure, maximizing its utilization. Consequently, multiple wireless virtual networks operated by different service providers (SPs) can dynamically share the physical substrate wireless networks operated by mobile network operators (MNOs). Since wireless network virtualization enables the sharing of infrastructure and radio spectrum resources, the capital expenses (CapEx) and operation expenses (OpEx) of wireless (radio) access networks (RANs), as well as core networks (CNs), can be reduced significantly. Moreover, mobile virtual network operators (MVNOs) who may provide some specific telecom services (e.g., VoIP, video call, over-the-top services) can help MNOs attract more users, while MNOs can produce more revenue by leasing the isolated virtualized networks to them and evaluating some new services.^[61]
- **Cognitive radio** technology, also known as smart radio. This allows different radio technologies to share the same spectrum efficiently by adaptively finding unused spectrum and adapting the transmission scheme to the requirements of the technologies currently sharing the spectrum. This dynamic radio resource management is achieved in a distributed fashion and relies on **software-defined radio**.^{[62][63]} See also the IEEE 802.22 standard for Wireless Regional Area Networks.
- **Dynamic Adhoc Wireless Networks (DAWN)**,^[8] essentially identical to **Mobile ad hoc network (MANET)**, **Wireless mesh network (WMN)** or **wireless grids**, combined with **smart antennas**, **cooperative diversity** and **flexible modulation**.
- **Vandermonde-subspace frequency division multiplexing (VFDN)**: a modulation scheme to allow the co-existence of macro cells and **cognitive radio** small cells in a two-tiered LTE/4G network.^[64]
- **IPv6**, where a visiting **mobile IP care-of address** is assigned according to location and connected network.^[60]
- **Wearable devices with AI capabilities**.^[8] such as **smartwatches** and **optical head-mounted displays** for **augmented reality**
- **One unified global standard**.^[8]
- *Real wireless world* with no more limitation with access and zone issues.^[60]
- *User centric* (or *cell phone developer initiated*) network concept instead of operator-initiated (as in 1G) or system developer initiated (as in 2G, 3G and 4G) standards^[65]

- **Li-Fi** (a portmanteau of *light* and *Wi-Fi*) is a massive MIMO visible light communication network to advance 5G. Li-Fi uses light-emitting diodes to transmit data, rather than radio waves like **Wi-Fi**.^[66]
- *Worldwide wireless web* (WWWW), i.e. comprehensive wireless-based web applications that include full multimedia capability beyond 4G speeds.^[8]

5 History

- In April 2008, **NASA** partnered with Geoff Brown and **Machine-to-Machine Intelligence (M2Mi) Corp** to develop 5G communication technology.^[10]
- In 2008, the South Korean IbjngT R&D program of “5G mobile communication systems based on beam-division multiple access and relays with group cooperation” was formed.^[19]
- In August 2012, New York University founded **NYU WIRELESS**, a multi-disciplinary academic research center that has conducted pioneering work in 5G wireless communications.^{[67][68][69]}
- On October 8, 2012, the UK’s **University of Surrey** secured £35M for a new 5G research center, jointly funded by the British government’s UK Research Partnership Investment Fund (UKRPIF) and a consortium of key international mobile operators and infrastructure providers, including **Huawei**, **Samsung**, **Telefonica Europe**, **Fujitsu Laboratories Europe**, **Rohde & Schwarz**, and **Aircom International**. It will offer testing facilities to mobile operators keen to develop a mobile standard that uses less energy and less radio spectrum while delivering speeds faster than current 4G with aspirations for the new technology to be ready within a decade.^{[70][71][72][73]}
- On November 1, 2012, the EU project “Mobile and wireless communications Enablers for the Twenty-twenty Information Society” (METIS) starts its activity towards the definition of 5G. METIS achieved an early global consensus on these systems. In this sense, METIS played an important role of building consensus among other external major stakeholders prior to global standardization activities. This was done by initiating and addressing work in relevant global fora (e.g. ITU-R), as well as in national and regional regulatory bodies.^[74]
- Also in November 2012, the iJOIN EU project was launched, focusing on “small cell” technology, which is of key importance for taking advantage of limited and strategic resources, such as the radio wave spectrum. According to **Günther Oettinger**, the European Commissioner for Digital Economy and Society (2014–19), “an innovative utilization of spectrum” is one of the key factors at the heart of 5G success. Oettinger further described it as “the essential resource for the wireless connectivity of which 5G will be the main driver”.^[75] iJOIN was selected by the **European Commission** as one of the pioneering 5G research projects to showcase early results on this technology at the **Mobile World Congress 2015** (Barcelona, Spain).
- In February 2013, ITU-R Working Party 5D (WP 5D) started two study items: (1) Study on IMT Vision for 2020 and beyond, and; (2) Study on future technology trends for terrestrial IMT systems. Both aiming at having a better understanding of future technical aspects of mobile communications towards the definition of the next generation mobile.
- On May 12, 2013, **Samsung Electronics** stated that they have developed a “5G” system. The core technology has a maximum speed of tens of Gbit/s (gigabits per second). In testing, the transfer speeds for the “5G” network sent data at 1.056 Gbit/s to a distance of up to 2 kilometres with the use of an 8*8 MIMO.^{[76][77]}
- In July 2013, **India** and **Israel** have agreed to work jointly on development of fifth generation (5G) telecom technologies.^[78]
- On October 1, 2013, **NTT (Nippon Telegraph and Telephone)**, the same company to launch world’s first 5G network in Japan, wins Minister of Internal Affairs and Communications Award at **CEATEC** for 5G R&D efforts.^[79]
- On November 6, 2013, **Huawei** announced plans to invest a minimum of \$600 million into R&D for next generation 5G networks capable of speeds 100 times faster than modern LTE networks.^[80]
- On May 8, 2014, **NTT DoCoMo** start testing 5G mobile networks with **Alcatel Lucent**, **Ericsson**, **Fujitsu**, **NEC**, **Nokia** and **Samsung**.^[81]
- In June 2014, the EU research project **CROWD** was selected by the European Commission to join the group of “early 5G precursor projects”. These projects contribute to the early showcasing of potential technologies for the future ubiquitous, ultra-high bandwidth “5G” infrastructure. **CROWD** was included in the list of demonstrations at the European Conference on Networks and Communications (EuCNC) organized by the EC in June 2014 (Italy).
- In October 2014, the research project **TIGRE5-CM** (Integrated technologies for management and operation of 5G networks) is launched with the aim to design an architecture for future generation mobile networks, based on the **SDN** (Software Defined Networking) paradigm. **IMDEA Networks Institute** is the project coordinator.

- In November 2014, it was announced that **Megafon** and **Huawei** will be developing a 5G network in **Russia**. A trial network will be available by the end of 2017, just in time for the **2018 World Cup**.^{[82][83]}
- On November 19, 2014, **Huawei** and **SingTel** announced the signing of a **MoU** to launch a joint 5G innovation program.^[84]
- On June 22, 2015, Greek government announced to Euro-group council talks that potential licensing 5G and 4G technology would offer 350 million euros earnings, as a result they were criticized for misleading European leaders in producing potential earnings from a technology that is supposed to roll-out after 2020.^[85]
- On July 1, 2015, METIS-II project was launched. This project aims at designing the 5G radio access network, building the basis for the multi-service allocation on an holistic cross-layer and cross-air interface framework.^[28]
- On September 8, 2015, Verizon announced a roadmap to begin testing 5G in field trials in the United States in 2016.^[86]
- On October 1, 2015, the French Operator **Orange** announced to be about to deploy 5G technologies to begin the first trial in January 2016 in **Belfort**, a City of Eastern **France**.^[87]
- On January 22, 2016, the Swedish mobile network equipment maker **Ericsson** said it had partnered with **TeliaSonera** to develop 5G services based on TeliaSonera's network and Ericsson's 5G technology. The partnership aims to provide 5G services to TeliaSonera customers in **Stockholm**, **Sweden** and **Tallinn**, **Estonia** in 2018. Sweden has long been a pioneer ICT nation and notably Ericsson and TeliaSonera launched the world's first commercial 4G network in Sweden in 2009.^[88]
- On February 22, 2016, **NTT DoCoMo** and **Ericsson** succeed in World's first trial to achieve a cumulative 20Gbit/s with two simultaneously connected mobile devices in 5G outdoor trial.^[89]
- Also on February 22, 2016, **Samsung** and **Verizon** joined to begin trial for 5G.^[90]
- On January 29, 2016, Google revealed that they are developing a 5G network called **SkyBender**. They planned to distribute this connection through sun-powered drones.^[91]
- In mid-March 2016, the UK government confirmed plans to make the UK a world leader in 5G. Plans for 5G are little more than a footnote in the country's 2016 budget, but it seems the UK government wants it to be a big focus going forward.^[92]

- On June 2, 2016, the first comprehensive book on 5G was launched. The book "5G Mobile and Wireless Communications Technology" by Cambridge University Press is edited by Afif Osseiran (Ericsson), Jose F. Monserrat (UPV) and Patrick Marsch (Nokia Bell Labs) and covers everything from the most likely use cases, spectrum aspects, and a wide range of technology options to potential 5G system architectures.^[4]
- On October 17, 2016, Qualcomm announced the first 5G modem, the Snapdragon X50, as the first commercial 5G mobile chipset.^{[93][94]}

6 See also

- List of mobile phone generations
- Femtocell
- IEEE 802.11u authentication
- IEEE P1905 hybrid networking
- Ka band
- OpenFlow/OpenRadio for sharing backhaul.
- Picocell
- Ultra-wideband (UWB)
- 3GPP (Mobile standards for 5G will start in 3GPP Release 15 of the standard)

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8 Further reading

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- Osseiran, Afif; Monserrat, Jose F., Marsch, Patrick (2 June 2016). *5G Mobile and Wireless Communications Technology* (1 ed.). Cambridge University Press. p 410. ISBN 9781107130098. Written by leading experts in 5G research, this book is a comprehensive overview of the current state of 5G.
- Madhusanka Liyanage, Mika Ylianttila, Andrei Gurtov (August 2016), Software Defined Mobile Networks (SDMN) : Beyond LTE Network Architecture, Wiley Publishers, p 438. ISBN 978-1-118-90028-4. This book describes the concept of a Software Defined Mobile Network (SDMN), which provide the baseline for 5G networks. The reader will be introduced to cutting-edge knowledge in areas such as network virtualization, as well as SDN concepts relevant to next generation mobile networks. [Liyanage, Madhusanka (2015). *Software Defined Mobile Networks (SDMN): Beyond LTE Network Architecture*. UK: Wiley Publishers. pp. 1–438. ISBN 978-1-118-90028-4.]

9 External links

- 5G Technology Technical Paper
- Information About Generation 5G
- Applications of 5G
- 2016 -- the year testing of 5G wireless really took off

10 Text and image sources, contributors, and licenses

10.1 Text

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10.2 Images

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From: Friends of Prune Hill [mailto:friendsofprunehill@gmail.com]
Sent: Monday, October 03, 2016 3:48 PM
To: City Council Members (GRP) <CityCouncilGRP@cityofcamas.us>; Community Development Email <communitydevelopment@cityofcamas.us>
Subject: 16-015 (Cell Tower Moratorium) Public Comment

Hello,

As I will be unable to attend the meeting this evening, I am submitting comments on behalf of the Friends of Prune Hill in writing.

The attached document was previously submitted to the City of Camas, and is being submitted again under 16-015, for review by the council.

We request a working group, comprised of city staff and public volunteers, be created to conduct further research regarding the best next steps to take to update the current Camas municipal code(s) associated with cell towers. The working group should be provided with an appropriate amount of time (i.e., 60 days minimum) to complete their work.

The work (by city staff) should include, but not be limited to, contacting other cities and obtaining information on the steps taken (by those cities) to address the issues we are presently faced with.

At a minimum, the updated code(s) should:

1. Prohibit cell towers in residential zones except through a rigid process, such as a variance, as required to comply with federal law;
2. Tighten up application requirements and approval criteria to better address a significant gap in service;
3. Include a requirement that all applications for new cell towers include an alternative configuration analysis;
4. Include a requirement that applicants for new cell towers include must perform an alternative sites analysis to study alternative locations to ensure there are no other sites more suitable (i.e., available sites with preferable commercial or industrial zoning);
5. Adjust height limits to clearly prohibit heights greater than necessary to fill the identified service gap;
6. Address new and emerging cell technology, including, but not limited to Distributed Antenna Systems (DAS), and Micro Cells.

Additionally, the city should obtain an evaluation by an electrical engineering consultant of the City's topography and provider cell phone coverage areas. Areas which have the potential to address any potential gaps in service could be identified. The consultant could identify specific locations for larger scale towers and recommend coverage options for mid-scale development (smaller towers) or attached panels. Having laid the appropriate technical foundation, the City and its citizens would not then need to rely on the experts provided by a development permit

applicant in the process but would have laid its own scientific and professional evaluation basis for regulation.

Again, we appreciate the city council's efforts to date. We look forward to working with the city on this important issue.

Regards,

Glenn Watson
On Behalf of the Friends of Prune Hill

AGENDA ITEM SUMMARY
February 22, 2016

To: Eugene Planning Commission
From: Anne C. Davies, City Attorney's Office
Subject: Cell Tower Code Changes

ACTION REQUESTED

This work session is an opportunity to provide the Planning Commission with an introduction to a package of land use code changes to the City's requirements for siting cell towers.

BRIEFING STATEMENT

Late last year, City Council directed staff to initiate code changes to the city's telecommunications ordinance. The proposed changes are intended to provide further protections to residential areas from the adverse impacts of cell towers, while complying with federal regulations designed to protect telecommunications companies from certain local government regulations. In particular, local government regulations may not prohibit or have the effect of profiting the provision of wireless services. That is, the telecommunications companies must be allowed to construct facilities where such facilities are needed to fill a "significant gap in service."

The City Council identified four specific areas for revision, based on the City Attorney's review of recent changes to the City of Glendale, California's cell tower regulations. Those four areas are outlined in the City Attorney's memo to the City Council, dated October 21, 2015, provided as part of Attachment A. In summary, the Council directed staff to revise the cell tower provisions to:

1. Prohibit cell towers in residential zones except through a process, such as a variance, as required to comply with federal law;
2. Tighten up application requirements and approval criteria to better address a significant gap in service;
3. Include a requirement that all applications for new cell towers include an alternative configuration analysis;
4. Adjust height limits to clearly prohibit heights greater than necessary to fill the identified service gap.

FOR MORE INFORMATION

Anne C. Davies: 541-682-8447, anne.c.davies@ci.eugene.or.us

ATTACHMENT

A. City Council Agenda Item Summary (AIS) for November 9, 2015

EUGENE CITY COUNCIL

AGENDA ITEM SUMMARY



Work Session: Cell Towers

Meeting Date: November 9, 2015
 Department: Planning and Development
www.eugene-or.gov

Agenda Item Number: A
 Staff Contact: Steve Nystrom
 Contact Telephone Number: 541-682-8385

ISSUE STATEMENT

This work session is an opportunity for the City Council to discuss a memo from the City Attorney's office concerning cell tower regulations.

BACKGROUND

This item is a follow-up to the work session the council previously held to discuss cell towers. That work session focused on the City's regulations, federal telecommunications standards and regulations of other select cities. At the conclusion of that work session, the council asked whether there was anything more the City could do, particularly within residential areas. The City Attorney offered to discuss this matter with the City's telecommunications consultant in Washington D.C. Based on his feedback, the City Attorney's office provided additional research and prepared a memo discussing those findings. Planning staff and legal counsel will be available at the work session to discuss this memo further.

While Eugene's ordinance has generally achieved the primary goal of minimizing the construction of new towers on residential lands (none built to date), there has been more recent interest from a couple of cell providers to locate a few towers in residential areas. As staff understands it, the cell providers have established the majority of their cell tower networks. However, a few pockets of poor service remain. It is this circumstance that has prompted the council to discuss whether there is more the City can do to regulate new towers in residential areas (primarily the R-1, Low-Density Residential zone).

As was discussed at the previous work session, the Federal Telecommunications Act stipulates the extent to which a local government may regulate telecommunication facilities. One of the key provisions of this federal act states that local government regulations may not prohibit, or "have the effect of prohibiting," the provision of personal wireless services. The City was successful in prohibiting cell towers in all residential zones except R-1 when it first adopted its ordinance. Given that the R-1 zoning district comprises the majority of land in the City, it was not legally possible to prohibit new towers in this zone as well.

Given these circumstances, the City Attorney's memo attempts to identify other possible actions

the City could consider. These suggestions generally include measures requiring cell providers to provide further analysis and justification that a proposed tower is necessary in the R-1 zone, and that all reasonable design alternatives have been considered. The memo also discusses other efforts underway by staff to encourage the use of emerging technologies which could help reduce visual impacts to neighborhoods.

Staff would note that while there currently is no capacity to undertake a code amendment process at this time, the City has begun a process of identifying potential amendments such as this which can be prioritized by the council in the future, as staff resources become available.

COUNCIL OPTIONS

This matter is before the City Council as a discussion item. No action is required.

CITY MANAGER'S RECOMMENDATION

No recommendation is necessary as this is a discussion item.

SUGGESTED MOTION

None.

ATTACHMENTS

A. Memo from City Attorney

FOR MORE INFORMATION

Staff Contact: Steve Nystrom
Telephone: 541-682-8385
Staff Email: steven.a.nystrom@ci.eugene.or.us



Eugene City Attorney's Office

Memorandum

Date: October 21, 2015

To: Mayor and City Council

From: Anne C. Davies

Subject: Cell Tower Update

In December of last year, staff provided council with a brief summary of the City's regulations related to siting cell towers. Staff outlined the limitations that federal law places on the City and what measures are embodied in the current Eugene Code that serve to protect residential neighborhoods from the impacts of cell towers. Councilor Taylor requested that staff outline measures that are not currently in the code that could be added to provide further protections. Interested citizens pointed to the City of Glendale in California for possible guidance.

As suggested in that December 8th work session, we contacted the City's consultant in Washington D.C. to inquire whether he was aware of any other local jurisdictions, nationwide, that had regulations that Eugene could adopt that would provide greater protections to residential neighborhoods. The consultant was not aware of any specific local governments that stood out, but commented that generally New York and California were viewed as the states with local governments that had the most protective regulations. We have also reviewed relevant code provisions from Palo Alto and Davis, California.

Summary of Eugene's existing regulations

Before addressing the possible changes that might be made to Eugene's code, it is worth summarizing briefly the measures that Eugene already has in place to limit impacts from cell towers in residential areas. The Eugene Code currently creates a preference for collocation. Collocation on existing buildings, structures and utilities is favored over citing new cell towers in the code because collocations generally require less restrictive processes and approval criteria. In general, new towers are not allowed if cell service can be accommodated by collocation on existing towers. Where a new tower is necessary, the applicant must demonstrate that the new tower has the ability to accommodate future collocated antenna in order to minimize the need for additional towers.

The Eugene Code also has a strong preference for siting new towers in commercial and industrial zones over residential zones. New towers are not permitted at all in R-2, R-3 and R-4 zones. New towers are permitted outright in E-1, E-2, I-2 and I-3 zones, and are allowed in the R-1 zone with a conditional use permit. New towers are currently not allowed within 2,000 feet

Mayor and City Council

October 21, 2015

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of an existing tower. Further restrictions, including height limits, required buffering and camouflage, are intended to limit the adverse visual effects of cell towers.

As explained by staff, federal regulations do create some road blocks to the City's attempts to impose significant restrictions on the siting of new cell towers. Most importantly, under federal law, local regulations cannot have the effect of prohibiting the provision of wireless service. The City's current code addresses this federal prohibition – both the site review and conditional use permit criteria require an applicant that is proposing a new tower to demonstrate that collocation is impractical and fails to meet the needs of the service area before a new tower can be added.

Summary of Glendale's provisions

The City of Glendale's code was mentioned as a potential good example to consider. In reviewing Glendale's recent code revisions, a few points stand out. Glendale sought to strengthen the application requirements and limit new towers as much as possible to those towers and the characteristics of towers that were required to fill a service gap. The following are some elements of Glendale's code that are not present in Eugene's code.

- 1) Stronger application requirements: In Glendale, an applicant proposing to site a new tower must identify the geographic service area for the subject installation, including a map showing all of the applicant's existing sites in the local service network associated with coverage gap that the proposed tower is meant to close. The application must describe how the proposal will close that service gap.
- 2) Least intrusive means: In Glendale, a proposed tower cannot be taller than is necessary to serve the gap. In other jurisdictions, an applicant must demonstrate that the proposed tower is necessary to fill a significant gap in coverage or capacity shortfall and is the "least intrusive means of doing so."
- 3) Maintenance and Monitoring Program: Glendale's monitoring program includes the ability to require maintenance of landscaping and other mitigation measures.
- 4) Alternative Designs: In Eugene, an applicant for a new tower must perform an alternative sites analysis to study alternative locations to ensure there are no other sites more suitable; *i.e.*, available sites with preferable zoning. In Glendale, the alternatives analysis does not only include alternative sites, it requires the applicant to demonstrate that it has considered alternative configurations (*i.e.*, system and tower designs) so that the proposed tower is the least intrusive possible.

Possible revisions to strengthen Eugene's wireless regulation

- 1) Towers in residential zones: New towers are allowed in the R-1, Low Density Residential zone under Eugene's code, although they are disfavored, as explained above. Davis, California prohibits new towers in residential zones. Given the amount of City land zoned R-1, if Eugene were to prohibit siting new towers in this zone, it would have to

Mayor and City Council

October 21, 2015

Page 3

provide a variance process to allow new towers where necessary to fill a significant gap in service.

- 2) Application requirements: Although an absolute prohibition in residential areas is not possible, the application requirements and approval criteria could be amended to clearly require a demonstration of a significant service gap and how the proposed tower is needed to fill that gap. However, it should be noted that the few recent proposals submitted for residential areas did demonstrate a significant gap in service. Therefore, it's not clear that such an amendment would affect future proposals in residential areas.
- 3) Alternatives analysis: Eugene could add a clearer requirement that the applicant include an alternative configuration analysis.
- 4) Tower Height: In Eugene's code, the height of a tower is merely limited to the maximum height allowed in the particular zone. Both Davis and Glendale require the tower to be no taller than is necessary to fill the service gap.

Additional Measures

In addition to reviewing the telecommunication regulations of other cities, staff is currently exploring other emerging technologies which may help minimize the need for new towers in the future. "Small Cell" technologies is a newer strategy for accommodating ever increasing data demands. These facilities are much smaller in size and can be collocated on a variety of structures and utilities, with minimal visual impact. While small cell facilities don't completely replace the need for towers, they do help augment telecommunication services which can help minimize the need for future towers. Staff believes these new technologies offer a positive alternative to the typical antenna designs.

Conclusion

Federal regulations do limit to some degree the steps local governments can take in prohibiting cell towers. However, technologies continue to improve – many carriers now prefer smaller equipment (small cells) that do not completely replace the need for towers, but that do provide an alternative for filling certain gaps in coverage. It is arguable that Eugene's code is adequate to address those changes in technology, but there may be updates and revisions that could be made to strengthen and make the code more clear.

EXHIBIT 8
MC16-05

From: Friends of Prune Hill [mailto:friendsofprunehill@gmail.com]
Sent: Monday, October 03, 2016 4:02 PM
To: City Council Members (GRP) <CityCouncilGRP@cityofcamas.us>; Community Development Email <communitydevelopment@cityofcamas.us>
Subject: Re: 16-015 (Cell Tower Moratorium) Public Comment

And, as the purpose of tonight's hearing is associated with the continuation of the moratorium, the Friends of Prune Hill strongly request and support the continued moratorium. We recommend the city to move ahead with the proposed work plan as described in ordinance 16-015.

Regards,

Glenn Watson

EXHIBIT 9
MC16-05

From: Phil Bourquin
Sent: Tuesday, October 04, 2016 9:14 AM
To: 'friendsofprunehill@gmail.com'
Subject: RE: 16-015 (Cell Tower Moratorium) Public Comment

Mr. Watson – This email is to confirm receipt of the two emails and that they have been included in the record on the Moratorium.

The next step as identified in the work plan will involve a hearing before the Planning Commission on November 15, 2016, at 7 PM in the City Council Chamber, 616 NE Fourth Avenue. The testimony received at the Planning Commission hearing will help in forming the issues and scope of work -- Your email and attached exhibit from the City of Eugene will be included in the packet to the Planning Commission for consideration on November 15th and are helpful to that end.

Sincerely,

Phil Bourquin
Community Development Director
City of Camas

From: Community Development Email
Sent: Tuesday, October 04, 2016 8:17 AM
To: Phil Bourquin
Subject: FW: 16-015 (Cell Tower Moratorium) Public Comment

2nd email..

From: Friends of Prune Hill [mailto:friendsofprunehill@gmail.com]
Sent: Monday, October 03, 2016 4:02 PM
To: City Council Members (GRP) <CityCouncilGRP@cityofcamas.us>; Community Development Email <communitydevelopment@cityofcamas.us>
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Regards,

Glenn Watson

On Mon, Oct 3, 2016 at 3:48 PM, Friends of Prune Hill <friendsofprunehill@gmail.com> wrote:
Hello,

As I will be unable to attend the meeting this evening, I am submitting comments on behalf of the Friends of Prune Hill in writing.

The attached document was previously submitted to the City of Camas, and is being submitted again under 16-015, for review by the council.

We request a working group, comprised of city staff and public volunteers, be created to conduct further research regarding the best next steps to take to update the current Camas municipal code(s) associated with cell towers. The working group should be provided with an appropriate amount of time (i.e., 60 days minimum) to complete their work.

The work (by city staff) should include, but not be limited to, contacting other cities and obtaining information on the steps taken (by those cities) to address the issues we are presently faced with.

At a minimum, the updated code(s) should:

1. Prohibit cell towers in residential zones except through a rigid process, such as a variance, as required to comply with federal law;
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3. Include a requirement that all applications for new cell towers include an alternative configuration analysis;
4. Include a requirement that applicants for new cell towers include must perform an alternative sites analysis to study alternative locations to ensure there are no other sites more suitable (i.e., available sites with preferable commercial or industrial zoning);
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Additionally, the city should obtain an evaluation by an electrical engineering consultant of the City's topography and provider cell phone coverage areas. Areas which have the potential to address any potential gaps in service could be identified. The consultant could identify specific locations for larger scale towers and recommend coverage options for mid-scale development (smaller towers) or attached panels. Having laid the appropriate technical foundation, the City and its citizens would not then need to rely on the experts provided by a development permit applicant in the process but would have laid its own scientific and professional evaluation basis for regulation.

Again, we appreciate the city council's efforts to date. We look forward to working with the city on this important issue.

Regards,

Glenn Watson

On Behalf of the Friends of Prune Hill

November 15, 2016

Scott Higgins
Mayor
City of Camas
616 N.E. 4th Avenue
Camas, WA 98607

Re: Ordinance No. 16-015 and
Amendments to City Municipal Code

Dear Mr. Mayor:

This letter is written pursuant to the City Council's action on September 6, 2016 to adopt Ordinance No. 16-015 to declare an emergency moratorium on further land use authorization, thereby prohibiting Wireless Communication Facilities as defined in RCW36.70A.390 and RCW 35.63.200, and to the further action on October 3, 2016 to confirm the extension of the moratorium. We address ourselves to the call in the Ordinance for consideration of amendments to the Camas Municipal Code Section 18.35.

We request that input from Camas residents, such as that which is contained herein, be duly considered by the staff and Planning Commission during the public hearing scheduled for November 15, 2016 and its workshop scheduled for February 22, 2017 and during the City Council workshop scheduled for March 6, 2017. We also request that all further input delivered to the City Council and staff after March 6, 2017 be duly considered prior to the staff's completion of its report and its recommendations for amendments on May 5, 2017.

INTRODUCTION

The recent staff approval of CUP 15-01, authorizing a 175 foot tall telecommunications tower on Prune Hill created a perfect storm for the forthcoming discussions about the revision of the Camas Municipal Code ("Code").

There must at the outset be an awareness that the myth that has seemed to have permeated the minds of some City employees, namely that federal law preempts any local regulation of the telecommunication facilities, needs to be put to rest. It is difficult to understand why else there was (a) no objective scientific evidence required by the staff that a height of 175 feet was minimally required by the applicants' business, especially since the base of the proposed tower would begin at the highest point in the City and (b) no attempt was made by the staff to require employment of concealment technology, which Section 18-35 of the Code clearly authorizes. It is difficult to understand the staff's mind-set, but we note the staffer in this case is not a resident of

Camas. The foregoing is only part of the rationale for a substantial revision of the Code. Another goal should be to emphasize objectivity and the elimination of subjectivity in the decision-making process. A further goal is to document accountability at all levels of the City's government.

It is regrettable that the City Council heretofore saw fit to repeal former Section 18-34 of the Code. Section 18-34 had originally been adopted in 1992 after substantial community input, resulting in a protective measure that would have gone far to prevent the tragedy we Prune Hill residents now face. We seriously question the motivation for the repeal and the way it was accomplished. The result was the adoption of a woefully deficient Section 18-35. The deficiency has been compounded by the absence of periodic reviews of Section 18-35 by the City Council for the protection of the residents. The thinking embodied in former Section 18-34, therefore, must be fleshed out in the forthcoming review process. The logical times for review of the history of the legislation and germane ideas for the revisions would appear to be the Planning Commission hearing scheduled for November 15, 2016 and the subsequent workshops scheduled for the Planning Commission on February 22, 2017 and the City Council on March 6, 2017.

DISCUSSION

It is urgent that a comprehensive revision of Section 18-35 of the Code be accomplished, incorporating minimum objective standards for evaluating applications for telecommunication facilities and the criteria for approval. The CUP 15-01 approval revealed how painfully such decisions can impact the health, safety, welfare, views and property values of the nearby residents. If in fact the CUP 15-01 approved tower is to be constructed, the effect will be to render Prune Hill Estates and the surrounding developments into an industrial eyesore.

RECOMMENDATIONS

We offer the following concepts for developing a regime of rules for Section 18-35 as minimum standards:

1. We believe that the impacts of constructing telecommunication towers in residential areas can be so traumatic for the residents, that both Planning Commission and City Council reviews need to be required in the approval process. The rationale is two-fold: (a) The measure would alleviate the pressure on the staffer, who is at the least level of authority, and (b) it would establish accountability of the City Council to the community. In the case of the CUP 15-01 approval, despite the availability of remedial measures in Section 18-35, such as height restriction, concealment technology availability and mast restriction, the applications were approved as made. Moreover, despite our written pleas prior to the CUP-15-01 approval for the City Council to elevate consideration of the application to its level for a full airing of all the issues, we were

ignored and left with the damaging outcome. The accountability of the City Council should be built right into the ordinance. We the homeowners should not have to use our personal resources to seek relief through judicial proceedings, as we now have, to protect our interests when the protection we seek can be afforded by local law.

2. Applicants should be required to present documentary objective scientific evidence justifying the construction of a telecommunication facility in a given residential area. Of particular moment would be the justification for the applied-for tower height. Justification should also be required for the number and design of the masts and antennae to be affixed to the tower.

3. Justification should be required for the construction of towers closer to neighboring dwellings than 600 feet.

4. Objective documentary evidence should be required for justifying construction within wetlands and wildlife protection areas and within historically significant areas.

5. Objective evidence should be required as to how the health, safety, welfare, views and property values will be protected. In the case of the CUP 15-1 approval, it was obvious that the areas on the east side of N.W. Astor Street, south of N.W. 16th Avenue were available and far more suitable from the standpoint of the affected residents. Everything about CUP 15-01 made it patently obvious that the applicants sought approval on the cheap. The municipalities as well as developers and other business owners have long been aware that business must pay its way in light of the long term rewards that are achieved by the enterprises.

The desire of the applicants in CUP 15-01 to save pennies by refusing to limit the tower to a reasonable height, to employ concealment technology or to seek a site less invasive to the residents should not have fallen as a burden upon the affected nearby residents. This was especially egregious inasmuch as the facility will not even serve Camas, but only other cities. It is not the residents of those other cities who will have to live with the approved monstrosity; we will.

6. Protective measures, such as the employment of specific plans or overlays in the residential zones can be used, which would document where in the zones telecommunication facilities are justified and where not. That approach is particularly needed on Prune Hill, where the CUP 15-01 approval should not be permitted to act as a precedent for the proliferation of towers anywhere else on the hill applicants choose without proper regulation.

7. Consideration should be given to the incorporation into the local historical register of areas of the City to be protected by including such areas within the jurisdiction of the Clark County Historic Preservation Commission.

We respectfully offer the foregoing thoughts for due consideration as the final language for the revision of Section 18.35 is conceived. We will be pleased to make ourselves available for any information, clarification or other assistance the staff or the Planning Manager might request. We respectfully request that copies of this letter be distributed to each of the persons enumerated below for copy recipients. We thank you in advance for this courtesy.



Robert I. Behar



Josephine Behar

Residence: 2120 N.W. Douglas Loop, Camas, WA

Mailing: P.O. Box 1010, Camas, WA 98607

(360) 834-2385

cc:Members of the City Council
Members of the Planning Commission
Peter Capell, City Administrator
Robert Maul, Planning Director
City Attorney

AGENDA ITEM SUMMARY
February 22, 2016

To: Eugene Planning Commission
From: Anne C. Davies, City Attorney's Office
Subject: Cell Tower Code Changes

ACTION REQUESTED

This work session is an opportunity to provide the Planning Commission with an introduction to a package of land use code changes to the City's requirements for siting cell towers.

BRIEFING STATEMENT

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The City Council identified four specific areas for revision, based on the City Attorney's review of recent changes to the City of Glendale, California's cell tower regulations. Those four areas are outlined in the City Attorney's memo to the City Council, dated October 21, 2015, provided as part of Attachment A. In summary, the Council directed staff to revise the cell tower provisions to:

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FOR MORE INFORMATION

Anne C. Davies: 541-682-8447, anne.c.davies@ci.eugene.or.us

ATTACHMENT

A. City Council Agenda Item Summary (AIS) for November 9, 2015

EUGENE CITY COUNCIL

AGENDA ITEM SUMMARY



Work Session: Cell Towers

Meeting Date: November 9, 2015
Department: Planning and Development
www.eugene-or.gov

Agenda Item Number: A
Staff Contact: Steve Nystrom
Contact Telephone Number: 541-682-8385

ISSUE STATEMENT

This work session is an opportunity for the City Council to discuss a memo from the City Attorney's office concerning cell tower regulations.

BACKGROUND

This item is a follow-up to the work session the council previously held to discuss cell towers. That work session focused on the City's regulations, federal telecommunications standards and regulations of other select cities. At the conclusion of that work session, the council asked whether there was anything more the City could do, particularly within residential areas. The City Attorney offered to discuss this matter with the City's telecommunications consultant in Washington D.C. Based on his feedback, the City Attorney's office provided additional research and prepared a memo discussing those findings. Planning staff and legal counsel will be available at the work session to discuss this memo further.

While Eugene's ordinance has generally achieved the primary goal of minimizing the construction of new towers on residential lands (none built to date), there has been more recent interest from a couple of cell providers to locate a few towers in residential areas. As staff understands it, the cell providers have established the majority of their cell tower networks. However, a few pockets of poor service remain. It is this circumstance that has prompted the council to discuss whether there is more the City can do to regulate new towers in residential areas (primarily the R-1, Low-Density Residential zone).

As was discussed at the previous work session, the Federal Telecommunications Act stipulates the extent to which a local government may regulate telecommunication facilities. One of the key provisions of this federal act states that local government regulations may not prohibit, or "have the effect of prohibiting," the provision of personal wireless services. The City was successful in prohibiting cell towers in all residential zones except R-1 when it first adopted its ordinance. Given that the R-1 zoning district comprises the majority of land in the City, it was not legally possible to prohibit new towers in this zone as well.

Given these circumstances, the City Attorney's memo attempts to identify other possible actions

the City could consider. These suggestions generally include measures requiring cell providers to provide further analysis and justification that a proposed tower is necessary in the R-1 zone, and that all reasonable design alternatives have been considered. The memo also discusses other efforts underway by staff to encourage the use of emerging technologies which could help reduce visual impacts to neighborhoods.

Staff would note that while there currently is no capacity to undertake a code amendment process at this time, the City has begun a process of identifying potential amendments such as this which can be prioritized by the council in the future, as staff resources become available.

COUNCIL OPTIONS

This matter is before the City Council as a discussion item. No action is required.

CITY MANAGER'S RECOMMENDATION

No recommendation is necessary as this is a discussion item.

SUGGESTED MOTION

None.

ATTACHMENTS

A. Memo from City Attorney

FOR MORE INFORMATION

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Memorandum

Date: October 21, 2015

To: Mayor and City Council

From: Anne C. Davies

Subject: Cell Tower Update

In December of last year, staff provided council with a brief summary of the City's regulations related to siting cell towers. Staff outlined the limitations that federal law places on the City and what measures are embodied in the current Eugene Code that serve to protect residential neighborhoods from the impacts of cell towers. Councilor Taylor requested that staff outline measures that are not currently in the code that could be added to provide further protections. Interested citizens pointed to the City of Glendale in California for possible guidance.

As suggested in that December 8th work session, we contacted the City's consultant in Washington D.C. to inquire whether he was aware of any other local jurisdictions, nationwide, that had regulations that Eugene could adopt that would provide greater protections to residential neighborhoods. The consultant was not aware of any specific local governments that stood out, but commented that generally New York and California were viewed as the states with local governments that had the most protective regulations. We have also reviewed relevant code provisions from Palo Alto and Davis, California.

Summary of Eugene's existing regulations

Before addressing the possible changes that might be made to Eugene's code, it is worth summarizing briefly the measures that Eugene already has in place to limit impacts from cell towers in residential areas. The Eugene Code currently creates a preference for collocation. Collocation on existing buildings, structures and utilities is favored over citing new cell towers in the code because collocations generally require less restrictive processes and approval criteria. In general, new towers are not allowed if cell service can be accommodated by collocation on existing towers. Where a new tower is necessary, the applicant must demonstrate that the new tower has the ability to accommodate future collocated antenna in order to minimize the need for additional towers.

The Eugene Code also has a strong preference for siting new towers in commercial and industrial zones over residential zones. New towers are not permitted at all in R-2, R-3 and R-4 zones. New towers are permitted outright in E-1, E-2, I-2 and I-3 zones, and are allowed in the R-1 zone with a conditional use permit. New towers are currently not allowed within 2,000 feet

of an existing tower. Further restrictions, including height limits, required buffering and camouflage, are intended to limit the adverse visual effects of cell towers.

As explained by staff, federal regulations do create some road blocks to the City's attempts to impose significant restrictions on the siting of new cell towers. Most importantly, under federal law, local regulations cannot have the effect of prohibiting the provision of wireless service. The City's current code addresses this federal prohibition – both the site review and conditional use permit criteria require an applicant that is proposing a new tower to demonstrate that collocation is impractical and fails to meet the needs of the service area before a new tower can be added.

Summary of Glendale's provisions

The City of Glendale's code was mentioned as a potential good example to consider. In reviewing Glendale's recent code revisions, a few points stand out. Glendale sought to strengthen the application requirements and limit new towers as much as possible to those towers and the characteristics of towers that were required to fill a service gap. The following are some elements of Glendale's code that are not present in Eugene's code.

- 1) Stronger application requirements: In Glendale, an applicant proposing to site a new tower must identify the geographic service area for the subject installation, including a map showing all of the applicant's existing sites in the local service network associated with coverage gap that the proposed tower is meant to close. The application must describe how the proposal will close that service gap.
- 2) Least intrusive means: In Glendale, a proposed tower cannot be taller than is necessary to serve the gap. In other jurisdictions, an applicant must demonstrate that the proposed tower is necessary to fill a significant gap in coverage or capacity shortfall and is the "least intrusive means of doing so."
- 3) Maintenance and Monitoring Program: Glendale's monitoring program includes the ability to require maintenance of landscaping and other mitigation measures.
- 4) Alternative Designs: In Eugene, an applicant for a new tower must perform an alternative sites analysis to study alternative locations to ensure there are no other sites more suitable; *i.e.*, available sites with preferable zoning. In Glendale, the alternatives analysis does not only include alternative sites, it requires the applicant to demonstrate that it has considered alternative configurations (*i.e.*, system and tower designs) so that the proposed tower is the least intrusive possible.

Possible revisions to strengthen Eugene's wireless regulation

- 1) Towers in residential zones: New towers are allowed in the R-1, Low Density Residential zone under Eugene's code, although they are disfavored, as explained above. Davis, California prohibits new towers in residential zones. Given the amount of City land zoned R-1, if Eugene were to prohibit siting new towers in this zone, it would have to

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provide a variance process to allow new towers where necessary to fill a significant gap in service.

- 2) Application requirements: Although an absolute prohibition in residential areas is not possible, the application requirements and approval criteria could be amended to clearly require a demonstration of a significant service gap and how the proposed tower is needed to fill that gap. However, it should be noted that the few recent proposals submitted for residential areas did demonstrate a significant gap in service. Therefore, it's not clear that such an amendment would affect future proposals in residential areas.
- 3) Alternatives analysis: Eugene could add a clearer requirement that the applicant include an alternative configuration analysis.
- 4) Tower Height: In Eugene's code, the height of a tower is merely limited to the maximum height allowed in the particular zone. Both Davis and Glendale require the tower to be no taller than is necessary to fill the service gap.

Additional Measures

In addition to reviewing the telecommunication regulations of other cities, staff is currently exploring other emerging technologies which may help minimize the need for new towers in the future. "Small Cell" technologies is a newer strategy for accommodating ever increasing data demands. These facilities are much smaller in size and can be collocated on a variety of structures and utilities, with minimal visual impact. While small cell facilities don't completely replace the need for towers, they do help augment telecommunication services which can help minimize the need for future towers. Staff believes these new technologies offer a positive alternative to the typical antenna designs.

Conclusion

Federal regulations do limit to some degree the steps local governments can take in prohibiting cell towers. However, technologies continue to improve – many carriers now prefer smaller equipment (small cells) that do not completely replace the need for towers, but that do provide an alternative for filling certain gaps in coverage. It is arguable that Eugene's code is adequate to address those changes in technology, but there may be updates and revisions that could be made to strengthen and make the code more clear.

**CITY OF SPOKANE
ORDINANCE NO. C35312**

An Ordinance Relating to Wireless Communication Facilities; repealing Chapter 17C.355 SMC; adopting a New Chapter 17C.355A SMC; amending SMC Section 17C.110.110, Table 17C.110-1, 17C.320.080, 17C.130.220, 17C.120.220, 17C.110.215, 17C.124.220, 17A.020.010, 17A.020.200, 17C.120.110, Table 17C.120-1, 17C.124.110, 17C.130.110, Table 17C.130-1, and 01.05.160, as those sections relate to wireless communications facilities; and Declaring an Emergency.

WHEREAS, Chapter 17C.355 SMC currently governs the City's regulation of wireless communication facilities; and

WHEREAS, some of the existing regulations for wireless communication facilities are more than ten years old and federal laws, regulations and court decisions, wireless technology and consumer usage have reshaped the environment within which Wireless Communications Facilities are permitted and regulated; and

WHEREAS, federal laws and regulations that govern local zoning standards and procedures for wireless communications have substantially changed since the City adopted Chapter 17C.355; and

WHEREAS, on March 9, 2015, the City Council adopted Ordinance No. C35243 imposing a moratorium on applications for new wireless communications support towers in the City's residential zones; and

WHEREAS, following the adoption of the moratorium, the City has been engaged in an extensive stakeholder process that has resulted in a substantial re-write of the City's regulations relating to wireless communications facilities; and

WHEREAS, following appropriate procedures and public notice, on October 14, 2015, the Spokane Plan Commission conducted a hearing on proposed amendments to the City's wireless communication facility regulations and recommended that the City Council approved the proposed amendments; and

WHEREAS, at the conclusion of its public hearing, the Plan Commission approved written findings, conclusions, and recommendation (the "Plan Commission Recommendation") which is incorporated into this Ordinance as if set forth fully herein; and

WHEREAS, on October 26, 2015, the City Council conducted a lawfully-noticed public hearing and received the report and recommendation of the Plan Commission regarding the Ordinance which modifies the code sections relating to wireless communication facilities; and

WHEREAS, the City Council of the City of Spokane desires to update its local standards and procedures to protect and promote the public health, safety and welfare of the City of Spokane community, to reasonably regulate wireless communication facilities aesthetics, to protect and promote the City's unique character in a manner consistent with State and federal laws and regulations; and

NOW, THEREFORE, THE CITY OF SPOKANE DOES ORDAIN:

SECTION 1. That Chapter 17C.355 of the Spokane Municipal Code is hereby repealed.

SECTION 2. That there is adopted a new Chapter 17C.355A of the Spokane Municipal Code to read as follows:

Section 17C.355A.010 Purpose

Section 17C.355A.020 Definitions

Section 17C.355A.030 Towers

Section 17C.355A.040 Collocation of Antennas, DAS, and Small Cells

Section 17C.355A.050 Tower Sharing, Collocation and Preferred Tower Locations

Section 17C.355A.060 Application Submittal Requirements

Section 17C.355A.070 General Development Standards Applicable to WCFs

Section 17C.355A.080 Regulations for Facilities Subject to a Conditional Use Permit

Section 17C.355A.090 Exception from Standards

Section 17C.355A.100 Final Inspection

Section 17C.355A.110 Maintenance

Section 17C.355A.120 Discontinuation of Use

Section 17C.355A.130 Independent Technical Review

Section 17C.355A.140 Exempt Facilities

Section 17C.355A.150 Indemnification

Chapter 17C.355A

Wireless Communication Facilities

Section 17C.355A.010 Purpose

The purpose of this Chapter is:

- A. To protect the community's natural beauty, visual quality and safety while facilitating the reasonable and balanced provision of wireless communication services. More specifically, it is the City's goal to minimize the visual impact of wireless communication facilities on the community, particularly in and near residential zones;
- B. To promote and protect the public health, safety and welfare, preserve the aesthetic character of the Spokane community, and to reasonably regulate the development and operation of wireless communication facilities within the City to the extent permitted under State and federal law;
- C. To minimize the impact of WCFs by establishing standards for siting design and screening;
- D. To encourage the collocation of antennas on existing structures, thereby minimizing new visual impacts and reducing the potential need for new towers that are built in or near residential zones by encouraging that WCFs first be located on buildings, existing towers or utility poles in public rights-of-way;
- E. To protect residential zones from excessive development of WCFs;
- F. To ensure that towers in or near residential zones are only sited when alternative facility locations are not feasible;
- G. To preserve the quality of living in residential areas which are in close proximity to WCFs;
- H. To preserve the opportunity for continued and growing service from the wireless industry;

- I. To preserve neighborhood harmony and scenic viewsheds and corridors;
- J. To accommodate the growing need and demand for wireless communication services;
- K. To establish clear guidelines and standards and an orderly process for expedited permit application review intended to facilitate the deployment of wireless transmission equipment, to provide advanced communication services to the City, its residents, businesses and community at large;
- L. To ensure City zoning regulations are applied consistently with federal telecommunications laws, rules, regulations and controlling court decisions;
- M. To encourage the use of Distributed Antenna Systems (DAS) and other small cell systems that use components that are a small fraction of the size of macrocell deployments, and can be installed with little or no impact on utility support structures, buildings, and other existing structures; and
- N. To provide regulations which are specifically not intended to, and shall not be interpreted or applied to, (1) prohibit or effectively prohibit the provision of personal wireless services, (2) unreasonably discriminate among functionally equivalent service providers, or (3) regulate WCFs and wireless transmission equipment on the basis of the environmental effects of radio frequency emissions to the extent that such emissions comply with the standards established by the Federal Communications Commission.

Section 17C.355A.020 Definitions

- A. "Antenna" means one or more rods, panels, discs or similar devices used for wireless communication, which may include, but is not limited to, omni-directional antenna (whip), directional antenna (panel), and parabolic antenna (dish).
- B. "Antenna Array" means a single or group of antenna elements and associated mounting hardware, transmission lines, or other appurtenances which share a common attachment device such as a mounting frame or mounting support structure for the sole purpose of transmitting or receiving electromagnetic waves.
- C. "Base Station" means a structure or equipment at a fixed location that enables Commission-licensed or authorized wireless communications between user equipment and a communications network. The term does not encompass a tower as defined in this chapter or any equipment associated with a tower.
 - 1. The term includes, but is not limited to, equipment associated with wireless communications services such as private, broadcast, and public safety services, as well as unlicensed wireless services and fixed wireless services such as microwave backhaul.
 - 2. The term includes, but is not limited to, radio transceivers, antennas, coaxial or fiber-optic cable, regular and backup power supplies, and comparable equipment, regardless of technological configuration (including Distributed Antenna Systems and small cell networks).
 - 3. The term includes any structure other than a tower that, at the time the relevant application is filed with the City under this section, supports or houses equipment described in this section that has been reviewed and approved under the applicable

zoning or siting process, or under Washington or local regulatory review process, even if the structure was not built for the sole or primary purpose of providing such support.

4. The term does not include any structure that, at the time the relevant application is filed with Washington or the City under this section, does not support or house equipment described in this section.
- D. “Collocation” means the mounting or installation of transmission equipment on an eligible support structure for the purpose of transmitting and/or receiving radio frequency signals for communications purposes.
- E. “Commission” means the Federal Communications Commission (“FCC”).
- F. “Distributed Antenna System” or “DAS” means a network consisting of transceiver equipment at a central hub site to support multiple antenna locations throughout the desired coverage area.
- G. “Small Cells” mean compact wireless base stations containing their own transceiver equipment and function like cells in a mobile network but provide a smaller coverage area than traditional macrocells. Small cells will meet the two parameters in subsections (a) and (b). For purposes of these definitions, volume is a measure of the exterior displacement, not the interior volume of the enclosures. Antennas or equipment concealed from public view in or behind an otherwise approved structure or concealment are not included in calculating volume.
 - (a) Small Cell Antenna: Each antenna shall be no more than three (3) cubic feet in volume.
 - (b) Small Cell Equipment: Each equipment enclosure shall be no larger than seventeen (17) cubic feet in volume. Associated conduit, mounting bracket or extension arm, electric meter, concealment, telecommunications demarcation box, ground-based enclosures, battery back-up power systems, grounding equipment, power transfer switch, and cut-off switch may be located outside the primary equipment enclosure(s) and are not included in the calculation of equipment volume.
- H. “Stealth design” means technology that minimizes the visual impact of wireless communications facilities by camouflaging, disguising, screening, and/or blending into the surrounding environment. Examples of stealth design include but are not limited to facilities disguised as trees, flagpoles, bell towers, and architecturally screened roof-mounted antennas.
- I. “Tower” means any structure built for the sole or primary purpose of supporting any Commission-licensed or authorized antennas and their associated facilities, including structures that are constructed for wireless communications services including, but not limited to, private, broadcast, and public safety services, as well as unlicensed wireless services and fixed wireless services such as microwave backhaul, and the associated site.
- J. “Tower Height” means the vertical distance measured from the base of the tower structure at grade to the highest point of the structure including the antenna.
- K. “Transmission Equipment” means equipment that facilitates transmission for any Commission-licensed or authorized wireless communication service, including, but not

limited to, radio transceivers, antennas, coaxial or fiber-optic cable, and regular and backup power supply. The term includes equipment associated with wireless communications services including, but not limited to, private, broadcast, and public safety services, as well as unlicensed wireless services and fixed wireless services such as microwave backhaul.

- L. "Utility Support Structure" means utility poles or utility towers supporting electrical, telephone, cable or other similar facilities; street light standards; pedestrian light standards; traffic light structures; traffic sign structures; or water towers.
- M. "Wireless Communication Facilities" or "WCF" means a staffed or unstaffed facility or location for the transmission and/or reception of radio frequency (RF) signals or other wireless communications or other signals for commercial communications purposes, typically consisting of one or more antennas or group of antennas, a tower or attachment support structure, transmission cables and other transmission equipment, and an equipment enclosure or cabinets.

Section 17C.355A.030 Towers

- A. Towers shall be located only in those areas and pursuant to the process described in SMC Tables 17C.355A-1 and 17C.355A-2, provided that towers that are proposed to be located in a residential zone or within 150 feet of a residential zone shall be subject to the siting priorities set forth for preferred tower locations in SMC 17C.355A.050.

Table 17C.355A-1 New Wireless Communication Tower Criteria Allowed by Type II Permit				
Zone Category	Located in Public Right-of-way (ROW)	Maximum Tower Height	Stealth Design	Setback from Property Lines (does not apply within ROW)[2]
O & OR[1]	Yes	60'	Optional[1]	N/A
	No	60'	Optional[1]	20'
NR, NMU CC & CA[1]	Yes	60'	Optional[1]	N/A
	No	60'	Optional[1]	20'
CB & GC[1]	Yes or No	70'	Optional[1]	20'
All DT[1]	Yes or No (allowed in ROW only if less than or equal to 70')	150'	Optional[1]	20'
Industrial[1]	Yes or No (allowed in ROW only if less than or equal to 70')	150'	Optional[1]	20'

[1] If an applicant wants to construct a tower in a residential zone or within 50' of a residential zone, then a Type III process and stealth design are required. If an applicant wants to construct a tower

within 51' - 150' of a residential zone, then a Type II process and stealth design are required. If an applicant wants to construct a tower beyond 150' of a residential zone, then the review process is that which is required in the zone in which the tower is to be located.

[2] See exception for locations adjacent to a residence in SMC 17C.355A.070(B).

Table SMC 17C.355A-2 New Wireless Communication Tower Criteria Allowed by Type III Conditional Use Permit				
Zone Category	Located in Public Right-of-way (ROW)	Maximum Tower Height	Stealth Design	Setback from Property Lines[2] (does not apply within ROW)
All R[1]	Yes or No	60'	Required	20'
O, OR, NR, NMU, CC & CA[1]	Yes or No	61' - 70'[3]	Optional[1]	20'
CB & GC[1]	Yes or No	71' - 90'[4]	Optional[1]	20'

[1] If an applicant wants to construct a tower in a residential zone or within 50' of a residential zone, then stealth design is required.

[2] See exceptions for locations adjacent to a residence in SMC 17C.355A.070(B).

[3] An additional 20 feet in height is allowed if applicant uses stealth design.

[4] An additional 30 feet in height is allowed if applicant uses stealth design.

Section 17C.355A.040 Collocation of Antennas, DAS, and Small Cells

- A. To the extent not otherwise covered by Chapter 17C.356 (Eligible Facilities Requests), collocation and new wireless communication antenna arrays are permitted in all zones via administrative approval provided that they are attached to or inside of an existing structure (except on the exterior of pole signs or anywhere on a billboard) that provides the required clearances for the array's operation without the necessity of constructing a tower or other apparatus to extend the antenna array more than 15 feet above the structure.
- B. Installation requires the granting of development permits prescribed by chapters 17G.010 and 17G.060 SMC.
- C. For antenna arrays on City-owned property, the execution of necessary agreements is also required.
- D. If any support structure must be constructed to achieve the needed elevation or if the attachment adds more than 15 feet above the existing structure, the proposal is subject to Type II review. The limitation to 15 feet applies to cumulative increases and any previously approved additions to height made under this section must be included in its measurement.
- E. Any equipment shelter or cabinet and other ancillary equipment are subject to the general development standards of SMC 17C.355A.070.
- F. Distributed Antenna Systems and Small Cells.
 1. Distributed Antenna Systems (DAS) and Small Cells are allowed in all land use zones, regardless of the siting preferences listed in SMC 17C.355A.050.

2. DAS and small cells are subject to approval via administrative review only unless their installation requires the construction of a new utility support structure or building. Type II review is required when the applicant proposes a new utility support structure or building.
3. Multiple Site DAS and Small Cells.
 - a. A single permit may be used for multiple distributed antennas that are part of a larger overall DAS network.
 - b. A single permit may be used for multiple small cells spaced to provide wireless coverage in a contiguous area.

Section 17C.355A.050 Tower Sharing, Collocation and Preferred Tower Locations

- A. Tower Sharing and Collocation. New WCF facilities must, to the maximum extent feasible, collocate on existing towers or other structures of a similar height to avoid construction of new towers, unless precluded by zoning constraints such as height, structural limitations, inability to obtain authorization by the owner of an alternative location, or where an alternative location will not meet the service coverage objectives of the applicant. Applications for a new tower must address all existing towers or structures of a similar height within 1/2 mile of the proposed site as follows: (a) by providing evidence that a request was made to locate on the existing tower or other structure, with no success; or (b) by showing that locating on the existing tower or other structure is infeasible.
- B. Preferred Tower Locations. All new towers proposed to be located in a residential zone or within 150 feet of a residential zone are permitted only after application of the following siting priorities, ordered from most-preferred (1) to least-preferred (8);
 1. City-owned or operated property and facilities, not including right-of-way and right-of-way facilities, that are not in residential zones or located within 150 feet of residential zones;
 2. industrial zones and downtown zones;
 3. City-owned or operated property and facilities in any zone, as long as the tower is inconspicuous from a public street, public open areas, or property that is being used for residential purposes;
 4. Community Business and General Commercial zones (CB & GC);
 5. office and other commercial zones;
 6. other City-owned or operated property and facilities;
 7. parcels of land in residential zones;
 8. sites in residential zones on or within 150 feet of a designated historic structure or district.

The applicant for a tower located in a residential zone or within 150 feet of a residential zone shall address these preferences in an alternative sites analysis meeting the requirements of section 17C.355A.060 below.

Section 17C.355A.060 Application Submittal Requirements

In addition to the application materials identified in SMC 17G.060.070, Type II and Type III applications submitted under this chapter shall include the following materials.

- A. Requirement for FCC Documentation. The applicant shall provide a copy of:
 - 1. its documentation for FCC license submittal or registration, and
 - 2. the applicant's FCC license or registration.
- B. Site plans. Complete and accurate plans and drawings to scale, prepared, signed and sealed by a Washington-licensed engineer, land surveyor and/or architect, including (1) plan views and all elevations before and after the proposed construction with all height and width measurements called out; (2) a depiction of all proposed transmission equipment; (3) a depiction of all proposed utility runs and points of contact; and (4) a depiction of the leased or licensed area with all rights-of-way and/or easements for access and utilities in plan view.
- C. Visual analysis. A color visual analysis that includes to-scale visual simulations that show unobstructed before-and-after construction daytime and clear-weather views from at least four angles, together with a map that shows the location of each view.
- D. Statement of Purpose/RF Justification. A clear and complete written Statement of Purpose shall minimally include: (1) a description of the technical objective to be achieved; (2) a to-scale map that identifies the proposed site location and the targeted service area to be benefited by the proposed project; and (3) full-color signal propagation maps with objective units of signal strength measurement that show the applicant's current service coverage levels from all adjacent sites without the proposed site, predicted service coverage levels from all adjacent sites with the proposed site, and predicted service coverage levels from the proposed site without all adjacent sites. These materials shall be reviewed and signed by a Washington-licensed professional engineer or a qualified employee of the applicant. The qualified employee of the applicant shall submit his or her qualifications with the application.
- E. Design justification. A clear and complete written analysis that explains how the proposed design complies with the applicable design standards under this chapter to the maximum extent feasible. A complete design justification must identify all applicable design standards under this chapter and provide a factually detailed reason why the proposed design either complies or cannot feasibly comply.
- F. Collocation and alternative sites analysis.
 - 1. All Towers. All applications for a new tower will demonstrate that collocation is not feasible, consistent with SMC 17C.355A.050.
 - 2. Towers in a residential zone or within 150 feet of a residential zone.
 - a. For towers in or within 150 feet of a residential zone, the applicant must address the City's preferred tower locations in SMC 17.355A.050 with a detailed explanation justifying why a site of higher priority was not selected. The City's tower location preferences must be addressed in a clear and complete written alternative site analysis that shows at least five (5) higher

ranked, alternative sites considered that are in the geographic range of the service coverage objectives of the applicant, together with a factually detailed and meaningful comparative analysis between each alternative candidate and the proposed site that explains the substantive reasons why the applicant rejected the alternative candidate. An applicant may reject an alternative tower site for one or more of the following reasons:

1. preclusion by structural limitations;
 2. inability to obtain authorization by the owner;
 3. failure to meet the service coverage objectives of the applicant;
 4. failure to meet other engineering requirements for such things as location, height and size;
 5. zoning constraints, such as the inability to meet setbacks;
 6. physical or environmental constraints, such as unstable soils or wetlands; and/or
 7. being a more intrusive location despite the higher priority in this chapter as determined by the Planning Director or Hearing Examiner, as applicable.
- b. A complete alternative sites analysis provided under this subsection (F)(2) may include less than five (5) alternative sites so long as the applicant provides a factually detailed written rationale for why it could not identify at least five (5) potentially available, higher ranked, alternative sites.
3. Required description of coverage objectives. For purposes of disqualifying potential collocations and/or alternative sites for the failure to meet the applicant's service coverage objectives the applicant will provide (a) a description of its objective, whether it be to close a gap or address a deficiency in coverage, capacity, frequency and/or technology; (b) detailed technical maps or other exhibits with clear and concise RF data to illustrate that the objective is not met using the alternative (whether it be collocation or a more preferred location); and (c) a description of why the alternative (collocation or a more preferred location) does not meet the objective.
- G. DAS and small cells. As outlined in SMC 17C.355A.010, the City encourages, but it does not require, the use of DAS and small cells. Each applicant will submit a statement that explains how it arrived at the structure and design being proposed.
- H. Radio frequency emissions compliance report. A written report, prepared, signed and sealed by a Washington-licensed professional engineer or a competent employee of the applicant, which assesses whether the proposed WCF demonstrates compliance with the exposure limits established by the FCC. The report shall also include a cumulative analysis that accounts for all emissions from all WCFs located on or adjacent to the proposed site, identifies the total exposure from all facilities and demonstrates planned compliance with all maximum permissible exposure limits established by the FCC. The report shall include a detailed description of all mitigation measures required by the FCC.

- I. Noise study. A noise study, prepared, signed and sealed by a Washington-licensed engineer, for the proposed WCF and all associated equipment in accordance with the Spokane Municipal Code.
- J. Collocation consent. A written statement, signed by a person with the legal authority to bind the applicant and the project owner, which indicates whether the applicant is willing to allow other transmission equipment owned by others to collocate with the proposed wireless communication facility whenever technically and economically feasible and aesthetically desirable.
- K. Other published materials. All other information and/or materials that the City may, from time to time, make publicly available and designate as part of the application requirements.

Section 17C.355A.070 General Development Standards Applicable to WCFs

The following criteria shall be applied in approving, approving with conditions or denying a WCF. Unless otherwise provided in this chapter, WCF construction shall be consistent with the development standards of the zoning district in which it is located.

- A. Height. Refer to SMC Tables 17C.355A-1 and 2.
- B. Setback Requirements. Refer to SMC Tables 17C.355A-1 and 2 for towers. All equipment shelters, cabinets or other on-the-ground ancillary equipment shall be buried or meet the setback requirement of the zone in which located. Notwithstanding the setbacks provided for in Tables 17C.355A-1 and 2, when a residence is located on an adjacent parcel, the minimum side setback from the lot line for a new tower must be equal to the height of the proposed tower, unless:
 - 1. The setback is waived by the owner of the residence; or
 - 2. The tower is constructed with breakpoint design technology. If the tower has been constructed using breakpoint design technology, the minimum setback distance shall be equal to 110 percent (110%) of the distance from the top of the structure to the breakpoint level of the structure, or the applicable zone's minimum side setback requirements, whichever is greater. (For example, on a 100-foot tall monopole with a breakpoint at eighty [80] feet, the minimum setback distance would be twenty-two [22] feet [110 percent of twenty (20) feet, the distance from the top of the monopole to the breakpoint] or the minimum side yard setback requirements for that zone, whichever is greater.) Provided, that if an applicant proposes to use breakpoint design technology to reduce the required setback from a residence, the issuance of building permits for the tower shall be conditioned upon approval of the tower design by a structural engineer.
- C. Landscaping. All landscaping shall be installed and maintained in accordance with this chapter. Existing on-site vegetation shall be preserved to the greatest extent reasonably possible and/or improved, and disturbance of the existing topography shall be minimized. The director may grant a waiver from the required landscaping based on findings that a different requirement would better serve the public interest.
 - 1. Tower bases, when fenced (compounds), or large equipment shelters (greater than three feet by three feet by three feet), shall be landscaped following the provisions of this section. In all residential, O, OR, NR, NMU, CC, CA, CB, GC, Downtown, and other commercial zones, landscaping shall consist of a six-foot wide strip of L2

landscaping as described in SMC 17C.200.030. Street Frontage and perimeter property landscaping where required shall follow standards set forth in SMC 17C.200.040 Site Planting Standards.

2. If fencing is installed, it shall consist of decorative masonry or wood fencing. Chain link is not allowed in residential, O, OR, NR, NMU, CC, and CA zones, except that in a CB and GC zone up to 3 strands of barbed wire may be placed atop a lawful fence exceeding six feet in height above grade. In Downtown and industrial zones, three strands of barbed wire may be placed atop a lawful fence if the fence is not visible from an adjacent street or is placed behind a sight-obscuring fence or wall. Electrified fences are not permitted in any zone. Razor or concertina wire is not allowed.
 3. Applicant shall meet the irrigation requirements of SMC 17C.200.100 where feasible and ensure the full establishment of plantings for two years in accordance with SMC 17C.200.090.
- D. Visual Impact. All WCFs in residential zones and within 150 feet of residential zones, including equipment enclosures, shall be sited and designed to minimize adverse visual impacts on surrounding properties and the traveling public to the greatest extent reasonably possible, consistent with the proper functioning of the WCF. Such WCFs and equipment enclosures shall be integrated through location and design to blend in with the existing characteristics of the site. Such WCFs shall also be designed to either resemble the surrounding landscape and other natural features where located in proximity to natural surroundings, or be compatible with the urban, built environment, through matching and complimentary existing structures and specific design considerations such as architectural designs, height, scale, color and texture, and/or be consistent with other uses and improvements permitted in the relevant zone.
- E. Use of Stealth Design/Technology. The applicant shall make an affirmative showing as to why they are not employing stealth technology. More specifically:
1. Stealth design is required in residential zones and to the extent shown in Tables A-1 and A-2. Stealth and concealment techniques must be appropriate given the proposed location, design, visual environment, and nearby uses, structures, and natural features. Stealth design shall be designed and constructed to substantially conform to surrounding building designs or natural settings, so as to be visually unobtrusive. Stealth design that relies on screening wireless communications facilities in order to reduce visual impact must screen all substantial portions of the facility from view. Stealth and concealment techniques do not include incorporating faux-tree designs of a kind that are not native to the Pacific Northwest.
- F. Lighting. For new wireless communication support towers, only such lighting as is necessary to satisfy FAA requirements is permitted. All FAA-required lighting shall use lights that are designed to minimize downward illumination. Security lighting for the equipment shelters or cabinets and other on-the-ground ancillary equipment is also permitted as long as it is down shielded to keep light within the boundaries of the site. Motion detectors for security lighting are encouraged in residential, O and OR zones or adjacent to residences.
- G. Noise. At no time shall transmission equipment or any other associated equipment (including, but not limited to, heating and air conditioning units) at any wireless communication facility emit noise that exceeds the applicable limit(s) established in SMC 10.08D.070.

- H. Signage. No facilities may bear any signage or advertisement(s) other than signage required by law or expressly permitted/required by the City.
- I. Code compliance. All facilities shall at all times comply with all applicable federal, State and local building codes, electrical codes, fire codes and any other code related to public health and safety.
- J. Building-mounted WCFs.
1. In residential zones, all transmission equipment shall be concealed within existing architectural features to the maximum extent feasible. Any new architectural features proposed to conceal the transmission equipment shall be designed to mimic the existing underlying structure, shall be proportional to the existing underlying structure or conform to the underlying use and shall use materials in similar quality, finish, color and texture as the existing underlying structure.
 2. In residential zones, all roof-mounted transmission equipment shall be set back from all roof edges to the maximum extent feasible.
 3. In all other zones, antenna arrays and supporting transmission equipment shall be installed so as to camouflage, disguise or conceal them to make them closely compatible with and blend into the setting and/or host structure.
- K. WCFs in the public rights-of-way.
1. *Preferred locations.* Facilities shall be located as far from residential uses as feasible, and on main corridors and arterials to the extent feasible. Facilities in the rights-of-way shall maintain at least a two hundred (200) foot separation from other wireless facilities (except with respect to DAS or Small Cells), except when collocated or on opposite sides of the same street.
 2. *Pole-mounted or tower-mounted equipment.* All pole-mounted and tower-mounted transmission equipment shall be mounted as close as possible to the pole or tower so as to reduce the overall visual profile to the maximum extent feasible. All pole-mounted and tower-mounted transmission equipment shall be painted with flat, non-reflective colors that blend with the visual environment.
 3. For all WCFs to be located within the right-of-way, prior to submitting for a building permit, the applicant must have a valid municipal master permit, municipal franchise, or exemption otherwise granted by applicable law, to the extent consistent with RCW 35.21.860.
- L. Accessory Equipment. In residential zones, all equipment shall be located or placed in an existing building, underground, or in an equipment shelter that is (a) designed to blend in with existing surroundings, using architecturally compatible construction and colors; and (b) located so as to be unobtrusive as possible consistent with the proper functioning of the WCF.
- M. Spacing of Towers. Towers shall maintain a minimum spacing of one-half mile, unless it can be demonstrated that physical limitations (such as topography, terrain, tree cover or location of buildings) in the immediate service area prohibit adequate service by the existing facilities or that collocation is not feasible under SMC 17C.355A.050.

- N. Site Design Flexibility. Individual WCF sites vary in the location of adjacent buildings, existing trees, topography and other local variables. By mandating certain design standards, there may result a project that could have been less intrusive if the location of the various elements of the project could have been placed in more appropriate locations within a given site. Therefore, the WCF and supporting equipment may be installed so as to best camouflage, disguise them, or conceal them, to make the WCF more closely compatible with and blend into the setting and/or host structure, upon approval by the Planning Director or the Hearing Examiner, as applicable. The design flexibility allowed under this subsection includes additional height for a tower located within tall trees on (i) City property or (ii) other parcels at least 5 acres in size, so that the impact of the tower may be minimized by the trees while still allowing for the minimum clearance needed for the tower to achieve the applicant's coverage objectives. A formal exception from standards under SMC 17C.355A.090 is not required for proposals meeting this subsection by being a less intrusive design option.
- O. Structural Assessment. The owner of a proposed tower shall have a structural assessment of the tower conducted by a professional engineer, licensed in the State of Washington, which shall be submitted with the application for a building permit.

Section 17C.355A.080 Regulations for Facilities Subject to a Conditional Use Permit

- A. Approval criteria. In addition to the development standards in this chapter and the approval criteria in SMC 17G.060.170, the following additional approval criteria apply:
 - 1. The need for the proposed tower shall be demonstrated if it is to be located in a residential zone or within one hundred fifty feet of an existing residential lot. An evaluation of the operational needs of the wireless communications provider, alternative sites, alternative existing facilities upon which the proposed antenna array might be located, and collocation opportunities on existing support towers within one-half mile of the proposed site shall be provided. Evidence shall demonstrate that no practical alternative is reasonably available to the applicant.
 - 2. The proposed tower satisfies all of the provisions and requirements of this chapter 17C.355A.
- B. Public Notice. In addition to the notice requirements of SMC 17G.060.120, for proposals in residential zones and within 150 feet of a residential zone, public notice shall include:
 - 1. A black and white architectural elevation and color photo simulation rendering of the proposed WCF.
 - 2. The sign required by SMC 17G.060.120(B) shall include that same architectural elevation and color photo simulation combination selected by the City that depicts the visual impact of the WCF.

Section 17C.355A.090 Exception from Standards

- A. Applicability. Except as otherwise provided in this chapter (under Site Design Flexibility), no WCF shall be used or developed contrary to any applicable development standard unless an exception has been granted pursuant to this Section. These provisions apply exclusively to WCFs and are in lieu of the generally applicable variance and design deviation provisions in SMC Title 17, provided this section does not provide an exception from this chapter's visual

impact and stealth design requirements or the approval criteria set forth in Section 17C.355A.080.

- B. Procedure Type. A wireless communications facility exception is a Type III procedure.
- C. Submittal Requirements. In addition to the general submittal requirements for a Type III application, an application for a wireless communication facility exception shall include:
 - 1. A written statement demonstrating how the exception would meet the criteria.
 - 2. A site plan that includes:
 - a. Description of the proposed facility's design and dimensions, as it would appear with and without the exception.
 - b. Elevations showing all components of the wireless communication facility as it would appear with and without the exception.
 - c. Color simulations of the wireless communication facility after construction demonstrating compatibility with the vicinity, as it would appear with and without the exception.
- D. Criteria. An application for a wireless communication facility exception shall be granted if the following criteria are met:
 - 1. The exception is consistent with the purpose of the development standard for which the exception is sought.
 - 2. Based on a visual analysis, the design minimizes the visual impacts to residential zones through mitigating measures, including, but not limited to, building heights, bulk, color, and landscaping.
 - 3. The applicant demonstrates the following:
 - a. A significant gap in the coverage, capacity, or technologies of the service network exists such that users are regularly unable to connect to the service network, or are regularly unable to maintain a connection, or are unable to achieve reliable wireless coverage within a building;
 - b. The gap can only be filled through an exception to one or more of the standards in this chapter; and
 - c. The exception is narrowly tailored to fill the service gap such that the wireless communication facility conforms to this chapter's standards to the greatest extent possible.
 - 4. Exceptions in Residential Zones. For a new tower proposed to be located in a residential zone or within 150 feet of a residential zone, unless the proposal qualifies as a preferred location on City-owned or operated property or facilities under SMC 17C.355A.050(B)(3), the applicant must also demonstrate that the manner in which it proposes to fill the significant gap in coverage, capacity, or technologies of the service network is the least intrusive on the values that this chapter seeks to protect.

Section 17C.355A.100 Final Inspection

- A. A Certificate of Occupancy will only be granted upon satisfactory evidence that the WCF was installed in substantial compliance with the approved plans and photo simulations.
- B. Failure to Comply. If it is found that the WCF installation does not substantially comply with the approved plans and photo simulations, the applicant immediately shall make any and all such changes required to bring the WCF installation into compliance.

Section 17C.355A.110 Maintenance

- A. All wireless communication facilities must comply with all standards and regulations of the FCC and any other State or federal government agency with the authority to regulate wireless communication facilities.
- B. The site and the wireless communication facilities, including all landscaping, fencing and related transmission equipment must be maintained at all times in a neat and clean manner and in accordance with all approved plans.
- C. All graffiti on wireless communication facilities must be removed at the sole expense of the permittee after notification by the City to the owner/operator of the WCF as provided in SMC 10.10.090.
- D. If any FCC, State or other governmental license or any other governmental approval to provide communication services is ever revoked as to any site permitted or authorized by the City, the permittee must inform the City of the revocation within thirty (30) days of receiving notice of such revocation.

Section 17C.355A.120 Discontinuation of Use

- A. Any wireless communication facility that is no longer needed and its use is discontinued shall be reported immediately by the service provider to the planning director. Discontinued facilities shall be completely removed within six months and the site restored to its pre-existing condition.
- B. There shall also be a rebuttable presumption that any WCF that is regulated by this chapter and that is not operated for a period of six (6) months shall be considered abandoned. This presumption may be rebutted by a showing that such WCF is an auxiliary back-up or emergency utility or device not subject to regular use or that the WCF is otherwise not abandoned. For those WCFs deemed abandoned, all equipment, including, but not limited to, antennas, poles, towers, and equipment shelters associated with the WCF shall be removed within six (6) months of the cessation of operation. Irrespective of any agreement among them to the contrary, the owner or operator of such unused facility, or the owner of a building or land upon which the WCF is located, shall be jointly and severally responsible for the removal of abandoned WCFs. If the WCF is not thereafter removed within ninety (90) days of written notice from the City, the City may remove the WCF at the owner of the property's expense or at the owner of the WCF's expense, including all costs and attorneys' fees. If there are two or more wireless communications providers collocated on a single support structure, this provision shall not become effective until all providers cease using the WCF for a continuous period of six (6) months.

Section 17C.355A.130 Independent Technical Review

Although the City intends for City staff to review administrative matters to the extent feasible, the City may retain the services of an independent, radio frequency technical expert of its choice to provide technical evaluation of permit applications for WCFs, including administrative and conditional use permits. The technical expert review may include, but is not limited to (a) the accuracy and completeness of the items submitted with the application; (b) the applicability of analysis and techniques and methodologies proposed by the applicant; (c) the validity of conclusions reached by the applicant; and (d) whether the proposed WCF complies with the applicable approval criteria set forth in this chapter. The applicant shall pay the cost for any independent consultant fees, along with applicable overhead recovery, through a deposit, estimated by the City, paid within ten (10) days of the City's request. When the City requests such payment, the application shall be deemed incomplete for purposes of application processing timelines. In the event that such costs and fees do not exceed the deposit amount, the City shall refund any unused portion within thirty (30) days after the final permit is released or, if no final permit is released, within thirty (30) days after the City receives a written request from the applicant. If the costs and fees exceed the deposit amount, then the applicant shall pay the difference to the City before the permit is issued.

Section 17C.355A.140 Exempt Facilities

The following are exempt from this chapter:

- A. FCC licensed amateur (ham) radio facilities;
- B. Satellite earth stations, dishes and/or antennas used for private television reception not exceeding one (1) meter in diameter;
- C. A government-owned WCF installed upon the declaration of a state of emergency by the federal, state or local government, or a written determination of public necessity by the City; except that such facility must comply with all federal and state requirements. The WCF shall be exempt from the provisions of this chapter for up to one week after the duration of the state of emergency; and
- D. A temporary, commercial WCF installed for providing coverage of a special event such as news coverage or sporting event, subject to approval by the City. The WCF shall be exempt from the provisions of this chapter for up to one week before and after the duration of the special event.
- E. In locations more than 150 feet from a residential zone, other temporary, commercial WCFs installed for a period of 90 days, subject to renewals at the City's discretion; provided, that such temporary WCF will comply with applicable setbacks and height requirements.
- F. Eligible Facilities Requests permitted under Chapter 17C.356 SMC.

Section 17C.355A.150 Indemnification

Each permit issued shall have as a condition of the permit a requirement that the applicant defend, indemnify and hold harmless the City and its officers, agents, employees, volunteers, and contractors from any and all liability, damage, or charges (including attorneys' fees and expenses) arising out of claims, suits, demands, or causes of action as a result of the permit process, granted permit, construction, erection, location, performance, operation, maintenance, repair, installation, replacement, removal, or restoration of the WCF on City property or in the public right-of-way.

SECTION 3. That SMC 17C.110.110 is amended to read as follows:

[Section 17C.110.110](#) Limited Use Standards

The uses listed below contain the limitations and correspond with the bracketed [] footnote numbers from [Table 17C.110-1](#).

A. Group Living.

This regulation applies to all parts of [Table 17C.110-1](#) that have a note [1]. Group living uses are also subject to the standards of [chapter 17C.330 SMC](#), Group Living.

1. General Standards.

All group living uses in RA, RSF, RTF, RMF and RHD zones, except for alternative or post incarceration facilities, are regulated as follows:

- a. All group living uses are subject to the requirements of [chapter 17C.330 SMC](#), Group Living, including the maximum residential density provisions of [Table 17C.330-1](#).
- b. Group living uses for more than six residents are a conditional use in the RA and RSF zones, subject to the standards of [chapter 17C.320 SMC](#), Conditional Uses, and the spacing requirements of [SMC 17C.330.120\(B\)\(2\)](#).
- c. Group living uses for more than twelve residents are a conditional use in the RTF and RMF zones, subject to the standards of [chapter 17C.320 SMC](#), Conditional Uses, and the spacing requirements of [SMC 17C.330.120\(B\)\(2\)](#).
- d. Exception.

Normally all residents of a structure are counted to determine whether the use is allowed or a conditional use as stated in subsections (A)(1)(a), (b) and (c) of this section. The only exception is residential facilities licensed by or under the authority of the state of Washington. In these cases, staff persons are not counted as residents to determine whether the facility meets the twelve-resident cut-off above, for which a conditional use permit is required.

2. Alternative or Post Incarceration Facilities.

Group living uses which consist of alternative or post incarceration facilities are conditional uses regardless of size and are subject to the provisions of [chapter 17C.320 SMC](#), Conditional Uses. They are also subject to the standards of [chapter 17C.330 SMC](#), Group Living.

B. Office.

This regulation applies to all parts of [Table 17C.110-1](#) that have a note [2]. Offices in the RMF and RHD zones and are subject to the provisions of [chapter 17C.320 SMC](#), Conditional Uses and are processed as a Type III application.

C. Basic Utilities.

This regulation applies to all parts of [Table 17C.110-1](#) that have a note [3]. Basic utilities that serve a development site are accessory uses to the primary use being served. In the RA, RSF and RTF zones, a one-time addition to an existing base utility use is permitted, provided the addition is less than fifteen hundred square feet and five or less parking stalls located on the same site as the primary use. The addition and parking are subject to the development standards of the base zone and the design standards for institutional uses. New buildings or larger additions require a conditional use permit and are processed as a Type III application. New buildings or additions to existing base utilities uses are permitted in the RMF and RHD zones.

D. Community Service Facilities.

This regulation applies to all parts of [Table 17C.110-1](#) that have a note [4]. In the RA, RSF and RTF zones, a one-time addition to an existing community services use is permitted, provided the addition is less than fifteen hundred square feet and three or less parking stalls located on the same site as the primary use. The addition and parking are subject to the development standards of the base zone and the design standards for institutional uses. New buildings or larger additions require a conditional use permit and are processed as a

Type III application. New buildings or additions to existing community services uses are permitted in the RMF and RHD zones.

E. Daycare.

This regulation applies to all parts of [Table 17C.110-1](#) that have a note [5]. Daycare uses are allowed by right if locating within a building or residence, and providing services to no more than twelve (children or clients). Daycare facilities for more than twelve children are a conditional use and are processed as a Type II application in the RA, RSF and RTF zones. However, in the RSF zone, daycare centers up to forty children are permitted if locating within a building that currently contains or did contain a college, medical center, school, religious institution or a community service facility.

F. Religious Institutions.

This regulation applies to all parts of [Table 17C.110-1](#) that have a note [6]. In the RA, RSF and RTF zones, a one-time addition to religious institutions is permitted, provided the addition is less than one thousand five hundred square feet and fifteen or less parking stalls located on the same site as the primary use. The addition and parking are subject to the development standards of the base zone and the design standards for institutional uses. New buildings or larger additions require a conditional use permit and are processed as a Type II application. The planning director may require a Type II conditional use permit application be processed as a Type III application when the director issues written findings that the Type III process is in the public interest. Applicants must comply with the requirements set forth in [SMC 17G.060.050](#) prior to submitting an application. New buildings or additions to existing religious institutions uses are permitted in the RMF and RHD zones.

G. Schools.

This regulation applies to all parts of the [Table 17C.110-1](#) that have a note [7]. In the RA, RSF and RTF zones, a one-time addition to schools is permitted, provided the addition is less than five thousand square feet and five or less parking stalls located on the same site as the primary use. The addition and parking are subject to the development standards of the base zone and the design standards for institutional uses. New buildings or larger additions require a conditional use permit and are processed as a Type II application. The planning director may require a Type II conditional use permit application be processed as a Type III application when the director issues written findings that the Type III process is in the public interest. Applicants must comply with the requirements set forth in [SMC 17G.060.050](#) prior to submitting an application.

H. Agriculture.

This regulation applies to all parts of [Table 17C.110-1](#) that have a note [8]. The keeping of large and small domestic animals, including bees, is permitted in the RA zone. See [chapter 17C.310 SMC](#), Animal Keeping, for specific standards.

I. ~~((Wireless Communication Facilities:~~

~~This regulation applies to all parts of [Table 17C.110-1](#) that have a note [9]. Wireless communication facilities ((are either permitted or require)) requiring a Type III conditional use ((based on location and type of facility)) must use stealth design. See (([chapter 17C.355 SMC](#))) [chapter 17C.355A SMC](#), Wireless Communication Facilities.)) ~~[Deleted]~~~~

SECTION 4. That Table 17C.110-1 is amended to read as follows:

[Section 17C.110T.001](#) Table 17C.110-1 Residential Zone Primary Uses

TABLE 17C.110-1 RESIDENTIAL ZONE PRIMARY USES (Click here to view PDF)					
Use is: P - Permitted	RA	RSF & RSF-C	RTF	RMF	RHD

N - Not Permitted L - Allowed, but special limitations CU - Conditional Use review required					
RESIDENTIAL CATEGORIES					
Group Living [1]	L/CU	L/CU	L/CU	L/CU	L/CU
Residential Household Living	P	P	P	P	P
COMMERCIAL CATEGORIES					
Adult Business	N	N	N	N	N
Commercial Outdoor Recreation	N	CU	CU	CU	CU
Commercial Parking	N	N	N	N	N
Drive-through Facility	N	N	N	N	N
Major Event Entertainment	N	N	CU	CU	CU
Office	N	N	N	CU[2]	CU[2]
Quick Vehicle Servicing	N	N	N	N	N
Retail Sales and Service	N	N	N	N	N
Mini-storage Facilities	N	N	N	N	N
Vehicle Repair	N	N	N	N	N
INDUSTRIAL CATEGORIES					
High Impact Uses	N	N	N	N	N
Industrial Service	N	N	N	N	N
Manufacturing and Production	N	N	N	N	N
Railroad Yards	N	N	N	N	N
Warehouse and Freight Movement	N	N	N	N	N
Waste-related	N	N	N	N	N
Wholesale Sales	N	N	N	N	N
INSTITUTIONAL CATEGORIES					
Basic Utilities [3]	L	L	L	L	L
Colleges	CU	CU	CU	P	P
Community Service	L[4]/CU	L[4]/CU	C[4]/CU	P	P
Daycare [5]	L	L	L	L	L
Medical Center	CU	CU	CU	CU	CU
Parks and Open Areas	P	P	P	P	P
Religious Institutions	L[6]/CU	L[6]/CU	L[6]/CU	P	P
Schools	L[7]/CU	L[7]/CU	L[7]/CU	P	P
OTHER CATEGORIES					
Agriculture	L[8]	N	N	N	N
Aviation and Surface Passenger	N	N	N	N	N

Terminals					
Detention Facilities	N	N	N	CU	CU
Essential Public Facilities	CU	CU	CU	CU	CU
Mining	N	N	N	N	N
Rail Lines and Utility Corridors	CU	CU	CU	CU	CU
((Wireless Communication Facilities [9]))	L/CU	L/CU	L/CU	L/CU	L/CU
Notes: * The use categories are described in chapter 17C.190 SMC . * Standards that correspond to the bracketed numbers [] are stated in SMC 17C.110.110 . * Specific uses and development may be subject to the standards in SMC 17C.320.080 .					

SECTION 5. That SMC 17C.320.080 is amended to read as follows:

[Section 17C.320.080](#) Decision Criteria

Decision criteria for conditional uses are stated in [SMC 17G.060.170](#). Those conditional uses with decision criteria in addition to that provided in [SMC 17G.060.170](#) are listed below. Requests for conditional uses will be approved if the hearing examiner finds that the applicant has shown that all of the decision criteria have been met.

- A. ~~((Wireless Communication Support Tower.~~
For conditional use permits to construct a wireless communication support tower the following additional criteria apply:
- ~~1. The need for the proposed wireless communication support tower shall be demonstrated if it is to be located in a residential zone or within three hundred feet of an existing residential lot. An evaluation of the operational needs of the wireless communications provider, alternative sites, alternative existing facilities upon which the proposed antenna array might be located, and co-location opportunities on existing support towers within one mile of the proposed site shall be provided. Evidence shall demonstrate that no practical alternative is reasonably available to the applicant.~~
 - ~~2. The proposed tower satisfies all of the provisions and requirements of [SMC 17C.355.030](#) and [SMC 17C.355.040](#).)~~ ~~[Deleted]~~
- B. Essential Public Facility.
For conditional use permits to site an essential public facility, the following additional criteria apply:
1. Before issuance of a conditional use permit, the applicant shall have complied with all applicable requirements for the siting of an essential public facility in accordance with state, regional and local mandates including the:
 - a. Spokane County Regional Siting Process for Essential Public Facilities, and
 - b. administrative procedures adopted as part of the interlocal agreement regarding siting of essential public facilities within Spokane County.
 2. Housing for persons with handicaps as defined under the Federal Fair Housing Act and children in the custody of the state, which housing includes "community facilities" as defined in RCW 72.05.020 and facilities licensed under chapter 74.15 RCW, are exempt from the Spokane County Regional Siting Process for Essential Public Facilities. Housing for juveniles held in county detention facilities or state juvenile institutions as defined in chapter 13.40 RCW is subject to the Spokane County Regional Siting Process for Essential Public Facilities.

3. Facilities of a similar nature must be equitably dispersed throughout the City.
- C. Secure Community Transition Facility.
- For a conditional use permit to site a secure community transition facility the following additional criteria must be met:
1. Before issuance of a conditional use permit, the applicant shall have complied with all applicable requirements for the siting of an essential public facility in accordance with state, regional and local mandates, including the:
 - a. Spokane County Regional Siting Process for Essential Public Facilities, and
 - b. administrative procedures adopted as part of the interlocal agreement regarding siting of essential public facilities within Spokane County.
 2. The siting of a secure community transition facility must comply with all provisions of state law, including requirements for public safety, staffing, security and training, and those standards must be maintained for the duration of the use.
 3. A secure community transition facility should be located on property of sufficient size and frontage to allow the residents an opportunity for secure on-site recreational activities typically associated with daily needs and residential routines.
 4. If state funds are available, the department of social and health services should enter into a mitigation agreement with the City of Spokane for training and the costs of that training with local law enforcement and administrative staff and local government staff, including training in coordination, emergency procedures, program and facility information, legal requirements and resident profiles.
 5. The applicant must show that the property meets all of the above requirements and, further, if more than one site is being considered, preference must be given to the site furthest removed from risk potential activities or facilities.
- D. Mining.
- For a conditional use permit for a mining use, the following additional criteria apply:
1. The minimum site size shall be three acres.
 2. The minimum setback shall be fifty feet from any property line; provided further, that such mining does not impair lateral or subjacent support or cause earth movements or erosions to extend beyond the exterior boundary lines of the mining site.
 3. Mining operations and associated buildings shall be located at least four hundred feet from a residential zone.
 4. An eight-foot site-obscurer fence shall be provided and maintained in good condition at all times on the exterior boundary of any portion of any site on which active operations exist and on the exterior boundary of any portion of the site which has been mined and not yet reclaimed.
 5. Sound levels, as measured on properties adjacent to a mining site, shall conform to the provisions of WAC 173-60-040, Maximum Permissible Environmental Noise Levels, for noise originating in a Class C RDNA (industrial zone).
 6. All mining and site reclamation activity shall be consistent with the Spokane Regional Clean Air Agency (SRCAA) air quality maintenance requirements.
 7. A reclamation plan approved by the Washington state department of natural resources (DNR) shall be submitted with the conditional use application. The plan shall be prepared consistent with the standards set forth in chapter 78.44 RCW. DNR shall have the sole authority to approve reclamation plans. Upon the exhaustion of minerals or upon the permanent abandonment of mining operations, the mined excavation must be rehabilitated or reclaimed consistent with the approved reclamation plan.
 8. Upon the exhaustion of minerals or materials in the mining use or upon the permanent abandonment of the mining use, all buildings, structures, apparatus or appurtenances accessory to the mining operation shall be removed or otherwise dismantled. Abandonment shall be deemed to have occurred after one year of cessation of all extraction operations.

9. Reclamation shall be complete within one year after the mining operations have ceased or after abandonment of the mining use. The reclamation of the site shall be consistent with the department of natural resources approved site reclamation plan.
 10. To provide for protection of groundwater and surface water, during and after operation, mining shall not be allowed to penetrate below an elevation ten feet above the highest known elevation of an aquifer within the Spokane Valley-Rathdrum Prairie Aquifer area.
 11. The primary reduction and processing of minerals or materials are high impact uses. These uses include, but are not limited to, concrete batching, asphalt mixing, rock crushing, brick, tile and concrete products manufacturing plants, and the use of accessory minerals and materials from other sources necessary to convert the minerals or materials to marketable products. These uses shall be located a minimum of six hundred feet from the boundary of a residential or commercial zone.
 12. The monitoring and clean-up of contaminants shall be ongoing. The mine operator shall comply with all existing water quality monitoring regulations of the Washington state department of ecology and the Spokane county regional health district.
- E. Retail Sales and Service Uses within Industrial Zone.
For a conditional use permit for a retail sales and service use in an industrial zone, the following additional criteria apply:
1. The use shall serve primarily other businesses and the use will contribute to the enhancement of the industrial character of the area and further the purpose of the industrial zone.
- F. Institutional and Other Uses in Residential Zones.
These approval criteria apply to all conditional uses in RA through RHD zones. The approval criteria allows institutional uses (including expansions of existing facilities), allows increases to the maximum occupancy of group living, and permits other non-residential household living uses in a residential zone. These types of uses must maintain or do not significantly conflict with the appearance and function of residential areas. The approval criteria are:
1. Proportion of Residential Household Living Uses.
The overall residential appearance and function of the area will not be significantly lessened due to the increased proportion of uses not in the residential household living category in the residential area. Consideration includes the proposal by itself and in combination with other uses in the area not in the residential household living category and is specifically based on the:
 - a. number, size and location of other uses not in the residential household living category in the residential; and
 - b. intensity and scale of the proposed use and of existing residential household living uses and other uses.
 2. Physical Compatibility.
 - a. The proposal will be compatible with adjacent residential developments based on characteristics such as the site size, building scale and style, setbacks and landscaping; or
 - b. The proposal will mitigate differences in appearance or scale through such means as setbacks, screening, landscaping and other design features.
 3. Livability.
The proposal will not have significant adverse impacts on the livability of nearby residential zoned lands due to:
 - a. noise, glare from lights, late-night operations, odors and litter; and
 - b. privacy and safety issues.
 4. Public Services.
 - a. The proposed use is in conformance with the street designations of the transportation element of the comprehensive plan.

- b. The transportation system is capable of supporting the proposed use in addition to the existing uses in the area. Evaluation factors include:
 - i. street capacity, level of service and other performance measures;
 - ii. access to arterials;
 - iii. connectivity;
 - iv. transit availability;
 - v. on-street parking impacts;
 - vi. access restrictions;
 - vii. neighborhood impacts;
 - viii. impacts on pedestrian, bicycle and transit circulation;
 - ix. safety for all modes; and
 - x. adequate transportation demand management strategies.
 - c. Public services for water supply, police and fire protection are capable of serving the proposed use, and proposed sanitary waste disposal and stormwater disposal systems are acceptable to the engineering services department.
- G. Alternative or Post Incarceration Facilities – Group Living.

These criteria apply to group living uses that consist of alternative or post incarceration facilities in the RA through the RHD zones.

 - 1. Physical Compatibility.
 - a. The proposal will preserve any City-designated scenic resources; and
 - b. The appearance of the facility is consistent with the intent of the zone in which it will be located and with the character of the surrounding uses and development.
 - 2. Livability.

The proposal will not have significant adverse impacts on the livability of nearby residential-zoned lands due to:

 - a. noise, glare from lights, late-night operations, odors and litter; and
 - b. privacy and safety issues.
 - 3. Public Services.
 - a. The proposed use is in conformance with the street designations in the transportation element of the comprehensive plan.
 - b. The transportation system is capable of supporting the proposed use in addition to the existing uses in the area. Evaluation factors include:
 - i. street capacity, level of service or other performance measures;
 - ii. access to arterials;
 - iii. connectivity;
 - iv. transit availability;
 - v. on-street parking impacts;
 - vi. access restrictions;
 - vii. neighborhood impacts;
 - viii. impacts on pedestrian, bicycle and transit circulation; and
 - ix. safety for all modes; and
 - c. Public services for water supply, police and fire protection are capable of serving the proposed use, and proposed sanitary waste disposal and stormwater disposal systems are acceptable to the engineering services department.
 - 4. Safety.

The facility and its operations will not pose an unreasonable safety threat to nearby uses and residents.
- H. Detention Facilities.

These approval criteria ensure that the facility is physically compatible with the area in which

it is to be located and that the safety concerns of people on neighboring properties are addressed. The approval criteria are:

1. Appearance.
The appearance of the facility is consistent with the intent of the zone in which it will be located and with the character of the surrounding uses and development.
2. Safety.
The facility and its operations will not pose an unreasonable safety threat to nearby uses and residents.
3. Public Services.
 - a. The proposed use is in conformance with the street designations shown in the transportation element of the comprehensive plan.
 - b. The transportation system is capable of supporting the proposed use in addition to the existing uses in the area. Evaluation factors include:
 - i. street capacity, level of service or other performance measures;
 - ii. access to arterials;
 - iii. connectivity;
 - iv. transit availability;
 - v. on-street parking impacts;
 - vi. access restrictions;
 - vii. neighborhood impacts;
 - viii. impacts on pedestrian, bicycle and transit circulation; and
 - ix. safety for all modes; and
 - c. Public services for water supply, police and fire protection are capable of serving the proposed use, and proposed sanitary waste disposal and stormwater disposal systems are acceptable to the engineering services department.
- I. Master Campus Plan.
These approval criteria apply to hospitals, colleges and universities, religious institutions and government complexes that develop in a campus setting. The purpose of master campus plan is to recognize the long-range development plans of those institutions and allow for a single integrated review of a campus development plan while allowing for a comprehensive review of facilities serving the site and impacts on neighboring residential areas. Through the master campus plan, these entities prepare master plans for their entire campus to facilitate orderly growth of the institution and assure its compatibility with the surrounding neighborhood.
 1. Eligibility.
All property owned or controlled by a major institution, including all property owned or controlled by the major institution within one-half mile of the primary site. Adjoining property owners may also agree to be included in the master campus plan if the use of their property is functionally related to the institution.
 2. Submittal Requirements.
In addition to the submittal requirements for a Type III application, a master plan of the proposed campus is required to be submitted. The master plan is a long range development plan that would show the long range intent for building locations, uses, circulation, parking, landscape detail, lighting and treatment of the perimeter of the campus area.
 3. Approval Criteria.
 - a. Physical Compatibility.
 - i. The proposal will be compatible with adjacent residential developments based on characteristics such as the site size, building scale and style, setbacks and landscaping; or

- ii. The proposal will mitigate differences in appearance or scale through such means as setbacks, screening, landscaping and other design features.
 - b. Livability.
The proposal will not have significant adverse impacts on the livability of nearby residential zoned lands due to:
 - i. noise, glare from lights, late-night operations, odors and litter; and
 - ii. privacy and safety issues.
 - 4. Development Permits.
After a master campus plan is approved, the institution may then make such improvements as are consistent with the master plan, with only normal development permits being required.
 - 5. Master Plan Amendment.
It is expected that the master campus plan will undergo modification. Such modifications may involve the expansion or relocation of the campus boundary, alteration/addition of uses or other changes. Master plan amendments shall be reviewed as a Type III permit application, subject to the same procedural requirements or as prescribed in subsection (I)(6) of this section.
 - 6. Master Campus Plan Minor Adjustments.
In the issuance of building permits for construction within an approved major campus plan, minor adjustments to the plan may be made consistent with the provisions of [SMC 17G.060.230](#).
- J. Office.
These approval criteria apply to offices allowed as a conditional use permit in the RMF and RHD zones.
- 1. Uses in the Office land use category of [SMC 17C.190.250](#) may be allowed by a Type III conditional use permit approval in the RMF and RHD zone subject to the following criteria:
 - a. The property must have frontage on a principal arterial.
 - b. The subject property is adjacent to or immediately across the street from an existing commercial zone.
 - c. Uses permitted in the Office land use category may not be developed to a depth greater than two hundred fifty feet.
 - d. Ingress and/or egress onto a local access street are not permitted unless the City traffic engineer determines that there is no alternative due to traffic volumes, site visibility and traffic safety.
 - e. All structures shall have size, scale, and bulk similar to residential uses as provided in [SMC 17C.110.500](#), Institutional Design Standards.
 - f. The development standards of the underlying zone shall apply to the use.
 - g. Drive-thru facilities are prohibited, except as allowed by the hearing examiner.

SECTION 6. That SMC 17C.130.220 is amended to read as follows:

[Section 17C.130.220](#) Height

- A. Purpose
The height limits are intended to control the overall scale of buildings. The height limits for sites near residential zones discourage buildings that visually dominate adjacent residential zones. Light, air, and potential for privacy are intended to be preserved in residential zones that are close to industrial zones.

B. Height Standards

The height standards for all structures are stated in [Table 17C.130-2](#). Exceptions to the maximum height standard are stated below.

1. Maximum Height.

Exceptions to the maximum structure height are designated on the official zoning map by a dash and a height listed after the zone map symbol (i.e., CB-150).

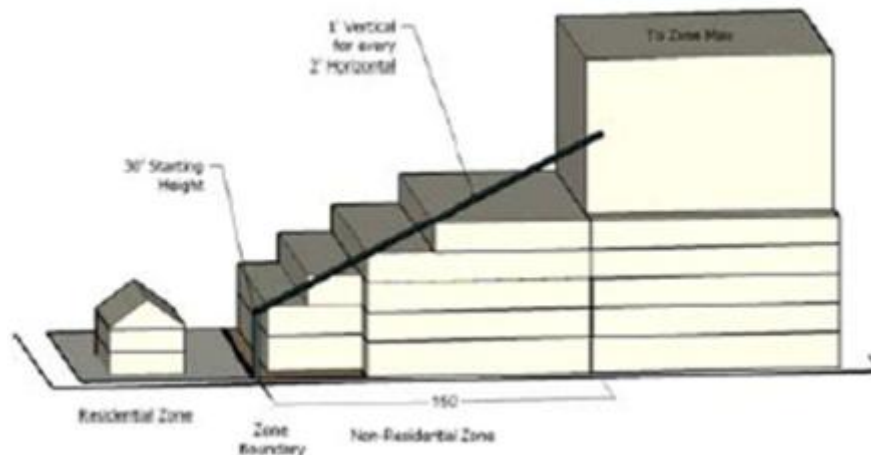
Changes to the height limits require a rezone. Height limits are thirty-five feet, forty feet, fifty-five feet, seventy feet or one hundred fifty feet depending on location.

2. Buildings and structures for uses that are not classified as industrial uses within the Industrial Categories of [Table 17C.130-1](#) and that are over fifty feet in height must follow the design, setback and dimensional standards found in [chapter 17C.250 SMC](#), Tall Building Standards.

3. Adjacent to Single-family and Two-family Residential Zones.

To provide a gradual transition and enhance the compatibility between the more intensive industrial zones and adjacent single-family and two-family residential zones:

- a. For all development within one hundred fifty feet of any single-family or two-family residential zone the maximum building height is as follows: Starting at a height of thirty feet at the residential zone boundary, additional building height may be added at a ratio of one to two (one foot of additional building height for every two feet of additional horizontal distance from the closest single-family or two-family residential zone). The building height transition requirement ends one hundred fifty feet from the single-family or two-family residential zone and then full building height allowed in the zone applies.



4. Projections Allowed.

Chimneys, flag poles, satellite receiving dishes and other items similar with a width, depth or diameter of five feet or less may rise ten feet above the height limit, or five feet above the highest point of the roof, whichever is greater. If they are greater than five feet in width, depth or diameter, they are subject to the height limit.

5. Rooftop Mechanical Equipment.

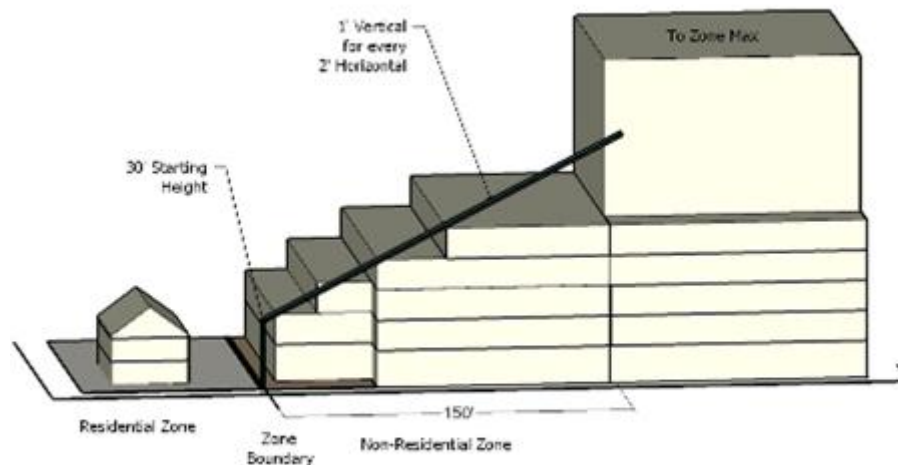
All rooftop mechanical equipment must be set back at least fifteen feet from all roof edges that are parallel to street lot lines and roof lines facing an abutting residential zone. Elevator mechanical equipment may extend up to sixteen feet above the height limit. Other rooftop mechanical equipment, which cumulatively covers no more than ten percent of the roof area, may extend ten feet above the height limit.

6. Radio and television antennas, utility power poles and public safety facilities are exempt from the height limit except as provided in (([chapter 17C.355 SMC](#))) [chapter 17C.355A.SMC](#), Wireless Communication Facilities.
- C. Special Height Districts
Special height districts are established to control building heights under particular circumstances such as preservation of public view or airport approaches. See [chapter 17C.170 SMC](#), Special Height Overlay Districts and [chapter 17C.180.SMC](#), Airfield Overlay Zones.

SECTION 7. That SMC 17C.120.220 is amended to read as follows:

[Section 17C.120.220](#) Height

- A. Purpose
The height limits are intended to control the overall scale of buildings. The height limits in the O, NR and NMU zones discourage buildings that visually dominate adjacent residential areas. The height limits in the OR, CB and GC zones allow for a greater building height at a scale that generally reflects Spokane's commercial areas. Light, air and the potential for privacy are intended to be preserved in single-family residential zones that are close to commercial zones.
- B. Height Standards
The height standards for all structures are stated in [Table 17C.120-2](#). Exceptions to the maximum height standard are stated below.
 1. Maximum Height.
Exceptions to the maximum structure height are designated on the official zoning map by a dash and a height listed after the zone map symbol (i.e., CB-150). Changes to the height limits require a rezone. Height limits are thirty-five feet, forty feet, fifty-five feet, seventy feet or one hundred fifty feet depending on location.
 2. Buildings and structures over fifty feet in height must follow the design, setback and dimensional standards found in [chapter 17C.250 SMC](#), Tall Building Standards.
 3. Adjacent to Single-family and Two-family Residential Zones.
To provide a gradual transition and enhance the compatibility between the more intensive commercial zones and adjacent single-family and two-family residential zones:
 - a. For all development within one hundred fifty feet of any single-family or two-family residential zone the maximum building height is as follows:
 - i. Starting at a height of thirty feet at the residential zone boundary additional building height may be added at a ratio of 1 to 2 (one foot of additional building height for every two feet of additional horizontal distance from the closest single-family or two-family residential zone). The building height transition requirement ends one hundred fifty feet from the single-family or two-family residential zone and then full building height allowed in the zone applies.



4. Projections Allowed.
Chimneys, flag poles, satellite receiving dishes, and other similar items with a width, depth or diameter of five feet or less may rise ten feet above the height limit, or five feet above the highest point of the roof, whichever is greater. If they are greater than five feet in width, depth or diameter, they are subject to the height limit.
 5. Rooftop Mechanical Equipment.
All rooftop mechanical equipment must be set back at least fifteen feet from all roof edges that are parallel to street lot lines. Elevator mechanical equipment may extend up to sixteen feet above the height limit. Other rooftop mechanical equipment which cumulatively covers no more than ten percent of the roof area may extend ten feet above the height limit.
 6. Radio and television antennas, utility power poles, and public safety facilities are exempt from the height limit except as provided in ([chapter 17C.355 SMC](#)) [chapter 17C.355A SMC](#), Wireless Communication Facilities.
- C. Special Height Districts
Special height districts are established to control structure heights under particular circumstances such as preservation of public view or airport approaches. See [chapter 17C.170 SMC](#), Special Height Overlay Districts.

SECTION 8. That SMC 17C.110.215 is amended to read as follows:

[Section 17C.110.215](#) Height

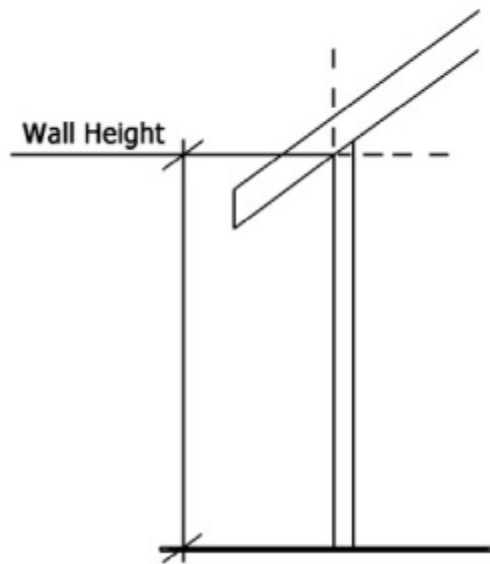
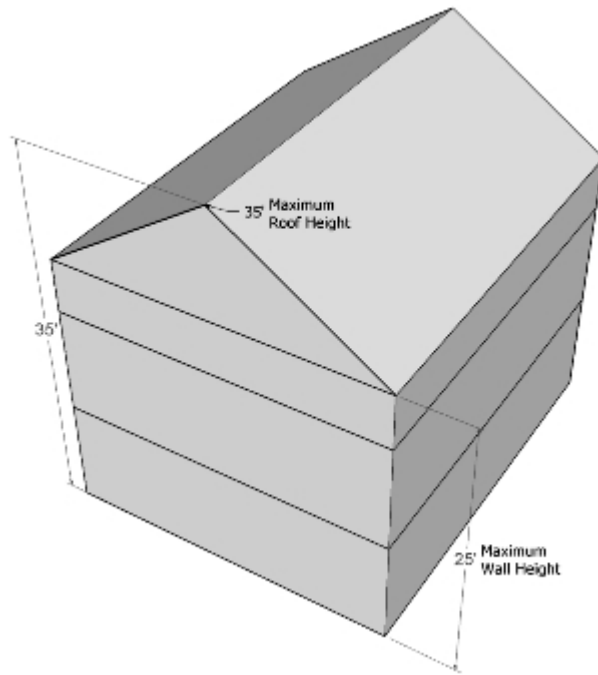
- A. Purpose.
The height standards promote a reasonable building scale and relationship of one residence to another and they promote privacy for neighboring properties. The standards contained in this section reflect the general building scale and placement of houses in the City's neighborhoods.
- B. Height Standards.
The maximum height standards for all structures are stated in [Table 17C.110-3](#). The building height shall be measured using the following method:
 1. The height shall be measured at the exterior walls of the structure. Measurement shall be taken at each exterior wall from the existing grade or finished grade,

whichever is lower, up to a plan essentially parallel to the existing or finished grade. For determining structure height, the exterior wall shall include a plane between the supporting members and between the roof and the ground. The vertical distance between the existing grade, or finished grade, if lower, and the parallel plan above it shall not exceed the maximum height of the zone.

2. When finished grade is lower than existing grade, in order for an upper portion of an exterior wall to avoid being considered on the same vertical plan as a lower portion, it must be set back from the lower portion a distance equal to two times the difference between the existing and finished grade on the lower portion of the wall.
3. Depressions such as window wells, stairwells for exits required by other codes, "barrier free" ramps on grade, and vehicle access driveways into garages shall be disregarded in determining structure height when in combination they comprise less than fifty percent of the facade on which they are located. In such cases, the grade for height measurement purposes shall be a line between the grades on either side of the depression.
4. No part of the structure, other than those specifically exempted or excepted under the provisions of the zone, shall extend beyond the plan of the maximum height limit.
5. Underground portions of the structure are not included in height calculations. The height of the structure shall be calculated from the point at which the sides meet the surface of the ground.
6. For purposes of measure building height in residential zones, the following terms shall be interpreted as follows:
 - a. "Grade" means the ground surface contour (see also "existing grade" and "finished grade").
 - b. "Fill" means material deposited, placed, pushed, pulled or transported to a place other than the place from which it originated.
 - c. "Finished grade" means the grade upon completion of the fill or excavation.
 - d. "Excavation" means the mechanical removal of earth material.
 - e. "Existing grade" means the natural surface contour of a site, including minor adjustments to the surface of the site in preparation for construction.

TABLE 17C.110.215-1 MAXIMUM HEIGHT	
Maximum Wall Height [1]	25 ft.
Maximum Roof Height [2]	35 ft.
[1] The height of the lowest point of the roof structure intersects with the outside plane of the wall. [2] The height of the ridge of the roof. See "Example A" below.	

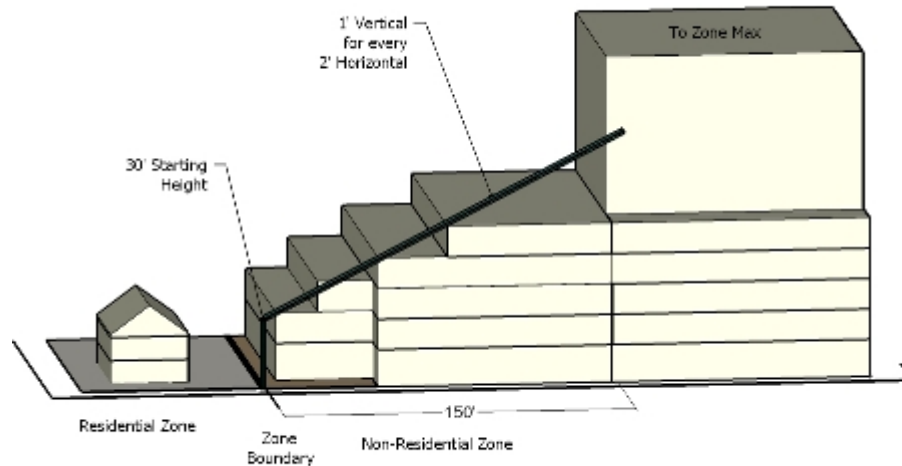
C. Example A



C. Exceptions to the maximum height standard are stated below:

1. Exceptions to the maximum structure height in the RMF and RHD zones are designated on the official zoning map by a dash and a height listed after the zone map symbol (i.e., CB-150). Changes to the height limits in the RMF and RHD zones require a rezone. Height limits are thirty feet, thirty-five feet, forty feet, fifty-five feet, seventy feet, or one hundred fifty feet depending on location.

2. Buildings and structures over fifty feet in height must follow the design, setback and dimensional standards found in [chapter 17C.250 SMC](#), Tall Building Standards
3. Adjacent to Single-family and Two-family Residential Zones.
To provide a gradual transition and enhance the compatibility between the more intensive commercial zones and adjacent single-family and two-family residential zones:
 - a. for all development within one hundred fifty feet of any single-family or two-family residential zone the maximum building height is as follows:
 - i. Starting at a height of thirty feet, the residential zone boundary additional building height may be added at a ratio of one to two (one foot of additional building height for every two feet of additional horizontal distance from the closest single-family or two-family residential zone). The building height transition requirement ends one hundred fifty feet from the single-family or two-family residential zone and then full building height allowed in the zone applies.



4. Projections Allowed.
Chimneys, flagpoles, satellite receiving dishes and other similar items with a width, depth or diameter of three feet or less may extend above the height limit, as long as they do not exceed three feet above the top of the highest point of the roof. If they are greater than three feet in width, depth or diameter, they are subject to the height limit.
5. Farm Buildings.
Farm buildings such as silos, elevators and barns are exempt from the height limit as long as they are set back from all lot lines at least one foot for every foot in height.
6. Utility power poles and public safety facilities are exempt from the height limit.
7. Radio and television antennas are subject to the height limit of the applicable zoning category.
8. Wireless communication support towers are subject to the height requirements of (~~chapter 17C.355 SMC~~) [chapter 17C.355A SMC](#), Wireless Communication Facilities.

9. Uses approved as a conditional use may have building features such as a steeple or tower which extends above the height limit of the underlying zone. Such building features must set back from the side property line adjoining a lot in a residential zone a distance equal to the height of the building feature or one hundred fifty percent of the height limit of the underlying zone, whichever is lower.
- D. Special Height Districts.
Special height districts are established to control structure heights under particular circumstances such as preservation of public view or airport approaches. See [chapter 17C.170 SMC](#), Special Height Overlay Districts.
- E. Accessory Structures.
The height of any accessory structure located in the rear yard, including those attached to the primary residence, is limited to twenty feet in height, except a detached ADU above a detached accessory structure may be built to twenty-three feet in height.

SECTION 9. That SMC 17C.124.220 is amended to read as follows:

[Section 17C.124.220](#) Height & Massing

- A. Purpose.
The height and massing standards control the overall scale of buildings. These standards downtown allow for building height and mass at a scale that generally reflects the most intensive area within the City. The standards help to preserve light, air, and the potential for privacy in lower intensity residential zones that are adjacent to the downtown zones.
- B. Height and Massing Standards.
The height and massing standards for all structures are stated in [Table 17C.124-2](#) and as shown on the zoning map. Bonus height may be allowed as defined in [SMC 17C.124.220\(E\)](#). The Bonus height provisions are not available within downtown zones that have a maximum height specified on the zoning map by a dash and a maximum height specified after the zone map symbol (i.e. DTG-100).
 1. Changes to the Maximum Height Provisions.
Changes to the height limits are not allowed outside of a downtown plan update process.
 2. Pitched roof forms and accessible decks may extend above the height limit; however, if the space within the pitched roof is habitable, it shall only be used for residential purposes.
 3. Projections Allowed.
Chimneys, flag poles, satellite receiving dishes, and other similar items with a width, depth, or diameter of five feet or less may rise ten feet above the height limit, or five feet above the highest point of the roof, whichever is greater. If they are greater than five feet in width, depth, or diameter, they are subject to the height limit.
 4. Rooftop Mechanical Equipment.
All rooftop mechanical equipment must be set back at least fifteen feet from all roof edges visible from streets. Elevator mechanical equipment may extend up to sixteen feet above the height limit. Other rooftop mechanical equipment which cumulatively covers no more than ten percent of the roof area may extend ten feet above the height limit.

5. Radio and television antennas, utility power poles, and public safety facilities are exempt from the height limit except as provided in (~~chapter 17C.355 SMC~~)chapter 17C.355A.SMC, Wireless Communication Facilities.
 6. Architectural Projections.
The height limits do not apply to uninhabitable space under four hundred square feet in floor area that is devoted to decorative architectural features such as belfries, spires, and clock towers.
 7. Ground Floor Allowed Height.
The first story of the building may be up to twenty-five feet tall and still count as only one story.
- C. Special Height Districts.
Special height districts are established to control structure heights under particular circumstances such as preservation of public view or airport approaches and protection. See [chapter 17C.170 SMC](#), Special Height Overlay Districts.
- D. Downtown West End Special Height District.
For the properties shown in Figure 17C.124.220-1 that are located in the area generally west of Monroe Street, east of Cedar Street, and between Main Avenue and Riverside Avenue, the maximum height shall be as shown in Figures 17C.124.220-1 and 17C.124.220-2.

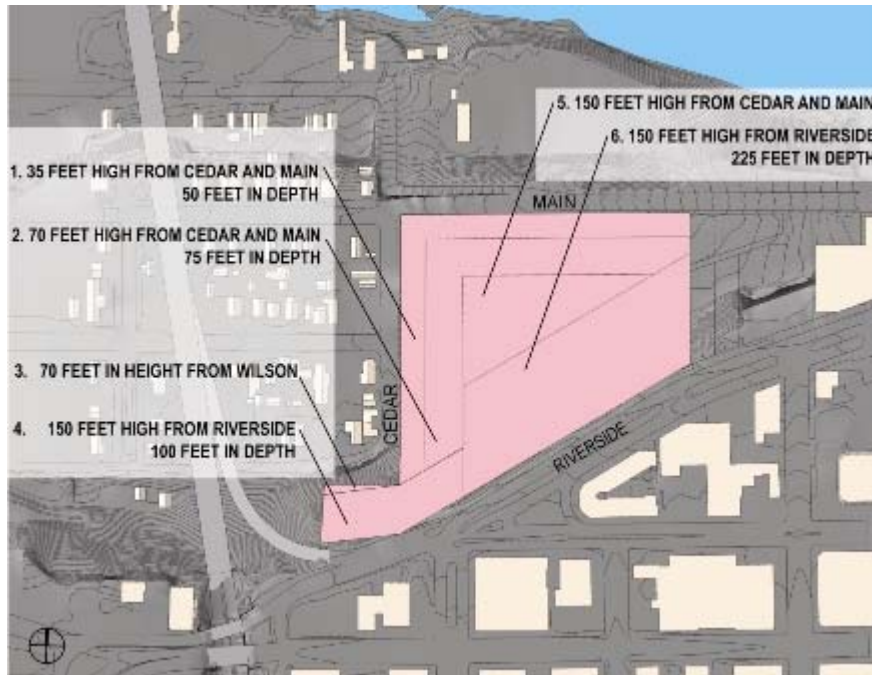


Figure 17C.124.220-1

Notes for Figure 17C.124.220-1.

1. Thirty-five feet high from Cedar Street and Main Avenue street grade (highest street elevation fronting the parcel). Horizontally, fifty feet in depth from Cedar Street and Main Avenue right-of-way/property line.
2. Seventy feet high from Cedar Street and Main Avenue street grade (highest street elevation fronting the parcel). Horizontally, seventy-five feet in depth beginning fifty feet from the Cedar Street and Main Avenue right-of-way/property line.

3. Seventy feet in height from Wilson Avenue street grade (highest street elevation fronting the parcel).
4. One hundred fifty feet high from Riverside Avenue street grade (highest street elevation fronting the parcel). Horizontally, one hundred feet in depth from the Riverside Avenue right-of-way/property line.
5. One hundred fifty feet high from Cedar Street and Main Avenue street grade (highest street elevation fronting the parcel).
6. One hundred fifty feet high from Riverside Avenue street grade (highest street elevation fronting the parcel). Horizontally, two hundred twenty-five feet in depth from the Riverside Avenue right-of-way/property line.

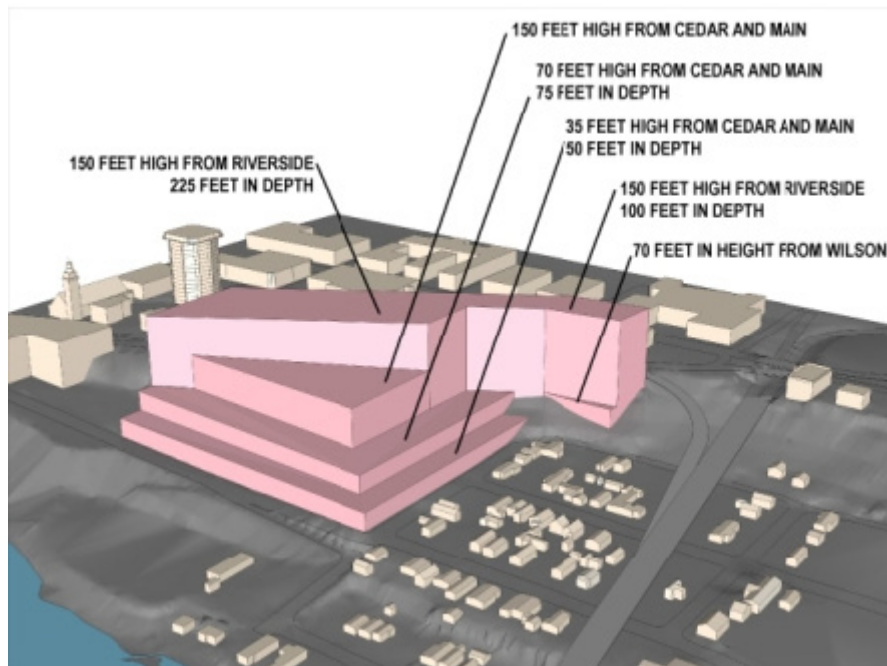
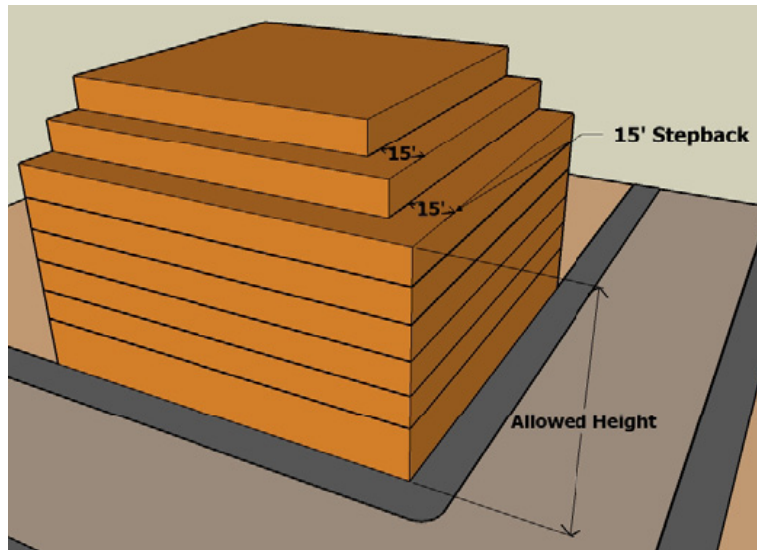


Figure 17C.124.220-2

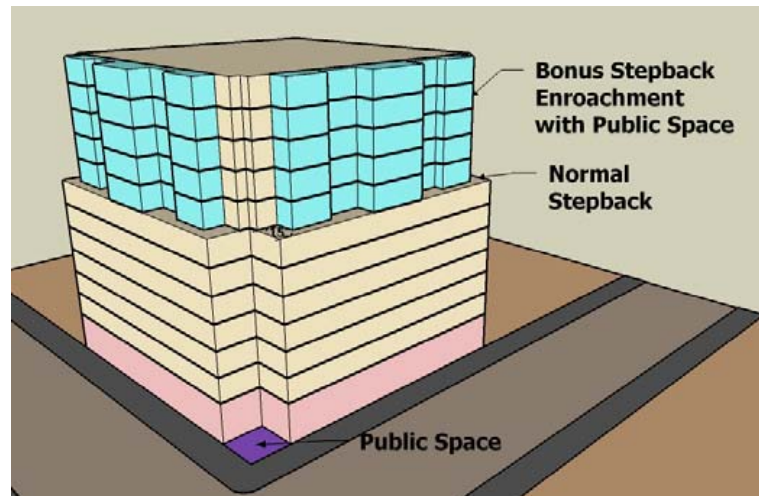
E. Additional Height Within Specific Height Designation Areas.

Additional stories for structures where the maximum height is specified with a dash after the zoning map symbol (i.e. DTG-70).

1. One additional story is allowed for every fifteen feet of upper story structure setback from a street lot line, up to the maximum number of stories allowed in the zone without a maximum height specified.



2. In the DTC-100 zone one additional story is allowed for every fifteen feet of upper story structure setback from Spokane Falls Boulevard. There is no upper story structure setback required from street lot lines that are not adjacent to Spokane Falls Boulevard after the first fifteen feet of upper story structure setback from Spokane Falls Boulevard.
- F. Structure Standards Above the Seventh Above Ground Story.
These standards are designed to transition the building bulk and mass for buildings exceeding seven stories in the DTG, DTU, and DTS zones.
2. Upper Story Setback.
All stories above the seventh story shall be setback from all property lines and street lot lines a minimum of fifteen feet.
 3. Exception.
The provision of an exterior public space as defined below allows for encroachment into the upper story setback. The allowed area of encroachment may not exceed an area equal to five times the area of the exterior public space.
Exterior Public Space(s) – A Plaza or Courtyard With a Minimum Area of Two Hundred Square Feet.
A plaza or a courtyard is a level space accessible to the public, at least ten feet in width, with a building façade on at least one side. The elevation of the courtyard or plaza shall be within thirty inches of the grade of the sidewalk providing access to it. For courtyards, at least sixty percent of the green shall be planted with trees, ground cover and other vegetation. For plazas, at least fifteen percent, but no more than sixty percent of the space shall be planted with trees, ground cover and other vegetation. Courtyards and plazas shall also include seating, pedestrian-scale lighting, decorative paving, and other pedestrian furnishings. The use of artists to create fixtures and furnishings is strongly encouraged.



G. Bonus Height.

The bonus height provisions are not available within specially designated height areas or the downtown zones that have a maximum height specified on the zoning map by a dash and a maximum height specified after the zone map symbol (i.e. DTG-100).

Additional bonus stories may be achieved if a development incorporates specified and described public amenities allowing bonus height and stories above the number of stories allowed outright in the zone. The bonus stories are in addition to what is specified in [Table 17C.124-2](#). The number of stories above the number of stories allowed outright may be increased through a ministerial process intended to ensure that each amenity both satisfies design criteria and serves a public purpose in the proposed location. Amenities provided must be associated with the use for which the height increase is sought. Proposed amenities shall have a public benefit that is appropriate considering the height increase being achieved.

0. Structure Standards for Stories Above the Twelfth Above Ground Story.

These standards are designed to transition the apparent building height and mass for buildings that exceed twelfth stories in the DTG, DTU, and DTS zones. All stories above the twelfth story must meet the following standards. The following floor area and maximum diagonal plan tower dimension shall be measured from the inside face of the outside wall.

- a. On sites less than or equal to thirty-four thousand square feet in size:
 - i. the maximum tower floor plate area per site is twelve thousand square feet;
 - ii. the maximum tower diagonal plan dimension is one hundred fifty feet.
- b. On sites over thirty-four thousand square feet in size:
 - i. the maximum tower floor plate area per site is thirty-six percent of the total site area;
 - ii. the maximum tower diagonal plan dimension is based upon the following formula: Maximum tower diagonal plan dimension = (Square Root of (Site Area x 2)) x 0.6).

1. Bonus Height Provisions.

- a. The following items qualify for addition structure height.
 - i. Permanent Affordable Housing.
Structure envelop devoted to permanent affordable household living space (housing units affordable to households making less than eighty percent of area median income for the City as defined by HUD) is not subject to a height or story limit.
 - ii. Affordable Housing Building Volume Bonus.
An area equal to the area devoted to permanent affordable housing that lies below the twelfth story may be added above the twelfth story in residential use that is not affordable housing.
 - iii. Historic Landmark Transfer of Development Right (TDR).
Subject to the requirements of [chapter 17D.070 SMC](#), Transfer of Development Rights, additional building height and gross floor area may be transferred from a building on the Spokane register of historic places that is within a downtown zone to a new development within a downtown zone. The TDR may be transferred from a historic landmark located on the same site or from a historic landmark located on a separate site.
- b. Two Story Bonus.
The following items each qualify for two bonus stories.
 - i. Ground Floor Uses that “Spill” onto Adjacent Streets.
One ground floor use that “spills” (single use) per one hundred foot of structure street frontage.

Preferred uses include retail sales and service or entertainment use, or any combination thereof, located on the ground floor with direct access and fronting on a street.
 - ii. Canopy Covering at Least Fifty Percent of Adjacent Frontage Over Public Sidewalk.
A virtually continuous canopy structure. A canopy is a permanent architectural element projecting out from a building facade over a sidewalk or walkway. A canopy shall be at least five feet in horizontal width and be no less than eight feet and no more than twelve feet above grade.
 - iii. Alley Enhancements.
Decorative paving, pedestrian-scaled lighting, special paving, and rear entrances intended to encourage pedestrian use of the alley.
 - iv. Additional Streetscape Features.
Seating, trees, pedestrian-scaled lighting, and special paving in addition to any that are required by the design standards and guidelines.
 - v. Small Scale Water Feature.
A small scale minor water feature integrated within an open space or plaza between the structure and public sidewalk. Small scale minor water features are generally designed to be viewed but not physically interacted with.
 - vi. Incorporating Historic Features and Signage.
Including historic plaques or markings about the local area or site.

- Reusing historic building elements and features on the site. Reusing existing landmark signs.
- vii. Incorporating Bicycle Parking Enhancements.
Providing covered bicycle parking for all required bicycle parking along with other bicycle amenities such as secured bicycle lockers and equipment storage facilities.
- c. Four Story Bonus.
The following items qualify for four bonus stories each.
- i. Additional Building Stepback Above the Seventh Floor.
An additional ten feet of upper floor stepback from the street lot lines.
 - ii. Preferred Materials in Pedestrian Realm.
Use of brick and stone on the building facades that face streets on the first three stories of the building.
 - iii. Multiple Ground Floor Uses that “Spill” onto Adjacent Streets.
One ground floor use that “spills” per thirty feet of structure street frontage. Preferred uses include retail sales and service or entertainment use, or any combination thereof, located on the ground floor with direct access and fronting on a street.
 - iv. Major Exterior Public Spaces/Plaza.
A plaza or courtyard, with a minimum area of four hundred square feet or one percent of the site size, whichever is greater. A plaza or a courtyard is a level space accessible to the public, at least ten feet in width, with a building façade on at least one side. The elevation of the courtyard or plaza shall be within thirty inches of the grade of the sidewalk providing access to it. For courtyards, at least sixty percent of the green shall be planted with trees, ground cover and other vegetation. For plazas, at least fifteen percent, but no more than sixty percent of the space shall be planted with trees, ground cover and other vegetation. Courtyards and plazas shall also include seating, pedestrian-scale lighting, decorative paving and other pedestrian furnishings. The use of artists to create fixtures and furnishings is strongly encouraged.
 - v. Workforce Housing Greater Than Twenty-five Percent of the Total Number of Housing Units.
For this bonus, the housing units shall be affordable to households earning one hundred twenty percent or less of area medium income (AMI). For homes to be purchased the total housing payment (principal, interest, taxes, and insurance, PITI) shall be no more than thirty-three percent of income. For rental housing the rent plus utilities shall be no more than thirty percent of income.
 - vi. Public Art.
Public art includes sculptures, murals, inlays, mosaics, and other two-dimensional or three-dimensional works, as well as elements integrated into the design of a project (e.g., fountain) that are designed and crafted by one or more artists. Such artists must be listed on a registry of either the Washington state arts commission or the Spokane arts commission. To receive the bonus, public art must be documented at a value that is at least one percent of the construction value of the bonus stories.

- vii. Through-block Pedestrian Connections.
Through-block pedestrian connection providing a continuous walkway accessible to the public, at least ten feet in width, paved with decorative paving and lighted for nighttime use. It may be covered or open to the sky.
 - viii. Major Water Feature.
A major water feature integrated within an open space or plaza between the structure and public sidewalk. A major water feature is designed to be viewed and is large enough to be physically interacted with by the public. It shall be at least ten square feet in size as measure in plan view.
 - ix. Green/Living Roof.
A planted area of a roof covering greater than fifty percent of the roof surface.
- d. Eight Story Bonus.
The following items qualify for eight bonus stories each.
- i. Workforce Housing Greater Than Fifty Percent of the Total Number of Housing Units.
For this bonus, the housing units shall be affordable to households earning one hundred twenty percent or less of area medium income (AMI). For homes to be purchased the total housing payment (principal, interest, taxes, and insurance, PITI) shall be no more than thirty-three percent of income. For rental housing the rent plus utilities shall be no more than thirty percent of income.
 - ii. Bicycle Commuter Shower Facilities.
Structures containing two hundred thousand square feet or more of office gross floor area shall include shower facilities and clothing storage areas for bicycle commuters. One shower per gender shall be required. Such facilities shall be for the use of the employees and occupants of the building, and shall be located where they are easily accessible to parking facilities for bicycles.

SECTION 10. That SMC 17A.020.010 is amended to read as follows:

Section 17A.020.010 "A" Definitions

- A. Abandoned Sign Structure.
A sign structure where no sign has been in place for a continuous period of at least six months.
- B. Aboveground Storage Tank or AST.
Any one or connected combination of tanks that is used to contain an accumulation of liquid critical materials and the aggregate volume of which (including the volume of piping connected thereto) is more than sixty gallons and the entire exterior surface area of the tank is above the ground and is able to be fully visually inspected. Tanks located in vaults or buildings that are to be visually inspected are considered to be aboveground tanks.
- C. Accepted.
A project for which the required plans have been found to be technically adequate.
- D. Accessory Dwelling Unit (ADU).
An accessory dwelling unit is a separate additional living unit, including separate kitchen, sleeping, and bathroom facilities, attached or detached from the primary residential unit, on a single-family lot. ADUs are known variously as:

1. "Mother-in-law apartments,"
 2. "Accessory apartments," or
 3. "Second units."
- E. Accessory Structure.
A structure of secondary importance or function on a site. In general, the primary use of the site is not carried on in an accessory structure.
1. Accessory structures may be attached or detached from the primary structure.
 2. Examples of accessory structures include:
 - a. Garages,
 - b. Decks,
 - c. Fences,
 - d. Trellises,
 - e. Flagpoles,
 - f. Stairways,
 - g. Heat pumps,
 - h. Awnings, and
 - i. Other structures.
 3. See also [SMC 17A.020.160](#) ("Primary Structure").
- F. Accessory Use.
A use or activity which is a subordinate part of a primary use and which is clearly incidental to a primary use on a site.
- G. Activity.
See Regulated Activity.
- H. Administrative Decision.
A permit decision by an officer authorized by the local government. The decision may be for approval, denial, or approval with conditions and is subject to the applicable development standards of the land use codes or development codes.
- I. Adult Bookstore or Adult Video Store.
1. A commercial establishment which, as one of its principal business activities, offers for sale or rental for any form of consideration any one or more of the following: books, magazines, periodicals or other printed matter, or photographs, films, motion pictures, video cassettes, compact discs, digital video discs, slides, or other visual representations which are characterized by their emphasis upon the display of "specified anatomical areas," as defined in [SMC 17A.020.190](#), or "specified sexual activities," as defined in [SMC 17A.020.190](#). A "principal business activity" exists where the commercial establishment meets any one or more of the following criteria:
 - a. At least thirty percent of the establishment's displayed merchandise consists of said items; or
 - b. At least thirty percent of the retail value (defined as the price charged to customers) of the establishment's displayed merchandise consists of said items; or
 - c. At least thirty percent of the establishment's revenues derive from the sale or rental, for any form of consideration, of said items; or
 - d. The establishment maintains at least thirty percent of its floor space for the display, sale, and/or rental of said items (aisles and walkways used to access said items, as well as cashier stations where said items are rented or sold, shall be included in "floor space maintained for the display, sale, and/or rental of said items"); or
 - e. The establishment maintains at least five hundred square feet of its floor space for the display, sale, and/or rental of said items (aisles and walkways used to access said items, as well as cashier stations where said items are rented or sold, shall be included in "floor space maintained for the display, sale, and/or rental of said items"); or

- f. The establishment regularly offers for sale or rental at least two thousand of said items; or
 - g. The establishment regularly features said items and regularly advertises itself or holds itself out, in any medium, by using “adult,” “XXX,” “sex,” “erotic,” or substantially similar language, as an establishment that caters to adult sexual interests.
- 2. For purposes of this definition, the term “floor space” means the space inside an establishment that is visible or accessible to patrons, excluding restrooms.
- J. Adult Business.
An “adult bookstore or adult video store,” an “adult entertainment establishment,” or a “sex paraphernalia store.”
- K. Adult Entertainment Establishment.
 - 1. An “adult entertainment establishment” is an enclosed building, or any portion thereof, used for presenting performances, activities, or material relating to “specified sexual activities” as defined in [SMC 17A.020.190](#) or “specified anatomical areas” as defined in [SMC 17A.020.190](#) for observation by patrons therein.
 - 2. A motion picture theater is considered an adult entertainment establishment if the preponderance of the films presented is distinguished or characterized by an emphasis on the depicting or describing of “specified sexual activities” or “specified anatomical areas.”
 - 3. A hotel or motel providing overnight accommodations is not considered an adult entertainment establishment merely because it provides adult closed circuit television programming in its rooms for its registered overnight guests.
- L. Adult Family Home.
A residential use as defined and licensed by the state of Washington in a dwelling unit.
- M. Agency or Agencies.
The adopting jurisdiction(s), depending on the context.
- N. Agricultural Activities.
 - 1. Pursuant to WAC 173-26-020(3)(a), agricultural uses and practices including, but not limited to:
 - a. Producing, breeding, or increasing agricultural products;
 - b. Rotating and changing agricultural crops;
 - c. Allowing land used for agricultural activities to lie fallow in which it is plowed and tilled but left unseeded;
 - d. Allowing land used for agricultural activities to lie dormant as a result of adverse agricultural market conditions;
 - e. Allowing land used for agricultural activities to lie dormant because the land is enrolled in a local, state, or federal conservation program, or the land is subject to a conservation easement;
 - f. Conducting agricultural operations; maintaining, repairing, and replacing agricultural equipment;
 - g. Maintaining, repairing, and replacing agricultural facilities, provided that the replacement facility is not closer to the shoreline than the original facility; and
 - h. Maintaining agricultural lands under production or cultivation.
 - 2. The City of Spokane shoreline master program defines agriculture activities as:
 - a. Low-intensity agricultural use is defined as passive grazing and plant cultivation; or
 - b. High-intensity agricultural use includes such activities as feedlots, feed mills, packing plants, agricultural processing plants or warehouse for the purpose of processing, packing, and storage of agricultural products.
- O. Agricultural Land.
Areas on which agricultural activities are conducted as of the date of adoption of the updated shoreline master program pursuant to the State shoreline guidelines as evidenced by aerial

photography or other documentation. After the effective date of the SMP, land converted to agricultural use is subject to compliance with the requirements herein.

P. AKART.

An acronym for “all known, available, and reasonable methods to control toxicants” as used in the sense of the state Water Pollution Control Act and RCW 90.48.520 thereof. AKART shall represent the most current methodology that can be reasonably required for preventing, controlling, or abating the pollutants associated with a discharge. The concept of AKART applies to both point and nonpoint sources of pollution.

Q. Alkali Wetlands.

Alkali wetlands means wetlands characterized by the occurrence of shallow saline water. In eastern Washington, these wetlands contain surface water with specific conductance that exceeds three thousand micromhos/cm. They have unique plants and animals that are not found anywhere else in eastern Washington such as the alkali bee. Conditions within these wetlands cannot be easily reproduced through compensatory mitigation.

R. Alley.

See “Public Way” ([SMC 17A.020.160](#)).

S. Alteration.

A physical change to a structure or site.

1. Alteration does not include normal maintenance and repair or total demolition.
2. Alteration does include the following:
 - a. Changes to the facade of a building.
 - b. Changes to the interior of a building.
 - c. Increases or decreases in floor area of a building; or
 - d. Changes to other structures on the site, or the development of new structures.

T. Alteration of Plat, Short Plat, or Binding Site Plan.

The alteration of a previously recorded plat, short plat, binding site plan, or any portion thereof, that results in a change to conditions of approval or the deletion of existing lots or the change of plat or lot restrictions or dedications that are shown on the recorded plat. An alteration does not include a boundary line adjustment subject to [SMC 17G.080.030](#).

U. Alternative or Post-incarceration Facility.

A group living use where the residents are on probation or parole.

V. ~~((Alternative Tower Structure (“Stealth” Technology).~~

~~Manmade trees, clock towers, bell steeples, light poles, flag poles, and similar alternative design mounting structures that camouflage or conceal the presence of antennas or towers (see also “Low Visual Impact Facility” [SMC 17A.020.120](#))).~~ ~~[Deleted]~~

W. ~~((Antenna Array (Wireless Communication Antenna Array).~~

- ~~1. One or more rods, panels, discs, or similar devices used for the transmission or reception of radio frequency (RF) signals, which may include omni-directional antenna (whip), directional antenna (panel), and parabolic antenna (dish).~~
- ~~2. Wireless communication antenna array shall be considered an accessory use provided they are located upon an existing structure.)~~ ~~[Deleted]~~

X. ~~((Antenna Height.~~

~~The vertical distance measured from the base of the antenna support structure at grade to the highest point of the structure including the antenna.)~~ ~~[Deleted]~~

Y. ~~((Antenna Support Structure.~~

~~Any pole, telescoping mast, tower tripod, or any other structure that supports a device used in the transmitting and/or receiving of electromagnetic waves.)~~ ~~[Deleted]~~

Z. API 653.

The American Petroleum Institute’s standards for tank inspection, repair, alteration, and reconstruction.

AA. Appeal.

A request for review of the interpretation of any provision of [Title 17 SMC](#).

BB. Appeal – Standing For.

As provided under RCW 36.70C.060, persons who have standing are limited to the following:

1. The applicant and the owner of property to which the land use decision is directed; and
2. Another person aggrieved or adversely affected by the land use decision, or who would be aggrieved or adversely affected by a reversal or modification of the land use decision. A person is aggrieved or adversely affected within the meaning of this section only when all of the following conditions are present:
 - a. The land use decision has prejudiced or is likely to prejudice that person;
 - b. That person's asserted interests are among those that the local jurisdiction was required to consider when it made the land use decision;
 - c. A judgment in favor of that person would substantially eliminate or redress the prejudice to that person caused or likely to be caused by the land use decision; and
 - d. The petitioner has exhausted his or her administrative remedies to the extent required by law (RCW 36.70C.060).

CC. Applicant.

An application for a permit, certificate, or approval under the land use codes must be made by or on behalf of all owners of the land and improvements. "Owners" are all persons having a real property interest. Owners include:

1. Holder of fee title or a life estate;
2. Holder of purchaser's interest in a sale contract in good standing;
3. Holder of seller's interest in a sale contract in breach or in default;
4. Grantor of deed of trust;
5. Presumptively, a legal owner and a taxpayer of record;
6. Fiduciary representative of an owner;
7. Person having a right of possession or control; or
8. Any one of a number of co-owners, including joint, in common, by entireties, and spouses as to community property.

DD. Application – Complete.

An application that is both counter-complete and determined to be substantially complete as set forth in [SMC 17G.060.090](#).

EE. Aquaculture.

The farming or culture of food fish, shellfish, or other aquatic plants or animals in freshwater or saltwater areas, and may require development such as fish hatcheries, rearing pens and structures, and shellfish rafts, as well as use of natural spawning and rearing areas.

Aquaculture does not include the harvest of free-swimming fish or the harvest of shellfish not artificially planted or maintained, including the harvest of wild stock geoducks on DNR-managed lands.

FF. Aquatic Life.

Shall mean all living organisms, whether flora or fauna, in or on water.

GG. Aquifer or Spokane Aquifer.

A subterranean body of flowing water, also known as the Spokane-Rathdrum Aquifer, that runs from Pend Oreille Lake to the Little Spokane River.

HH. Aquifer Sensitive Area (ASA).

That area or overlay zone from which runoff directly recharges the aquifer, including the surface over the aquifer itself and the hillside areas immediately adjacent to the aquifer. The area is shown in the map adopted as part of [SMC 17E.050.260](#).

II. Aquifer Water Quality Indicators.

Common chemicals used for aquifer water quality screening. These are:

1. Calcium,
2. Magnesium,
3. Sodium,

4. Total hardness,
 5. Chloride,
 6. Nitrate-nitrogen, and
 7. Phosphorus.
- JJ. Archaeological Areas and Historical Sites.
Sites containing material evidence of past human life, such as structures and tools and/or cultural sites with past significant historical events. These sites are a nonrenewable resource and provided a critical educational link with the past.
- KK. Architectural feature
Ornamental or decorative feature attached to or protruding from an exterior wall or roof, including cornices, eaves, belt courses, sills, lintels, bay windows, chimneys, and decorative ornaments.
- LL. Architectural Roof Structure
Minor tower or turret extending from the cornice or main roof line of a building, typically highlighting a primary corner or building entry. For purposes of the FBC, such features may not be occupied.
1. Area of Shallow Flooding.
A designated AO or AH Zone on the Flood Insurance Rate Map (FIRM).
 2. The base flood depths range from one to three feet.
 3. A clearly defined channel does not exist.
 4. The path of flooding is unpredictable and indeterminate.
 5. Velocity flow may be evident.
 6. AO is characterized as sheet flow and AH indicates ponding.
- MM. Area of Shallow Flooding.
A designated AO or AH Zone on the Flood Insurance Rate Map (FIRM).
1. The base flood depths range from one to three feet.
 2. A clearly defined channel does not exist.
 3. The path of flooding is unpredictable and indeterminate.
 4. Velocity flow may be evident.
 5. AO is characterized as sheet flow and AH indicates ponding.
- NN. Area of Special Flood Hazard.
The land in the floodplain within a community subject to a one percent or greater chance of flooding in any given year. Designation on maps always includes the letters A or V.
- OO. Arterial.
See:
1. "Principal Arterials" – [SMC 17A.020.160](#),
 2. "Minor Arterials" – [SMC 17A.020.130](#),
 3. "Collector Arterial" – [SMC 17A.020.030](#), or
 4. "Parkway" – [SMC 17A.020.160](#).
- PP. Assisted Living Facility.
A multi-family residential use licensed by the state of Washington as a boarding home pursuant to chapter 18.20 RCW, for people who have either a need for assistance with activities of daily living (which are defined as eating, toileting, ambulation, transfer [e.g., moving from bed to chair or chair to bath], and bathing) or some form of cognitive impairment but who do not need the skilled critical care provided by nursing homes.
1. An "assisted living facility" contains multiple assisted living units.
 2. An assisted living unit is a dwelling unit permitted only in an assisted living facility.
- QQ. Attached Housing.
Two or more dwelling units that are single-family residences on individual lots attached by a common wall at a shared property line. These include:
1. Townhouses,
 2. Row houses, and
 3. Other similar structures

RR. Attached Structure.

Any structure that is attached by a common wall to a dwelling unit.

1. The common wall must be shared for at least fifty percent of the length of the side of the principal dwelling.
2. A breezeway is not considered a common wall.
3. Structures including garages, carports, and house additions attached to the principal dwelling unit with a breezeway are still detached structures for purposes of this chapter and its administration.

SS. Available Capacity.

Capacity for a concurrency facility that currently exists for use without requiring facility construction, expansion, or modification (RCW 76.70A.020).

TT. Average Grade Level.

Means the average of the natural or existing topography of the portion of the lot, parcel, or tract of real property on that part of the lot to be occupied by the building or structure as measured by averaging the elevations at the center of all exterior walls of the proposed structure.

UU. Awning

A roof-like cover, often made of fabric or metal, designed and intended for protection from the weather or as a decorative embellishment, and which projects from a wall or roof of a structure over a window, walk, or door.

SECTION 11. That SMC 17A.020.200 is amended to read as follows:

[Section 17A.020.200](#) "T" Definitions

A. Temporary Erosion and Sediment Control Measures.

Erosion and sediment control devices used to provide temporary stabilization of a site, usually during construction or ground disturbing activities, before permanent devices are installed.

B. Temporary Sign.

A sign placed on a structure or the ground for a specifically limited period of time as provided in [SMC 17C.240.240\(G\)](#).

C. Temporary Structure.

A structure approved for location on a lot by the department for a period not to exceed six months with the intent to remove such structure after the time period expires.

D. Tenant Space.

Portion of a structure occupied by a single commercial lease holder with its own public entrance from the exterior of the building or through a shared lobby, atrium, mall, or hallway and separated from other tenant spaces by walls.

E. Through Pedestrian Zone.

The portion of a sidewalk that is intended for pedestrian travel and is entirely free of permanent and temporary objects.

F. Tideland.

Land on the shore of marine water bodies between the line of ordinary high tide and the line of extreme low tide.

G. Total Maximum Daily Load (TMDL).

A calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and non point sources. The calculation shall include a margin of safety to ensure that the water body can be used for the purposes the state has designated. The calculation shall also

account for seasonable variation in water quality. Water quality standards are set by states, territories, and tribes. They identify the uses for each water body, for example, drinking water supply, contact recreation (swimming), and aquatic life support (fishing), and the scientific criteria to support that use. The Clean Water Act, section 303, establishes the water quality standards and TMDL programs.

- H. ~~((Tower (Wireless Communication Support Tower).
Any structure that is designed and constructed specifically to support a wireless communication antenna array. Towers include self-supporting towers, guyed towers, a single pole structure (monopole), lattice tower, and other similar structures.)) [Deleted].~~
- I. ~~((Tower Compound.
The area containing support tower and ground equipment. The fence surrounding the equipment is the outer extent of the compound.)) [Deleted].~~
- J. ~~((Tower Height.
The vertical distance measured from the base of the tower structure at grade to the highest point of the structure including the antenna.)) [Deleted].~~
- K. Tracking.
The deposition of sediment onto paved surfaces from the wheels of vehicles.
- L. Tract.
A piece of land created and designated as part of a land division that is not a lot, lot of record or a public right-of-way. Tracts are created and designated for a specific purpose. Land uses within a tract are restricted to those uses consistent with the stated purpose as described on the plat, in maintenance agreements, or through conditions, covenants and restrictions (CC&Rs).
- M. Traveled Way.
The area of street which is intended to carry vehicular traffic, including any shoulders.
- N. Type I Application.
An application for a project permit that is subject to an administrative approval and is not categorically exempt from environmental review under chapter 43.21C RCW (SEPA) and the City of Spokane Environmental Ordinance [chapter 17E.050 SMC](#), and does not require a public hearing. Type I applications are identified in [Table 17G.060-1](#) in [chapter 17G.060 SMC](#). These applications may include, but are not limited to, building permits and grading permits.
- O. Type II Application.
An application for a project permit that is subject to an administrative decision of a department director, that may or may not be categorically exempt from chapter 43.21C RCW (SEPA), and does not require a public hearing. The Type II applications are identified in [Table 17G.060-1](#) in chapter [17G.060 SMC](#). These applications may include, but are not limited to, short plats, binding site plans, shoreline substantial development permits, and some conditional use permits; provided, the planning director may require conditional use permits which are otherwise characterized as Type II applications under this title to be submitted and processed as Type III applications when the director issues written findings that the Type III process is in the public interest.
- P. Type III Application.
An application for a project permit that is subject to a quasi-judicial decision of the hearing examiner that may or may not be categorically exempt from chapter 43.21C RCW (SEPA) and the City of Spokane Environmental Ordinance [chapter 17E.050 SMC](#) and requires a public hearing. Type III applications are identified in [Table 17G.060-1](#) in [chapter 17G.060 SMC](#). These applications may include, but are not limited to, rezones, conditional use permits, preliminary long plats, or shoreline conditional use permits.

SECTION 12. That SMC 17C.120.110 is amended to read as follows:

[Section 17C.120.110](#) Limited Use Standards

The paragraphs listed below contain the limitations and correspond with the bracketed [] footnote numbers from [Table 17C.120-1](#).

1. Group Living.
This regulation applies to all parts of [Table 17C.120-1](#) that have a [1].
 - a. General Standards.
All group living uses except for alternative or post-incarceration facilities are allowed by right.
 - b. Alternative or Post Incarceration Facilities.
Group living uses which consist of alternative or post incarceration facilities are conditional uses.
2. Adult Business.
This regulation applies to all parts of [Table 17C.120-1](#) that have a [2]. Adult businesses are subject to the additional standards of [chapter 17C.305 SMC](#).
3. Commercial Parking.
This regulation applies to all parts of [Table 17C.120-1](#) that have a [3]. In the O and OR zones, a commercial parking use provided within a building or parking structure is a conditional use.
4. Drive-through Facility.
This regulation applies to all parts of [Table 17C.120-1](#) that have a [4]. In the O and OR zones, a drive-through facility is permitted only when associated with a drive-through bank. In addition, in the OR zone, for a florist use approved by a special permit, sales of non-alcoholic beverages, and sale of food items not prepared on site, including drive-through sales of such items are allowed as an accessory use at locations situated on principal arterials or a designated state route. Drive-through facilities are subject to the additional standards of [SMC 17C.120.290](#).
5. Quick Vehicle Servicing.
This regulation applies to all parts of [Table 17C.120-1](#) that have a [5]. Quick vehicle servicing uses are permitted only on sites that have frontage on a principal arterial street. Quick vehicle servicing uses are subject to the additional standards of [SMC 17C.120.290](#).
6. Retail Sales and Service Uses Size Limitation.
This regulation applies to all parts of [Table 17C.120-1](#) that have a [6]. Retail sales and services are limited in size in order to reduce their potential impacts on residential uses and to promote a relatively local market area. Retail sales and services uses are limited to the following:
 - a. When retail sales and services uses are located within an office building, the retail sales and services may be larger than three thousand square feet, but may not exceed ten percent of the total floor area of the building exclusive of parking areas located within the structure.
 - b. Uses not within an office building which are listed as sales-oriented under [SMC 17C.190.270\(C\)](#), retail sales and service, are limited to three thousand square feet of total floor area per site exclusive of parking areas located within a structure.
 - c. Uses other than a hotel, motel, private club or lodge which are listed as personal service-oriented, entertainment-oriented or repair-oriented under [SMC 17C.190.270\(C\)](#), retail sales and service, that are larger than three thousand square feet are a conditional use. A hotel, motel, private club or lodge may be larger than three thousand square feet.
7. Required Residential Limitation.
This regulation applies to all parts of [Table 17C.120-1](#) that have a [7]. The limitations are stated in [SMC 17C.120.280](#).
8. Industrial Size Limitation.
This regulation applies to all parts of [Table 17C.120-1](#) that have a [8]. These types of uses are limited in size to assure that they will not dominate the commercial area and to limit their

potential impacts on residential and commercial uses. In addition, if the planning director determines that the proposed use will not be able to comply with the off- site impact standards of [chapter 17C.220 SMC](#), the planning director may require documentation that the development will be modified to conform with the standards.

- a. Individual uses in the NR and NMU zones are limited to five thousand square feet of floor area per site exclusive of parking area.
 - b. Individual uses in the CB zone that exceed twenty thousand square feet of floor area per site exclusive of parking area are a conditional use.
 - c. Individual uses in the GC zone that exceed fifty thousand square feet of floor area per site exclusive of parking area are a conditional use.
9. Mini-storage Facilities Limitation.
This regulation applies to all parts of [Table 17C.120-1](#) that have an [9]. The limitations are stated with the special standards for these uses in [chapter 17C.350 SMC](#), Mini-storage Facilities.
10. Outdoor Activity Limitation.
This regulation applies to all parts of [Table 17C.120-1](#) that have a [10]. Outdoor display, storage or use of industrial equipment, such as tools, equipment, vehicles, products, materials or other objects that are part of or used for the business operation is prohibited.
11. [Deleted]
12. ~~((Wireless Communication Facilities.
This regulation applies to all parts of [Table 17C.120-1](#) that have an [12]. Some wireless communication facilities are allowed by right. See [chapter 17C.355 SMC](#).)~~ [Deleted]
13. Mobile Food Vending.
This standard applies to all parts of [Table 17C.120-1](#) that have a [13]. All mobile food vendors shall have a valid mobile food vending license issued pursuant to [SMC 10.51.010](#) Mobile Food Vendors.

SECTION 13. that Table 17C.120-1 is amended to read as follows:

[Section 17C.120.100](#) Commercial Zones Primary Uses

- A. Permitted Uses – “P.”
Uses permitted in the commercial zones are listed in Table 17C.120-1 with a “P.” These uses are allowed if they comply with the development standards and other standards of this chapter.
- B. Limited Uses – “L.”
Uses allowed that are subject to limitations are listed in Table 17C.120-1 with an “L.” These uses are allowed if they comply with the limitations as listed in the footnotes following the table and the development standards and other standards of this chapter. In addition, a use or development listed in Part 3 of this division, Special Use Standards, is also subject to the standards of those chapters.
- C. Conditional Uses – “CU.”
Uses that are allowed if approved through the conditional use review process are listed in Table 17C.120-1 with a “CU.” These uses are allowed provided they comply with the conditional use approval criteria for that use, the development standards, and other standards of this chapter. Uses listed with a “CU” that also have a footnote number in the table are subject to the standards cited in the footnote. In addition, a use or development listed in Part 3 of this division, Special Use Standards, is also subject to the standards of those chapters. The conditional use review process and approval criteria are stated in [chapter 17C.320 SMC](#), Conditional Uses.
- D. Uses Not Permitted – “N.”
Uses listed in Table 17C.120-1 with an “N” are not permitted. Existing uses in categories

listed as not permitted are subject to the standards of [chapter 17C.210 SMC](#), Nonconforming Situations.

TABLE 17C.120-1 COMMERCIAL ZONE PRIMARY USES						
Use is: P: Permitted N: Not Permitted L: Allowed, but Special Limitations CU: Conditional Use Review Required	O (Office)	OR (Office Retail)	NR (Neighborhood Retail)	NMU (Neighborhood Mixed Use)	CB (Community Business)	GC (General Commercial)
Residential Categories						
Group Living [1]	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU
Residential Household Living	P	P	P	P	P	P
Commercial Categories						
Adult Business	N	N	N	N	L[2]	L[2]
Commercial Outdoor Recreation	N	N	N	N	P	P
Commercial Parking	CU[3]	CU[3]	P	P	P	P
Drive-through Facility	L[4]	L[4]	L[4]	L[4]	P	P
Major Event Entertainment	N	N	N	N	P	P
Office	P	P	P	P	P	P
Quick Vehicle Servicing	N	N	L[5, 10]	L[5, 7, 10]	P	P

Retail Sales and Service	N	L/CU[6]	P	L[7]	P	P
Mini-storage Facilities	N	N	N	N	L[9]	L[9]
Vehicle Repair	N	N	N	N	P	P
Mobile Food Vending	L[13]	L[13]	L[13]	L[13]	L[13]	L[13]
Industrial Categories						
High Impact Uses	N	N	N	N	N	N
Industrial Service	N	N	N	N	L/CU[8, 10]	L/CU[8, 10]
Manufacturing and Production	N	N	L[8, 10]	L[7, 8, 10]	L/CU[8, 10]	L/CU[8, 10]
Railroad Yards	N	N	N	N	N	N
Warehouse and Freight Movement	N	N	N	N	L/CU[8, 10]	L/CU[8, 10]
Waste-related	N	N	N	N	N	N
Wholesale Sales	N	N	N	N	L/CU[8, 10]	L/CU[8, 10]
Institutional Categories						
Basic Utilities	P	P	P	P	P	P
Colleges	P	P	P	P	P	P
Community Service	P	P	P	P	P	P
Daycare	P	P	P	P	P	P
Medical Centers	P	P	P	P	P	P
Parks and Open Areas	P	P	P	P	P	P

Religious Institutions	P	P	P	P	P	P
Schools	P	P	P	P	P	P
Other Categories						
Agriculture	N	N	N	N	CU	CU
Aviation and Surface Passenger Terminals	CU	CU	CU	CU	CU	CU
Detention Facilities	N	N	N	N	CU	CU
Essential Public Facilities	CU	CU	CU	CU	CU	CU
Mining	N	N	N	N	N	N
Rail Lines and Utility Corridors	CU	CU	CU	CU	CU	CU
Wireless Communication Facilities [11]	L/CU	L/CU	L/CU	L/CU	L/CU	L/CU
Notes: <ul style="list-style-type: none"> ▪ The use categories are described in chapter 17C.190 SMC. ▪ Standards that correspond to the bracketed numbers [] are stated in SMC 17C.120.110. ▪ Specific uses and developments may be subject to the standards in Part 3 of this division, Special Use Standards. 						

SECTION 14. That SMC 17C.124.110 is amended to read as follows:

[Section 17C.124.110](#) Limited Use Standards

- A. The paragraphs listed below contain the limitations and correspond with the bracketed [] footnote numbers from [Table 17C.124-1](#).
1. Group Living.
This regulation applies to all parts of [Table 17C.124-1](#) that have a [1].
 - a. General Standards.
All group living uses except for alternative or post-incarceration facilities are allowed by right.

- b. Alternative or Post Incarceration Facilities.
Group living uses which consist of alternative or post incarceration facilities are conditional uses.
- 2. Adult Business.
This regulation applies to all parts of [Table 17C.124-1](#) that have a [2]. Adult businesses are subject to the additional standards of [chapter 17C.305 SMC](#).
- 3. Commercial Parking.
This regulation applies to all parts of [Table 17C.124-1](#) that have a [3]. See [SMC 17C.230.310](#) for the parking structure design guidelines. See [SMC 17C.124.340](#), Parking and Loading, for ground level parking structure use standards.
 - a. New standalone surface commercial parking lots are not allowed as the primary use within the area shown on [Map 17C.124-M1](#), Surface Parking Limited Area. Within the area shown on [Map 17C.124-M1](#), standalone commercial parking as a primary use must be located entirely within a parking structure.
- 4. Drive-through Facility.
This regulation applies to all parts of [Table 17C.124-1](#) that have a [4]. Drive-through facilities are subject to the additional standards of [SMC 17C.124.290](#).
- 5. Quick Vehicle Servicing.
This regulation applies to all parts of [Table 17C.124-1](#) that have a [5]. Quick vehicle servicing uses are permitted only on sites that have frontage on a Type III or IV complete street. Quick vehicle servicing uses must be fully contained within a structure. Quick vehicle servicing uses are subject to the additional standards of [SMC 17C.124.290](#).
- 6. Retail Sales and Services Uses Motorized Vehicle Limitation.
This regulation applies to all parts of [Table 17C.124-1](#) that have a [6]. Sale, rental, or leasing of motor vehicles, including passenger vehicles, light and medium trucks is not allowed. Sale, rental, and leasing of motorcycles and other recreational vehicles not able to be licensed for normal on street use is allowed. For sale or leasing of motorcycles and other recreational vehicles see [SMC 17C.124.270](#), Outdoor Activities.
- 7. Industrial Limitation.
This regulation applies to all parts of [Table 17C.124-1](#) that have a [7]. These types of uses are limited to assure that they will not dominate the downtown area and to limit their potential impacts on residential and commercial uses. In addition, if the planning director determines that the proposed use will not be able to comply with the off-site impact standards of [chapter 17C.220 SMC](#), the planning director may require documentation that the development will be modified to conform with the standards.
 - a. Limited industrial uses are allowed. Only limited industrial uses are allowed. Industrial uses more intensive than the limited industrial definition are not allowed.
 - b. Industrial buildings and industrial sites are subject to the same design standards as commercial buildings and commercial sites.
- 8. Mini-storage, Storage, Warehousing, Industrial and Parking Structure Limitation.
This regulation applies to all parts of [Table 17C.124-1](#) that have an [8]. See [SMC 17C.124.340](#).
- 9. Mini-storage Facilities Limitation.
This regulation applies to all parts of [Table 17C.124-1](#) that have an [9]. Mini-storage facilities are subject to the additional standards of [chapter 17C.350 SMC](#), Mini-storage Facilities.
- 10. Outdoor Activity Limitation.
This regulation applies to all parts of [Table 17C.124-1](#) that have a [10]. Outdoor display, storage, or use of industrial equipment or other industrial items such as

tools, equipment, vehicles, products, materials, or other objects that are part of or used for the business operation is prohibited.

11. Community Services.

This regulation applies to all parts of [Table 17C.124-1](#) that have a [11]. Most community service uses are allowed by right.

12. Wireless Communication Facilities.

~~((This regulation applies to all parts of [Table 17C.124-1](#) that have an [12]. Some wireless communication facilities are allowed by right. See [chapter 17C.355 SMC](#).) See chapter 17C.355A SMC.~~

13. Existing Light Industrial and Self-service Storage Uses.

This regulation applies to all parts of [Table 17C.124-1](#) that have an [13]. Light industrial and self-service storage uses in operation on the effective date of this ordinance, are considered to be a conforming use.

14. Mobile Food Vending.

This standard applies to all parts of [Table 17C.124-1](#) that have a [14]. All mobile food vendors shall have a valid mobile food vending license issued pursuant to [SMC 10.51.010](#).

SECTION 15. That SMC 16C.130.110 is amended to read as follows:

[Section 17C.130.110](#) Limited Use Standards

The paragraphs listed below contain the limitations and correspond with the bracketed [] footnote numbers from [Table 17C.130-1](#).

1. Group Living.

This standard applies to all parts of [Table 17C.130-1](#) that have a [1].

- a. Group living uses are allowed on sites within one-quarter mile of the Spokane River where residents can take advantage of the river amenity. The planning director may authorize a group living use greater than one-quarter mile from the Spokane River if the applicant demonstrates that the site has a river viewpoint and a pedestrian connection to the river. Group living uses shall provide buffering from adjacent industrial lands by use of berms, landscaping, fencing or a combination of these measures or other appropriate screening measures deemed appropriate by the planning director. The proposal shall include a design, landscape and transportation plan which will limit conflicts between the residential, employment and industrial uses.

- b. Alternative or Post Incarceration Facilities.

Group living uses which consist of alternative or post incarceration facilities are not permitted.

2. Residential Household Living.

This standard applies to all parts of [Table 17C.130-1](#) that have a [2].

- a. Residential household living uses are allowed on sites within one-quarter mile of the Spokane River where residents can take advantage of the river amenity. The planning director may authorize a residential living use greater than one-quarter mile from the Spokane River if the applicant demonstrates that the site has a river viewpoint and a pedestrian connection to the river. Residential uses shall provide buffering from adjacent industrial lands by use of berms, landscaping, fencing or a combination of these measures or other appropriate screening measures deemed appropriate by the planning director. The proposal shall include a design, landscape, and transportation plan, which will limit conflicts between the residential, employment and industrial uses.

- b. A single-family residence may be erected on a lot having a side property line which adjoins a lot in a residential zone, with or without an intervening alley, or on a lot which has less than one hundred feet of frontage and has residences existing on all lots adjoining its side property lines.
 - c. Living quarters for one caretaker per site in the LI, HI and PI zones are permitted.
- 3. Group Living and Residential Household Living.
This standard applies to all parts of [Table 17C.130-1](#) that have a [3]. Group living and residential household living uses may be permitted in the PI zone as a part of a binding site plan under the provisions of the subdivision code or a planned unit development under the provisions of Division G – Administration and Procedures. A minimum of fifty percent of the site within the binding site plan or planned unit development shall be in manufacturing and production, industrial service or office uses. Group living and residential household living uses shall be buffered from industrial lands by use of berms, landscaping, fencing or a combination of these measures or other appropriate screening measures deemed appropriate by the planning director. The buffering improvements shall be developed on the residential portion of the binding site plan or planned unit development at the time the residential uses are constructed. The site development plan shall include a design, landscape, and transportation plan, which will limit conflicts between the residential and industrial uses.
- 4. Adult Business.
This standard applies to all parts of [Table 17C.130-1](#) that have a [4]. Adult businesses are subject to the following standards:
 - a. [Chapter 17C.305 SMC](#), Adult Business.
 - b. Adult businesses are subject to the size requirements specified in item [5] below applicable to retail sales and services uses in the light industrial (LI) zone.
 - c. In addition to the standards in subsections (4)(a) and (b) of this section, adult businesses are permitted only in the light industrial zone adult business overlay zone as designated on the official zoning map.
- 5. Retail Sales and Service Uses Size Limitation.
This standard applies to all parts of [Table 17C.130-1](#) that have a [5]. Retail sales and service uses are allowed if the floor area plus outdoor sales and display and outdoor storage area is not more than sixty thousand square feet per site. Retail sales and service uses where the floor area plus the outdoor sales and display and outdoor storage area is more than sixty thousand square feet per site are a conditional use.
- 6. Retail Sales and Service Uses Size Limitation.
This standard applies to all parts of [Table 17C.130-1](#) that have a [6]. Retail sales and service uses are allowed if the floor area plus outdoor sales and display and outdoor storage area is not more than twenty thousand square feet per site. Retail sales and service uses where the floor area plus the outdoor sales and display and outdoor storage area is more than twenty thousand square feet per site are a conditional use.
- 7. Retail Sales and Service Uses Size Limitation.
This standard applies to all parts of [Table 17C.130-1](#) that have a [7]. Retail sales and service uses are allowed if the floor area plus the outdoor sales and display and outdoor storage area is not more than three thousand square feet per site. Retail sales and service uses where the floor area plus the outdoor sales and display and outdoor storage area is more than three thousand square feet per site may be permitted as a part of a binding site plan under the provisions of the subdivision code or a planned unit development under the provisions of the zoning code. A minimum of fifty percent of the site area of the uses in the planned unit development or binding site plan shall be in manufacturing and production, industrial service or office uses.
- 8. Mini-storage Facilities.
This standard applies to all parts of [Table 17C.130-1](#) that have a [8]. The limitations are

stated with the special standards for these uses in [chapter 17C.350 SMC](#), Mini-Storage Facilities.

9. High Impact Uses.

This standard applies to all parts of [Table 17C.130-1](#) that have a [9]. High impact uses shall be located a minimum of six hundred feet from the boundary of a residential or commercial zone.

10. Colleges, Medical Centers, Daycare and School Uses.

This standard applies to all parts of [Table 17C.130-1](#) that have an [10]. Colleges, medical centers, daycare and school uses may be permitted as a part of a binding site plan under the provisions of the subdivision code, or a planned unit development under the provisions of the zoning code. A minimum of fifty percent of the site within the planned unit development or binding site plan shall be in manufacturing and production, industrial service or office uses. Colleges, medical centers, daycare and school uses are allowed within the planned unit development or binding site plan provided that the site development includes a design, landscape and transportation plan which will limit conflicts between the college, medical center, daycare, school and industrial uses.

11. Wireless Communication Facilities.

~~((This standard applies to all parts of [Table 17C.130-1](#) that have a [11]. Some wireless communication facilities are allowed by right. See [chapter 17C.355 SMC](#)-.))~~ See [chapter 17C.355A SMC](#).

12. Mobile Food Vending.

This standard applies to all parts of [Table 17C.130-1](#) that have a [12]. All mobile food vendors shall have a valid mobile food vending license issued pursuant to [SMC 10.51.010](#).

SECTION 16. That TABLE 17C.130-1 is amended to read as follows:

[Section 17C.130.100](#) Industrial Zones Primary Uses

A. Permitted Uses (P).

Uses permitted in the industrial zones are listed in Table 17C.130-1 with a "P." These uses are allowed if they comply with the development standards and other standards of this chapter.

B. Limited Uses (L).

Uses allowed that are subject to limitations are listed in Table 17C.130-1 with an "L." These uses are allowed if they comply with the limitations as listed in the footnotes following the table and the development standards and other standards of this chapter. In addition, a use or development listed in Part 3 of this division, Special Use Standards, is also subject to the standards of those chapters.

C. Conditional Uses (CU).

Uses that are allowed if approved through the conditional use review process are listed in Table 17C.130-1 with a "CU." These uses are allowed provided they comply with the conditional use approval criteria for that use, the development standards, and other standards of this chapter. Uses listed with a "CU" that also have a footnote number in the table are subject to the standards cited in the footnote. In addition, a use or development listed in Part 3 of this division, Special Use Standards, is also subject to the standards of those chapters. The conditional use review process and approval criteria are stated in [chapter 17C.320 SMC](#), Conditional Uses.

D. Uses Not Permitted (N).

Uses listed in Table 17C.130-1 with an "N" are not permitted. Existing uses in categories listed as not permitted may be subject to the standards of [chapter 17C.210 SMC](#), Nonconforming Situations.

Table 17C.130-1 Industrial Zones Primary Uses			
Use is: P – Permitted; N – Not Permitted; L – Allowed, but with Special Limitations; CU – Conditional Use Review Required	LI Zone (Light Industrial)	HI Zone (Heavy Industrial)	PI Zone (Planned Industrial)
Residential Categories			
Group Living	L[1]	N	L[3]
Residential Household Living	L[2]	L[2]	L[3]
Commercial Categories			
Adult Business	L[4]	N	N
Commercial Outdoor Recreation	P	P	CU
Commercial Parking	P	P	P
Drive-through Facility	P	P	P
Major Event Entertainment	CU	CU	CU
Office	P	P	P
Quick Vehicle Servicing	P	P	P
Retail Sales and Service	L/CU[5]	L/CU[6]	L[7]
Mini-storage Facilities	L[8]	L[8]	L[8]
Vehicle Repair	P	P	P
Mobile Food Vending	L[12]	L[12]	L[12]
Industrial Categories			
High Impact Use	L[9]	L[9]	N

Industrial Service	P	P	P
Manufacturing and Production	P	P	P
Railroad Yards	CU	P	P
Warehouse and Freight Movement	P	P	P
Waste-related	CU	CU	CU
Wholesale Sales	P	P	P
Institutional Categories			
Basic Utilities	P	P	P
Colleges	P	N	L[10]
Community Service	P	N	N
Daycare	P	CU	L[10]
Medical Centers	P	N	L[10]
Parks and Open Areas	P	CU	P
Religious Institutions	P	N	N
Schools	P	N	L[10]
Other Categories			
Agriculture	P	P	P
Aviation and Surface Passenger Terminals	P	P	P
Detention Facilities	CU	CU	CU
Essential Public Facilities	CU	CU	CU
Mining	CU	CU	CU
Rail Lines and Utility Corridors	P	P	P
Wireless Communication Facilities	L/CU[11]	L/CU[11]	L/CU[11]
Notes: • The use categories are described in chapter 17C.190 SMC . • Standards that correspond to the bracketed numbers [] are specified in SMC 17C.130.110 .			

- Specific uses and developments may be subject to the standards in Part 3 of this division, Special Use Standards.
- Standards applicable to conditional uses are stated in [chapter 17C.320 SMC](#).

SECTION 17. That SMC 01.05.160 is amended to read as follows:

[Section 01.05.160](#) Land Use Violation

- A. For each subsequent violation, excluding continuing violations, by a person the classification of infraction advances by one class.
- B. Infraction/Violation Class – General.

SMC 1.05.160 Penalty Schedule – Land Use Violation Infraction		Violation Class
General		
IFC 105.3.3 SMC 17G.010.100(B) SMC 10.48.050	Occupy Land or Building Without Certificate of Occupancy	2
SMC 10.48.130	Alarm Installation or Monitoring Company Failure to Provide Customer List	1
	Alarm Installation or Monitoring Company Failure to Report New Customers	1
Boiler Code		
SMC 10.29.020	Operating Boiler Without License	1
SMC 10.29.021	Failure to Report Hazard	1
SMC 10.29.022	Leaving Boiler Room	2
SMC 17F.030.110	Failure to Cause Required Inspections of Boiler, Pressure Vessel	2
SMC 17F.030.130	Improper Operation of Boiler, Pressure Vessel	1
SMC 17F.060.050	Operate Without Elevator Operating Permit	1
Fire Code – International Fire Code (IFC)		
Chapter 22 IFC	Improper Aboveground Storage Tank for Motor Fuel Dispensing	1
Chapter 28 IFC	Improper Storage, Display of Aerosols	2
Chapter 33 IFC	Unauthorized Manufacture, Storage, Sale, Use, Handling of	1
IFC 105.6.14	Explosives	
Chapter 10.33A SMC SMC 17F.080.060		
IFC 107	Continuance of Hazard	1
IFC 109		
IFC 110		
IFC 109.2.2	Noncompliance with Condemnation Tag	1
IFC 109.2.4	Removal, Destruction of Tag, Sign	1
IFC 304	Improper Storage/Accumulation of Rubbish, Vegetation	2
IFC 304	Storage, Use, Handling of Miscellaneous Combustible Material	2
IFC 308	Improper Use of Candles, Open Flame	3
IFC 311	Failure to Properly Maintain Vacant Building, Property	2
IFC 503.4	Obstruction of Fire Access Road	2
IFC 703.1	Failure to Maintain Fire-resistive Construction	2

IFC 703.2	Failure to Maintain Fire Assemblies for Openings	2
IFC 704		
IFC 805	Failure to Flameproof Decorative Material	2
IFC 806		
IFC 901.4	Failure to Install Protection for Kitchen Hoods, Ducts	2
IFC 901.4	Failure to Install Sprinkler System	2
IFC 901.4	Failure to Install Alarm System	1
SMC 17F.080.100		
SMC 17F.080.150		
IFC 901.6	Failure to Maintain Automatic Extinguishing System	2
IFC 901.6	Failure to Maintain Kitchen Rangehood Extinguishing System	2
IFC 901.6	Failure to Maintain Sprinkler System	2
IFC 901.6	Failure to Maintain Standpipe System	2
IFC 903.4	Failure to Provide Approved Electronic Monitoring for Sprinkler and	2
IFC 907.15	Fire Alarm Systems	
IFC 904.11.6.3	Failure to Clean Kitchen Hoods, Ducts	2
IFC 905.3	Failure to Install Standpipe System	2
IFC		
IFC 1003.6	Obstruction of Exit	1
IFC 1011	Failure to Provide Exit Signs	1
IFC 2703.3	Release of Hazardous Material	1
IFC 3404.2.13.1.3	Failure to Remove Abandoned Underground Storage Tank	1
Spokane Municipal Code		
SMC 10.08.040	Fire Hazard from Vegetation and Debris	1
SMC 10.20.020	Abatement of Nuisance	1
SMC 12.01.0804	Failure to Maintain Pedestrian Strip	2
SMC 12.02.010	Sidewalk Not Clear of Snow, Ice	3
SMC 12.02.0210	Vegetation Nuisance Obstruction	1
SMC 12.02.0737	Obstruction of Public Right-of-Way	1
SMC 12.02.0760	Disposal of Leaves and Yard Debris	2
SMC 13.05.010	Tree, etc., Interfering With City Sewer	2
SMC 13.05.020	Poplar, Cottonwood Tree Near Utility Line	2
SMC 17C.110.100	Use Not Permitted in Residential Zone	2
SMC 17C.110.110	Limited Use Standards (Residential)	2
SMC 17C.110.120	Accessory Uses – Residential	2
SMC 17C.110.200	Violation of Development Standards – Residential	2
–		
SMC 17C.110.220		
SMC 17C.110.225	Accessory Structures – Residential	2
SMC 17C.110.230	Residential Fence	2
SMC 17C.110.270	Exterior Storage	2
SMC 17C.110.300	Alternative Residential Development	1
–		
SMC 17C.110.350		
SMC 17C.110.400	Multi-family Design Standards	1
–		
SMC 17C.110.465		
SMC 17C.110.500	Institutional Design Standards	1
–		
SMC 17C.110.575		
SMC 17C.120.100	Use Not Permitted in Commercial Zone	1
SMC 17C.120.110	Limited Use Standards – Commercial	1
SMC 17C.120.210	Development Standards - Commercial	1

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SMC 17C.120.300		
SMC 17C.120.310	Commercial Fence	1
SMC 17C.120.500	Commercial Design Standards	1
—		
SMC 17C.120.580		
SMC 17C.122.070	Use Not Permitted in Center and Corridor Zone	1
SMC 17C.122.080	Development Standards – Center and Corridor Zone	1
—		
SMC 17C.122.150		
SMC 17C.124.100	Use Not Permitted in Downtown Zone	1
SMC 17C.124.110	Limited Use Standards – Downtown	1
SMC 17C.124.210	Development Standards - Downtown	1
—		
SMC 17C.124.300		
SMC 17C.124.310	Fences – Downtown Zone	1
SMC 17C.124.340	Parking and Loading - Downtown	1
SMC 17C.124.500	Design Standards – Downtown	1
—		
SMC 17C.124-590		
SMC 17C.130.100	Use Not Permitted in Industrial Zone	1
—		
SMC 17C.130.110		
SMC 17C.130.210	Violation of Development Standards	1
—		
SMC 17C.130.250		
SMC 17C.130.270	Outdoor Activities Not Permitted	1
SMC 17C.130.300	Detached Accessory Structures	1
SMC 17C.130.310	Industrial Fence	1
SMC 17C.160.020	North River Overlay District	1
—		
SMC 17C.160.030		
SMC 17C.170.110	Special Height Overlay Zone	1
SMC 17C.180.050	Airfield Overlay Zone	1
—		
SMC 17C.180.100		
SMC 17C.200.040	Landscaping and Screening Requirements	1
—		
SMC 17C.200.110		
SMC 17C.210.040	Non-conforming Rights	1
—		
SMC 17C.210.070		
SMC 17C.220.080	Off-Site Impacts	1
—		
SMC 17C.220.090		
SMC 17C.230.140	Development Standards – Parking and Loading	2
—		
SMC 17C.230.300		
SMC 17C.230.310	Design Standards - Parking Structures	1
SMC 17C.240.070	Sign in Violation of the Sign Code	1
—		
SMC 17C.240.270		
SMC 17C.300.100	Accessory Dwelling Units General Regulations	2

SMC 17C.300.110	Accessory Dwelling Units Criteria	2
SMC 17C.300.130	ADU Development Standards	1
SMC 17C.305.020	Adult Business Use Standards	1
SMC 17C.310.100	Animal Keeping – Permitted/Prohibited Practices	2
–		
SMC 17C.310.160		
SMC 17C.315.120	Bed and Breakfast Use-related Regulations	2
SMC 17C.315.130	Bed and Breakfast Site-related Standards	2
SMC 17C.315.150	Bed and Breakfast Monitoring	2
SMC 17C.315.160	Pre-established Bed and Breakfast Facilities	2
SMC 17C.316	Short Term Rentals	2
SMC 17C.319.100	Commercial Use of Residential Streets	2
SMC 17C.319.200	Recreational Camping	2
SMC 17C.320.080	Conditional Uses	1
SMC 17C.325.030	Drive-through Facilities	1
–		
SMC 17C.325.060		
SMC 17C.330.120	Group Living Development Standards	1
SMC 17C.335.110	Historical Structures – Change Of Use Development Standards	1
SMC 17C.340.100	Home Occupations	2
–		
SMC 17C.340.110		
SMC 17C.345.100	Manufactured Homes and Mobile Home Parks	1
–		
SMC 17C.345.120		
SMC 17C.350.030	Development Standards – Mini Storage Facilities	1
SMC 17C.350.040	Design Considerations – Mini Storage Facilities	1
SMC 17C.355.030	Wireless Communication Facilities	1
SMC 17C.355.030		
SMC 17C.355.040		
))		
Chapter 17C.355A		
SMC 17C.390.030.B	Mobile Food Vending Located Entirely on Private Property	1
Chapter 17D.060	Stormwater Facility Standards	1
SMC 17E.010.080	Aquifer Pollution Nuisance Declared by Critical Review Officer	2
SMC 17E.010.160(B)	Failure to Comply With Order, Decision of Critical Review Officer	1
SMC 17E.010.350(F)		
SMC 17E.010.540(F)	Failure to Abide by Terms, Conditions of Permit, License, Approval	1
SMC 17E.010.160(C)	Maintain Underground Storage Tank Without Permit	2
SMC 17E.010.210(A)		
SMC 17E.010.230	Use of Underground/Aboveground Storage Tank Without Permit	1
SMC 17E.010.440		
SMC 17E.010.350(A)	Supply False, Inaccurate, Incomplete Information Concerning an UST or AST	2

SMC		
17E.010.350(E)		
SMC		
17E.010.540(A)		
SMC		
17E.010.540(E)		
SMC	Approval Permit Violation	2
17E.010.350(B)		
SMC		
17E.010.540(B)		
SMC	Fill Unpermitted Underground/Aboveground Storage Tank	2
17E.010.350(C)		
SMC		
17E.010.540(C)		
SMC	Tamper with, Fail to Maintain Inventory, Other Records	2
17E.010.350(D)		
SMC		
17E.010.540(D)		
Chapter 17E.020	Prohibited Activities in Fish and Wildlife Areas and Buffers	1
SMC		
Chapter 17E.040	Prohibited Activities in Geological Hazard Areas and Buffers	1
SMC		
SMC 17E.060.120	Use, Alter Land, Erect, Alter, Occupy Structure Within Shoreline Without Compliance With Shoreline Management Regulations	1
Chapter 17E.070	Prohibited Activities in Wetlands and Buffers	1
SMC		
SMC 17F.070.380	Failure to Discharge Responsibilities of Owner	2
SMC 17F.070.390	Failure to Discharge Responsibilities of Occupant	2
SMC 17F.080.250	Failure to Maintain Fire Alarm System	1
SMC	Failure to Provide Fire Protection System Verification Fees	2
17F.080.260(B)		
SMC 17F.080.280	Failure to Secure Fire-damaged Building	2
SMC 17F.080.390	Failure to Provide Semi-annual Inspection of Private Hydrant	2
SMC 17F.080.420	Failure to Maintain Private Hydrant	2
SMC 17F.080.440	Lack of Basement Sprinkler System in Existing Building	2
SMC 17G.010.100	Testing Underground Storage Tank Without Spokane Fire	1
(C)(2)	Department Registration	

SECTION 18. Conflicts with Other Ordinances or Regulations. In the event that any City ordinance or regulation, in whole or in part, conflicts with any provisions in this Ordinance, the provisions of this Ordinance shall control.

SECTION 19. Severability. In the event that a court of competent jurisdiction holds any section, subsection, paragraph, sentence, clause or phrase in this Ordinance unconstitutional, preempted or otherwise invalid, that portion shall be severed from this Ordinance and shall not affect the validity of the remaining portions of this Ordinance.

SECTION 20. Declaration of Emergency and Effective Date. This ordinance, passed by a majority plus one of the whole membership of the City Council as a public emergency ordinance necessary for the protection of the public health, public safety, public property, or public peace, shall be effective immediately upon its passage. The City Council previously adopted Ordinance C35243 imposing a moratorium on applications for new wireless communications support towers in the City's

residential zones. The City's wireless communications regulations were dated, and without the moratorium, processing of such applications by the City could have occurred under regulations that are inconsistent with the City's legitimate policy of protecting residentially zoned areas from the aesthetic, visual, and noise impacts associated with wireless communications support towers and related attachments. Wireless communications support towers that are incompatible with adjoining land uses could have been permitted, since current City regulations have not anticipated the proliferation of support towers that are being constructed in response to rapid increases in demand for and changes in wireless communications technology and law. The moratorium is set to expire, and it is necessary for the new regulations in this Ordinance to go into effect immediately for the same reasons the moratorium was needed.

CITY OF SPOKANE, WASHINGTON

Mayor

ATTEST:

City Clerk

APPROVED AS TO FORM:

James Richman, Assistant City Attorney

**SUMMARY OF FCC'S DECLARATORY RULING ON
CTIA'S SHOT CLOCK PETITION**

WT Docket No. 08-165; FCC 09-99

Rel. November 18, 2009

Shot Clock

The FCC declared that state and local authorities must review completed applications within 90 days for collocations and 150 days for all other applications. These timeframes are deemed presumptively "reasonable" under section 332(c)(7)(B)(ii).

The *Declaratory Ruling* does not preempt state statutes or local zoning ordinances. Therefore, if a state or local government mandates shorter or longer time limits for application review, these time limits are still effective. When the shorter timeframe runs, the applicant can seek whatever remedy is provided under the state statute or local zoning ordinance. Once the federally mandated timeframe runs, the applicant can seek the federal remedy. Similarly, if a state statute or local zoning ordinance imposes a longer timeframe, an applicant may seek the federal remedy once the federal timeframe runs, and may seek the remedy provided by state statute or local zoning ordinance once the longer timeframe runs.

Trigger

The shot clock begins once an application is filed. State and local governments have 30 days to review an application for completeness and to request additional information. If a state or local government requests additional information outside of 30 day review period, the time it takes an applicant to respond and the time the authority takes to review the additional material counts towards the 90 day or 150 day timeframe.

Enforcement

If a state or local government fails to act within the prescribed timeframes, applicants can seek relief from a court of competent jurisdiction. Section 332(c)(7)(B)(v) of the Act requires applicants to seek relief within 30 days of the failure to act. The *Declaratory Ruling* preserves state and local governments' ability, if challenged for a failure to act, to rebut the presumption that the timeframes are reasonable given the circumstances.

Effect on Pending Applications

The *Declaratory Ruling* is effective upon the date of release, November 18, 2009. If a state or local government has not acted within the prescribed timeframes as of November 18, 2009, an applicant may provide notice to the relevant state or local authority that it is filing suit under section 332(c)(7)(B)(v). If the locality fails to act within 60 days of the notice given, the applicant may file suit for failure to act. For applications currently pending upon release of the *Declaratory Ruling* for a time less than the proscribed timeframes, the state or local authority has 90 or 150 days from the release of the *Declaratory Ruling* to act.

Single Provider Rejections

State and local authorities are prohibited from denying an application *solely* because one or more carriers serve a given geographic market. A locality that denies an application on this ground violates section 332(c)(7)(B)(i)(II) by engaging in unlawful regulation that “prohibits or ha[s] the effect of prohibiting the provision of personal wireless services.” This resolves the existing split among several courts of appeals.

Ordinances Requiring Variances

The Commission declined to preempt local ordinances and state laws that require service providers to obtain a variance regardless of the type of deployment. The record was insufficient to establish a controversy on which the Commission could base its action.

Other Issue Addressed

Several commenters in this docket urged the Commission to deny the *Petition* because of concerns over radio frequency emissions. The Commission reaffirmed that under section 332(c)(7)(B)(iv) state and local authorities are prohibited from denying or delaying action on an application because of “perceived health effects of RF emissions.”



DATE: February 28, 2017

TO: City Council

FROM: Lauren Hollenbeck, Senior Planner

SUBJECT: Consider accepting all of Volume 1 and the Introduction, Appendices and the City's portion of Volume 2 of the Clark Regional Natural Hazard Mitigation Plan.

STAFF RECOMMENDATION:

Consider accepting all of Volume 1 and the Introduction, Appendices and the City's portion of Volume 2 of the Clark Regional Natural Hazard Mitigation Plan.

STAFF REPORT

Natural Hazard Mitigation Background:

In July of 2015 Clark Regional Emergency Services Agency (CRESA) formed a regional, seventeen member partnership comprised of Clark County, its cities and its special purpose districts and embarked on a planning process to prepare for and lessen the impacts of natural hazards by completely revising and updating the Clark Regional Natural Hazard Mitigation Plan (NHMP). The result of this effort will be a FEMA and Washington State Emergency Management Agency approved multi-jurisdictional, multi-hazard mitigation plan that meets federal mandates in the Disaster Mitigation Act of 2000 (Public Law 106-390) and establishes eligibility for hazard mitigation project funding under the unified hazard mitigation assistance grant program, which provides pre- and post-disaster grant opportunities.

The term "hazard mitigation" refers to actions that reduce or eliminate long-term risks caused by hazards such as earthquakes, floods, storms, and wildfires. It involves strategies such as planning, policy changes, programs, projects, and other activities that can mitigate the impacts of hazards. Without an investment in hazard mitigation, repeated disasters result in repeated damage and rebuilding. This recurrent reconstruction becomes more expensive as the years go by. Hazard mitigation breaks this costly cycle of damage and reconstruction by taking a long-term view of rebuilding and recovering from disasters.

The risk assessment in the hazard mitigation plan addresses the following hazards of concern within Clark County:

- Dam failure
- Drought

- Earthquake
- Flood
- Landslide
- Severe Weather
- Volcano
- Wildfire

A 15 member Steering Committee composed of representative stakeholders was formed early in the planning process to guide the development of the NHMP. Members of the public and other area stakeholders were invited and encouraged to participate in the process through a multi-media effort that included several presentations at local events, press and media releases, the establishment of a mitigation planning website, booths at local community events and a public survey.

Why adopt this Plan?

Once the hazard mitigation plan is adopted by each jurisdictional partner and approved by FEMA, the partnership will collectively and individually become eligible to apply for hazard mitigation project funding under the unified hazard mitigation assistance grant program, which provides pre- and post-disaster grant opportunities. See the following FEMA website for more information - <https://www.fema.gov/hazard-mitigation-assistance>

Where do we go from here?

Upon adoption of Volume 1 and City of Camas Annex of Volume 2 of the Clark Regional Natural Hazard Mitigation Plan (NHMP) and subsequent approval of said plan by WAEMD and FEMA, the City will be eligible to apply for specified grants. The grant funds are made available to states and local governments and can be used to implement the long-term hazard mitigation measures specified within the City's annex of the NHMP before and after a major disaster declaration. The NHMP is considered a living document such that, as awareness of additional hazards develops and new strategies and projects are conceived to offset or prevent losses due to natural disasters, the NHMP will be evaluated and revised on a continual 5-year time frame.

RECOMMENDED ACTION:

Staff recommends that Council consider adoption of a resolution of all of Volume 1 and the Introduction, Appendices and the City's portion of Volume 2 of the Clark Regional Natural Hazard Mitigation Plan at the March 20, 2017 Regular Council Meeting.



Clark Regional Emergency Services Agency

Clark Regional Natural Hazard Mitigation Plan Volume 1—Planning Area-Wide Elements

Agency Review Draft



EXECUTIVE SUMMARY

Hazard mitigation is the use of long-term and short-term policies, programs, projects, and other activities to alleviate the death, injury, and property damage that can result from a disaster. Clark County and a partnership of local governments within the County, led by Clark Regional Emergency Management Services (CRESA), have developed a countywide hazard mitigation plan to reduce risks from natural disasters. The plan complies with hazard mitigation planning requirements to establish eligibility for funding under Federal Emergency Management Agency grant programs.

PREVIOUS HAZARD MITIGATION PLANNING IN CLARK COUNTY

Federal regulations require periodic updates of hazard mitigation plans to reevaluate recommendations, monitor the impacts of actions that have been accomplished, and determine if there is a need to change the focus of mitigation strategies. A jurisdiction covered by a plan that has expired is no longer in compliance with the federal requirements for hazard mitigation planning.

Clark County and its seven cities prepared an initial hazard mitigation plan that was approved by the Federal Emergency Management Agency in 2004. This document represents a comprehensive update to the initial plan to reestablish grant eligibility for the original planning partnership and to expand eligibility to participating special purpose districts and the City of Woodland. Participating planning partners are listed in Tables ES-1 and ES-2. Seventeen local governments are seeking Disaster Mitigation Act compliance through this planning effort.

Planning partners who participated in the initial planning effort made efforts to reconcile the status of actions identified in the 2004 plan to the best of their abilities. Due to the significant amount of time that has passed since initial development and other factors such as staff turnover, not all action items were able to be reconciled. Through this planning effort, the planning partnership, led by CRESA, has recommitted to establishing implementation and maintenance processes that will be followed over the performance period of the 2016 plan. A hazard mitigation working group has been established that will convene quarterly over the next five years.

Table ES-1. Municipal Planning Partners

Jurisdiction	Point of Contact	Jurisdiction	Point of Contact
Clark County	Mike Lewis	City of Vancouver	Chad Eiken
City of Battle Ground	Scott Sawyer	City of Washougal	Mitch Kneipp
City of Camas	Lauren Hollenbeck	City of Woodland	Dennis Ripp
City of La Center	Jeffery Sarvis	Town of Yacolt	Cindy Marbut
City of Ridgefield	Lee Knottnerus		

Table ES-2. Special Purpose District Planning Partners

Jurisdiction	Point of Contact	Jurisdiction	Point of Contact
Fire District 3	Sean Smith	Ridgefield School District	Chris Griffith
Port of Vancouver	Scott Ouchi	Clark Public Utilities	Dan Krebs
Battle Ground Public Schools	Scott McDaniel	Clark Regional Wastewater District	Hugh Findlay
Camas School District	Heidi Burkart	C-TRAN	Terry Lohnes

PLAN UPDATE PROCESS

Updating the plan consisted of the following phases:

- **Phase 1, Organize Resources**—A planning team was assembled for the plan update, consisting of staff from CRESA and a technical consultant. The team conducted outreach to establish the planning partnership. A 15-member steering committee was assembled to oversee the plan update, consisting of planning partner staff, residents, and other stakeholders in the planning area. Coordination with other local, state and federal agencies involved in hazard mitigation occurred throughout the plan update process. This phase included a review of the existing plan, the Washington State Hazard Mitigation Plan, and existing programs that may support hazard mitigation actions.
- **Phase 2, Update the Risk Assessment**—Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards. This process assesses the vulnerability of people, buildings and infrastructure to natural hazards. Risk assessment models were enhanced with new data and technologies that have become available since 2004. The risk assessment included the following:
 - Hazard identification and profiling
 - Assessment of the impact of hazards on physical, social and economic assets
 - Vulnerability identification
 - Estimates of the cost of potential damage.
 - Planning partners used the risk assessment to rank risk and to gauge the potential impacts of each hazard of concern on their jurisdiction. The mitigation actions recommended in this plan include some that address limitations in the modeling caused by insufficient data, such as digitizing maps of urban flooding issues and collecting perishable data, such as high water marks, after hazard events.
- **Phase 3, Engage the Public**—The planning team implemented a public involvement strategy developed by the Steering Committee. The strategy included staffing public events where members of the planning team presented the risk assessment and the draft plan, presentations at various events and to community groups, a hazard mitigation survey, a CRESA-sponsored website, and multiple media releases.
- **Phase 4, Update Goals, Objectives and Actions**—The Steering Committee reviewed and updated the goals from the 2004 plan and developed a set of objectives. The planning partnership selected a range of appropriate mitigation actions to work toward achieving the goals set forth in this plan update. Additionally, the Steering Committee selected a set of county-wide mitigation actions.
- **Phase 5, Develop Plan Implementation and Maintenance Strategy**—The Steering Committee developed a plan implementation and maintenance strategy that includes the establishment of a hazard mitigation working group, annual progress reporting, a strategy for continued public involvement, a commitment to plan integration with other relevant plans and programs, and a recommitment from the planning partnership to actively maintain the plan over the five-year performance period.
- **Phase 6, Assemble the Updated Plan**—The planning team and Steering Committee assembled a document to meet federal hazard mitigation planning requirements for all partners. The updated plan contains two volumes. Volume 1 contains components that apply to all partners and the broader planning

area. Volume 2 contains all components that are jurisdiction-specific. Each planning partner has a dedicated annex in Volume 2.

- **Phase 7, Plan Adoption/Implementation**—Once pre-adoption approval has been granted by Washington State’s Emergency Management Division and FEMA Region X, the final adoption phase will begin. Each planning partner will individually adopt the updated plan.

Phase 8, Plan Implementation, will occur over the next five years as the planning partnership begins to implement the county-wide and jurisdiction specific actions identified in this plan.

RISK ASSESSMENT RESULTS

Based on the risk assessment, hazards were ranked as follows for the risk they pose to the overall planning area as shown in Table ES-3.

Table ES-3. Hazard Risk Ranking

Hazard Ranking	Hazard Event	Category
1	Earthquake	High
1	Severe weather	High
2	Flood	Medium
2	Landslide	Medium
2	Wildfire	Medium
3	Volcano	Low
4	Drought	Low
5	Dam failure	Low

Each planning partner also ranked hazards for its own area. Table ES-4 summarizes the categories of high, medium and low (relative to other rankings) based on the numerical ratings that each jurisdiction assigned each hazard. The results indicate the following general patterns:

- The earthquake and severe weather hazards were most commonly ranked as high.
- The flood and landslide hazards were most commonly ranked as medium.
- The dam failure, drought, volcano and wildfire hazard were most commonly ranked as low.

Table ES-4. Summary of Hazard Ranking Results

	Number of Jurisdictions Assigning Ranking to Hazard			
	High	Medium	Low	Not Ranked
Dam Failure	0	1	11	5
Drought	0	0	15	2
Earthquake	15	2	0	0
Flood	2	11	4	0
Landslide	0	10	7	0
Severe weather	15	1	1	0
Volcano	0	3	14	0
Wildfire	2	4	8	3

MITIGATION PURPOSE STATEMENT, GOALS AND OBJECTIVES

The following purpose statement guided the Steering Committee and the planning partnership in selecting the actions contained in this plan update:

Define natural hazard risk and, through collaboration and partnerships, establish strategies and actions for reducing the impacts of disasters in Clark County.

The Steering Committee and the planning partnership established the following goals for the plan update:

- Reduce and prevent the loss of life and property.
- Protect public services and critical facilities from the impacts of natural disasters.
- Increase public awareness of vulnerability to natural hazards and educate on risk reduction strategies.
- Promote community resilience.
- Protect environmental resources and utilize natural systems to reduce natural hazard impacts.
- Develop and implement cost-effective mitigation strategies.

The following objectives were identified that meet multiple goals, helping to establish priorities for recommended mitigation actions:

1. Inform the public on the risk exposure to natural hazards and ways to increase the public's capability to prepare, respond, recover and mitigate the impacts of these events.
2. Reduce the impacts of hazards on vulnerable populations.
3. Improve and maintain systems that provide warning and emergency communications.
4. Work cooperatively with stakeholders in planning for and reducing the impacts of natural hazards.
5. Incorporate risk reduction strategies in new and updated infrastructure and development plans to reduce the impacts of natural hazards.
6. Integrate natural hazard mitigation goals and objectives into other existing plans and programs within the planning area.
7. Provide incentives for development and land use techniques that reduce risks.
8. Strengthen and build redundancy into infrastructure, prioritizing areas that may be potentially isolated areas.
9. Retrofit, purchase, or relocate structures in high hazard areas, especially those known to be repetitively damaged.
10. Avoid, minimize or mitigate risks to critical facilities and infrastructure.
11. Support and enhance environmental protection and sustainability activities that may also accomplish mitigation objectives.
12. Use the best available data, science and technologies to implement mitigation strategies.

MITIGATION ACTIONS

Mitigation actions presented in this update are activities designed to reduce or eliminate losses resulting from natural hazards. The update process resulted in the identification of more than 272 mitigation actions for implementation by individual planning partners, as presented in Volume 2 of this plan. In addition, the steering committee and planning partnership identified 14 countywide actions benefiting the whole partnership, as listed in Table ES-5.

Table ES-5. County-Wide Mitigation Actions

Applies to New or Existing Assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding ^a	Timeline
CW-1 —Establish a county-wide repository of perishable data from hazard events and develop a standard form for capturing information						
New and existing	All hazards	4, 12	CRESA	Low	Staff time	Short-term
CW-2 —Develop a county-wide recovery/resiliency plan						
New and existing	All hazards	2, 4, 6	CRESA	High	Local, possible grant funding (UASI)	Short-term
CW-3 —Participate in the plan implementation hazard mitigation working group by sharing lessons learned and mitigation success stories and actively participating in progress reporting						
New and existing	All hazards	1, 4, 6, 12	Planning Partners/ facilitated by CRESA	Low	Staff time	Ongoing
CW-4 —Support and guide the technology for regional hazard warning systems						
New and existing	All hazards	1, 2, 3, 12	CRESA	Medium	Local, possible grant funding (FEMA, DHS, NWS, NOAA)	Ongoing
CW-5 —Ensure that a link to the hazard mitigation plan website hosted by CRESA is posted conspicuously on each planning partner website						
N/A	All hazards	1, 4	Planning Partners	Low	Staff time	Short-term
CW-6 —Support regional collaboration and consistency in hazard mitigation implementation and programs						
New and existing	All hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Clark County/CRESA	Low	Staff time	Ongoing
CW-7 —Where appropriate, support retro-fitting, relocating or acquisition from willing property owners of structures located in hazard-prone areas to protect structures from future damage, with repetitive and severe repetitive loss as a priority. Seek opportunities to leverage partnerships within the planning area in these pursuits						
Existing	All hazards	4, 5, 7, 9, 10	Planning Partners	High	HMGP, PDM, FMA, CDBG-DR	Ongoing
CW-8 —Utilize information contained within the Clark Regional Natural Hazard Mitigation Plan to support updates to other emergency management plans in effect within the planning area						
New and existing	All hazards	2, 4	CRESA	Low	Staff time	Ongoing
CW-9 —Utilize information contained within the Clark Regional Natural Hazard Mitigation Plan to support updates to other plans in effect within the planning area						
New and existing	All hazards	2, 4, 5	Planning Partners	Low	Staff time	Ongoing
CW-10 —Develop the capacity for a regional post-disaster volunteer coordination program						
N/A	All hazards	1, 2, 3, 4	CRESA	Medium	Staff time, Local funds	Long-term
CW-11 —Explore opportunities with all community stakeholders to implement, identify and fund mitigation actions						
New and existing	All hazards	1, 2, 4, 12	CRESA	Medium	Staff time, Local funds	Ongoing
CW-12 —Continue regional partnerships to improve and enhance mitigation efforts in the larger region						
New and existing	All hazards	1, 4	CRESA	Low	Staff-time	Ongoing
CW-13 —Establish guidelines to increase communication and coordination of mitigation actions across agencies whenever feasible						
New and existing	All hazards	4	CRESA	Low	Staff time	Short-term
CW-14 —Continue to work with planning partners and other stakeholders to clearly articulate and define emergency management roles and responsibilities within the County, including the implementation of identified mitigation actions.						
New and existing	All hazards	1, 4, 6	CRESA	Low	Staff time	Ongoing

a. HMGP = Hazard Mitigation Grant Program; FMA = Flood Mitigation Assistance; PDM = Pre-Disaster Mitigation Assistance; CDBG-DR = Community Development Block Grants Disaster Recovery; UASI = Urban Area Security Initiative

IMPLEMENTATION

Full implementation of the recommendations of this plan will require time and resources. The measure of the plan's success will be its ability to adapt to changing conditions. Clark County and its planning partners will assume responsibility for adopting the recommendations of this plan and committing resources toward implementation. The framework established by this plan commits all planning partners to pursue actions when the benefits of a project exceed its costs. The planning partnership developed this plan with extensive public input, and public support of the actions identified in this plan will help ensure the plan's success.

3. CITY OF CAMAS

3.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Lauren Hollenbeck, Senior Planner
616 NE 4th Avenue
Camas, WA 98607
Telephone: 360-817-1568
e-mail Address: lhollenbeck@cityofcamas.us

Alternate Point of Contact

Steve Wall, Public Works Director
616 NE 4th Avenue
Camas, WA 98607
Telephone: 360-834-6864
e-mail Address: swall@cityofcamas.us

3.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- Date of Incorporation—1906
- Current Population—21,210 as of April 1, 2015 (2015 Office of Financial Management estimates)
- Population Growth—Based on data tracked by the Office of Financial Management, Camas has experienced a fairly steady growth rate. The overall population has increased approximately 15 percent from 19,355 in 2010 to 22,843 in 2015, an average 3.5 percent per year increase during this time frame.
- Location and Description—The City of Camas is located in Clark County, Washington, west of the Columbia River gorge and approximately 20 miles north of Portland, Oregon. The City is bordered by the Columbia River to the south, the City of Washougal and Woodburn Hill to the east, Lacamas Lake and Lacamas Lake Park to the north, and Grass Valley and the City of Vancouver to the west. It sits north of Highway 14 across the Columbia River from the City of Gresham, Oregon. Camas' downtown and older parts of the City are fairly flat, almost at the same level of the Columbia River, and surrounded by steep slopes.
- Brief History—In the late 1800's, hundreds of Native Americans camped along the Columbia River. The name for the City of Camas comes from the lily-like camas plant, an important part of the Native American diet in the Northwest, and widely found in this area. The first settlers arrived to Camas in the mid 1800's. In 1883, the LaCamas Colony Company of Portland selected this area for their new paper mill, the largest paper mill west of the Rocky Mountains. Mr. Henry L. Pittock, the owner of the Oregonian newspaper needed plenty of water to power paper-making machines for his newspaper and found it in the nearby lakes. Camas was incorporated in 1906 and by 1928 the paper mill was owned and operated by the Crown-Zellerbach Corporation. Today, Crown-Zellerbach is known as Georgia Pacific. From the 1990s through today, Camas experienced significant growth in residential development and in the technology and manufacturing industries due to land annexations.
- Climate—Camas' climate is influenced by the Coast and Cascade mountain ranges. Prevailing winds are from the northeast from April through September, and from the east-southeast for the rest of the year. Occasional high easterly winds occur year-round through the Columbia Gorge. Annual average precipitation is 51 inches. The month of December generally receives the most precipitation, with an

average of 6.5 inches, and July receives the least, with a half-inch. The average mid-winter temperature is 40 degrees, the summer average is 65 degrees, and the annual average temperature is 53 degrees.

- **Governing Body Format**—Camas uses the “Mayor-Council” form of government which consists of an elected mayor, who serves as the city’s chief administrative officer, and a council, which serves as the municipality’s legislative body. Additionally, the City has a professional City Administrator to assist the Mayor with administrative and polity related duties. The City consists of nine departments: City Administration, Community Development, Fire, Finance, IT, Library, Parks & Recreation, Police and Public Works. The City has 10 committees, commissions and task forces, which report to the City Council. The City Council assumes responsibility for the adoption of this plan; the City Administrator will oversee its implementation.
- **Development Trends**—Anticipated development levels for Camas are high, consisting primarily of residential development. In 2015, Camas approved the Green Mountain Planned Residential Development Mixed Use Master Plan to include 1,300-1,400 residential units and commercial uses, the largest mixed use development in the city’s recent history. There has also been a focus on affordable housing and a push for more accessory dwelling units, secondary “mother-in-law” units, on properties. Camas adopted its comprehensive plan in 2004, which provides policies and recommendations to direct public and private decisions affecting future growth and development. City actions, such as those relating to growth, land use, transportation, public facilities and services, parks, and open space must be consistent with the plan.

3.3 CAPABILITY ASSESSMENT

An assessment of legal and regulatory capabilities is presented in Table 3-1. An assessment of fiscal capabilities is presented in Table 3-2. An assessment of administrative and technical capabilities is presented in Table 3-3. Information on National Flood Insurance Program (NFIP) compliance is presented in Table 3-4. Classifications under various community mitigation programs are presented in Table 3-5. An assessment of education and outreach capabilities is presented in Table 3-6.

Table 3-1. Legal and Regulatory Capability

	Local Authority	Other Jurisdiction Authority	State Mandated
Building Code <i>Comment: Camas Municipal Code (CMC) Chapter 15.04.010; adopts the most current State Building Code as amended.</i>	Yes	No	Yes
Zoning Code <i>Comment: CMC Title 18 Zoning: Ord. 2515 § 1 (Exh. A (part)), 2008; Ord. 2443 § 3 (Exh. A (part)), 2006</i>	Yes	No	Yes
Subdivisions <i>Comment: CMC Chapter 17.11 Subdivisions; Ord. 2483, 2007</i>	Yes	No	Yes
Stormwater Management <i>Comment: CMC Chapter 14.02 Stormwater Control: Ord. 2582, § I, 2-1-2010- adopts the 2005 Ecology Stormwater Manual and Camas Stormwater Design Standards Manual Res. 1193 adopted July 2010.</i>	Yes	Yes	Yes
Post-Disaster Recovery <i>Comment: None at this time.</i>	No	No	No
Real Estate Disclosure <i>Comment: WA State Disclosure Law- RCW 64.06</i>	No	Yes	Yes
Growth Management <i>Comment: The City is in compliance and good standing with the Washington Growth Management Act of 1990 with its land-use policies identified in its comprehensive plan (March 2004 update) and municipal code.</i>	Yes	No	Yes
Site Plan Review <i>Comment: CMC Chapter 18.18 Site Plan Review: Ord. 2515 § 1(Exh. A (part)), 2008, Ord. 2481 § 1 (Exh. A (part)), 2007, Ord. 2443 § 3 (Exh. A (part)), 2006</i>	Yes	No	No
Environmental Protection <i>Comment: CMC Chapter 16.51 Critical Areas: Ord. 2517 § 1(Exh. A (part)), 2007; CMC Chapter 18.31 Sensitive Areas and Open Space: Ord. 2515 § 1(Exh. A (part)), 2008; Shoreline Master Program adopted 2012</i>	Yes	No	Yes
Flood Damage Prevention <i>Comment: CMC Chapter 16.57 Frequently Flooded Areas: Ord. 2517 § 1(Exh. A (part)), 2008, Ord. 2647 § I (Exh. A) 5-21-2012,</i>	Yes	Yes	Yes
Emergency Management <i>Comment: 2016 Draft Comprehensive Emergency Management Plan</i>	Yes	No	Yes
Climate Change <i>Comment: None at this time.</i>	No	No	No
Other <i>Comment: None at this time.</i>	No	No	No
General or Comprehensive Plan <i>Is the plan equipped to provide linkage to this mitigation plan? No</i> <i>Comment: March 2004 City of Camas Comprehensive Plan; 2035 City of Camas Comprehensive Plan is anticipated for adoption before the end of 2016.</i>	Yes	No	Yes
Capital Improvement Plan <i>What types of capital facilities does the plan address? Roads, water and sewer</i> <i>How often is the plan updated? 6 year CIP, reviewed and updated annually.</i> <i>Comment:</i>	Yes	No	Yes
Floodplain or Watershed Plan <i>Comment: None at this time.</i>	No	No	No
Stormwater Plan <i>Comment: Comprehensive Stormwater Drainage Plan April 2013</i>	Yes	No	No

	Local Authority	Other Jurisdiction Authority	State Mandated
Habitat Conservation Plan <i>Comment: None at this time.</i>	No	No	No
Economic Development Plan <i>Comment: Camas-Washougal Economic Development Association</i>	Yes	Yes	Yes – dependent on funding
Shoreline Management Plan <i>Comment: Ord. 2643 and Res. 1250, Sept. 12, 2012 and Ord. 15-007</i>	Yes	No	Yes
Community Wildfire Protection Plan <i>Comment: None at this time.</i>	No	No	No
Forest Management Plan <i>Comment: None at this time.</i>	No	No	No
Climate Action Plan <i>Comment: None at this time.</i>	No	No	No
Other <i>Comment: None at this time.</i>	No	No	No
Comprehensive Emergency Management Plan <i>Comment: Adopted/approved 2006, currently being revised.</i>	Yes	No	Yes
Threat & Hazard Identification & Risk Assessment <i>Comment: None at this time.</i>	No	No	No
Post-Disaster Recovery Plan <i>Comment: None at this time.</i>	No	No	No
Continuity of Operations Plan <i>Comment: None at this time.</i>	No	No	No
Public Health Plan <i>Comment: Region IV Public Health Emergency Response Plan Dec. 2013</i>	No	Yes	No

Table 3-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes (water, sewer, stormwater)
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
Withhold Public Expenditures in Hazard-Prone Areas	No
State-Sponsored Grant Programs	No
Development Impact Fees for Homebuyers or Developers	Yes
Other	No

Table 3-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Community Department – 1 Community Development Director, 1 Planning Manager, 2 Senior Planners, 1 Project Manager
Engineers or professionals trained in building or infrastructure construction practices	Yes	Community Development- 1 Building Official, 2 Building Inspectors. Utilities Department (21 water/sewer/storm water employees).
Planners or engineers with an understanding of natural hazards	Yes	Community Development- 1 Senior Planner; Engineering- 1 Engineer; could contract with others for expertise in this field
Staff with training in benefit/cost analysis	Yes and No	Community Development- 1 Senior Planner (could use a refresher course)
Surveyors	No	No licensed surveyors on City staff.
Staff capable of making substantial damage estimates	Yes	Community Development- 1 Building Official, 1 Senior Planner
Personnel skilled or trained in GIS applications	Yes and No	Community Development- Senior Planners, City can and has requested GIS assistance from Clark County GIS staff.
Scientist familiar with natural hazards in local area	Yes	No scientist or biologist on staff. The City has contracted for this level of expertise in the past.
Emergency manager	Yes	Fire Department- Fire Chief
Grant writers	Yes	City staff writes grants.

Table 3-4. National Flood Insurance Program Compliance

Criteria	Response
When did the community enter the NFIP?	02/18/81
When did the Flood Insurance Rate maps become effective?	09/05/2012
What local department is responsible for floodplain management?	Community Development
Who is your floodplain administrator? (department/position)	Community Development/Senior Planner
• Is this a primary or auxiliary role?	N/A
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date of adoption of your flood damage prevention ordinance?	5-21-2012
• Does your floodplain management program meet or exceed minimum requirements?	Meets
• If so, in what ways?	N/A
When was the most recent Community Assistance Visit or Community Assistance Contact?	Unknown
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed?	No
• If so, please state what they are.	N/A
Do your flood hazard maps adequately address the flood risk within your jurisdiction?	Yes
• If no, please state why.	N/A
Does your floodplain management staff need any assistance or training to support its floodplain management program?	Not at this time.
• If so, what type of assistance/training is needed?	
Does your jurisdiction participate in the Community Rating System (CRS)?	No
• If so, is your jurisdiction seeking to improve its CRS Classification?	
• If not, is your jurisdiction interested in joining the CRS program?	No

Criteria	Response
How many Flood Insurance policies are in force in your jurisdiction? ^a	65
• What is the insurance in force? ^a	\$18,405,500
• What is the premium in force? ^a	\$33,992
How many total loss claims have been filed in your jurisdiction? ^a	5
• How many claims were closed without payment/are still open? ^a	2
• What were the total payments for losses? ^a	\$13,710.27

a. According to FEMA records as of 11/30/15.

Table 3-5. Community Classifications

	Participating?	Classification	Date Classified
Community Rating System	No	N/A	N/A
Building Code Effectiveness Grading Schedule	Yes	2	2001
Public Protection	No	N/A	N/A
Storm Ready	No	N/A	N/A
Firewise	No	N/A	N/A

Table 3-6. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes, City Clerk
Do you have personnel skilled or trained in website development?	Yes. IT department.
Do you have hazard mitigation information available on your website?	No
• If yes, please briefly describe.	N/A
Do you utilize social media for hazard mitigation education and outreach?	No
• If yes, please briefly describe.	N/A
Do you have any citizen boards or commissions that address issues related to hazard mitigation?	No
• If yes, please briefly specify.	N/A
Do you have any other programs already in place that could be used to communicate hazard-related information?	Yes
• If yes, please briefly describe.	city website, water bill news media
Do you have any established warning systems for hazard events?	No
• If yes, please briefly describe.	N/A

3.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into local planning mechanisms.

3.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- The Comprehensive Plan- The Plan addresses Critical Areas including Frequently Flooded Areas and Geologically Hazardous Areas.
- Stormwater Design Manual- geotechnical analysis report is required for stormwater detention facilities located within 200 feet top of a Landslide Hazard area.
- Critical Areas Ordinance (CAO)—The first goal of the Camas CAO is to protect members of the public and public resources and facilities from injury, loss of life, or property damage due to landslides and steep slope failures, erosion, seismic events, or flooding.
- Shoreline Master Program (SMP)—The goal for flood hazards in the SMP is to promote public health, safety, and general welfare, and minimize public and private losses due to flood conditions in specific areas.

3.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- Comprehensive Plan- The Hazard Mitigation plan could be adopted by reference
- Stormwater Drainage Plan- some of the identified capital improvements could be included as hazard mitigation initiatives in the Hazard Mitigation action plan.
- Capital Improvement Plan- some of the hazard mitigation initiatives could be incorporated from the Capital Improvement Plan.

3.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 3-7 lists all past occurrences of natural hazards within the jurisdiction.

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Severe Storm(s)	4253	2/2/16	Approx. 1 mill.
Severe Storm(s)	1825	3/2/2009	N/A
Severe Storm(s)	1682	2/14/2007	N/A
Severe Storm(s)	1671	12/12/2006	N/A
Earthquake	1361	3/1/2001	N/A
Severe Storm(s)	1159	3/1/2001	N/A
Flood	1100	2/9/1996	N/A
Severe Storm(s)	1079	1/3/1996	N/A
Volcano	623	5/21/1980	N/A
Flood	545	12/10/1977	N/A
Flood	185	12/29/1964	N/A
Flood	146	3/2/1963	N/A
Severe Storm(s)	137	10/20/1962	N/A
Flood	70	3/6/1957	N/A
Flood	50	2/25/1956	N/A

3.6 JURISDICTION-SPECIFIC VULNERABILITIES

Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: 0

- Number of FEMA-identified Severe-Repetitive-Loss Properties: 0
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: 0

Other noted vulnerabilities include:

- Aging water and sewer lines are vulnerable to the earthquake hazard.
- Aging city hall building. Constructed before seismic codes were in place- susceptible to earthquake damage.
- Public Works Operations Center building- constructed prior to seismic codes in place and thus vulnerable to the earthquake hazard.
- Dam at Lacamas lake- could be impacted to flooding or earthquake.
- Potential chemical spill from the paper mill
- High pressure natural gas line could be vulnerable to the earthquake hazard.
- High tension power lines may be vulnerable severe storms (i.e. wind and ice).
- Homes along the Washougal River may be susceptible to flooding.

3.7 HAZARD RISK RANKING

Table 3-8 presents the ranking of the hazards of concern.

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Earthquake	51	High
2	Severe Weather	51	High
3	Landslide	36	Medium
4	Flood	21	Medium
5	Wildfire	18	Medium
6	Dam Failure	11	Low
6	Volcano	11	Low
7	Drought	9	Low

3.8 STATUS OF PREVIOUS PLAN INITIATIVES

Table 3-9 summarizes the initiatives that were recommended in the previous version of the natural hazard mitigation plan and their implementation status at the time this update was prepared. It should be noted, that the actions identified in the following table were developed in 2004. Due to the significant amount of time and staff turnover that has occurred since their identification, the status of some actions may be unknown. Additionally, many of the action items identified were to be led by CRESA or other non-City agencies. For ease of annual progress reporting, these actions have generally been removed from the City's action plan or rephrased to be within the capabilities of the City. This will allow for a fresh start consistent with the comprehensive update to the natural hazard mitigation plan conducted during the 2016 planning process.

3.9 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 3-10 lists the actions that make up the City of Camas hazard mitigation action plan. Table 3-11 identifies the priority for each action. Table 3-12 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 3-9 Status of Previous Plan Initiatives

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Support voluntary structural retrofitting of older homes on vulnerable soils. <i>Comment: Provide educational materials (Action carried over as Action #CM-10 in update action plan)</i>		X	
Require the retrofitting of older, vulnerable or critical structures located on NEHRP 'E' and 'F' soils. <i>Comment: City of Camas does not have NEHRP 'E' or 'F' soils, therefore this action has been removed.</i>			X
Encourage non-structural retrofitting throughout the County. <i>Comment: Provide educational materials supplied or approved by CRESA (Action carried over as Action #CM-12 in updated action plan).</i>		X	
Join the CRS program <i>Comment: The City of Camas is not joining the CRS program at this time, therefore this action has been removed.</i>			X
Support the retrofit of at-risk homes in subdivisions <i>Comment: (Action carried over as Action #CM-13 in updated action plan)</i>		X	
Encourage non-structural retrofitting of hazardous materials containment <i>Comment: (Action carried over as Action #CM-12 in updated action plan)</i>		X	
Ensure that the public is informed of the necessity of maintaining a 3 day supply of food and water <i>Comment: Provide educational material for disaster preparedness supplied by CRESA. Will add a "Preparing for Emergency" to our website. (Action carried over as Action #CM-14 in updated action plan)</i>		X	
Develop public information packets ready to deploy following a disaster event <i>Comment: (This was a CRESA specific action item. City of Camas will support out partner by providing information and resources as requested.)</i>			X
Ensure that residents understand the benefits of defensible space to minimize and reduce the impacts of fires. <i>Comment: add this information to the city website. (Action carried over as Action #CM-16 in updated action plan)</i>		X	
Ensure severe weather warning system and public education for tornadoes in place. <i>Comment: (This was a CRESA specific action item. City of Camas will support our partner by providing information and resources as requested.)</i>			X
Expand the public awareness program about hazard materials <i>Comment: (This was a CRESA and Local Emergency Planning Committee specific action item. CRESA also leads the Committee which has responsibility for this action item. City of Camas will support our partner by providing information and resources as requested.)</i>			X
Cultivate an awareness program for landslide hazards <i>Comment: (This was a CRESA specific action item. City of Camas will support our partner by providing information and resources as requested.)</i>			X
Develop an automated method to notify the public of events during a disaster. <i>Comment: Possible develop a reverse 911. (Action carried over as Action #CM-20 in updated action plan)</i>		X	
Expand weather radio systems to include all of Clark County <i>Comment: (This was a CRESA specific action item. City of Camas will support our partner by providing information and resources as requested.)</i>			X
Provide fast, accurate spatial incident information for emergency services response. <i>Comment: (CAMEO and other software are for First Responders. Clark County has no Hazmat First Responders. This was a CRESA specific action item.)</i>			X
Conduct pre-earthquake assessments for critical and essential facilities and develop a risk-reduction strategy <i>Comment: Work with CRESA on pre-earthquake assessments and risk reduction strategies (Action carried over as Action #CM-23 in updated action plan)</i>		X	

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Determine critical government functions and establish redundancy for these functions.		X	
<i>Comment: Coordinate with Public Works, Fire and Police (Action carried over as Action #CM-24 in updated action plan)</i>			
Target development and preparedness efforts of Tier II hazardous material facilities	X		
<i>Comment: Through fire inspections and plans reviews, these facilities are in compliance.</i>			
Encourage partnerships among agencies to promote uniformity among no-burn policies in forest lands	X		
<i>Comment: No open burning is permitted.</i>			
Develop a contingency/Business resumption organization			X
<i>Comment: (This was a CRESA specific action item).</i>			
Provide opportunities for strategic relations between emergency managers and social service providers.			X
<i>Comment: (This was a CRESA specific action item).</i>			
Require the construction of earthquake-resilient structures	X	X	
<i>Comment: This work is implemented through the adoption of the International Building Codes. (Ongoing action, implements annually by Building Department).</i>			
Develop integrated County stormwater basin-wide plans	X	X	
<i>Comment: (The Clark County Stormwater Plan was completed in 2009 & updated annually in the first quarter of the year. Plan includes maintenance, repair, etc. LID principles are currently being considered for inclusion in the local development codes. Action carried over as Action #CM-27 in updated action plan).</i>			
Promote development off of the floodplain	X		
<i>Comment: This action has been completed through the adoption of Camas Municipal Code (CMC) 18.09.060 Density Transfer and CMC Chapter 18.23 Planned Residential Development</i>			
Consider adoption of a zero-rise floodway	X		
<i>Comment: This action has been completed through the adoption of CMC Section 16.57.020.E.1 Development in Floodways.</i>			
Expand the County Clean Water Program	X		
<i>Comment: Clark County Environmental Services expanded the program to include an integrated stormwater basin plan & retrofitting & property purchase via Legacy Lands Program.</i>			
Develop a method of assessing and documenting landslide hazard areas.	X		
<i>Comment: City code defines landslide hazard areas and requirements for development including a geologic hazard area study by a State of Washington registered geotechnical engineer using the "best available engineering and geologic practice." The geotechnical information and plan requirements are defined in Camas Code."</i>			
Support the use of LIDAR mapping technology to refine landslide hazard maps	X		
<i>Comment: The latest LIDAR information is currently used in the slope layer and developers package of Clark Co. GIS.</i>			
Ensure state certification of licensing for professionals performing geotechnical evaluations	X		
<i>Comment: This action is completed through the adoption of CMC 16.59.060(A) Critical area report requirements for geologically hazardous areas.</i>			
Institute Low Impact Development Practices		X	
<i>Comment: LID principles are currently being considered for inclusion in the local development codes. (Action carried over as Action #CM-30 in updated action plan)</i>			
Initiate a vegetation management program	X		
<i>Comment: This action is completed through the adoption of CMC 16.59.070(A)(5)—Hazard and environmental mitigation plans for erosion and landslide hazard areas shall include a vegetation management and/or replanting plan.</i>			

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Ensure emergency vehicle access to all residents to allow effective response and recovery from disaster events.	X		
<i>Comment: All residences can be reached through fire access roads.</i>			
Develop priority routes throughout the county and improve these routes to a higher standard.	X		
<i>Comment: This action has been completed.</i>			
Ensure that electricity is available to populations requiring priority for electricity.	X		
<i>Comment: Nursing home, schools, police and fire stations have back-up generators.</i>			

Table 3-10. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CM-1—Where appropriate, support retro-fitting, purchase or relocation of structures located in high hazard areas and prioritize those structures that have experienced repetitive losses.						
Existing	All Hazards	4, 5, 7, 9, 10	Planning	High	HMGP, PDM, FMA, CDBG-DR	Short-term
CM-2—Integrate the natural hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions within the community.						
New and Existing	All Hazards	2, 4	Planning	Low	Staff Time, General Funds	On-going
CM-3—Develop and implement a program to capture perishable data after significant events (e.g. high water marks, preliminary damage estimates, damage photos) to support future mitigation efforts including the implementation and maintenance of the natural hazard mitigation plan.						
Existing	All Hazards	1, 2, 4, 12	Fire/Emergency Management and Building Department	Medium	Staff Time, General Funds	Short-term
CM-4—Support the County-wide hazard mitigation initiatives identified in Volume I of the natural hazard mitigation plan.						
New and Existing	All Hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Lead Contact Department for Plan	Low	Staff Time, General Funds	Short-term
CM-5—Actively participate in the plan maintenance protocols outlined in Volume I of the natural hazard mitigation plan.						
New and Existing	All Hazards	1, 4	Lead Contact Department for Plan	Low	Staff Time, General Funds	Short-term
CM-6—Continue to maintain good standing and compliance under the National Flood Insurance Program (NFIP). This will be accomplished through the implementation of floodplain management programs that will, at a minimum, meet the requirements of the NFIP:						
<ul style="list-style-type: none"> Enforcement of the flood damage prevention ordinance Participate in floodplain identification and mapping updates Provide public assistance/information on floodplain requirements and impacts 						
New and Existing	Flood	1, 4, 5, 9	Community Development and Public Works	Low	Staff Time, General Funds	On-going

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CM-7—Work with building officials to identify ways to improve the jurisdiction's BCEGS classification.						
New	Earthquake, Flood, Landslide, Severe Weather, Volcano, Wildfire	5, 6, 7, 10, 12	Building and Development Services	Low	Staff Time, General Funds	Short-term
CM-8- Develop a post-disaster recovery plan and a debris management plan.						
Existing	All Hazards	1, 2, 4, 9	Fire/Emergency Management and Public Works	Medium	EMPG	On-going
CM-9—Participate in programs such as Firewise, StormReady and the Great Shakeout.						
New and Existing	Dam Failure, Flood, Severe Weather, Wildfire	1, 7	Fire/Emergency Management and Public Works	Low	Staff Time, General Funds	
CM-10—Support voluntary structural retrofitting of older homes on vulnerable soils.						
Existing	Earthquake	1, 2, 7, 9	Building	Low	Property Owner, FEMA Hazard Mitigation Grant Funding	On-going
CM-11—Ensure critical facilities have back-up power generation facilities.						
New	All Hazards	2, 5, 8, 9, 10	Public Works	High	FEMA Hazard Mitigation Grant Programs	Long-term
CM-12—Encourage non-structural retrofitting for critical facilities, schools, hospitals and businesses by anchoring, base isolating, relocating vulnerable nonstructural building elements such as hazardous materials containment.						
New and Existing	Earthquake	1, 2, 5, 9, 10	Building	Low	Property owner, Staff Time, General Funds, FEMA funding	On-going
CM-13—Support the retrofit of at-risk homes to wildland fire.						
New and Existing	Wildfire	2, 4, 5, 7, 9, 12	Fire and Building	Medium	Property owner, FEMA Hazard Mitigation Grant Programs	On-going
CM-14—Work with CRESA to ensure that the public is informed of the necessity of maintaining self-sufficient supplies for 10-14 days.						
Existing	All Hazards	1, 2, 3, 4	Fire/Emergency Management	Low	Staff Time, General Funds	On-going
CM-15— Ensure that residents understand the benefits of defensible space to minimize and reduce the impacts of fires.						
New	Wildfire	1, 2, 5, 11	Fire	Low	Staff Time, General Funds	On-going
CM-16—Develop an automated method to notify the public of events during a disaster.						
New	All Hazards	1, 2, 3, 4, 12	Fire/Emergency Management	Medium	FEMA funds	Short-term
CM-17—Conduct pre-earthquake assessments for critical and essential facilities and develop a risk-reduction strategy.						
New	Earthquake	1, 5, 9, 10, 12	Building and Public Works	Medium	Staff time, General Funds, FEMA Hazard Mitigation Grant Programs	Long-term
CM-18—Determine critical government functions and establish redundancy for these functions.						
New	Earthquake	4, 6, 8, 10	Public Works, Police, Fire	Medium	Staff Time, General Funds	Long-term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CM-19—Develop integrated County stormwater basin-wide plans						
New	Flood, Severe Weather	1, 5, 9, 10, 11, 12	Public Works	Medium	FEMA Hazard Mitigation Funding	Long-term
CM-20—Institute Low Impact Development Practices						
New	Flood, Severe Weather	1, 5, 6, 7, 11, 12	Public Works, Community Development	Low	Staff Time, General Funds	On-going
CM-21—Continue and/or enhance where feasible, the city's ongoing drainage system maintenance program to reduce or minimize the impact from stormwater flooding within the City.						
New and Existing	Flood and Severe Weather	2, 5, 10, 11, 12	Public Works	Low	Stormwater Utility, CIP	On-going
CM-22—Address stormwater flooding problems due to lack of drainage conveyance systems at the following locations:						
<ul style="list-style-type: none"> • intersection of NW Julia Street and NW 26th Avenue • along NW Maryland Street • southern end of NW Iris Court, north of Columbia Summit Drive • along NW 10th Ave at NW Ivy Drive and NW Drake Street 						
New and Existing	Flood and Severe Weather	2, 5, 10, 11, 12	Public Works	Medium	CIP, FEMA Hazard Mitigation Grant Programs	Long-term
CM-23—Identify and mitigate drainage issues resulting in nuisance flooding such as replacing undersized culverts where needed.						
New and Existing	Flood and Severe Weather	1, 2, 5, 11, 12	Public Works	Low	Staff Time, General Funds	On-going
CM-24—Monitor/review accumulated effects from piecemeal development on steep slopes.						
New	Landslide	11, 12	Community Development	Low	Staff Time, General Funds	On-going
CM-25—Identify a funding mechanism for a local match to Federal funds that can fund private mitigation practices.						
New	All Hazards	1	Community Development	Low	Staff Time, General Funds	Short-term
CM-26—Develop a drought contingency plan.						
New	Drought	1, 2, 3, 4, 5, 6, 11	Public Works	Medium	Staff Time, General Funds, FEMA Hazard Mitigation Grant Programs	Short-term
CM-27—Update the City's Emergency Plan notebook.						
Existing	All Hazards	1, 3, 12	Fire/Emergency Management	Low	Staff Time, General Funds	On-going
CM-28—Partner with the Cascade Volcano Observatory in public education and awareness campaigns.						
Existing	Volcano	1, 2, 3, 4	Fire/Emergency Management	Low	Staff Time, General Funds	On-going
CM-29—Use zoning and/or special wildfire overlay district to designate high-risk areas and specify the conditions for the use and development of specific areas.						
New	Wildfire	1, 2, 4, 5, 7, 11	Fire	Low	Staff Time, General Funds	Short-term
CM-30—Seek out partnerships for the use of a boat during a flood disaster.						
New	Flood	2, 5	Fire/Emergency Management	Low	Staff Time, General Funds	Short-term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CM-31—Develop an inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.						
New	Earthquake	1, 5, 9, 10	Building/Public Works	Low	Staff Time, General Funds	Short-term

Table 3-11. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
CM-1	5	High	High	Yes	Yes	No	Medium	High
CM-2	2	Medium	Low	Yes	No	Yes	High	Low
CM-3	4	Low	Medium	No	No	Maybe	Low	Low
CM-4	12	Low	Low	Yes	No	Yes	High	Low
CM-5	2	Low	Low	Yes	No	Yes	High	Low
CM-6	4	Medium	Low	Yes	No	Yes	High	Low
CM-7	5	Medium	Low	Yes	No	Yes	High	Low
CM-8	4	Medium	Medium	Yes	Yes	No	Medium	High
CM-9	2	Medium	Low	Yes	No	Yes	High	Low
CM-10	4	High	Low	Yes	Yes	No	Medium	High
CM-11	5	High	High	Yes	Yes	Yes	Medium	High
CM-12	5	High	Low	Yes	Yes	No	Medium	High
CM-13	6	High	Medium	Yes	Yes	No	Medium	High
CM-14	4	Medium	Low	Yes	No	Yes	Medium	Low
CM-15	4	Medium	Low	Yes	No	Yes	Medium	Low
CM-16	5	Medium	Medium	Yes	No	Yes	Medium	Low
CM-17	5	Medium	Medium	Yes	Maybe	No	Medium	Medium
CM-18	4	High	Medium	Yes	No	Yes	Medium	Low
CM-19	6	High	Medium	Yes	Yes	No	High	High
CM-20	6	Medium	Low	Yes	Maybe	Yes	Medium	Low
CM-21	5	Medium	Low	Yes	No	Yes	Medium	Low
CM-22	5	High	Medium	Yes	No	No	High	High
CM-23	5	Medium	Low	Yes	No	Yes	Medium	Low
CM-24	2	Low	Low	Yes	No	Yes	Low	Low
CM-25	1	Medium	Low	Yes	No	Yes	Medium	Low
CM-26	7	Medium	Medium	Yes	Yes	Yes	Medium	Medium
CM-27	3	Medium	Low	Yes	No	Yes	Medium	Low
CM-28	4	Medium	Low	Yes	No	Yes	Medium	Low
CM-29	6	Medium	Low	Yes	No	Yes	Medium	Low
CM-30	2	Medium	Low	Yes	No	Yes	Medium	Low
CM-31	4	Medium	Low	Yes	No	Yes	Medium	Low

a. See the introduction to this volume for explanation of priorities.

Table 3-12. Analysis of Mitigation Actions

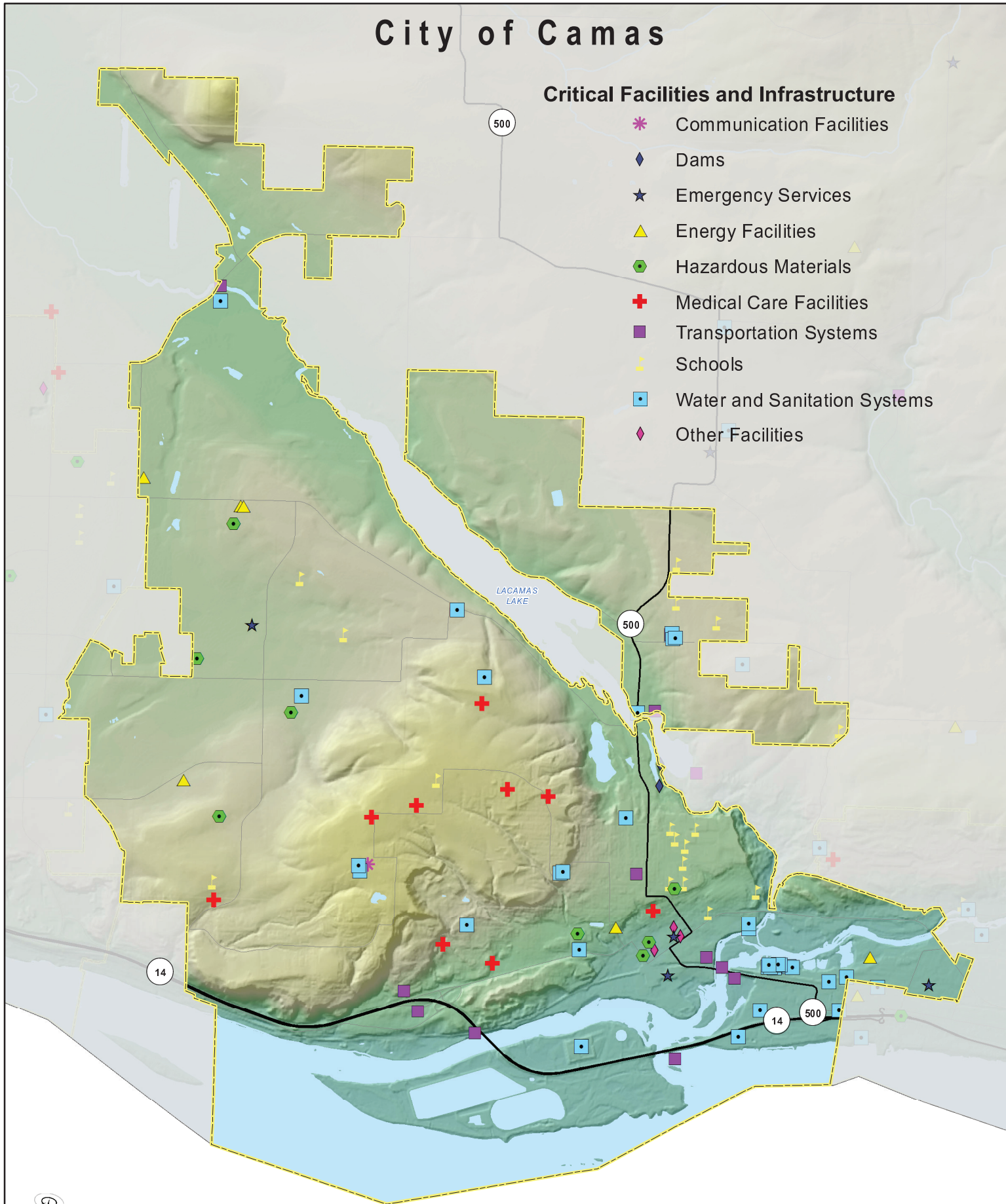
Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	CM-2, CM-3, CM-4, CM-5, CM-6, CM-8, CM-25, CM-27	CM-1, CM-6	CM-4, CM-6, CM-14, CM-16		CM-8, CM-11	
Drought	CM-2, CM-3, CM-4, CM-5, CM-8, CM-25, CM-26, CM-27	CM-1, CM-26	CM-4, CM-14, CM-16, CM-26	CM-26	CM-8, CM-11	
Earthquake	CM-2, CM-3, CM-4, CM-5, CM-7, CM-8, CM-17, CM-25, CM-27, CM-31	CM-1, CM-7, CM-10, CM-11, CM-12, CM-17, CM-31	CM-4, CM-14, CM-16		CM-8, CM-11, CM-18	CM-17, CM-31
Flood	CM-2, CM-3, CM-4, CM-5, CM-6, CM-7, CM-8, CM-19, CM-21, CM-23, CM-25, CM-27	CM-1, CM-6, CM-7	CM-4, CM-6, CM-14, CM-16	CM-9, CM-19, CM-20, CM-21	CM-8, CM-11	CM-22
Landslide	CM-2, CM-3, CM-4, CM-5, CM-7, CM-8, CM-24, CM-25, CM-27	CM-1, CM-7	CM-4, CM-14, CM-16		CM-8, CM-11	
Severe weather	CM-2, CM-3, CM-4, CM-5, CM-7, CM-8, CM-19, CM-21, CM-23, CM-25, CM-27	CM-1, CM-7, CM-9	CM-4, CM-14, CM-16	CM-19, CM-20, CM-21	CM-8, CM-11	CM-22
Volcano	CM-2, CM-3, CM-4, CM-5, CM-7, CM-8, CM-25, CM-27	CM-1, CM-7	CM-4, CM-14, CM-16, CM-28		CM-8, CM-9, CM-11	
Wildfire	CM-2, CM-3, CM-4, CM-5, CM-7, CM-15, CM-25, CM-27	CM-1, CM-7, CM-9, CM-13, CM-15	CM-4, CM-9, CM-14, CM-15, CM-20	CM-15	CM-9, CM-11	

a. See the introduction to this volume for explanation of mitigation types.

City of Camas

Critical Facilities and Infrastructure

- * Communication Facilities
- ◆ Dams
- ★ Emergency Services
- ▲ Energy Facilities
- ⬢ Hazardous Materials
- ✚ Medical Care Facilities
- Transportation Systems
- ▲ Schools
- Water and Sanitation Systems
- ◆ Other Facilities



Base Map Data Sources: Clark County, U.S. Geological Survey

0 0.25 0.5 1 Miles



Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

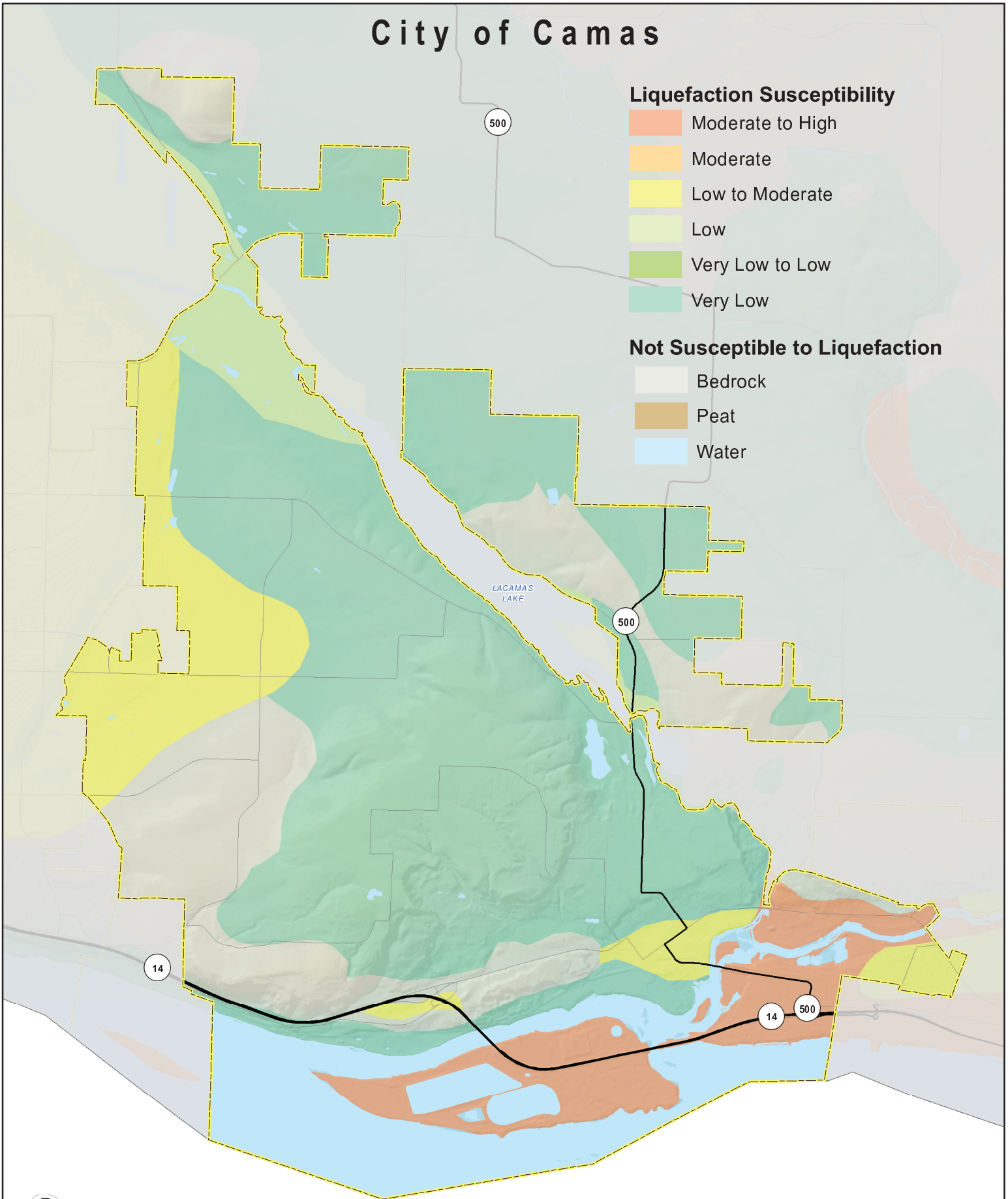
City of Camas

Liquefaction Susceptibility

- Moderate to High
- Moderate
- Low to Moderate
- Low
- Very Low to Low
- Very Low

Not Susceptible to Liquefaction

- Bedrock
- Peat
- Water



Base Map Data Sources: Clark County, U.S. Geological Survey

0 0.25 0.5 1 Miles

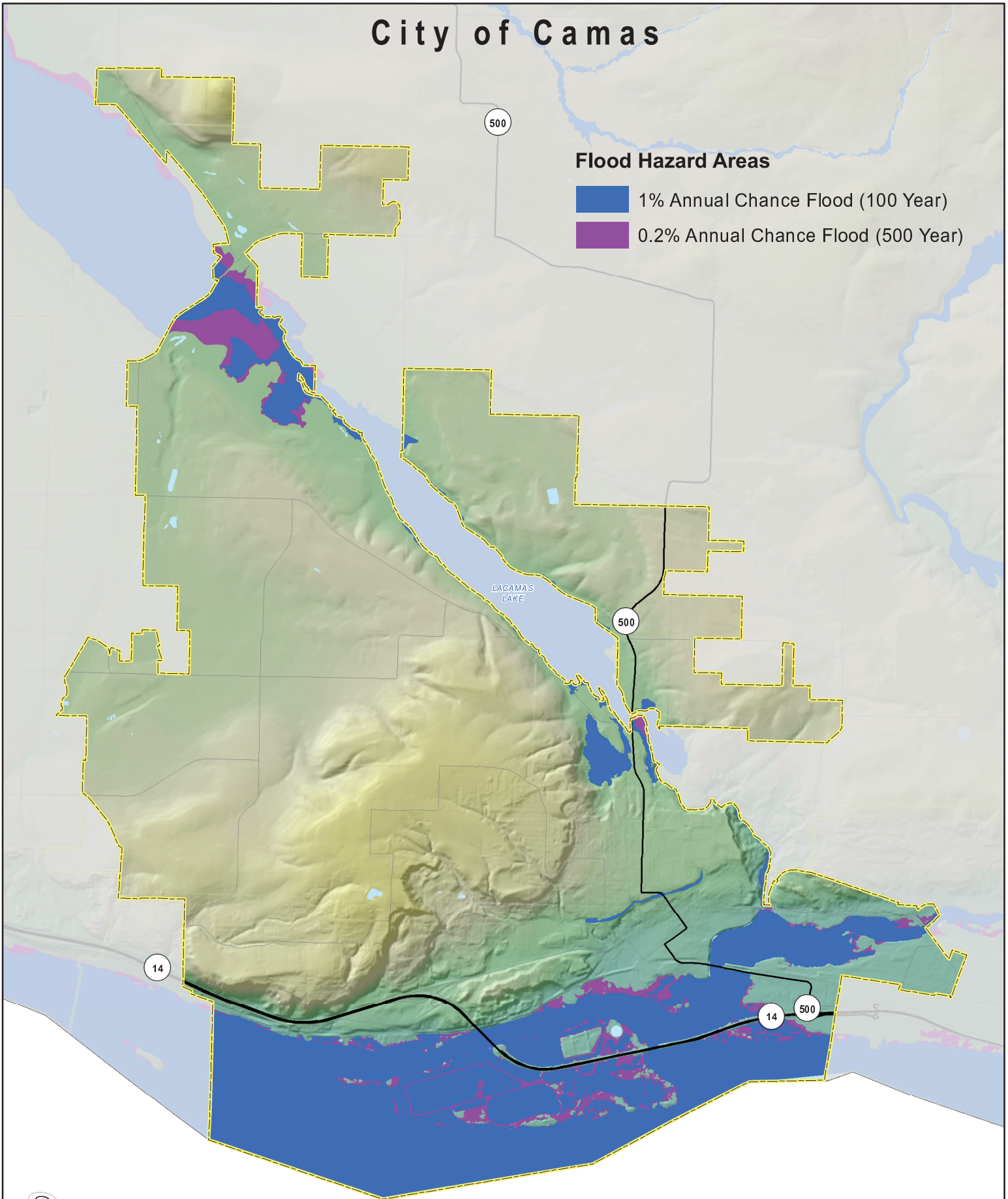


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City of Camas

Flood Hazard Areas

- 1% Annual Chance Flood (100 Year)
- 0.2% Annual Chance Flood (500 Year)



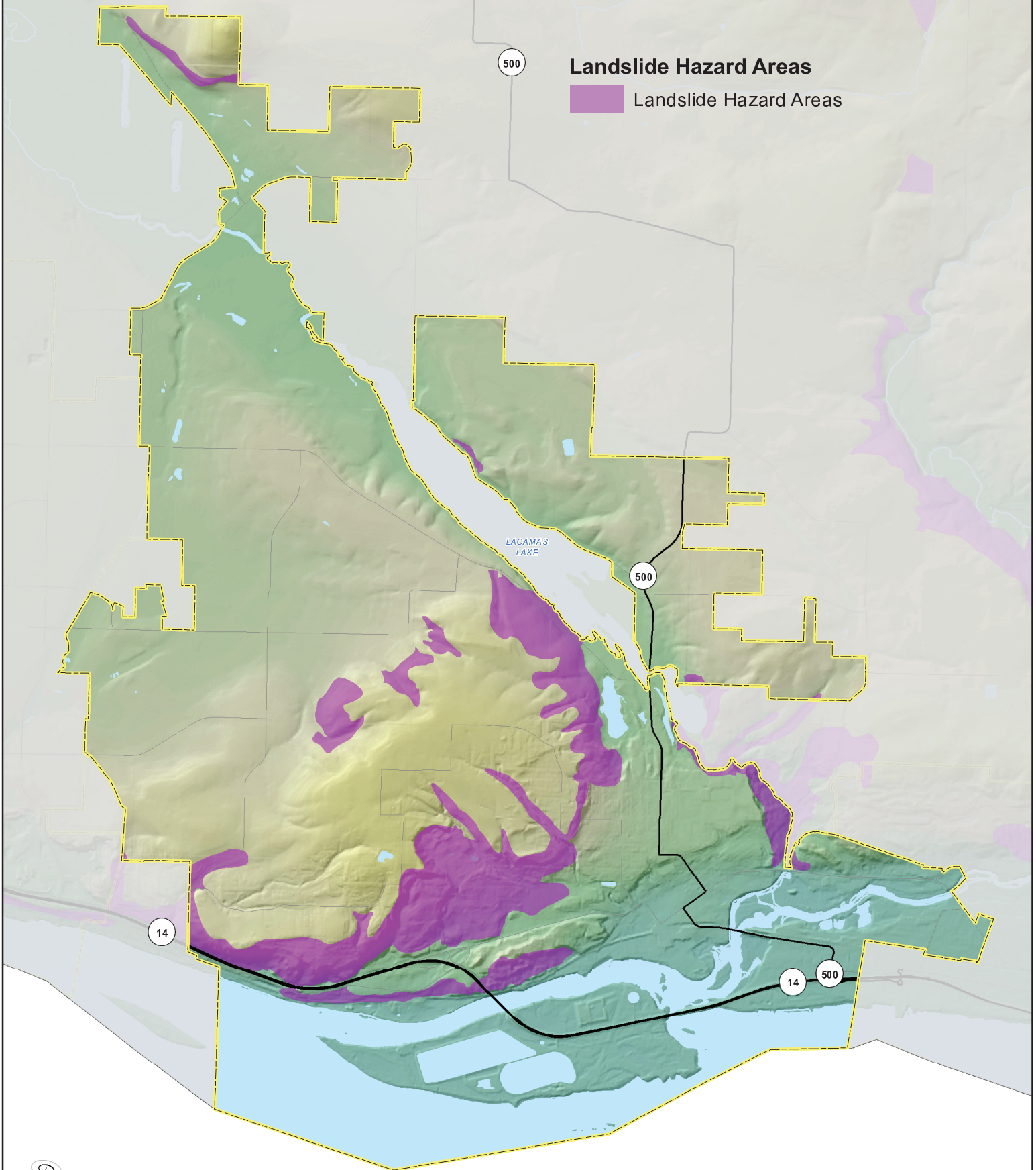
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City of Camas



Landslide Hazard Areas

 Landslide Hazard Areas



Base Map Data Sources: Clark County, U.S. Geological Survey


0 0.25 0.5 1 Miles

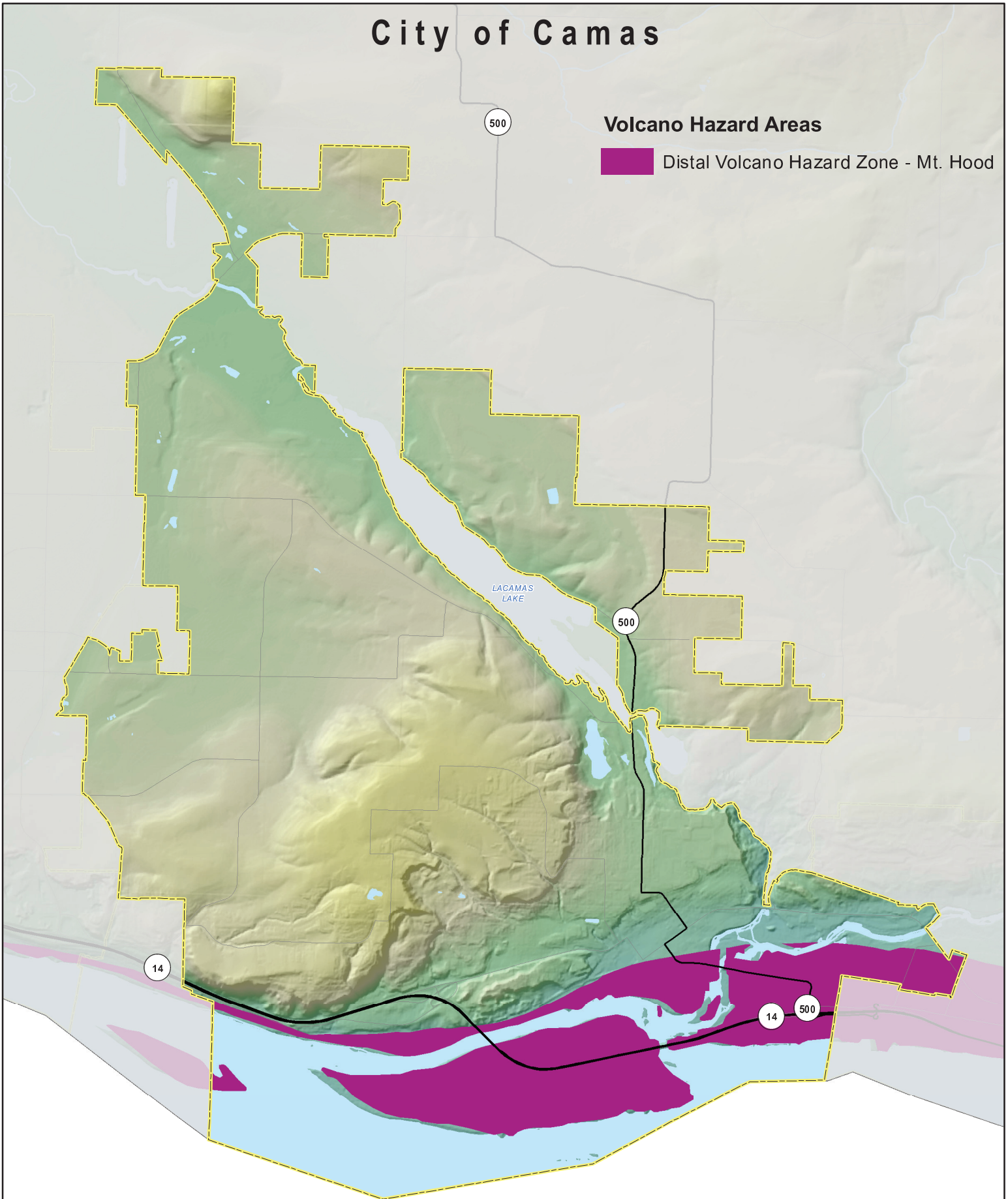


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City of Camas

Volcano Hazard Areas

 Distal Volcano Hazard Zone - Mt. Hood



Base Map Data Sources: Clark County, U.S. Geological Survey

0 0.25 0.5 1 Miles

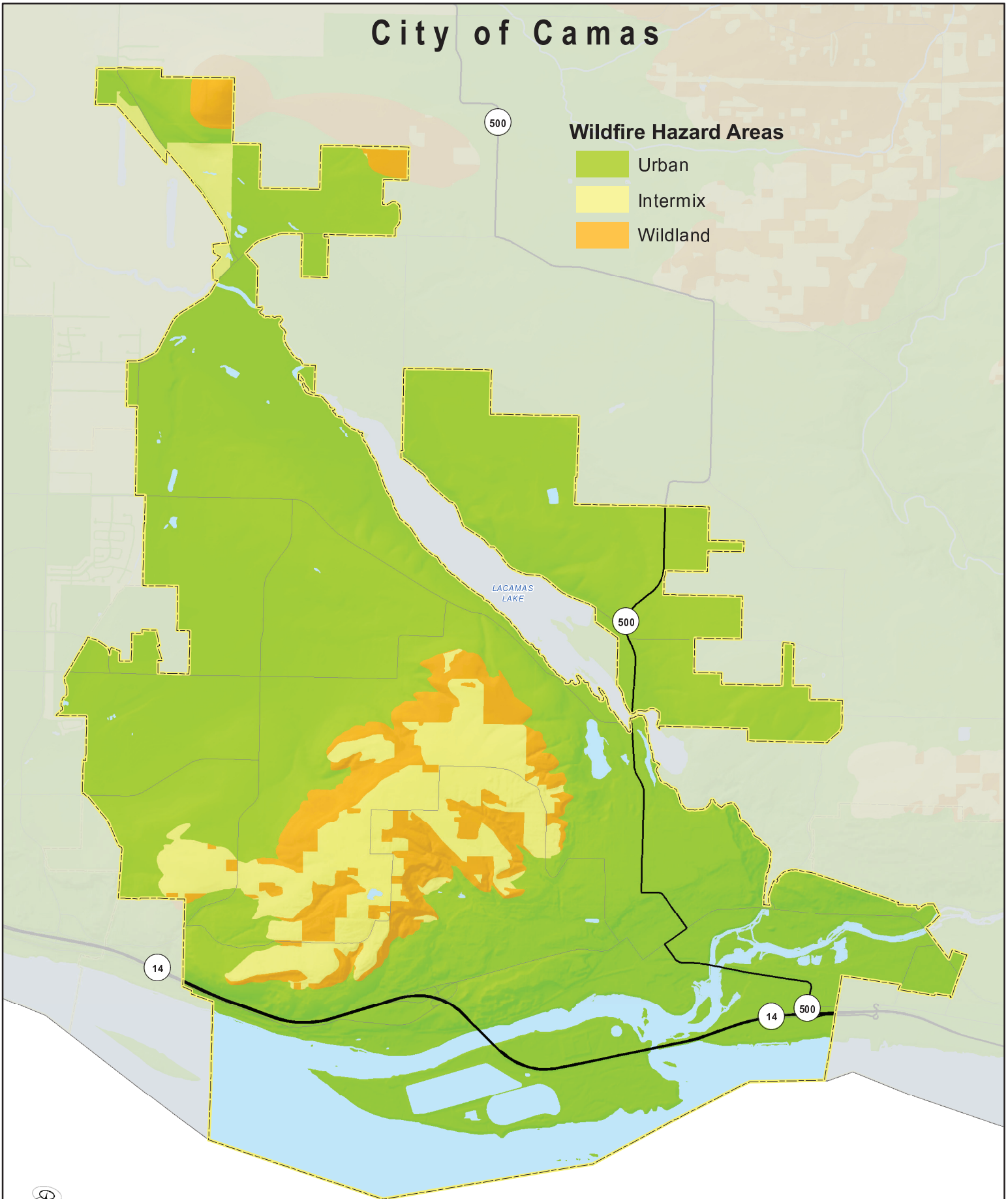


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City of Camas

Wildfire Hazard Areas

- Urban
- Intermix
- Wildland



Base Map Data Sources: Clark County, U.S. Geological Survey

0 0.25 0.5 1 Miles



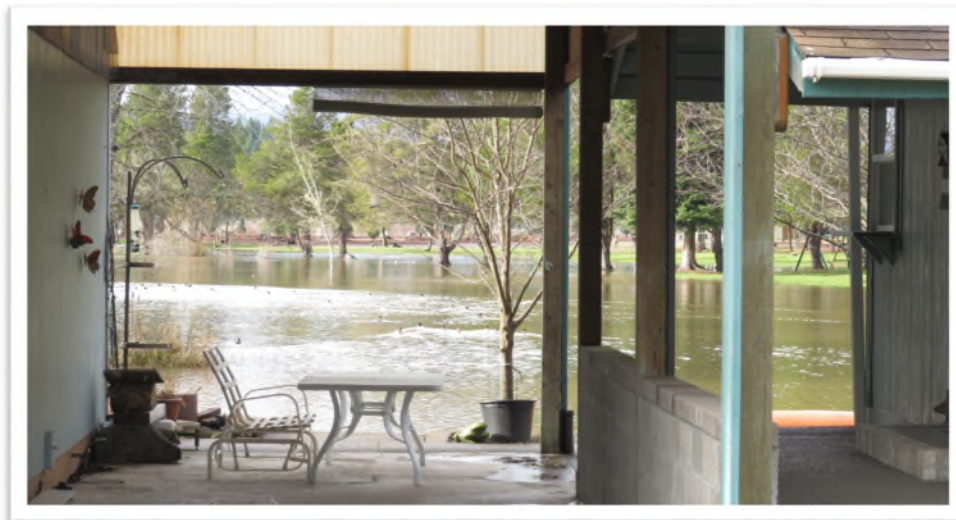
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Clark Regional Emergency Services Agency

Clark Regional Natural Hazard Mitigation Plan Volume 1—Planning Area-Wide Elements

Agency Review Draft



Clark Regional Natural Hazard Mitigation Plan: Volume 1—Planning Area-Wide Elements

September 2016 – Agency Review Draft

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- | | | |
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EXECUTIVE SUMMARY

Hazard mitigation is the use of long-term and short-term policies, programs, projects, and other activities to alleviate the death, injury, and property damage that can result from a disaster. Clark County and a partnership of local governments within the County, led by Clark Regional Emergency Management Services (CRESA), have developed a countywide hazard mitigation plan to reduce risks from natural disasters. The plan complies with hazard mitigation planning requirements to establish eligibility for funding under Federal Emergency Management Agency grant programs.

PREVIOUS HAZARD MITIGATION PLANNING IN CLARK COUNTY

Federal regulations require periodic updates of hazard mitigation plans to reevaluate recommendations, monitor the impacts of actions that have been accomplished, and determine if there is a need to change the focus of mitigation strategies. A jurisdiction covered by a plan that has expired is no longer in compliance with the federal requirements for hazard mitigation planning.

Clark County and its seven cities prepared an initial hazard mitigation plan that was approved by the Federal Emergency Management Agency in 2004. This document represents a comprehensive update to the initial plan to reestablish grant eligibility for the original planning partnership and to expand eligibility to participating special purpose districts and the City of Woodland. Participating planning partners are listed in Tables ES-1 and ES-2. Seventeen local governments are seeking Disaster Mitigation Act compliance through this planning effort.

Planning partners who participated in the initial planning effort made efforts to reconcile the status of actions identified in the 2004 plan to the best of their abilities. Due to the significant amount of time that has passed since initial development and other factors such as staff turnover, not all action items were able to be reconciled. Through this planning effort, the planning partnership, led by CRESA, has recommitted to establishing implementation and maintenance processes that will be followed over the performance period of the 2016 plan. A hazard mitigation working group has been established that will convene quarterly over the next five years.

Table ES-1. Municipal Planning Partners

Jurisdiction	Point of Contact	Jurisdiction	Point of Contact
Clark County	Mike Lewis	City of Vancouver	Chad Eiken
City of Battle Ground	Scott Sawyer	City of Washougal	Mitch Kneipp
City of Camas	Lauren Hollenbeck	City of Woodland	Dennis Ripp
City of La Center	Jeffery Sarvis	Town of Yacolt	Cindy Marbut
City of Ridgefield	Lee Knottnerus		

Table ES-2. Special Purpose District Planning Partners

Jurisdiction	Point of Contact	Jurisdiction	Point of Contact
Fire District 3	Sean Smith	Ridgefield School District	Chris Griffith
Port of Vancouver	Scott Ouchi	Clark Public Utilities	Dan Krebs
Battle Ground Public Schools	Scott McDaniel	Clark Regional Wastewater District	Hugh Findlay
Camas School District	Heidi Burkart	C-TRAN	Terry Lohnes

PLAN UPDATE PROCESS

Updating the plan consisted of the following phases:

- Phase 1, Organize Resources**—A planning team was assembled for the plan update, consisting of staff from CRESA and a technical consultant. The team conducted outreach to establish the planning partnership. A 15-member steering committee was assembled to oversee the plan update, consisting of planning partner staff, residents, and other stakeholders in the planning area. Coordination with other local, state and federal agencies involved in hazard mitigation occurred throughout the plan update process. This phase included a review of the existing plan, the Washington State Hazard Mitigation Plan, and existing programs that may support hazard mitigation actions.
- Phase 2, Update the Risk Assessment**—Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards. This process assesses the vulnerability of people, buildings and infrastructure to natural hazards. Risk assessment models were enhanced with new data and technologies that have become available since 2004. The risk assessment included the following:
 - Hazard identification and profiling
 - Assessment of the impact of hazards on physical, social and economic assets
 - Vulnerability identification
 - Estimates of the cost of potential damage.
 - Planning partners used the risk assessment to rank risk and to gauge the potential impacts of each hazard of concern on their jurisdiction. The mitigation actions recommended in this plan include some that address limitations in the modeling caused by insufficient data, such as digitizing maps of urban flooding issues and collecting perishable data, such as high water marks, after hazard events.
- Phase 3, Engage the Public**—The planning team implemented a public involvement strategy developed by the Steering Committee. The strategy included staffing public events where members of the planning team presented the risk assessment and the draft plan, presentations at various events and to community groups, a hazard mitigation survey, a CRESA-sponsored website, and multiple media releases.
- Phase 4, Update Goals, Objectives and Actions**—The Steering Committee reviewed and updated the goals from the 2004 plan and developed a set of objectives. The planning partnership selected a range of appropriate mitigation actions to work toward achieving the goals set forth in this plan update. Additionally, the Steering Committee selected a set of county-wide mitigation actions.
- Phase 5, Develop Plan Implementation and Maintenance Strategy**—The Steering Committee developed a plan implementation and maintenance strategy that includes the establishment of a hazard mitigation working group, annual progress reporting, a strategy for continued public involvement, a commitment to plan integration with other relevant plans and programs, and a recommitment from the planning partnership to actively maintain the plan over the five-year performance period.
- Phase 6, Assemble the Updated Plan**—The planning team and Steering Committee assembled a document to meet federal hazard mitigation planning requirements for all partners. The updated plan contains two volumes. Volume 1 contains components that apply to all partners and the broader planning

area. Volume 2 contains all components that are jurisdiction-specific. Each planning partner has a dedicated annex in Volume 2.

- **Phase 7, Plan Adoption/Implementation**—Once pre-adoption approval has been granted by Washington State’s Emergency Management Division and FEMA Region X, the final adoption phase will begin. Each planning partner will individually adopt the updated plan.

Phase 8, Plan Implementation, will occur over the next five years as the planning partnership begins to implement the county-wide and jurisdiction specific actions identified in this plan.

RISK ASSESSMENT RESULTS

Based on the risk assessment, hazards were ranked as follows for the risk they pose to the overall planning area as shown in Table ES-3.

Table ES-3. Hazard Risk Ranking

Hazard Ranking	Hazard Event	Category
1	Earthquake	High
1	Severe weather	High
2	Flood	Medium
2	Landslide	Medium
2	Wildfire	Medium
3	Volcano	Low
4	Drought	Low
5	Dam failure	Low

Each planning partner also ranked hazards for its own area. Table ES-4 summarizes the categories of high, medium and low (relative to other rankings) based on the numerical ratings that each jurisdiction assigned each hazard. The results indicate the following general patterns:

- The earthquake and severe weather hazards were most commonly ranked as high.
- The flood and landslide hazards were most commonly ranked as medium.
- The dam failure, drought, volcano and wildfire hazard were most commonly ranked as low.

Table ES-4. Summary of Hazard Ranking Results

	Number of Jurisdictions Assigning Ranking to Hazard			
	High	Medium	Low	Not Ranked
Dam Failure	0	1	11	5
Drought	0	0	15	2
Earthquake	15	2	0	0
Flood	2	11	4	0
Landslide	0	10	7	0
Severe weather	15	1	1	0
Volcano	0	3	14	0
Wildfire	2	4	8	3

MITIGATION PURPOSE STATEMENT, GOALS AND OBJECTIVES

The following purpose statement guided the Steering Committee and the planning partnership in selecting the actions contained in this plan update:

Define natural hazard risk and, through collaboration and partnerships, establish strategies and actions for reducing the impacts of disasters in Clark County.

The Steering Committee and the planning partnership established the following goals for the plan update:

- Reduce and prevent the loss of life and property.
- Protect public services and critical facilities from the impacts of natural disasters.
- Increase public awareness of vulnerability to natural hazards and educate on risk reduction strategies.
- Promote community resilience.
- Protect environmental resources and utilize natural systems to reduce natural hazard impacts.
- Develop and implement cost-effective mitigation strategies.

The following objectives were identified that meet multiple goals, helping to establish priorities for recommended mitigation actions:

1. Inform the public on the risk exposure to natural hazards and ways to increase the public's capability to prepare, respond, recover and mitigate the impacts of these events.
2. Reduce the impacts of hazards on vulnerable populations.
3. Improve and maintain systems that provide warning and emergency communications.
4. Work cooperatively with stakeholders in planning for and reducing the impacts of natural hazards.
5. Incorporate risk reduction strategies in new and updated infrastructure and development plans to reduce the impacts of natural hazards.
6. Integrate natural hazard mitigation goals and objectives into other existing plans and programs within the planning area.
7. Provide incentives for development and land use techniques that reduce risks.
8. Strengthen and build redundancy into infrastructure, prioritizing areas that may be potentially isolated areas.
9. Retrofit, purchase, or relocate structures in high hazard areas, especially those known to be repetitively damaged.
10. Avoid, minimize or mitigate risks to critical facilities and infrastructure.
11. Support and enhance environmental protection and sustainability activities that may also accomplish mitigation objectives.
12. Use the best available data, science and technologies to implement mitigation strategies.

MITIGATION ACTIONS

Mitigation actions presented in this update are activities designed to reduce or eliminate losses resulting from natural hazards. The update process resulted in the identification of more than 272 mitigation actions for implementation by individual planning partners, as presented in Volume 2 of this plan. In addition, the steering committee and planning partnership identified 14 countywide actions benefiting the whole partnership, as listed in Table ES-5.

Table ES-5. County-Wide Mitigation Actions

Applies to New or Existing Assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding ^a	Timeline
CW-1 —Establish a county-wide repository of perishable data from hazard events and develop a standard form for capturing information						
New and existing	All hazards	4, 12	CRESA	Low	Staff time	Short-term
CW-2 —Develop a county-wide recovery/resiliency plan						
New and existing	All hazards	2, 4, 6	CRESA	High	Local, possible grant funding (UASI)	Short-term
CW-3 —Participate in the plan implementation hazard mitigation working group by sharing lessons learned and mitigation success stories and actively participating in progress reporting						
New and existing	All hazards	1, 4, 6, 12	Planning Partners/ facilitated by CRESA	Low	Staff time	Ongoing
CW-4 —Support and guide the technology for regional hazard warning systems						
New and existing	All hazards	1, 2, 3, 12	CRESA	Medium	Local, possible grant funding (FEMA, DHS, NWS, NOAA)	Ongoing
CW-5 —Ensure that a link to the hazard mitigation plan website hosted by CRESA is posted conspicuously on each planning partner website						
N/A	All hazards	1, 4	Planning Partners	Low	Staff time	Short-term
CW-6 —Support regional collaboration and consistency in hazard mitigation implementation and programs						
New and existing	All hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Clark County/CRESA	Low	Staff time	Ongoing
CW-7 —Where appropriate, support retro-fitting, relocating or acquisition from willing property owners of structures located in hazard-prone areas to protect structures from future damage, with repetitive and severe repetitive loss as a priority. Seek opportunities to leverage partnerships within the planning area in these pursuits						
Existing	All hazards	4, 5, 7, 9, 10	Planning Partners	High	HMGP, PDM, FMA, CDBG-DR	Ongoing
CW-8 —Utilize information contained within the Clark Regional Natural Hazard Mitigation Plan to support updates to other emergency management plans in effect within the planning area						
New and existing	All hazards	2, 4	CRESA	Low	Staff time	Ongoing
CW-9 —Utilize information contained within the Clark Regional Natural Hazard Mitigation Plan to support updates to other plans in effect within the planning area						
New and existing	All hazards	2, 4, 5	Planning Partners	Low	Staff time	Ongoing
CW-10 —Develop the capacity for a regional post-disaster volunteer coordination program						
N/A	All hazards	1, 2, 3, 4	CRESA	Medium	Staff time, Local funds	Long-term
CW-11 —Explore opportunities with all community stakeholders to implement, identify and fund mitigation actions						
New and existing	All hazards	1, 2, 4, 12	CRESA	Medium	Staff time, Local funds	Ongoing
CW-12 —Continue regional partnerships to improve and enhance mitigation efforts in the larger region						
New and existing	All hazards	1, 4	CRESA	Low	Staff-time	Ongoing
CW-13 —Establish guidelines to increase communication and coordination of mitigation actions across agencies whenever feasible						
New and existing	All hazards	4	CRESA	Low	Staff time	Short-term
CW-14 —Continue to work with planning partners and other stakeholders to clearly articulate and define emergency management roles and responsibilities within the County, including the implementation of identified mitigation actions.						
New and existing	All hazards	1, 4, 6	CRESA	Low	Staff time	Ongoing

a. HMGP = Hazard Mitigation Grant Program; FMA = Flood Mitigation Assistance; PDM = Pre-Disaster Mitigation Assistance; CDBG-DR = Community Development Block Grants Disaster Recovery; UASI = Urban Area Security Initiative

IMPLEMENTATION

Full implementation of the recommendations of this plan will require time and resources. The measure of the plan's success will be its ability to adapt to changing conditions. Clark County and its planning partners will assume responsibility for adopting the recommendations of this plan and committing resources toward implementation. The framework established by this plan commits all planning partners to pursue actions when the benefits of a project exceed its costs. The planning partnership developed this plan with extensive public input, and public support of the actions identified in this plan will help ensure the plan's success.

Part 1. BACKGROUND AND METHODS

1. INTRODUCTION TO HAZARD MITIGATION PLANNING

1.1 ABOUT HAZARD MITIGATION

1.1.1 What Is It?

As the cost of disasters continues to rise, communities must find ways to reduce hazard risks. The term “hazard mitigation” refers to actions that reduce or eliminate long-term risks caused by hazards such as earthquakes, floods, storms, and wildfires. It involves strategies such as planning, policy changes, programs, projects, and other activities that can mitigate the impacts of hazards. Without an investment in hazard mitigation, repeated disasters result in repeated damage and rebuilding. This recurrent reconstruction becomes more expensive as the years go by. Hazard mitigation breaks this costly cycle of damage and reconstruction by taking a long-term view of rebuilding and recovering from disasters.

1.1.2 When Does it Apply?

The federal Disaster Mitigation Act (DMA) of 2000 requires state and local governments to develop hazard mitigation plans as a condition for federal disaster grant assistance. The DMA emphasizes planning for disasters before they occur. However, hazard mitigation is also essential to post-disaster recovery. After disasters, repairs and reconstruction often just restore damaged property to pre-disaster conditions. The implementation of additional hazard mitigation actions leads to building smarter, safer, and more resilient communities that are better able to reduce future injuries and damage.

1.1.3 Who Is Responsible?

The responsibility for hazard mitigation lies with private property owners; business and industry; and local, state and federal governments. The Federal Emergency Management Agency (FEMA) encourages multi-jurisdictional planning under its guidance for the DMA, urging state and local authorities to work together on pre-disaster planning. The enhanced planning network called for by the DMA helps local governments articulate accurate needs for mitigation, resulting in faster allocation of funding and more cost-effective risk reduction projects. One of the benefits of multi-jurisdictional planning is the ability to pool resources and eliminate redundant activities within a planning area that has uniform risk exposure and vulnerabilities.

1.1.4 How Is It Developed and Implemented?

The DMA promotes sustainability for disaster resistance. “Sustainable hazard mitigation” includes the sound management of natural resources and the recognition that hazards and mitigation must be understood in the largest possible social and economic context. Efforts to reduce risks should be compatible with other community goals, which may be related to economic development, sustainability, public and environmental health, or other issues. As communities plan for new development and improvements to existing infrastructure, mitigation should be an important consideration.

1.2 HAZARD MITIGATION FOR CLARK COUNTY

The 2016 *Clark Regional Natural Hazard Mitigation Plan* is Clark County’s first comprehensive hazard mitigation plan update since the *Clark County Multi-Jurisdictional All-Hazard Mitigation Plan* was initially adopted in 2004. This update identifies resources and strategies for reducing risk from natural hazards. Strategies were selected because they meet a program requirement and the needs of the planning partners and their residents. The plan will help guide and coordinate mitigation activities throughout the planning area. The main purpose of the plan is to identify risks posed by hazards and to present strategies to reduce the impact of hazard events. The plan also meets the following objectives:

- Meet or exceed requirements of the DMA.
- Enable all planning partners to use federal grant funding to reduce risk through mitigation.
- Meet the needs of each planning partner.
- Create a risk assessment that focuses on Clark County hazards of concern.
- Create a single planning document that integrates all planning partners into a framework that supports partnerships within the county, and puts all partners on the same planning cycle for future updates.
- Meet the planning requirements of FEMA’s Community Rating System (CRS), allowing planning partners that participate in the CRS program to maintain or enhance their CRS classifications.
- Coordinate existing plans and programs so that high-priority actions and projects to mitigate possible disaster impacts are funded and implemented.

The process of developing and implementing this plan encompasses eight phases:

- Phase 1—Organize resources
- Phase 2—Perform a risk assessment
- Phase 3—Develop and implement a public involvement strategy
- Phase 4—Identify goals, objectives and actions
- Phase 5—Develop a plan maintenance strategy
- Phase 6—Assemble the updated plan
- Phase 7—Initiate and complete plan review and adoption
- Phase 8—Implement the approved, adopted plan.

The methodology and results of Phases 1 through 5 are presented within this document. Phases 6 through 8 represent activities to move from planning through adoption to implementation of targeted mitigation actions.

1.3 WHO WILL BENEFIT FROM THIS PLAN?

Effective hazard mitigation can provide the following benefits:

- Reduce the loss of life, property, essential services, critical facilities, and economic hardship
- Reduce short-term and long-term recovery and reconstruction costs
- Increase cooperation and communication within the community through the planning process
- Increase potential for state and federal funding for pre- and post-disaster projects.

All residents and businesses of Clark County are the ultimate beneficiaries of this hazard mitigation plan update. The plan identifies strategies and actions that will reduce risk for those who live in, work in, and visit the county. It provides a viable planning framework for all foreseeable natural hazards that may impact the county. Participation in the development of the plan by key stakeholders in the county helped ensure that outcomes will be mutually beneficial. The resources and background information in the plan are applicable countywide, and the plan’s goals and recommendations can lay groundwork for the development and implementation of local mitigation activities and partnerships.

1.4 HOW TO USE THIS PLAN

In order to fulfill the requirements of the DMA and be eligible for federal disaster funding grant programs, a local hazard mitigation plan must contain a set of information as outlined in the Code of Federal Regulations (see box at right). The *Clark Regional Natural Hazard Mitigation Plan* has been organized to provide all the required information. Notations are provided throughout the plan indicating specific requirements being addressed.

This plan has been set up in two volumes so that elements that are jurisdiction-specific can easily be distinguished from those that apply to the whole planning area:

- **Volume 1**—Volume 1 includes all federally required elements of a disaster mitigation plan that apply to the entire planning area. This includes the description of the planning process, public involvement strategy, goals and objectives, countywide hazard risk assessment, countywide mitigation actions, and a plan maintenance strategy. The following appendices at the end of Volume 1 include supporting information:
 - Appendix A—A glossary of acronyms and definitions
 - Appendix B—The Steering Committee ground rules
 - Appendix C—Hazard mitigation questionnaire and summary of results.
 - Appendix D—Planning partner updates distributed through the course of the planning process
 - Appendix E—Concepts and methods used for hazard mapping
 - Appendix F—Plan adoption resolutions from Planning Partners
 - Appendix G—A template for progress reports to be completed as this plan is implemented.
 - Appendix H—The FEMA plan review crosswalk for this plan
- **Volume 2**—Volume 2 includes all federally required jurisdiction-specific elements, in annexes for each participating jurisdiction. It includes a description of the participation requirements that each jurisdiction agreed to, as well as instructions and templates that the partners used to complete their annexes. Volume 2 also includes “linkage” procedures for eligible jurisdictions that did not participate in development of this plan but wish to adopt it in the future.

All planning partners will adopt Volume 1 in its entirety and at least the following parts of Volume 2: Part 1; each partner’s jurisdiction-specific annex; and the appendices.

REQUIRED CONTENT FOR LOCAL HAZARD MITIGATION PLANS (44 CFR 201.6(c))

1. Documentation of the process used to develop the plan, including who was involved and how the public was involved.
2. A risk assessment that provides the following information:
 - A description of the type, location, and extent of all natural hazards that can affect the jurisdiction, previous occurrences of hazard events, and the probability of future hazard events.
 - A description of the jurisdiction’s vulnerability to the hazards in terms of:
 - Buildings, infrastructure and critical facilities located in hazard areas
 - Potential dollar losses
 - Development trends and the ability to consider mitigation in land use decisions.
 - Assessment of each participating jurisdiction’s risks where they vary from those of the entire planning area.
3. A mitigation strategy for reducing potential losses identified in the risk assessment:
 - A description of mitigation goals.
 - A range of mitigation actions and projects to consider.
 - An action plan for each participating jurisdiction recommending and prioritizing specific mitigation actions.
4. A plan maintenance process that includes:
 - A schedule for monitoring, evaluating, and updating the mitigation plan.
 - A process for incorporating the requirements of the mitigation plan into other local planning mechanisms.
 - A plan for ongoing public participation.
5. Documentation that the plan has been formally adopted by the governing body of each jurisdiction requesting approval of the plan.

2. PLAN UPDATE—WHAT HAS CHANGED

1.1 THE PREVIOUS PLAN

The inevitability of natural hazards and the growing population and activity in Clark County create a need to develop strategies, coordinate resources, and increase public awareness to mitigate future hazard events. To accomplish these objectives, Clark County and its cities prepared a hazard mitigation plan in 2004, which was formally approved by FEMA Region X on December 16, 2004. This effort was led by the Clark Regional Emergency Services Agency (CRESA), which provides emergency management for Clark County and the Cities of Battle Ground, Camas, La Center, Ridgefield, Vancouver, Washougal, and Yacolt. The plan development was funded in part by a planning grant from the federal Hazard Mitigation Grant Program, which was applied for and received after the 2001 Nisqually Earthquake and resulting presidential disaster declaration. Several factors initiated this planning effort:

- The Clark County area has significant exposure to numerous natural hazards that have caused millions of dollars in past damage.
- The participating partners (Clark County and cities and districts within the county) want to be proactive in preparedness for the probable impacts of natural hazards.
- Local resources to undertake risk reduction actions are limited. Being able to leverage federal financial assistance is paramount to successful hazard mitigation.

The 2004 plan was presented in a single volume that addressed eight hazards: earthquakes, floods, severe weather, volcanic eruption, landslide, wildfire, hazardous materials release, and terrorism. Five goals and 11 objectives were identified to guide the identification and selection of mitigation actions to reduce risk from these hazards. The mitigation action plan included 47 targeted mitigation initiatives that were defined and prioritized through a workshop process with Stakeholder Committee members. Jurisdiction-specific risk assessment information and mitigation actions were presented in two chapters covering all participating jurisdictions.

The performance period of the initial plan ran from 2004 to its expiration in 2009. The 2016 *Clark Regional Natural Hazard Mitigation Plan* represents a comprehensive update to the initial plan. Given the expansion of the planning partnership, the substantial difference in the facilitated process for plan development and the length of time the plan was expired, reviewers should consider this as a new plan with a new process and a new direction. Many of the chapters of this plan describing the plan update process and the tools and techniques that were utilized address these topics as if they were being completed for the first time. When relevant, the update discusses correlations with the initial plan, especially when data or information is being carried over to this update, or when the planning team wished to acknowledge the work that was accomplished by the original planning partnership.

2.1 WHY UPDATE?

Natural hazards continue to impact residents, property, the environment and the economy of Clark County. Since the initial planning effort, the communities of Clark County have undergone changes in their composition, development patterns, and priorities. This update provides an opportunity to reevaluate recommendations, monitor

the impacts of actions that have been accomplished, and determine if there is a need to change the focus of mitigation strategies.

2.1.1 Changes in Development

Hazard mitigation plans must be revised to reflect changes in development within the planning area during the previous performance period of the plan (44 CFR Section 201.6(d)(3)). The plan must describe development changes in hazard-prone areas that increased or decreased vulnerability for each jurisdiction since the last plan was approved. If no changes in development impacted the jurisdiction's overall vulnerability, then plan updates may validate the information in the previously approved plan. The intent of this requirement is to ensure that the mitigation strategy continues to address the risk and vulnerability of existing and potential development and takes into consideration possible future conditions that could impact vulnerability.

Clark County and its incorporated cities have experienced relatively minor changes in population, housing and land use in recent years. The total County population increased 6.2 percent from 2010 to 2015, to 451,820. Unincorporated areas saw a population growth of 5.5 percent over that time and incorporated areas grew 6.8 percent. Land uses have remained mostly constant, with minor changes in some places, mostly in Camas, La Center, and Yacolt (Clark County, 2015a).

From 2000 to 2014, Clark County's estimated total housing units increased from 134,030 to 172,965—a 29-percent increase. Vacant and renter-occupied units were also on the rise, but so were household income and the ability for individuals to secure adequate housing (Clark County, 2015a).

The county lost 6 percent of its employment base in the economic downturn starting in 2008, worse than the nation and state. In 2013 the downward employment trend in Clark County reversed and job growth began accelerating (Clark County, 2015a).

There was a major update of Clark County's Shoreline Master Program in 2012 to comply with amendments to the State Shoreline Management Act. The changes were relatively minor—simplifying shoreline designations, making them more consistent with the cities, protecting shoreline environmental functions, and encouraging public access and water-dependent use (Clark County, 2015a).

A Rural Lands Task Force has been established to examine and make recommendations on how the County could facilitate more efficient use of its rural and resource lands (Clark County, 2015a).

Changes in development are difficult to assess between the 2004 and 2016 hazard mitigation plans due to a variety of factors. One particularly important factor is that the 2004 plan loss estimates focused on residential losses, while the 2016 update assesses all general building stock in the planning area. Exposure and vulnerability are discussed as appropriate in the risk assessment portion of this plan; however, it should be noted that the changes in methodology used to assess risk between the planning processes are significant. Clark County and its cities have adopted comprehensive plans that govern land-use decisions and policy-making, as well as a building code and specialty ordinances based on state and federal mandates. This plan update assumes that some new development triggered by the increase in population occurred in hazard areas. Because all such new development would have been regulated pursuant to local programs and codes, it is generally assumed that vulnerability did not increase even if exposure did. Now that the planning area is equipped with tools such as a level 2 user-defined Hazus-MH model for the planning area, this type of comparative analysis will be possible for future updates to this plan.

2.1.2 Federal Eligibility

Federal planning requirements stipulate that hazard mitigation plans must present a schedule for monitoring, evaluating, and updating the plan. A jurisdiction covered by a plan that has expired is not able to pursue elements of federal funding for which a current hazard mitigation plan is a prerequisite. The schedule for updating the plan in the 2004 effort was not followed, and that plan expired in 2009. It has now been 11 years since the initial planning effort, and coverage has lapsed from 2009 until the updated plan will be completed in 2016. With the initiation of the 2016 planning effort, CRESA committed to maintaining this plan in accordance with federal requirements on behalf of the Clark regional hazard mitigation planning partnership that has committed to this process.

2.2 THE UPDATED PLAN—WHAT IS DIFFERENT?

Given the expansion of the planning partnership, the substantial difference in the facilitated process for plan development and the length of time the plan was expired, reviewers should consider this as a new plan with a new process and a new direction. Discussion of the previous plan is included to acknowledge the work that was done by the original planning partnership.

The updated plan differs from the initial plan in a variety of ways:

- The planning partnership was expanded to include cities and special purpose districts.
- The hazards of concern now focus on natural hazards and were expanded to include drought and dam failure.
- A Level-2 Hazus analysis forms the basis of risk assessment for the flood, earthquake and dam failure hazards.
- A critical facilities and infrastructure database was developed and used in the risk assessment.
- The goals were reviewed and updated.
- Each participating jurisdiction developed an annex to the plan with jurisdiction-specific information including hazard risk ranking and mitigation actions.

Table 2-1 indicates the major changes between the two plans as they relate to 44 CFR planning requirements.

Table 2-1. Plan Changes Crosswalk

44 CFR Requirement	Previous Plan	Updated Plan
<p>§201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:</p> <ol style="list-style-type: none"> (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval; (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information. 	<p>A multi-faceted public involvement strategy was developed and implemented. It included a Stakeholder Committee that provided input at each stage of the planning process; a series of jurisdictional input meetings; targeted group meetings with subject matter experts; key informant interviews; and the posting of the draft plan on the CRESA website. Relevant plans, studies and reports were reviewed and incorporated as appropriate throughout the document.</p>	<p>The plan update was facilitated through a Steering Committee made up of stakeholders within the planning area. The Steering Committee was responsible for review of relevant plans and programs, review and identification of goals and objectives, confirmation of a public involvement strategy, development of a plan implementation and maintenance strategy, and review and approval of the draft plan. All Steering Committee meetings were open to the public. Additional public input was received through several public events early and late in the planning process and through a public survey. A 30-day public comment period was held before the draft plan was submitted for review. Agency coordination occurred through several avenues including the development of the risk assessment, monthly updates on plan progress distributed to a mailing list, attendance at steering committee meetings, the composition of the Steering Committee and the dissemination of the draft plan for public comment.</p>
<p>§201.6(c)(2): The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.</p>	<p>Risk was determined by describing a most probable case hazard scenario and using this scenario, to estimate future expected losses. Available County assessor datasets and GIS spatial analysis formed the basis of the risk assessment. Six natural hazards of concern (earthquake, flood, wildfire, severe weather, landslides and volcanos) and two non-natural hazards (hazardous materials and terrorism) were assessed.</p>	<p>A comprehensive risk assessment for the planning area that looks at 8 natural hazards of concern: dam failure, drought, earthquake, flood, landslide, severe weather, volcanic hazards, and wildfire. This assessment used the best available data and science with the Hazus-MH (version 2.2) risk assessment software and GIS analysis.</p>
<p>§201.6(c)(2)(i): [The risk assessment shall include a] description of the ... location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.</p>	<p>Location and extent was generally described in prose. Limited description of previous occurrences was included and probability was described in terms of high, medium and low.</p>	<p>Comprehensive risk assessments of each hazard of concern are presented in Chapters 7 through 14. Each chapter includes the following:</p> <ul style="list-style-type: none"> • Hazard profile, including maps of extent and location, historical occurrences, frequency, severity and warning time • Secondary hazards • Exposure of people, property, critical facilities and environment • Vulnerability of people, property, critical facilities and natural environment • Future trends • Scenarios • Issues. <p>Each hazard is compared to each other via a risk ranking methodology described in Chapter 15.</p>

44 CFR Requirement	Previous Plan	Updated Plan
§201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i). This description shall include an overall summary of each hazard and its impact on the community	Vulnerabilities were discussed through a series of bullet point problem statements for each hazard of concern. Brief summary descriptions of vulnerabilities were discussed for each participating jurisdiction.	Vulnerability was assessed for all hazards of concern. The Hazus-MH computer model was used for the dam failure, earthquake, and flood hazards. These were Level-2 (user-defined) analyses using coordinating agency and County data. Critical facilities and assets were defined and inventoried using the Hazus Comprehensive Data Management System and other available datasets. Outputs were generated for other hazards by applying an estimated damage function to affected assets when available. The asset inventory was extracted from the Hazus-MH model. Best available data were used for all analyses.
§201.6(c)(2)(ii): [The risk assessment] must also address National Flood Insurance Program insured structures that have been repetitively damaged floods	The risk assessment does not discuss structures that have been repetitively damaged by floods.	The description of the National Flood Insurance Program and repetitive loss discussion was enhanced to meet new DMA and CRS planning requirements. The update includes an analysis of repetitive loss properties. For these properties the type of structure was determined and likely causes of flooding were cited, and the information was reflected on maps. National Flood Insurance Program capability is also assessed for each jurisdiction in Volume II.
§201.6(c)(2)(ii)(A): The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area.	Vulnerability was assessed largely using date of construction and hazard layers. Some hazards included damage state probabilities based on building types. This was noted as a limitation in the plan development. Future losses were described using a 'most probable build' scenario.	A complete inventory of the numbers and types of buildings exposed was generated for each hazard of concern. The Steering Committee defined "critical facilities" as they pertained to the planning area, and these facilities were inventoried. Each hazard chapter provides a discussion of future development trends as they pertain to the hazard.
§201.6(c)(2)(ii)(B): [The plan should describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) and a description of the methodology used to prepare the estimate.	Loss estimates were derived using established or accepted percent damage estimates multiplied by the assessed value of vulnerable structures. Methodology varied by hazard.	Dollar loss estimations were generated for all hazards of concern likely to impact property. These were generated by Hazus for the dam failure, earthquake, and flood. For the other hazards, loss estimates were generated by applying a regionally relevant damage function to the exposed inventory. In all cases, a damage function was applied to an asset inventory. The asset inventory was the same for all hazards and was generated in the Hazus-MH model.

44 CFR Requirement	Previous Plan	Updated Plan
§201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.	The plan utilizes probable build out scenarios and development trends to support possible future vulnerability.	There is a discussion on future development trends as they pertain to each hazard of concern. This discussion looks predominantly at the existing land use and the current regulatory environment that dictates this land use and also includes information on vacant buildable lands where feasible.
§201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.	The risk assessment is applied to each of the county's seven jurisdictions. Hazard events likely to affect the jurisdictions are described and vulnerabilities detailed.	Risk assessment results were generated for each planning partner to support the concept of risk ranking, which was performed by each planning partner. Risk ranking was used by each planning partner to provide vision and focus to action plan development.
§201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.	The plan includes 47 mitigation strategies organized by hazard type, goal, and applicable jurisdiction.	Action plans were developed for each planning partner via a facilitated process that includes: <ul style="list-style-type: none"> • Risk ranking • Capability assessment • Action alternative review • Action selection • Action prioritization • Action category analysis
§201.6(c)(3)(i): [The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.	The plan identifies five goals.	The plan update identifies a purpose, 6 goals and 12 objectives. Goals were selected that support the purpose, objectives were selected that meet multiple goals, and actions were selected and prioritized based on meeting multiple objectives.
§201.6(c)(3)(ii): [The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.	It is unclear how the comprehensive range of alternatives requirements was documented in the development of the mitigation strategy.	A hazard mitigation best practices catalog was developed through a facilitated process that looks at strengths, weaknesses, obstacles and opportunities in the planning area. This catalog identifies actions that manipulate the hazard, reduce exposure to the hazard, reduce vulnerability, and increase mitigation capability. The catalog further segregates actions by scale of implementation. A table in the action plan section analyzes each action by mitigation type to illustrate the range of actions selected.
§201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program, and continued compliance with the program's requirements, as appropriate.	The National Flood Insurance is discussed in the flood hazard profile. Mitigation strategies regarding continued compliance were identified.	All municipal planning partners were asked to assess National Flood Insurance Program capability in their jurisdictional annexes. All participating communities have identified actions supporting continued compliance and good standing under the program.
§201.6(c)(3)(iii): [The mitigation strategy shall describe] how the actions identified in Section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.	Prioritization is described in terms of high, medium and low. Benefit-cost analysis was not conducted. Mitigation strategies included information on the lead agency, timeline and possible sources of funding.	Each of the recommended actions is prioritized using a qualitative methodology that looked at the objectives the project will meet, the timeline for completion, how the project will be funded, the impact of the project, the benefits of the project and the costs of the project. This prioritization scheme is detailed in Chapter 18.

44 CFR Requirement	Previous Plan	Updated Plan
§201.6(c)(4)(i): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.	The Plan Maintenance chapter includes a process for monitoring, evaluation and updating, which includes an annual review meeting and criteria for evaluation of the action plan.	A detailed plan maintenance strategy is provided that includes the following: <ul style="list-style-type: none"> • Annual review and progress reporting • Defined role for Steering Committee • Plan update triggers • Plan incorporation guidelines • Strategy for continuing public involvement • Grant coordination protocol
§201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.	The Plan Maintenance Chapter includes discussion on incorporation through existing mechanisms including comprehensive plans, building codes and capital improvement programs.	This is included in the detailed plan maintenance strategy and also discussed in each jurisdictional annex.
§201.6(c)(4)(iii): [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.	The Plan Maintenance chapter includes discussion on continued public involvement: membership on a hazard mitigation planning committee, public availability of copies of the plan and contacts for providing comments, and an annual public forum for discussing concerns, opinions and ideas.	This is included in the detailed plan maintenance strategy.
§201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commission, Tribal Council).	The plan was adopted by all participating planning partners.	17 planning partners will seek DMA compliance for this plan. Appendix G contains the resolutions of all planning partners that adopted this plan

3. PLANNING APPROACH

The planning effort to prepare the *Clark Regional Natural Hazard Mitigation Plan* was largely funded by a grant from FEMA’s Pre-Disaster Mitigation grant program. CRESA, supported by the County and all incorporated areas, was the applicant agent for the grant. The grant was applied for in 2014 and funding was appropriated in 2015. It covered 75 percent of the cost for development of this plan, with the balance funded by CRESA. The approach to developing this hazard mitigation plan encouraged broad participation from many stakeholders. The activities carried out under this approach are described in the following sections (44 CFR, Section 201.6(c)(1)).

3.1 FORMATION OF THE PLANNING TEAM

CRESA hired Tetra Tech, Inc. to assist with development and implementation of the plan. A planning team formed to lead the planning effort included the following CRESA and Tetra Tech staff:

- John Wheeler, CRESA Project Manager
- Scott Johnson, CRESA Project Manager
- Anthony Vendetti, Lead Project Coordinator
- Rob Flaner, Tetra Tech, Project Manager
- Kristen Gelino, Tetra Tech, Lead Project Planner
- Carol Baumann, Tetra Tech, GIS Analyst and Risk Assessment Lead.

The planning team held regularly scheduled coordination meetings throughout the course of the planning process.

3.2 ESTABLISHMENT OF THE PLANNING PARTNERSHIP

In order to promote the wise use of resources and to encourage coordination within the County, CRESA encouraged all eligible local governments to participate in this hazard mitigation planning process. The planning team invited all local governments to a planning partner kickoff meeting on July 9, 2015. This meeting was held to introduce the planning team, provide an overview of the mitigation planning process and solicit planning partners. Key objectives were as follows:

- Provide an overview of the Disaster Mitigation Act.
- Describe the reasons for a plan.
- Introduce the planning team.
- Outline the work plan.
- Outline planning partner expectations.
- Seek commitment to the planning partnership.
- Seek volunteers for the Steering Committee.
- Explain the role of CRESA in maintaining the plan and the partnership.

GROUPS INVOLVED IN DEVELOPING THE HAZARD MITIGATION PLAN

Planning Team—The Tetra Tech consultant team and CRESA staff responsible for the facilitation of the planning process and the development of the plan document.

Steering Committee—Representative members from the planning partnership that serve as the oversight body. They are responsible for many of the planning milestones and decisions prescribed for this process to help reduce the burden of time required by each planning partner.

Planning Partners—Those jurisdictions or special purpose districts that are developing an annex to the regional plan.

Planning Stakeholders—Individuals, groups, businesses, academia, etc., providing information to support the plan. May also be referred to as coordinating stakeholders.

Each jurisdiction wishing to join the planning partnership was asked to provide a “letter of intent to participate” that designated a primary and secondary point of contact for the jurisdiction and confirmed the jurisdiction’s commitment to the process and understanding of expectations. Linkage procedures have been established (see Volume 2 of this plan) for any jurisdiction wishing to link to the Clark County plan in the future. The municipal planning partners covered under this plan are shown in Table 3-1. The special purpose district planning partners are shown in Table 3-2.

Table 3-1. Municipal Planning Partners

Jurisdiction	Point of Contact	Jurisdiction	Point of Contact
Clark County	Mike Lewis	City of Vancouver	Chad Eiken
City of Battle Ground	Scott Sawyer	City of Washougal	Mitch Kneipp
City of Camas	Lauren Hollenbeck	City of Woodland	Dennis Ripp
City of La Center	Jeffery Sarvis	Town of Yacolt	Cindy Marbut
City of Ridgefield	Lee Knottnerus		

Table 3-2. Special Purpose District Planning Partners

Jurisdiction	Point of Contact	Jurisdiction	Point of Contact
Fire District 3	Sean Smith	Ridgefield School District	Chris Griffith
Port of Vancouver	Scott Ouchi	Clark Public Utilities	Dan Krebs
Battle Ground Public Schools	Scott McDaniel	Clark Regional Wastewater District	Hugh Findlay
Camas School District	Heidi Burkart	C-TRAN	Terry Lohnes

3.3 THE STEERING COMMITTEE

Hazard mitigation planning enhances collaboration and support among diverse parties whose interests can be affected by hazard losses. A 15-member steering committee was formed to oversee all phases of the plan development process. Members of the Steering Committee represented a cross-section of views and interests across the County including key planning partner staff, residents, and other stakeholders from within the planning area. The Steering Committee membership was formed through the following methods:

- Solicitation of members representing various jurisdiction types at the kickoff meeting
- Recommendations for other stakeholders from planning partners
- Candidates identified by the planning team who represent interests within the planning area that could have recommendations for the plan or be impacted by its recommendations
- Additional recommendations from the Steering Committee members asked to participate.

The partnership confirmed a committee of members via an email vote in early October. Table 3-3 lists the committee members. Leadership roles and ground rules were established during the Steering Committee’s initial meeting on August 19, 2015 and confirmed at the second meeting in September. The ground rules are included in Appendix B of this document. The Steering Committee agreed to meet monthly as needed throughout the course of the plan’s development. The planning team facilitated each Steering Committee meeting, which addressed a set of objectives based on the established work plan. The Steering Committee met nine times from August 2015 through May 2016. All Steering Committee meetings were open to the public, and agendas and meeting notes were posted to the hazard mitigation plan website. Handouts and attendance logs are available for review upon request.

Table 3-3. Steering Committee Members

Representation	Name	Title/Agency
Lead Agency, Emergency Management		
Primary Member	John Wheeler (chairperson) ^a	Emergency Management Coordinator, CRESA
Alternate Member	Scott Johnson	Emergency Management Division Manager, CRESA
Stakeholder, Engineer/Emergency Manager		
Primary Member	Ken Alexander (vice chairperson)	Resident, retired military officer, and certified emergency manager
Alternate Member	N/A	N/A
Planning Partner, Fire and Emergency Services/Large City		
Primary Member	Doug Koellmer	Deputy Fire Chief, Vancouver Fire
Alternate Member	Steve Eldred	Division Fire Chief, Vancouver Fire
Alternate Member	Heidi Scarpelli	Fire Marshal, Vancouver Fire
Planning Partner, Utility District		
Primary Member	Dan Krebs	Director of Operations, Clark Public Utilities
Alternate Member	Ben Feliz	Transmission and Distribution Manager, Clark Public Utilities
Planning Partner, County		
Primary Member	Mike Lewis	Emergency Response/Continuity of Operations Plan Coordinator, Clark County Risk Management
Alternate Member	Jeff Swanson	Director of Economic Development, Board of County Councilors
Planning Partner, Small City		
Primary Member	Jeff Sarvis	Public Works Director, City of La Center
Alternate Member	N/A	N/A
Planning Partner, School District		
Primary Member	Heidi Burkart	Operations Coordinator, Camas School District
Alternate Member	Scott McDaniel	Director Technology Services, Battle Ground School District
Planning Partner, Public Affairs		
Primary Member	Carole Bua	Communications Manager, City of Vancouver
Alternate Member	Loretta Callahan	Public Information Officer/Community Relations, Vancouver Public Works
Stakeholder, Real Estate		
Primary Member	Lynette Jackson	Real Estate Agent
Alternate Member	N/A	N/A
Planning Partner, Land Use Planning		
Primary Member	Lauren Hollenbeck	Senior Planner, City of Camas
Alternate Member	N/A	N/A
Stakeholder, Building Industry		
Primary Member	Paul McGraw	Builder Director, Building Industry Association of Clark County
Alternate Member	Avaly Scarpelli	Executive Director, Building Industry Association of Clark County
Planning Partner, Small City		
Primary Member	Lee Kottnerus	Administrative Services Director/City Clerk, City of Ridgefield
Alternate Member	Jeff Niten	Community Development Director, City of Ridgefield
Planning Partner, Floodplain Management		
Primary Member	Mike Soliwoda	Engineer III, Clark County Public Works
Alternate Member	Melissa Tracy	Planning Technician II, Clark County Public Works
Stakeholder, Engineer		
Primary Member	Joseph C. Gehlen P.E., S.E.	Structural Engineer with Kramer Gehlen and Associates, Inc.
Alternate Member	N/A	N/A
Planning Partner, Port		
Primary Member	Scott Ouchi	Safety, Risk and Emergency Manager, Port of Vancouver USA
Alternate Member	Todd Krout	Director of Operations, Port of Vancouver USA

- a. John Wheeler served as chairperson until leaving CRESA for another position in mid-December. Scott Johnson assumed his duties for the remainder of the planning process.

3.4 COORDINATION WITH OTHER AGENCIES

Opportunities for involvement in the hazard mitigation planning process must be provided to neighboring communities, local and regional agencies involved in hazard mitigation, agencies with authority to regulate development, businesses, academia, and other private and nonprofit interests (44 CFR, Section 201.6(b)(2)). This task was accomplished by the planning team as follows:

- **Planning Partnership Formation**—Eligible local jurisdictions in the planning area were invited to participate in the planning partnership. This included 35 municipalities and special purpose districts, of which 18 submitted letters of intent to participate in the planning partnership.
- **Steering Committee Involvement**—Agency representatives were invited to participate on the Steering Committee. In addition to the agencies that ultimately agreed to serve on the committee, the following agencies and organizations were contacted regarding their participation, but were unable to participate:
 - Cascade Volcano Observatory
 - Clark County Local Emergency Planning Committee
 - Fire Chiefs Association
 - Washington Department of Natural Resources.
- **Data Provision**—The following agencies were contacted during the course of the planning process to provide data or technical input:
 - Cascade Volcano Observatory
 - Cowlitz County
 - PacifiCorp
 - Washington Department of Natural Resources.
- **Agency Notification**—The following agencies were kept apprised of planning milestones and invited to participate in the plan development through steering committee meeting reminders and monthly updates:
 - Cascade Volcano Observatory
 - Clark College
 - Clark County Sheriff's Office
 - Columbia County Emergency Management
 - Cowlitz County Department of Emergency Management
 - Educational Service District 112
 - Evergreen Public Schools
 - FEMA Region X
 - Fort Vancouver Regional Library
 - Multnomah County Emergency Management
 - Northwest Natural
 - PeaceHealth Southwest Medical Center
 - Portland Bureau of Emergency Management
 - Skamania County Department of Emergency Management
 - U.S. Forest Service
 - Washington County Emergency Management
 - Washington Department of Ecology
 - Washington Department of Natural Resources
 - Washington Emergency Management Division
 - Washington State Department of Commerce
 - Washington State Department of Transportation.

These agencies received notices that included meeting announcements and meeting agenda. Many of these agencies supported the effort by attending meetings or by sending comments on the draft plan.

- **Pre-Adoption Review**—All the agencies listed above were provided an opportunity to review and comment on this plan, primarily through the hazard mitigation plan website (see Section 3.5). Each agency was sent an e-mail message informing them that draft portions of the plan were available for review. In addition, the complete draft plan was sent to FEMA’s Community Rating System contractor, the Insurance Services Office, Inc., for a pre-adoption review to ensure CRS program compliance.

Distribution lists for agency coordination are available upon request.

3.5 PUBLIC INVOLVEMENT

Broad public participation in the planning process helps ensure that diverse points of view about the planning area’s needs are considered and addressed. The public must have opportunities to comment on disaster mitigation plans during the drafting stages and prior to plan approval (44 CFR, Section 201.6(b)(1)). The Community Rating System (CRS) expands on these requirements by making CRS credits available for optional public involvement activities.

3.5.1 Strategy

The strategy for involving the public in this plan emphasized the following elements:

- Identify and include planning area stakeholders, including members of the public and other non-governmental stakeholders, on the Steering Committee.
- Provide an opportunity for members of the public to subscribe to a project mailing list.
- Use a questionnaire to help gauge the public’s perception of risk and support of hazard mitigation.
- Attempt to reach as many planning area residents as possible using multiple media.
- Leverage existing community events and networks to provide opportunities for community engagement on hazard mitigation.

Stakeholders and the Steering Committee

Stakeholders are the individuals, agencies and jurisdictions that have a vested interest in the recommendations of the hazard mitigation plan, including planning partners. The effort to include stakeholders in this process included stakeholder participation on the Steering Committee. The Steering Committee consisted of a diverse group of stakeholders, including planning partner representatives, residents, members of the local business community, government representatives, and members of the emergency management community.

Stakeholders were also able to sign up for a monthly email list that provided monthly steering committee meeting reminders and planning process updates. Approximately 50 stakeholders, representing local businesses, residents and media outlets, signed up for this mailing list over the course of the planning process.

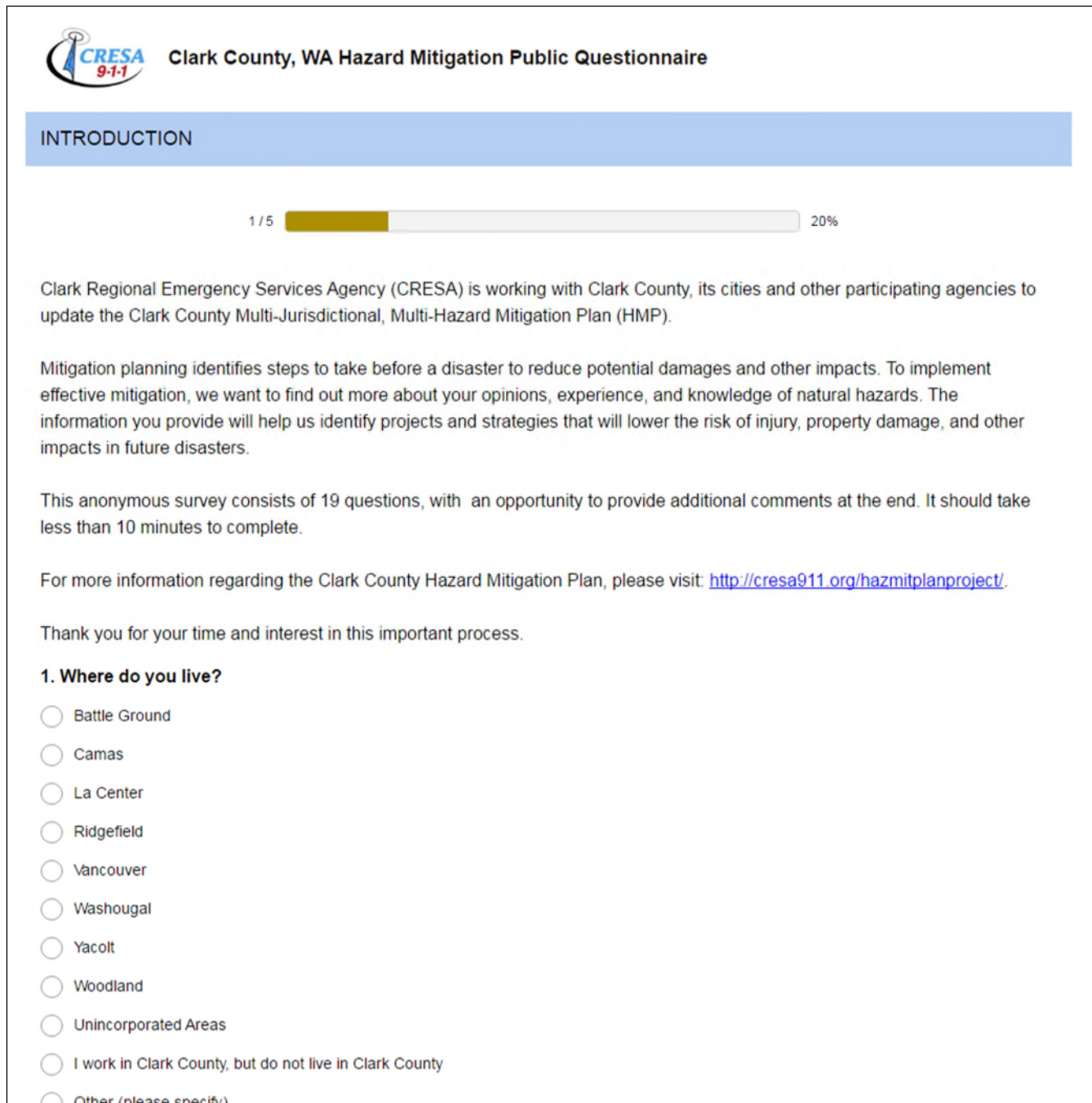
Public Television

The local government cable channel, Clark-Vancouver Television, broadcast an interview with CRESA project manager John Wheeler from October through December 2015. The interview provided information on hazard mitigation and on the planning process. The interview was also posted on the Clark County YouTube channel on October 16, 2015. Over the course of the planning process, the video received more than 200 views:

<https://www.youtube.com/watch?v=RZKjjbfYm3Q&feature=youtu.be>

Questionnaire

A hazard mitigation plan questionnaire (see Figure 3-1) was developed by the planning team with guidance from the Steering Committee. The questionnaire was used to gauge the public's perception of risk from natural hazards and the level of knowledge of tools and techniques that assist in reducing risk and loss from natural hazards. The answers to its 19 questions helped guide the Steering Committee in its development of the updated hazard mitigation plan. A web-based version was made available through the hazard mitigation plan website. Over 830 questionnaires were completed. A summary of the key findings is located in Section 3.5.2 of this volume. The complete questionnaire and a detailed summary of its findings can be found in Appendix C of this volume.



The image shows a sample web page for the Clark County, WA Hazard Mitigation Public Questionnaire. At the top left is the CRESA 9-1-1 logo. The title is "Clark County, WA Hazard Mitigation Public Questionnaire". Below the title is a blue header with the word "INTRODUCTION". A progress bar shows "1 / 5" and "20%". The text explains that CRESA is working with Clark County to update the Multi-Jurisdictional, Multi-Hazard Mitigation Plan (HMP). It describes the purpose of the survey: to find out more about public opinions, experience, and knowledge of natural hazards to identify projects and strategies that lower the risk of injury, property damage, and other impacts in future disasters. It states the survey is anonymous, consists of 19 questions, and should take less than 10 minutes. A link is provided for more information: <http://cresa911.org/hazmitplanproject/>. A thank you message follows. The first question is "1. Where do you live?" with radio button options: Battle Ground, Camas, La Center, Ridgefield, Vancouver, Washougal, Yacolt, Woodland, Unincorporated Areas, I work in Clark County, but do not live in Clark County, and Other (please specify).

Figure 3-1. Sample Web Page from Questionnaire

Public Meetings and Presentations

The planning team staffed booths at several well attended public events during the planning process and gave presentations on hazard mitigation at several relevant local events (see Figure 3-2 through Figure 3-5):

- Scott Johnson, CRESA, provided information on hazard mitigation and the plan update process to the Neighborhood Associations Council of Clark County on February 8, 2016 and the Vancouver Neighborhood Alliance Meeting on February 10, 2016. Mr. Johnson presented information describing hazard mitigation, providing reasons for the preparation of a hazard mitigation plan, describing the plan update process, outlining the expected outcomes, and describing the public's role in the planning process.
- A Disaster Movie Night, sponsored by CRESA, was held at the Kiggins Theatre in downtown Vancouver on March 4, 2016. CRESA staff and members of the planning team staffed a booth in the theatre lobby before and after the movie. Attendees had the opportunity to review property-specific information on a computer workstation (see Figure 3-6), learn about mitigation and preparedness, and fill out the hazard mitigation questionnaire. There were over 100 attendees at the movie night.
- Planning team members staffed a booth at an emergency preparedness event at Washington State University Vancouver ("Prepare for the Big One") on March 24, 2016. Information on hazard mitigation was provided, including hazard location maps. Mr. Johnson addressed a standing room only crowd in an hour long presentation about a Cascadia Subduction Zone earthquake event and expected impacts in Clark County. The event's hundreds of attendees had the opportunity to ask questions about hazard mitigation and interact with members of the planning team and other CRESA staff (Fischer, 2016).
- Planning team members and other CRESA staff members staffed at booth at the 2016 Clark Public Utilities Home and Garden Idea Fair. The event was held at the Clark County Event Center April 22 through April 24. Thousands of people attended the event and had the opportunity to ask questions regarding hazard mitigation, review hazard maps, view property-specific information on computer workstations and take the public survey.
- Planning team members attended and provided information on the draft plan and how to comment at the July 7, 2016 meeting of the Clark Regional Emergency Services Agency Administration Board, which has representatives from the small cities within Clark County, Vancouver Fire Department, local financial institutions, Clark County, regional law enforcement, Clark County Sheriff's Office, City of Vancouver, the Fire Chiefs' Association, and public EMS providers.

Flyers

As part of the public outreach, flyers were printed that advertised the public questionnaire (see Figure 3-7). These flyers were provided to all planning partners, posted on the website and distributed via email and social media. Clark County also provided information about the hazard mitigation planning process in its annual mailer to flood hazard residents and property owners (see Figure 3-8).

Press Releases and Media Coverage

Press releases were distributed over the course of the plan's development as key milestones were achieved and prior to each public meeting. The planning effort received the following press coverage:

- Press release material published in the Daily Insider on October 13, 2015
<http://dailyinsider.info/partnership-formed-to-work-on-hazard-mitigation-plan/>
- An article about the planning process was published in The Columbian on October 15, 2015
<http://www.columbian.com/news/2015/oct/15/cresa-seeks-hazard-plan-input/>

Source: Eric Frank and Anthony Vendetti, CRESA



Figure 3-2. Attendees Listen to Presentation at WSU Outreach Event



Figure 3-3. Disaster Movie Night Sponsored by CRESA

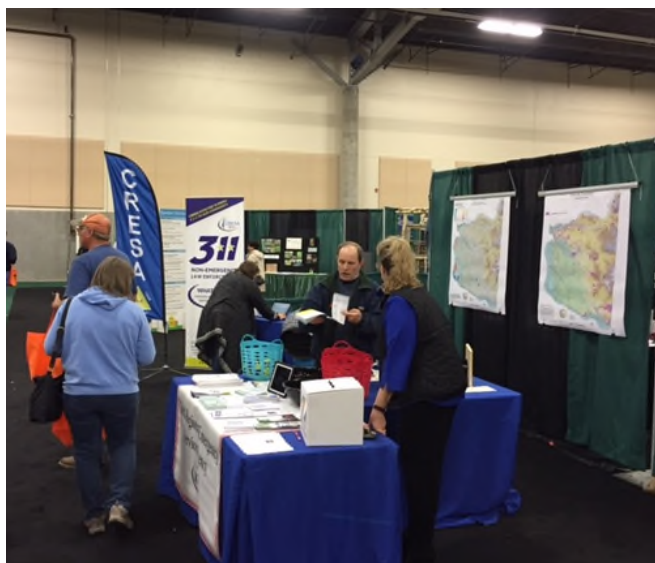


Figure 3-4. CRESA Booth at the Home and Garden Idea Fair



Figure 3-5. Attendees Review Hazard Maps at WSU-Vancouver

Hazard Report

Parcel ID:

Address:

Zip Code:

Earthquake Hazards

NEHRP Soil Class: C

Liquefaction Susceptibility: **Very Low**

Probabilistic 100 Year Scenario Mercalli Scale (Potential Damage / Perceived Shaking): **VI (Light, Strong)**

Probabilistic 100 Year Scenario Structure Damage: **\$1,034**

Probabilistic 100 Year Scenario Contents Damage: **\$376**

Probabilistic 500 Year Scenario Mercalli Scale (Potential Damage / Perceived Shaking): **VII (Moderate, Very Strong)**

Probabilistic 500 Year Scenario Structure Damage: **\$21,928**

Probabilistic 500 Year Scenario Contents Damage: **\$7,173**

Portland Hills M6.5 Scenario Mercalli Scale (Potential Damage / Perceived Shaking): **VI (Light, Strong)**

Portland Hills M6.5 Scenario Structure Damage: **\$713**

Portland Hills M6.5 Scenario Contents Damage: **\$324**

Cascadia M9.0 Scenario Mercalli Scale (Potential Damage / Perceived Shaking): **VI (Light, Strong)**

Cascadia M9.0 Scenario Structure Damage: **\$2,804**

Cascadia M9.0 Scenario Contents Damage: **\$727**

Flood Hazards

Structure in 100 Year Floodplain: **No**

100 Year Flood Scenario Water Depth (ft):

100 Year Flood Scenario Structure Damage:

100 Year Flood Scenario Contents Damage:

Structure in 500 Year Floodplain: **No**

500 Year Flood Scenario Water Depth (ft):

500 Year Flood Scenario Structure Damage:

500 Year Flood Scenario Contents Damage:

Volcano Hazards

Mt. Hood Distal Lahar Hazard Zone: **No**


Landslide Hazards

Landslide Hazard Area: **No**


For Informational Purposes Only

Page 1 of 1

Figure 3-6. Example Hazus Workstation Output



IS CLARK COUNTY AT RISK FROM NATURAL DISASTERS?






Take the Online Survey!

All residents of Clark County are invited to join us in the update of the Clark County Multi-Hazard Mitigation Plan.

A hazard mitigation plan is the foundation of a community's long term strategy to reduce losses from hazard events and to break the disaster cycle. As a result, we want to partner with you in developing this plan:

- We want to hear about what concerns you the most and what impact disasters have had on you and your family.
- We want your feedback throughout the planning process.
- We want your comments and suggestions on the plan as drafts become available for review.

Take the first step by submitting your response to the Clark County Hazard Mitigation Public Survey!

TELL US ABOUT YOUR EXPERIENCE WITH THE FOLLOWING HAZARDS:


- Dam Failure
- Drought
- Earthquake
- Flood
- Landslide
- Severe Weather
- Volcano
- Wildfire


PARTICIPATING STAKEHOLDERS:

<ul style="list-style-type: none"> • Clark County • City of Battle Ground • City of Camas • City of La Center • City of Ridgefield • City of Vancouver • City of Washougal • City of Woodland • Town of Yacolt • Clark Public Utilities • Port of Vancouver 	<ul style="list-style-type: none"> • C-TRAN • Clark Regional Wastewater District • Battle Ground Public Schools • Camas School District • Green Mountain School District No. 103 • Ridgefield School District • Clark County Fire District 3 • <i>And Most Important...</i>
--	---


COMPLETE THE SURVEY NOW:

www.surveymonkey.com/r/ClarkCounty2016HMP





YOU



STAY INFORMED OF UPCOMING EVENTS:

<http://cresa911.org/hazmitplanproject/>

Figure 3-7. Flyer Advertising Public Questionnaire



Figure 3-8. Annual Mailer with Information on Hazard Mitigation Plan

Social Media

Social media was used throughout the planning process to inform members of the public about the planning process, advertise the questionnaire, and advertise public meetings. Planning partners and Steering Committee members posted information about the plan on Facebook, Twitter and blogs. Examples of outreach using social media are shown in Figure 3-9.

Project Website

At the beginning of the plan development process, a website was created to keep the public posted on plan development milestones and to solicit relevant input (see Figure 3-10):

<http://cresa911.org/hazmitplanproject/>

The site's address was publicized in all press releases, mailings, questionnaires and public meetings. Information on the plan development process, the Steering Committee, the questionnaire and drafts of the plan was made available to the public on the site throughout the process. CRESA intends to keep a website active after the plan's completion to keep the public informed about successful mitigation projects and future plan updates.

The screenshot displays two columns of Facebook posts. The left column shows a sidebar with 'PEOPLE ALSO LIKE' (Clark County Fire & Rescue, Vancouver Police Department, Vancouver Fire Department, Vanco..., Clark Public Utilities) and 'LIKED BY THIS PAGE' (Bruce H. Lipton, Ph.D.). The right column shows a main feed with posts from CRESA (Clark Regional Emergency Services Agency) dated October 12 and October 10, Fire District 3 dated October 13 and October 2, and Safe Kids Clark County (WA). The posts discuss hazard mitigation planning, partnership formations, and a burn ban.

Post 1 (Top Left): Clark County Fire & Rescue (Fire Protection). "Tell people what you think" (5 stars).

Post 2 (Top Left): Vancouver Police Department (Government Organization). "Tell people what you think" (5 stars).

Post 3 (Top Left): Vancouver Fire Department, Vanco... (Government Organization). "Tell people what you think" (5 stars).

Post 4 (Top Left): See more Government Organizations in Vancouver, Washington.

Post 5 (Top Left): Liked by Bruce H. Lipton, Ph.D.

Post 6 (Top Left): Clark Public Utilities.

Post 7 (Top Right): CRESA (Clark Regional Emergency Services Agency). October 12 at 9:59am. Edited. "CRESA is leading a project to make Clark County safer and more resilient. Check it out and get involved." "CLARK REGIONAL EMERGENCY SERVICES AGENCY – Partnership Formed to Work on Hazard Mitigation Plan" "Clark Regional Emergency Services Agency (CRESA) is leading a joint planning effort to help Clark County reduce the impacts of disasters and the public will have an opportunity to weigh in. This project will be a team effort involving several local government agencies including: CRESA911.ORG" Like Comment Share. Jason Hoover, Annie Riehl Wilson, Bebe N Annette and 8 others like this.

Post 8 (Top Right): CRESA (Clark Regional Emergency Services Agency) shared Vancouver Fire Department, Vancouver WA's photo. October 10 at 2:29pm. "Live in the City of Vancouver Fire Department, Vancouver WA service area? Help vote for them to win this grant to benefit their risk reduction efforts." Photo of a fire truck.

Post 9 (Bottom Left): Cherish L. DesRochers. October 8 at 8:18pm. "When you come into Battle Ground, can you bring the CERT program? I... See More" Like Comment Share.

Post 10 (Bottom Left): Lyssa Mongeau Orelli. 5★ Today they pulled my son from his wrecked vehicle. I can not thank them enough! December 11, 2013. 2 likes.

Post 11 (Bottom Left): Trevor Wilhelm. 5★ July 27, 2015.

Post 12 (Bottom Left): Tell people what you think (5 stars).

Post 13 (Bottom Left): Liked by SAFE KIDS Clark County (WA).

Post 14 (Bottom Left): CRESA (Clark Regional Emergenc...).

Post 15 (Bottom Left): English (US) - Privacy - Terms - Cookies - Advertising - Ad Choices - More - Facebook © 2015.

Post 16 (Bottom Right): Fire District 3. October 13. "Fire District 3 has teamed up with several other agencies in the county to assist with the development of a new Hazard Mitigation Plan which is the foundation of a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. If you would like to know more about the process, please visit the following website: <http://cresa911.org/hazmitplanproject/>" "CLARK REGIONAL EMERGENCY SERVICES AGENCY – Hazmit Planning Project" "A hazard mitigation plan is the foundation of a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage." CRESA911.ORG. Like Comment Share. Teri Austin Monstad and Holly Robinson like this.

Post 17 (Bottom Right): Fire District 3. October 2. "Burn Ban in Clark County Lifted" "Effective: October 1, 2015 - All burning is permanently banned in the Southern Clark County no burn area and the cities and surrounding urban growth areas of Vancouver/Camas/Washougal, Battle Ground, Ridgefield, La Center and Yacolt." "Burning is limited to natural vegetation only in the remainder of Clark County. A free permit is necessary for all fires up to 10 x 10 x 6 and can be printed from www.swcleanair.org, or you can obtain a free permit... See More" Like Comment. Roxanne Converse DaCorte likes this. 1 share. Chronological.

Figure 3-9. Hazard Mitigation Planning Information on Social Media

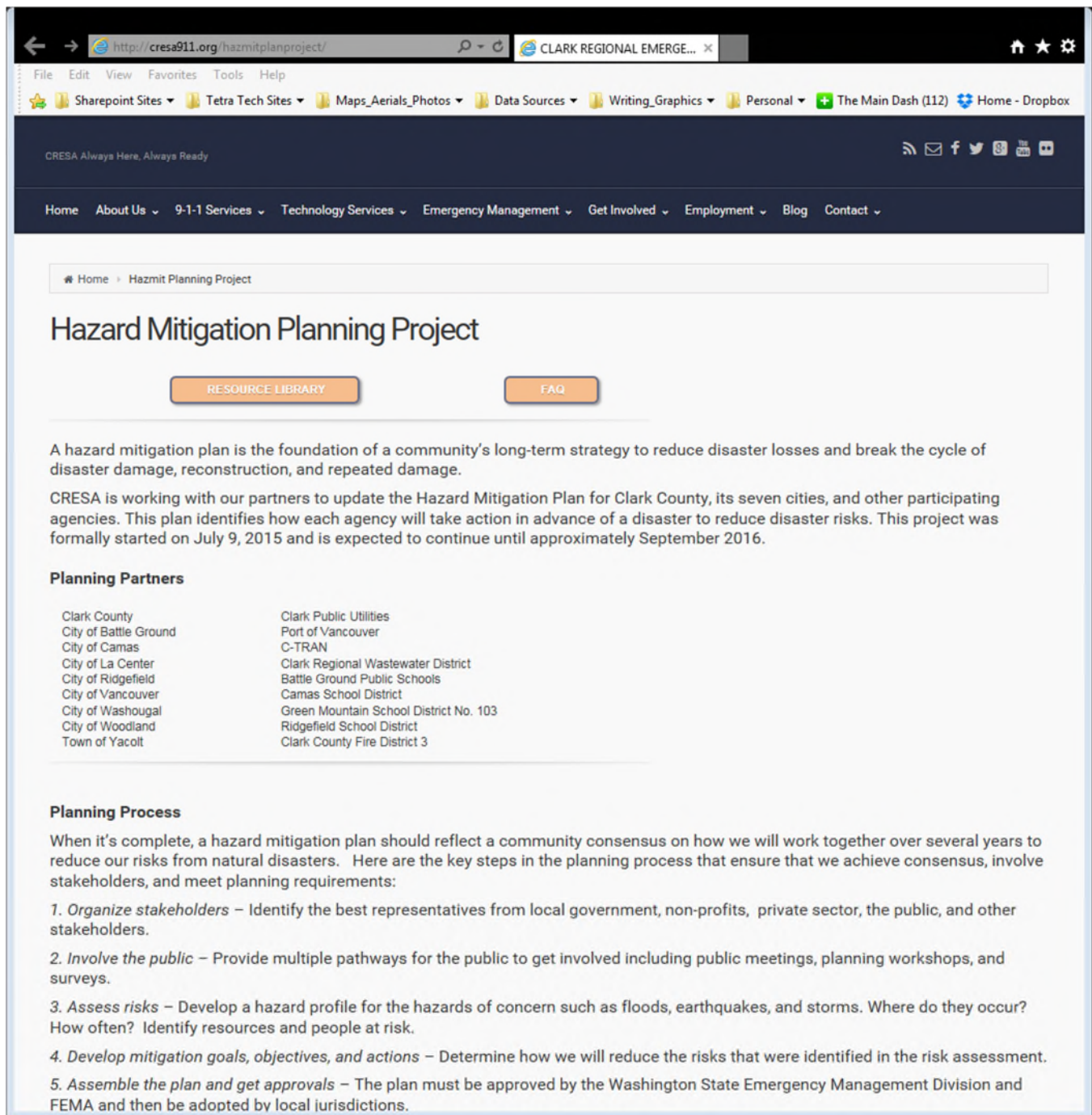


Figure 3-10. Sample Page from Hazard Mitigation Plan Web Site

Planning Partner Process Updates

As a way to keep the large planning partnership apprised of plan development milestones, the planning team distributed four planning partner process updates to the planning partners over the course of the plan development. These updates helped to keep the partnership involved in the process and informed them when planning partner deliverables were due. The updates are presented in Appendix D.

3.5.2 Public Involvement Results

Questionnaire Results

A total of 837 persons completed the online questionnaire for this plan between January and April of 2016. Detailed questionnaire results are provided in Appendix C. Key results are summarized below.

Geographic Representation and Residency Tenure

Survey responses were received from all participating jurisdictions and from individuals who live outside of Clark County. 96 percent of all respondents indicated that they live within Clark County.

In general, responses from the City of Ridgefield were significantly over-represented with over 20 percent of the total responses and only 1.4 percent of the estimated population. Responses from the unincorporated areas were under-represented as the estimated population is almost 50 percent of the total planning area population and accounted for only 12 percent of responses.

The majority of respondents who live in Clark County have lived in the County for 11 or more years (62 percent). 38 percent of respondents indicated that they have lived in the City for more than 20 years.

Demographics

Respondents indicated that they were 61 or older most commonly (28 percent) followed by 41 to 50 year olds (24 percent). More than half (58 percent) of respondents were female.

More than 50 percent of respondents indicated that their household income was \$75,000 per year or greater. More than 65 percent of respondents indicated that they hold college or graduate degrees.

88 percent of respondents indicated that they own their own home.

Hazard Concern, Preparation and Mitigation

More than half of respondents indicated that they were concerned, very concerned or extremely concerned about the earthquake (77 percent) and severe weather (50 percent) hazards' impacts in Clark County. 27 percent of respondents indicated that they were extremely concerned about the earthquake hazard. Respondents were generally slightly concerned or not concerned about the drought (66 percent), flood (59 percent), landslide (55 percent), volcano (65 percent) and wildfire hazard (56 percent). In general, respondents were not concerned about the dam failure hazard with 55 percent of respondents indicating no concern. Other natural hazards of concern mentioned by respondents included sink holes, radon, falling trees, climate change, and tsunamis. Most other hazards of concern mentioned were man-made or technological hazards such as terrorism and oil train derailments.

More than half of respondents indicated that they had purchased emergency food rations/supplies (64 percent) or checked smoke detector batteries once a month or changed batteries once a year (66 percent) to prepare for natural disasters. All other preparedness related activities were selected by less than half of respondents.

96 percent of respondents indicated that they have homeowners' or renters' insurance for their properties. 6 percent of respondents indicated that they had flood insurance and 29 percent had purchased earthquake insurance. 9 percent of respondents indicated that they did not know that primary insurance may not cover damage from some natural hazards.

Respondents most commonly indicated that they would be willing to spend \$1,001 to \$4,999 on safety improvements to reduce the possible risks from disaster damage (24 percent). 12 percent indicated that they would not be willing to spend any money.

The most common reason chosen for not taking actions to reduce risk from natural hazards was that it costs too much (20 percent), while almost a quarter (24 percent) of respondents indicated that they felt well prepared.

The top three types of projects or actions that respondents indicated local, state and federal governments should take to reduce damage and disruption from natural hazard disasters were:

- Strengthen infrastructure, such as roads and water supply systems (79 percent)
- Provide better public information about risks and vulnerable areas (57 percent)
- Strengthen essential facilities such as police stations and schools (52 percent).

Information on Hazards

The top three sources where respondents indicated that they had found useful information on preparing for, responding to, and reducing risk from natural hazards were local news and other media (52 percent), nongovernmental organizations (40 percent) and social media (37 percent).

The top three types of information that respondents indicated would be useful in helping to reduce risk from natural disasters were:

- Recommended preparedness actions residents can take (69 percent)
- Information on city and county disaster capabilities (54 percent)
- Recommended mitigation actions residents can take (53 percent).

40 percent of respondents indicated that they did not know if their home was located in a natural hazard area and 17 percent indicated that they did not live in any of the listed hazard areas. The most commonly selected hazard areas were earthquake hazard zone (42 percent), volcano hazard zone (13 percent) and wildfire risk area (10 percent). It was most common for respondents to indicate that their knowledge on their homes location in a hazard zone was determined through their own research (41 percent of total respondents).

Public Meetings and Presentations

By staffing booths at popular public events and presenting information to local groups, the concept of mitigation was introduced to the public and the Steering Committee and Planning Partnership received feedback to use in developing the components of the plan. The results of the public survey were provided to each planning partner to aid in the identification and selection of mitigation actions and reviewed by the steering committee before the strengths, weaknesses, obstacles and opportunities session. Details of attendance are summarized in Table 3-4.

Table 3-4. Summary of Public Meetings

Date	Location	Estimated Number of Residents in Attendance
February 8, 2016	Neighborhood Associations Council of Clark County Meeting - Clark County Public Works Operations Center	25
February 10, 2016	Vancouver Neighborhood Alliance Meeting - Firstenberg Community Center	25
March 4, 2016	Disaster Movie Night – Kiggins Theatre, Vancouver	100
March 24, 2016	Prepare for the Big One – Washington State University Vancouver	Hundreds
April 22 – 24, 2016	Clark Public Utilities, Home and Garden Idea Fair – Clark County Event Center	Thousands
July 7, 2016	Clark Regional Emergency Services Agency Administration Board	15

Public Comment Period

A 30 day public comment period was held from July 7, 2016 to August 5, 2016. No comments were received on the plan; however, the planning team did receive calls from several residents with inquiries and mitigation, the planning process and other general emergency management related questions.

3.6 PLAN DEVELOPMENT CHRONOLOGY/MILESTONES

Table 3-5 summarizes important milestones in the development of the plan.

Table 3-5. Plan Development Milestones			
Date	Event	Description	Attendance
2014			
4/21	Grant	CRESA received notice of the award of a Pre-Disaster Mitigation Grant to fund the hazard mitigation plan update.	N/A
2015			
2/11	Contractor solicitation	CRESA advertised for contractor support for the plan update	N/A
3/16	Contractor selection	CRESA selected Tetra Tech to facilitate plan development	N/A
5/16	Planning team formation	Members of the planning team were designated	N/A
7/09	Planning partner kickoff meeting	Attendees were advised of planning partner expectations and asked to formally commit to the process. Steering Committee volunteers were solicited.	32
7/22	Planning partner outreach	Follow up outreach to eligible local governments that did not attend the kickoff meeting	N/A
7/23	Steering Committee formation	Planning partners nominated potential committee members and the planning team solicited representation from non-government representatives. The planning team received commitments from 14 members, finalizing the formation of the Steering Committee.	N/A
8/19	Steering Committee Meeting #1	<ul style="list-style-type: none"> • Introduce the Steering Committee and planning team • Review and discuss the work plan and timeline • Confirm Steering Committee composition • Discuss and develop Steering Committee ground rules • Begin plan review • Identify hazards of concern • Discuss public involvement 	19
8/24	Planning partnership finalized	Deadline for submittal of letters of intent to participate in the planning effort.	N/A
9/16	Steering Committee Meeting #2	<ul style="list-style-type: none"> • Confirm Steering Committee composition • Confirm Steering Committee ground rules • Confirm first phase of jurisdictional annexes • Confirm plan purpose statement • Confirm hazards of concern • Identify scenarios • Begin to develop public outreach strategy 	17
10/8	Public outreach	Email distributed to over 100 planning area stakeholders announcing the start of the planning process, soliciting involvement and advertising the project website.	N/A
10/9	Public outreach	Project website for hazard mitigation planning process launched	N/A
10/12	Public outreach	Press release announcing planning process and advertising website disseminated to all media outlets	N/A

Date	Event	Description	Attendance
10/16	Steering Committee approved	Steering Committee membership was approved by the planning partners. The committee consists of 15 members representing diverse interests across the planning area.	N/A
10/16	Public outreach	Interview regarding hazard mitigation and the planning process posted on YouTube.	N/A
10/21	Steering Committee Meeting #3	<ul style="list-style-type: none"> • Begin to develop public outreach strategy • Confirm goals • Discuss and confirm risk assessment data • Discuss critical facilities definition 	24
11/18	Steering Committee Meeting #4	<ul style="list-style-type: none"> • Confirm objectives • Discuss and confirm mitigation questionnaire 	21
12/16	Steering Committee Meeting #5	<ul style="list-style-type: none"> • Confirm critical facility definition • Confirm hazard mitigation questionnaire • Introduce next steps 	17
2016			
1/13	Public outreach	Public hazard mitigation questionnaire disseminated to community members	N/A
1/20	Steering Committee Meeting #6	<ul style="list-style-type: none"> • Review status of public involvement • Discuss risk ranking • Discuss plan maintenance • Introduce next steps 	18
2/08	Public outreach	Planning team presentation on hazard mitigation planning process to Neighborhood Associations Council of Clark County	25
2/10	Public outreach	Planning team presentation on hazard mitigation planning process to Vancouver Neighborhood Alliance	25
2/17	Steering Committee Meeting #7	<ul style="list-style-type: none"> • Review status of public involvement • Review identified issues • Brainstorming session—strengths, weaknesses, opportunities and obstacles • Introduce next steps 	14
3/03	Jurisdictional Annex Workshops (Round 1)	Mandatory session for planning partners. Workshop focused on how to complete the jurisdictional annex template.	15
3/04	Jurisdictional Annex Workshops (Round 2)	Mandatory session for planning partners. Workshop focused on how to complete the jurisdictional annex template.	12
3/04	Public outreach	Public outreach conducted at Disaster movie night	100
3/16	Steering Committee Meeting #8	<ul style="list-style-type: none"> • Review status of public involvement • Discuss and identify county-wide action items • Confirm plan implementation and maintenance strategy 	16
3/24	Public Outreach	Public outreach conducted at Prepare for the “Big One” event	100s
4/22	Public outreach	Public outreach conducted at Home and Garden Idea Fair	1,000s
5/18	Steering Committee Meeting #9	<ul style="list-style-type: none"> • Review and approve County-wide Mitigation Strategy • Approve public review draft of Volume I 	20
7/07	Public outreach	Public comment period opens	N/A
7/07	Public outreach	Public meeting on Draft Plan – Fire District #6	15
8/05	Public outreach	Public comment period closes	N/A
X/X	Regulatory review submittal	Final draft plan submitted to Washington State for review and approval	N/A
X/X	Adoption	Adoption window of final plan opens	N/A
X/X	Plan approval	Final plan approved by FEMA	N/A

4. CLARK COUNTY PROFILE

4.1 PLANNING AREA OVERVIEW

Clark County is located in southwest Washington, in the northern portion of the Portland metropolitan area. The county borders the relatively rural Washington counties of Cowlitz to the north and Skamania to the east. The Columbia River makes up the county's western and southern borders, with the State of Oregon across the river. Clark County is the fifth smallest of Washington's 39 counties by area (656 square miles) but the fifth largest by population (451,000).

Seven incorporated cities lie entirely within the county, and the City of Woodland lies partly in Clark County and partly in Cowlitz County. The City of Vancouver is the county seat. The other incorporated cities in the county are Battle Ground, Camas, La Center, Ridgefield, Washougal, and Yacolt. The planning area for this hazard mitigation plan consists of all incorporated and unincorporated areas of Clark County, as well as the portion of the City of Woodland that lies in Cowlitz County. All partners to this plan have jurisdictional authority within this planning area.

The Cowlitz Indian Tribe is the only tribe with land in the county; the Tribe also has land in Cowlitz County (Washington State, 2015). The Tribe's reservation was established in March 2015 along Interstate 5, west of La Center, when a U.S. District Court judge approved 152 acres in Clark County to be set aside for it (Cowlitz Tribe, 2015).

4.2 PHYSICAL SETTING

4.2.1 Topography and Geology

Elevations in Clark County range from 50 feet in downtown Vancouver to over 3,500 feet in the foothills in the northeast. The Cascade Mountain Range, crossing the eastern half of the county, was formed 4 to 7 million years ago as a result of the steep descent of the Juan De Fuca plate below the continental margin. The friction of this descent created two folds that formed the Cascade and Olympic Mountain Ranges. (Townsend and Figge, 2002).

In addition to tectonic movements, repeated glacier movement across the region over the past 2 million years affected the geological features of the western portion of Clark County. The most recent period of glaciation was the Vashon period, which occurred during the late Pleistocene. Glaciers in this period advanced into Washington from Canada about 18,000 years ago and retreated 10,000 to 12,000 years ago (Townsend and Figge, 2002).

4.2.2 Seismic and Volcanic Features

The Washington portion of the Portland metropolitan area is the second most seismically active area in Washington, after the Puget Sound area. Clark County lies between the Lacamas Lake Fault in the eastern part of the county and the Portland Hills Fault in Oregon. Earthquakes in this area present what may be the worst-case scenario for Clark County because the epicenters may be quite close. Geologists theorize there may be faults directly underneath the cities of Portland and Vancouver. Recent studies suggest that the epicenter for the Magnitude 5.5 earthquake on November 5, 1962 was located underneath the City of Vancouver (CRESA, 2011).

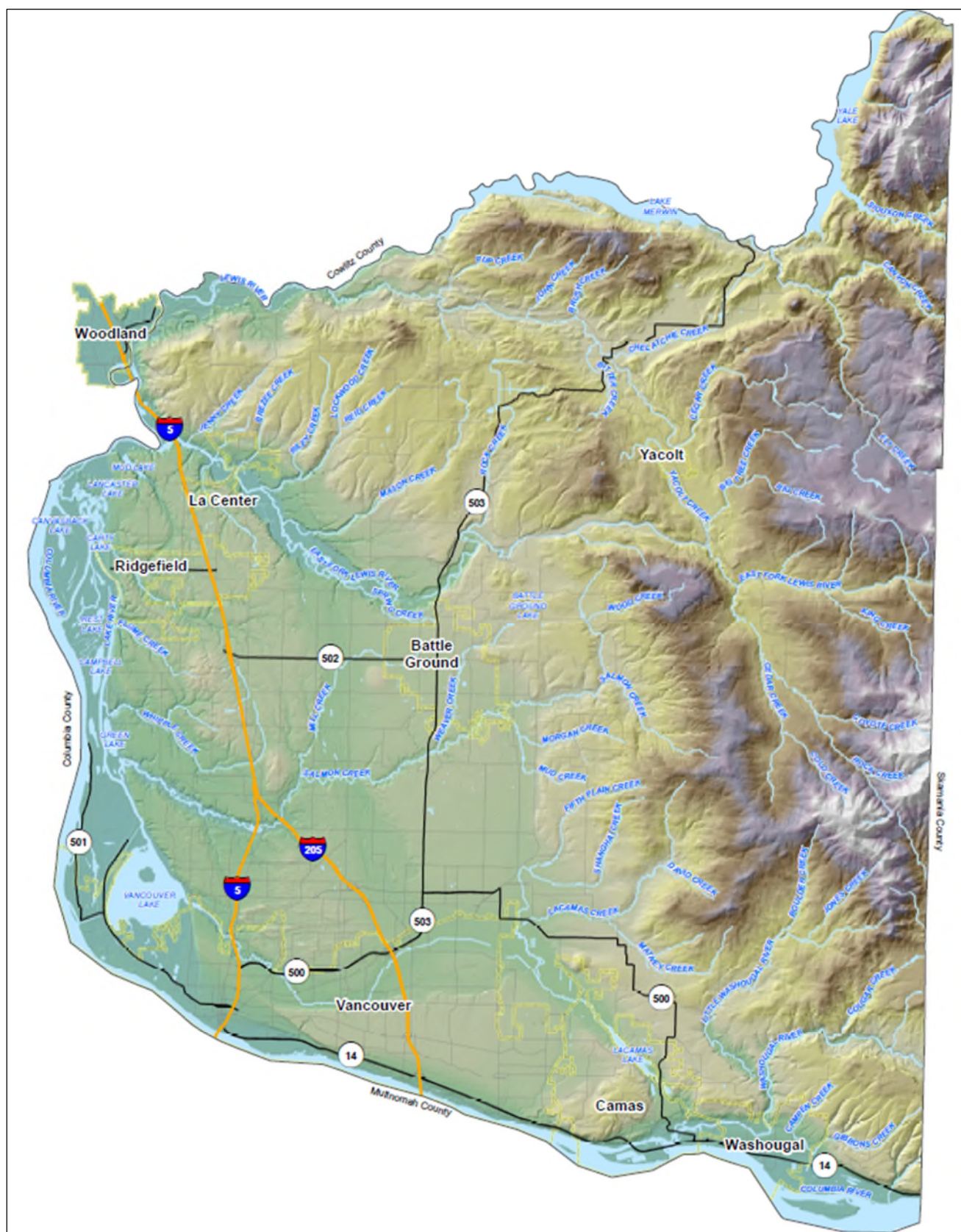


Figure 4-1. Main Features of the Planning Area

All of western Washington also is located on the Pacific “Ring of Fire”—a geological area known for volcanic activity and frequent seismic activity. Washington is near the convergence of several tectonic plates, including the Pacific, North American, and Juan de Fuca. In general earthquakes in the area arise from three sources:

- The oblique subduction of the Juan de Fuca plate can produce events as large as magnitude 7.
- Faults on the North American plate can produce moderate to large events on either side of the Cascades.
- Great earthquakes, which can have magnitudes of 9.0 or greater, can occur at the boundaries of these plates generally referred to as the Cascadia Subduction Zone (USGS, 2012a).

Mount St. Helens, Mount Hood and Mount Adams are nearby volcanoes associated with the Cascade range. Active volcanoes have been present in the Cascades for millions of years, and the remnants of former volcanoes make up the bedrock of the current Cascade range. Volcanoes in the range are still active, although their presence as a result of the fold is merely incidental to the older chain (Townsend and Figge, 2002).

4.2.3 Soils

Clark County is located within the Willamette-Puget trough, a structural low between the Coast Range to the west and the Cascade Range to the east. The regional geology of Clark County is generally divided into four major physiographic categories (CRESA, 2004):

- The Lowland Valley area, adjacent to the Columbia River, consists primarily of recent floodplain and stream deposits of semi-consolidated silt, clay, sand, and gravel.
- Alluvial deposits of thickness ranging from a few feet to about 200 feet overlying the Troutdale Formation define the Fourth Plains area.
- The Troutdale bench is the highest in a series of flat plains rising step-like from the Columbia River and is predominately composed of cemented sandy gravel and fine sand, silt and clay.
- The Foothills area rising to the east is a mixture of older, mostly volcanic, consolidated rocks underlying local sedimentary deposits.

4.2.4 Surface Waters

Major waterways in or surrounding Clark County are the Columbia River, the Lewis River, and the East Fork of the Lewis River. Smaller waterways include Cedar Creek, Canyon Creek, Chelatchie Creek, Dugan Creek, Gee Creek, Salmon Creek, Mill Creek, the Washougal River, the North Fork of the Washougal River, Weaver Creek, Burnt Creek, and Lacamas Creek (CRESA, 2004).

4.2.5 Climate

The climate of the county is greatly influenced by its geography. Moist air flows up the Columbia River bringing rain and moderate temperatures. It is seasonally mild, with relatively cool, dry summers and warm, wet winters. Average temperatures range from 40°F in January to 65 or 70°F in August. Annual rainfall is variable, ranging from about 37 to more than 110 inches in various parts of the county. Precipitation tends to be greatest in the more mountainous (northeast) portions of the county. Concentrated rainfall events are relatively common, especially during winter (CRESA, 2004). Average climate conditions at two National Oceanic and Atmospheric Administration (NOAA) weather stations in Clark County are shown in Table 4-1.

Table 4-1. Normal Precipitation and Temperatures, 1981 – 2010

	Precipitation (inches)	Temperature (°F)		
		Minimum	Average	Maximum
NOAA Weather Station: Battle Ground, WA US				
January	7.19	32.6	39.7	46.8
February	5.42	32.6	41.9	51.2
March	5.54	36.0	45.9	55.8
April	4.35	39.0	49.6	60.2
May	3.43	44.1	55.2	66.4
June	2.51	48.2	59.8	71.4
July	0.87	51.2	64.7	78.2
August	0.95	50.6	65.0	79.4
September	2.24	45.9	60.3	74.6
October	4.40	40.0	51.6	63.1
November	8.14	36.5	44.2	51.9
December	7.56	32.0	38.5	45.0
Annual	52.60	40.7	51.4	62.0
NOAA Weather Station: Vancouver Pearson Airport, WA US				
January	5.50	35.4	41.6	47.7
February	4.03	35.3	43.5	51.7
March	3.57	39.1	48.0	56.9
April	3.01	42.6	52.1	61.5
May	2.47	48.2	58.1	68.1
June	1.79	53.3	63.3	73.4
July	0.69	56.9	68.4	80.0
August	0.77	56.9	69.2	81.5
September	1.56	51.6	63.6	75.7
October	3.07	44.1	53.8	63.4
November	5.91	39.8	46.4	53.1
December	6.77	34.5	40.6	46.7
Annual	39.14	44.8	54.1	63.3

Source: NOAA, 2015.

4.3 MAJOR PAST HAZARD EVENTS

Presidential disaster declarations are typically issued for hazard events that cause more damage than state and local governments can handle without assistance from the federal government, although no specific dollar loss threshold has been established for these declarations. A presidential disaster declaration puts federal recovery programs into motion to help disaster victims, businesses and public entities. Some of the programs are matched by state programs. The planning area has experienced 11 events since 1956 for which presidential disaster declarations were issued. These events are listed in Table 4-2.

Review of these events helps identify ways to increase a community's capability to avoid large-scale events in the future. Still, many natural hazard events do not trigger federal disaster declaration protocol but have significant impacts on their communities. These events are also important to consider in establishing recurrence intervals for hazards of concern and are addressed in more detail in Part 2 of this document.

Table 4-2. Federal Disaster Declarations for Events Affecting Clark County

Disaster Number ^a	Incident Description	Event Begin Date
DR-185	Heavy Rains and Flooding	December 29, 1964
DR-545	Severe Storms, Mudslides, Flooding	December 10, 1977
DR-623	Volcanic Eruption, Mount St. Helens	May 21, 1980
DR-1079	Storms, High Winds, Floods	November 7, 1995
DR-1100	Severe Storms, Flooding	January 26, 1996
DR-1159	Severe Winter Storms, Flooding	December 26, 1996
DR-1361	Earthquake	February 28, 2001
EM-3227	Hurricane Katrina Evacuation	August 29, 2005
DR-1671	Severe Storms, Flooding, Landslides, and Mudslides	November 2, 2006
DR-1682	Severe Winter Storm, Landslides, and Mudslides	December 14, 2006
DR-1825	Severe Winter Storm and Record and Near Record Snow	December 12, 2008
DR-4253	Severe Winter Storm, Straight Line Winds, Flooding, Landslides, Mudslides, Tornado	December 1, 2015

a. DR = major disaster; EM = emergency

Source: Federal Emergency Management Agency, 2015.

4.4 DEVELOPMENT PROFILE

4.4.1 Historical Development

The Clark County area's indigenous peoples were the Chinook Indians. The Lewis and Clark expedition estimated the Chinook population in 1806 to be several thousand, from The Dalles to the coast. Later, the British Hudson's Bay Company estimated the Chinook population in 1825 to be 2,500. An illness—most likely malaria or influenza—later destroyed most of the local population (Hanable, 2004).

The area that is now Clark County was an early trading center and an agriculture market. The Hudson's Bay Company established Fort Vancouver in 1825, the oldest permanent, non-native settlement in the Pacific Northwest. Fort Vancouver, named for British naval captain and explorer George Vancouver, provided access to the Columbia River, facilitating easier trade of local products. The Hudson's Bay Company's agricultural investments stretched for 30 miles along the Columbia (Hanable, 2004).

The County was incorporated as the District of Vancouver on June 27, 1844, by the Oregon Provisional Government. The name was changed to County of Vancouver in 1845 and to County of Clarke in 1849. Clarke County became a political subdivision of Washington Territory upon that territory's establishment in 1853. The state legislature corrected the spelling of the county's name in 1925. The City of Vancouver incorporated in 1857 as a jurisdiction in the Washington Territory (Hanable, 2004).

While Clark County's economy originally centered on agriculture, Vancouver eventually acquired lumber and paper mills, docks, grain elevators, and canneries. Local growth was enhanced by the West Coast gold rush, and in 1870 the Northern Pacific Railroad connected Vancouver to Puget Sound (Hanable, 2004).

World Wars I and II brought additional industries to the county, including the world's largest spruce mill and the west's first aluminum manufacturing plant. Tourism became a much more important economic driver for Clark County after World War I; this change was enabled by the construction of the Pacific Highway, US 99, in the 1920s. Fort Vancouver's designation as a National Historic Monument and the reconstruction of the Hudson Bay's Company post facilitated tourist interest. Today, a large number of sites (64 total) are recorded on both the National Historic Register and the Clark County Heritage Register (CRESA, 2004).

4.4.2 Current Land Use

Clark County land use has remained relatively unchanged since 2007. It consists of predominantly forest lands in the eastern side of the county, and scattered agriculture, parks/open space, and rural lands throughout the remaining portions of Clark County. Commercial, residential, and industrial land uses are the predominant land uses within the County's incorporated cities and towns (Clark County, 2015a). For recreation, residents and visitors can access the Gifford Pinchot National Forest and Lewis River, and municipal park systems also abound.

Land use information is analyzed in this plan for each identified hazard that has a defined spatial extent and location. For hazards that lack this spatial reference, land use summary information in Table 4-3 serves as a baseline estimate of land use and exposure for the planning area. Future trends in development are discussed in Section 4.4.4. Table 4-4 shows the type and distribution of structures throughout the planning area.

Table 4-3. Present Land Use in Planning Area^a

Present Use Classification ^b	Area (acres) ^{c, d}	% of total
Agriculture/Resource Land	112,261	24.1%
Commercial	20,261	4.4%
Education	2,923	0.6%
Governmental Services	3,742	0.8%
Industrial	2,535	0.5%
Religious Services	1,062	0.2%
Residential	291,365	62.7%
Vacant or uncategorized	30,710	6.6%
Total	464,858	100%

- Present land use information in this plan is for planning purposes only. Discrepancies may exist between these estimates and official records maintained by participating jurisdictions.
- Present use classification provided by Clark and Cowlitz County assessor's data assigned to best fit occupancy classes in FEMA's Hazus model (see Section 6.3.1). Parcels for which conflicting information on current development was available were assumed to be improved. Some designated resource land may also be included in the vacant or uncategorized category.
- Acreage covers only mapped parcels; it excludes many rights of way and major water features.
- Acreage includes Clark County and the incorporated areas of the City of Woodland.

Table 4-4. Structure Type in the Planning Area

	Number of Structures ^a							
	Residential	Commercial	Industrial	Agriculture/ Forestry	Religion	Government	Education	Total
Battle Ground	5,558	237	4	10	17	3	25	5,854
Camas	7,109	272	19	26	47	15	25	7,513
La Center	1,051	39	1	5	1	7	6	1,110
Ridgefield	2,176	106	12	8	5	13	8	2,328
Vancouver	47,275	2,387	53	60	167	43	113	50,098
Washougal	5,212	248	7	15	25	19	13	5,539
Woodland	1,642	170	26	1	16	4	5	1,864
Yacolt	489	24		8	7	4	1	533
Unincorporated County	72,392	1,424	29	708	184	54	111	74,902
Total	142,904	4,907	151	841	469	162	307	149,741

- Structure type assigned to best fit Hazus occupancy classes based on present use classifications provided by Clark and Cowlitz County assessor's data. Where conflicting information was present in the available data, parcels were assumed to be improved.

4.4.3 Critical Facilities and Infrastructure

The Steering Committee selected the following definition of critical facilities and infrastructure:

Facilities and infrastructure that are critical to the health and welfare of the population and that are especially important following hazard events.

For this planning process, critical facilities and infrastructure meeting this definition were inventoried from the best available databases under the following sectors:

- Communication facilities
- Dams
- Emergency services
- Energy
- Government facilities
- Hazardous materials
- Healthcare and public health
- Information technology
- Schools
- Transportation systems
- Water and sanitation systems.

Information on data sources for these facilities can be found in Chapter 6 of this volume. The location of critical facilities and infrastructure within the unincorporated areas and cities participating in this plan are shown in Figure 4-2 and Figure 4-3, and summarized in Table 4-5. Due to the sensitivity of this information, a detailed list of facilities is not provided. The list is on file with each planning partner.

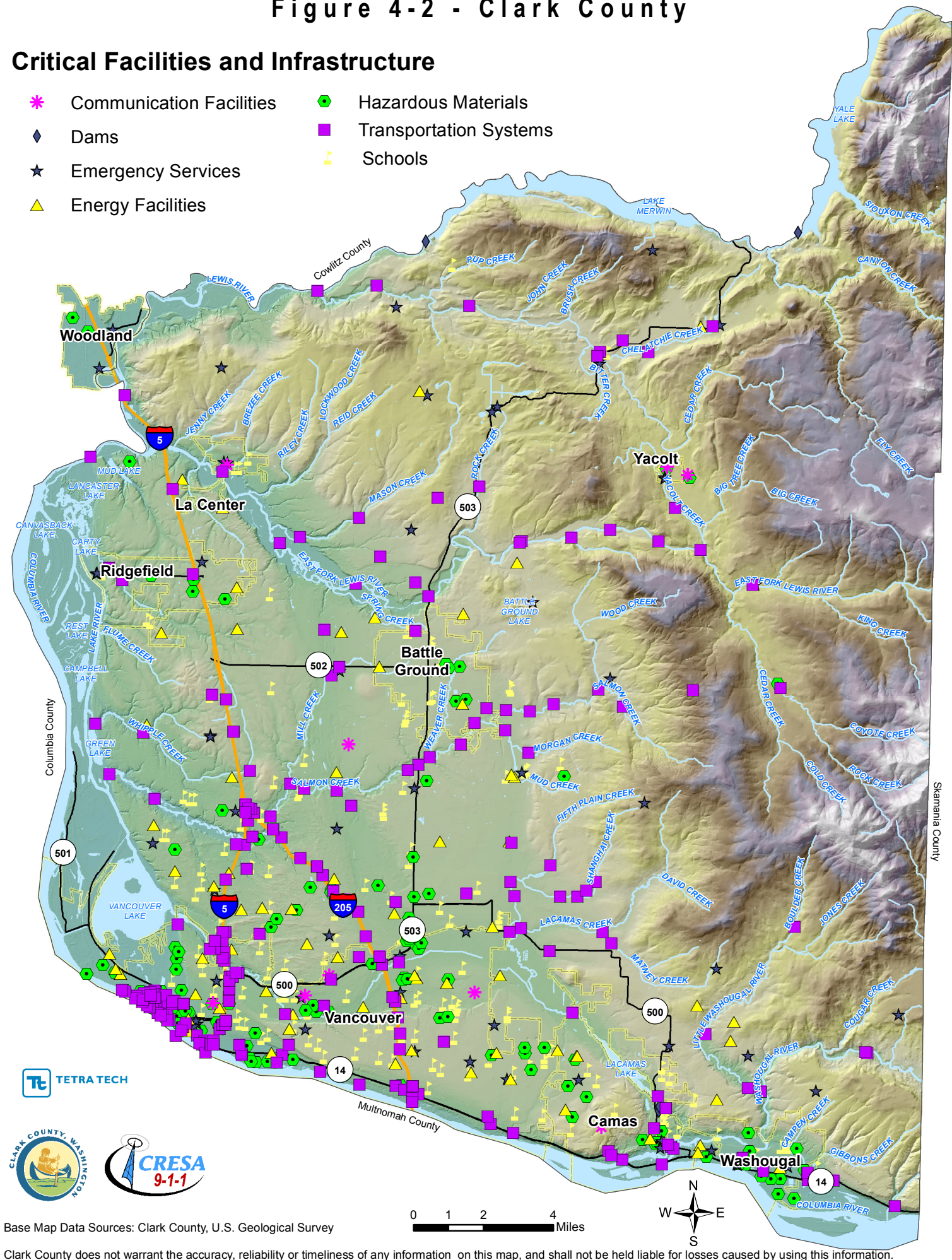
Table 4-5. Critical Facilities and Infrastructure by Jurisdiction and Category

	Commu- nication Facilities	Dams	Emer- gency Services	Energy	Govern- ment Facilities	Hazardous Materials	Health Care & Public Health	Infor- mation Technol- ogy	Schools	Trans- portation Systems	Water & Sanitation Systems	Total
Battle Ground			2	2	4	6	5		9	2	18	48
Camas	1	2	4	6	3	8	9		17	10	57	117
La Center	1		2	1	2		1		3	1	7	18
Ridgefield	0	0	3	1	2	4	1	0	4	3	12	30
Vancouver	4	0	13	24	37	62	165	0	60	126	54	545
Washougal	0	0	3	2	3	11	7	0	5	3	28	62
Woodland	0	0	3	1	0	2	0	0	5	0	0	11
Yacolt	2	0	2	0	1	1	0	0	1	0	0	7
Unincorporated	1	2	29	35	8	21	163	0	53	125	217	654
Total	9	4	61	72	60	115	351	0	157	270	393	1,492

Figure 4-2 - Clark County

Critical Facilities and Infrastructure

- ✱ Communication Facilities
- ◆ Dams
- ★ Emergency Services
- ▲ Energy Facilities
- Hazardous Materials
- Transportation Systems
- ▲ Schools



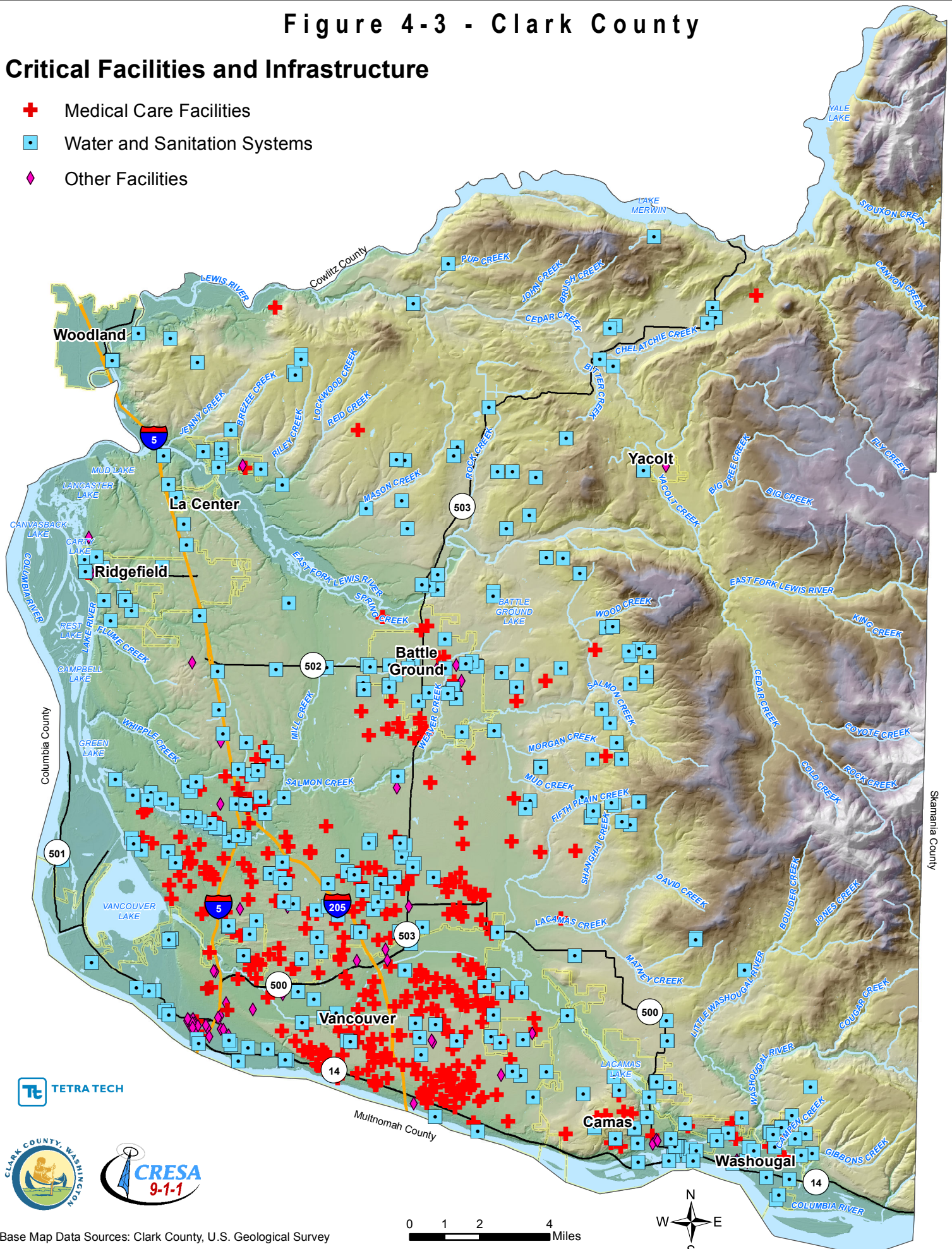
Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

Figure 4-3 - Clark County

Critical Facilities and Infrastructure

- + Medical Care Facilities
- Water and Sanitation Systems
- ◆ Other Facilities



Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

4.4.4 Future Trends in Development

The municipal planning partners have adopted comprehensive plans that govern land-use decision-making and policy-making in their jurisdictions. The Community Framework Plan adopted in 1993 as Clark County’s long-term vision of what the county could become guides the development of each jurisdiction’s growth management comprehensive plan. It embodies countywide planning policies and envisions urban growth areas (UGAs) with specific boundaries and rural centers within larger natural resource and rural areas (Clark County, 2015a).

The Framework Plan emphasizes distinctions between urban, rural and resource lands. It encourages growth in UGAs and rural centers, with each center of development distinct from the others. These centers of development are of different sizes; they contain different combinations of housing, shopping, and employment areas. Each provides places to live and work. The centers are oriented and developed around neighborhoods to create a distinct sense of community (Clark County, 2015a).

In order to achieve this development pattern, each UGA designates a mix of land uses with housing, businesses, and services appropriate to its character and location. Residential development appropriate to the needs of workers and residents is encouraged nearby. Outside of UGAs, the land is predominantly rural with farms, forests, open space, and large lot residences. Shopping and businesses are located in rural centers. Most of northern Clark County remains in rural use, with some resource-based industries (Clark County, 2015a).

This hazard mitigation plan will work together with local programs to support wise land use in the future by providing vital information on the risk associated with natural hazards in the planning area. All municipal planning partners will incorporate this hazard mitigation plan update in their comprehensive plans by reference. This will ensure that future development trends can be established with the benefits of the information on risk and vulnerability to natural hazards identified in this plan.

Risks to future development are analyzed in this plan for each identified hazard that has a defined spatial extent and location. For hazards that lack this spatial reference, buildable lands summary information in Table 4-6 summarizes buildable land area by use category for the planning area.

Table 4-6. Buildable Lands in Planning Area Urban Growth Areas^a

Urban Growth Area Name	Residential (acres)	Commercial (acres)	Industrial (acres)	Total (acres)
Battle Ground	1,070	412	188	1,670
Camas	891	337	495	1,724
La Center	373	44	49	466
Ridgefield	1,009	192	542	1,743
Vancouver	3,620	971	2,414	7,005
Washougal	477	88	268	833
Woodland	25	0	0	25
Yacolt	44	11	29	83
Total	7,509	2,055	3,984	13,548

- Buildable lands information in this plan is for planning purposes only. Discrepancies may exist between these estimates and official records maintained by participating jurisdictions.
- Unincorporated areas outside of urban growth areas are excluded from this assessment. Development in these areas consists largely of rural lands, open space and large residential lots. Changes in development can be assessed through
- Acreage covers only mapped parcels; it excludes many rights of way and major water features.
- Acreage includes Clark County and the incorporated areas of the City of Woodland.

4.5 DEMOGRAPHICS

Some populations are at greater risk from hazard events because of decreased resources or physical abilities. Research has shown that people living near or below the poverty line, the elderly, socially-isolated persons, people with disabilities, women, children, ethnic minorities and renters all experience, to some degree, more severe effects from disasters than the general population. They may vary from the general population in risk perception, living conditions, access to information, capabilities during a hazard event, and access to resources for post-disaster recovery. These populations often overlap spatially and live in the most vulnerable locations. Detailed spatial analysis to locate areas where there are higher concentrations of vulnerable community members would assist the County in extending focused public outreach and education to these most vulnerable residents.

4.5.1 Population Characteristics

Information about the composition of the population and how it has changed in the past and how it may change in the future is a critical part of planning because it directly relates to land needs such as housing, industry, public services, and transportation. The Washington Office of Financial Management estimated the total Clark County population at 451,820 as of September 2015 (Washington OFM, 2015a). Table 4-7 presents current and recent population estimates for the county as a whole and for individual jurisdictions within it. Most of the population resides in the incorporated cities, which are mostly along the banks of the Columbia River. The City of Vancouver far surpasses the rest of the cities in population, with over 170,000 residents, although the unincorporated county has a larger total population, with about 215,000 (Washington OFM, 2015a).

Table 4-7. Clark County City and Unincorporated Area Population, 1990 - 2015

	Population Estimate			
	1990	2000	2010	2015
Battle Ground	3,758	9,322	17,571	19,250
Camas	6,798	12,534	19,355	21,210
La Center	483	1,654	2,800	3,100
Ridgefield	1,332	2,147	4,763	6,400
Vancouver	46,380	143,560	161,791	170,400
Washougal	4,764	8,595	14,095	15,170
Woodland	2,500	3,780	5,509	5,845
Yacolt	600	1,055	1,566	1,620
Unincorporated	173,844	166,279	203,339	214,585
Clark County Total^a	238,053	345,238	425,363	451,820

a. County total is less than the sum of jurisdictions because Woodland includes population outside Clark County.

Source: Washington OFM, 2015b

Population change is also an important socio-economic indicators. A growing population generally indicates a growing economy, while a decreasing population signifies economic decline. Both incorporated and unincorporated areas in Clark County have continued to grow, as shown in Table 4-7 and Figure 4-4.

Unincorporated-area population declined from 1990 to 2000, largely due to annexation of unincorporated areas; since then, unincorporated population has grown, remaining about 48 percent of the total county population.

Source: Washington OFM, 2015b

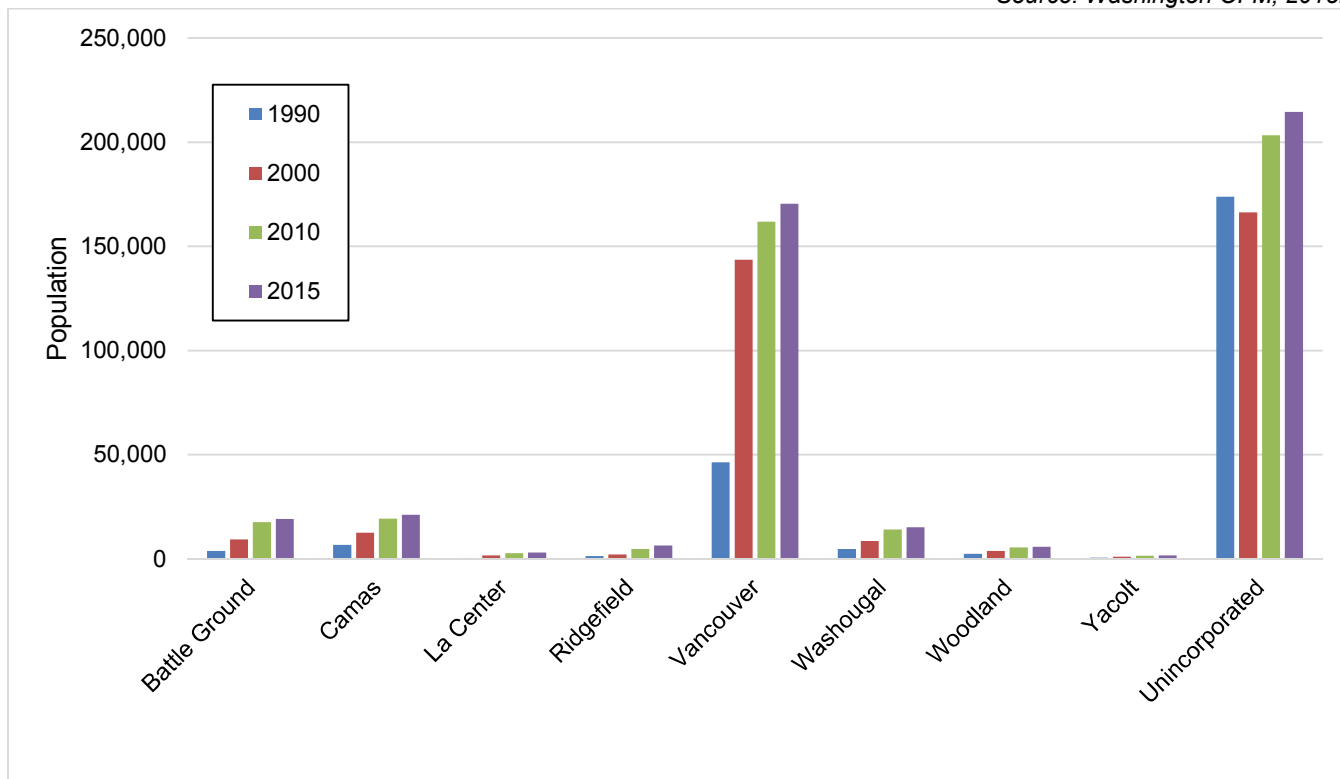


Figure 4-4. Clark County City and Unincorporated Area Population, 1990 - 2015

Overall, Clark County has experienced significant population growth recently. The State of Washington notes that Clark County had 10 percent of the state's population growth in the last year (State of Washington 2015).

Figure 4-5 shows the overall population growth rate in the planning area from 1910 to 2010 compared to that of the State of Washington. Clark County's 10-year growth rate has been slightly higher than the statewide rate, except for the 1950s.

4.5.2 Age Distribution

As a group, the elderly are more likely than the general population to lack the physical and economic resources to respond to hazard events and are more likely to suffer health-related consequences. They are more likely to be vision, hearing, and/or mobility impaired, and more likely to experience mental impairment. The elderly are more likely to live in assisted-living facilities where emergency preparedness occurs at the discretion of facility operators. These facilities are typically identified as "critical facilities" by emergency managers, and they require extra notice to implement evacuation. Elderly residents living in their own homes may have more difficulty evacuating and could be stranded in hazard events. This population is more likely to need medical attention, which may not be readily available during natural disasters due to isolation caused by the event. Specific planning attention for the elderly is an important consideration given the current aging of the American population.

Children are vulnerable to disaster events because of their young age and dependence on others for basic necessities. Very young children may additionally be vulnerable to injury or sickness; this vulnerability can be worsened during a natural disaster because they may not understand the measures that need to be taken to protect themselves from hazards.

The age distribution for the planning area is shown in Figure 4-6. Based on U.S. Census estimates, 12.1 percent of the county's population is 65 or older and 21.6 percent is 14 or younger (U.S. Census Bureau, 2015).

Source: Washington OFM, 2012

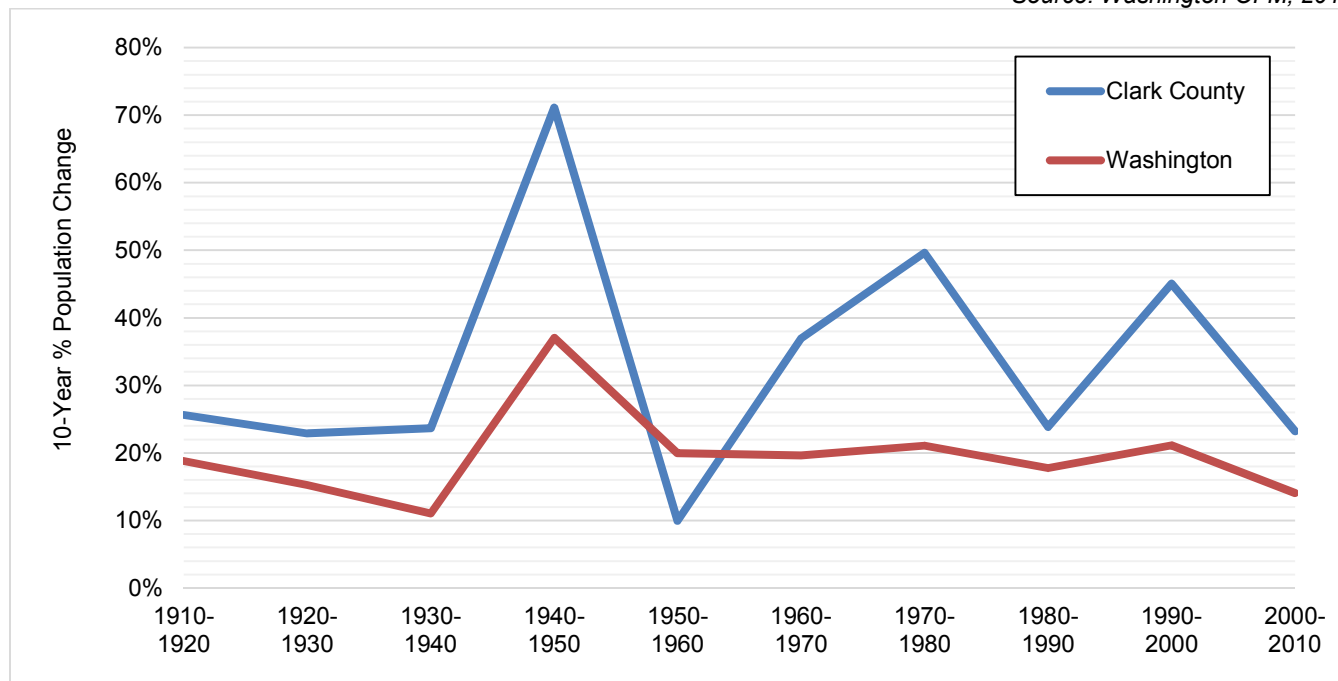


Figure 4-5. Washington and Clark County Population Growth

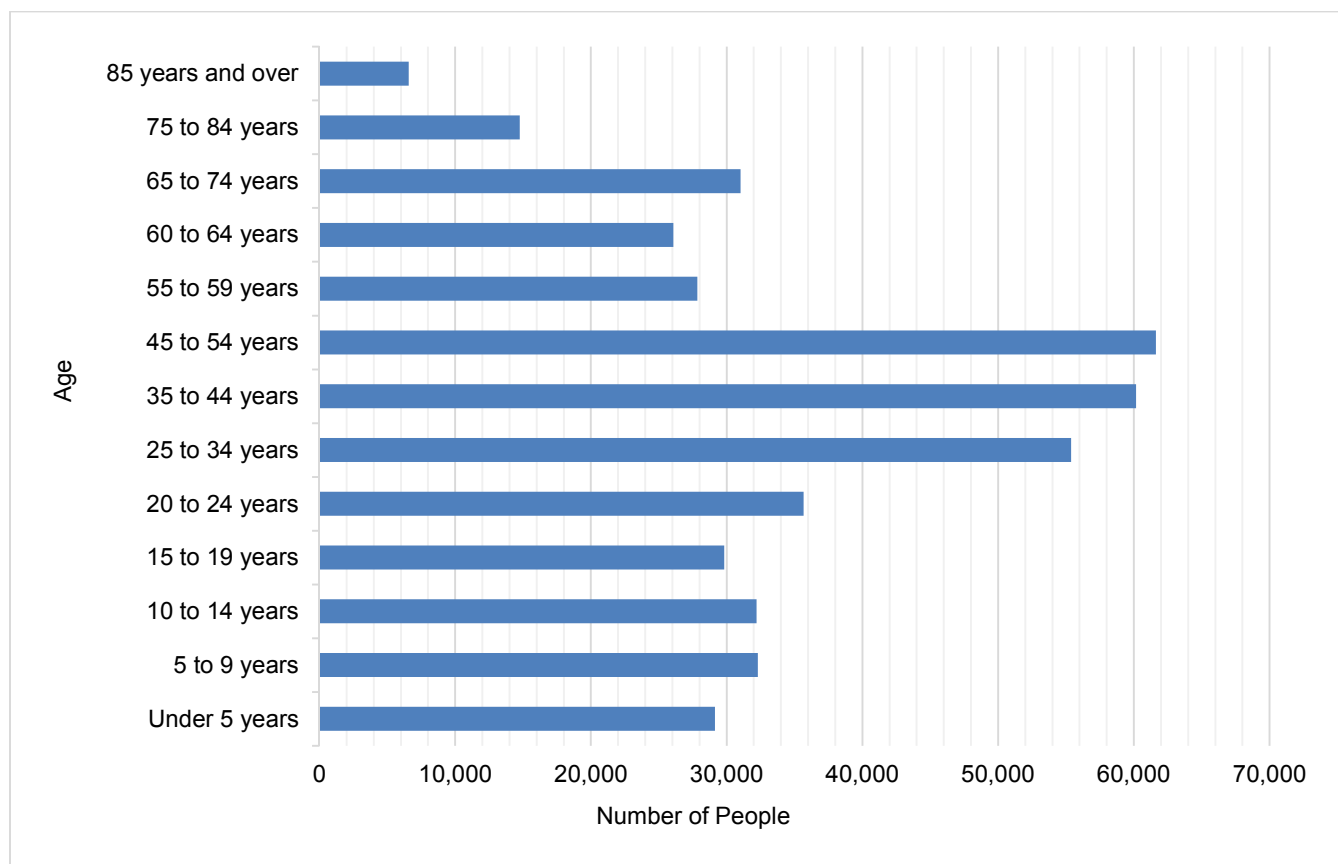


Figure 4-6. Planning Area Age Distribution

4.5.3 Race, Ethnicity and Language

Research shows that minorities are less likely to be involved in pre-disaster planning and experience higher mortality rates during a disaster event. Post-disaster recovery can be ineffective and is often characterized by cultural insensitivity. Higher proportions of ethnic minorities live below the poverty line than the majority white population, and poverty can compound vulnerability. According to the U.S. Census, the racial composition of the planning area is predominantly white, at 85.7 percent. The largest minority populations are Asian at 4.09 percent, “Two or More Races” at 4.12 percent, and “Some Other Race” at 2.67 percent. Figure 4-7 shows the racial distribution in the planning area (U.S. Census Bureau, 2015).

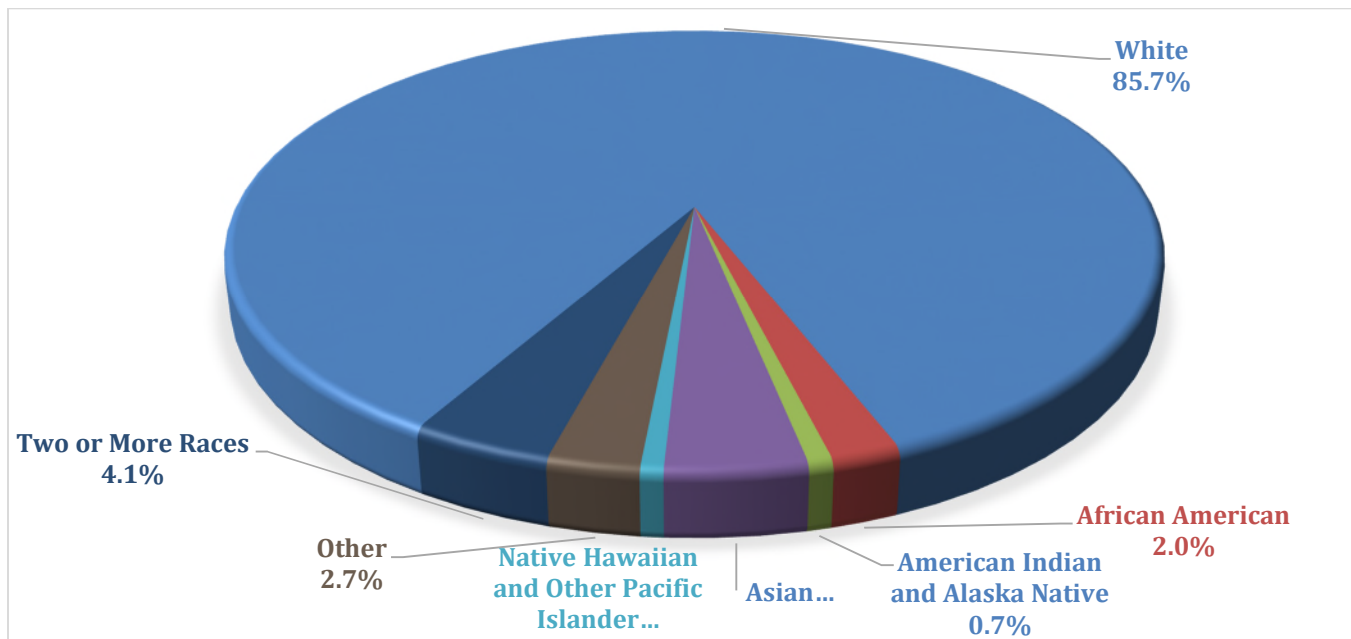


Figure 4-7. Planning Area Race Distribution

The planning area has a 9.95-percent foreign-born population. Other than English, the most commonly spoken languages in the planning area are Indo-European languages. The census estimates 6 percent of residents speak English “less than very well” (U.S. Census Bureau, 2015).

4.5.4 Persons with Disabilities or with Access and Functional Needs

Persons with disabilities or others with access and functional needs are more likely to have difficulty responding to a hazard event than the general population. Local government is the first level of response to assist these individuals, and coordination of efforts to meet their access and functional needs is paramount to life safety efforts. It is important for emergency managers to distinguish between functional and medical needs in order to plan for incidents that require evacuation and sheltering. Knowing the percentage of population with a disability will allow emergency management personnel and first responders to have personnel available who can provide services needed by those with access and functional needs.

According to U.S. Census estimates, 12.4 percent of the Clark County population has some form of disability, including 37.1 percent of those 65 and older (U.S. Census Bureau, 2015).

4.6 ECONOMY

The economy of Clark County is significantly affected by its location within the Portland Metropolitan Area. One-third of the county's labor force—over 50,000 workers—commutes to Portland on a daily basis; only 11,000 commute in the opposite direction. The lack of a sales tax in Oregon has led to significant leakage of retail sales in Clark County, lowering both retail investment and tax revenues for local governments (Washington ESD, 2014).

4.6.1 Income

In the United States, individual households are expected to use private resources to prepare for, respond to and recover from disasters to some extent. This means that households living in poverty are automatically disadvantaged when confronting hazards. Additionally, the poor typically occupy more poorly built and inadequately maintained housing. Mobile or modular homes, for example, are more susceptible to damage in earthquakes and floods than other types of housing. In urban areas, the poor often live in older houses and apartment complexes, which are more likely to be made of un-reinforced masonry, a building type that is particularly susceptible to damage during earthquakes. Furthermore, residents below the poverty level are less likely to have insurance to compensate for losses incurred from natural disasters. This means that residents below the poverty level have a great deal to lose during an event and are the least prepared to deal with potential losses. Personal household economics significantly impact people's decisions on evacuation. Individuals who cannot afford gas for their cars will likely decide not to evacuate.

Based on U.S. Census Bureau American Community Survey estimates, per capita income in Clark County in 2013 was \$27,681, and the median household income was \$58,225. It is estimated that 22.9 percent of households receive an annual income of \$100,000 or more. An estimated 17.8 percent of households in the county made less than \$25,000 per year in 2013, and 9.1 percent of families had incomes below the poverty level. The Census Bureau estimates that 26.1 percent of the population under age 18 and 7.6 percent of the population 65 or older lives in a household with income below the poverty line (U.S. Census Bureau, 2015).

4.6.2 Industry, Businesses and Institutions

Major industry sectors in Clark County include healthcare and social assistance (21,700 jobs in 2013), retail trade (15,800 jobs), leisure and hospitality (13,100 jobs) and manufacturing (12,900 jobs). In addition, government employed 23,700, half of which were in public education (Washington ESD, 2014). Figure 4-8 shows the U.S. Census Bureau breakdown of industry types in Clark County (U.S. Census Bureau, 2015).

4.6.3 Employment Trends and Occupations

Over the past 20 years, Clark County nonfarm employment has grown more than twice as fast as the nation's and much faster than the state's. Pre-recession employment peaked in November 2007. Employment hit bottom in February 2010, when the county had lost 6 percent of its jobs. Unemployment during the recession was exacerbated by higher than average job losses for county residents working in Portland. The recovery was slow in 2011 and 2012, but job growth began accelerating in mid-2013 and has been rapid since then (Washington ESD, 2014).

Clark County's unemployment rate was lower than state and national averages during the 1990s; however, it has been higher than state and national averages since 2000. Figure 4-9 compares Washington and Clark County unemployment trends from 2000 through 2014. In the past 15 years, the county unemployment rate was lowest in 2007, at 5.6 percent. It then rose to 14.0 percent in 2010, and has gradually decreased since then. According to the 2013 American Community Survey, 64.6 percent of Clark County's population age 16 and older is in the labor force (U.S. Census Bureau, 2015).

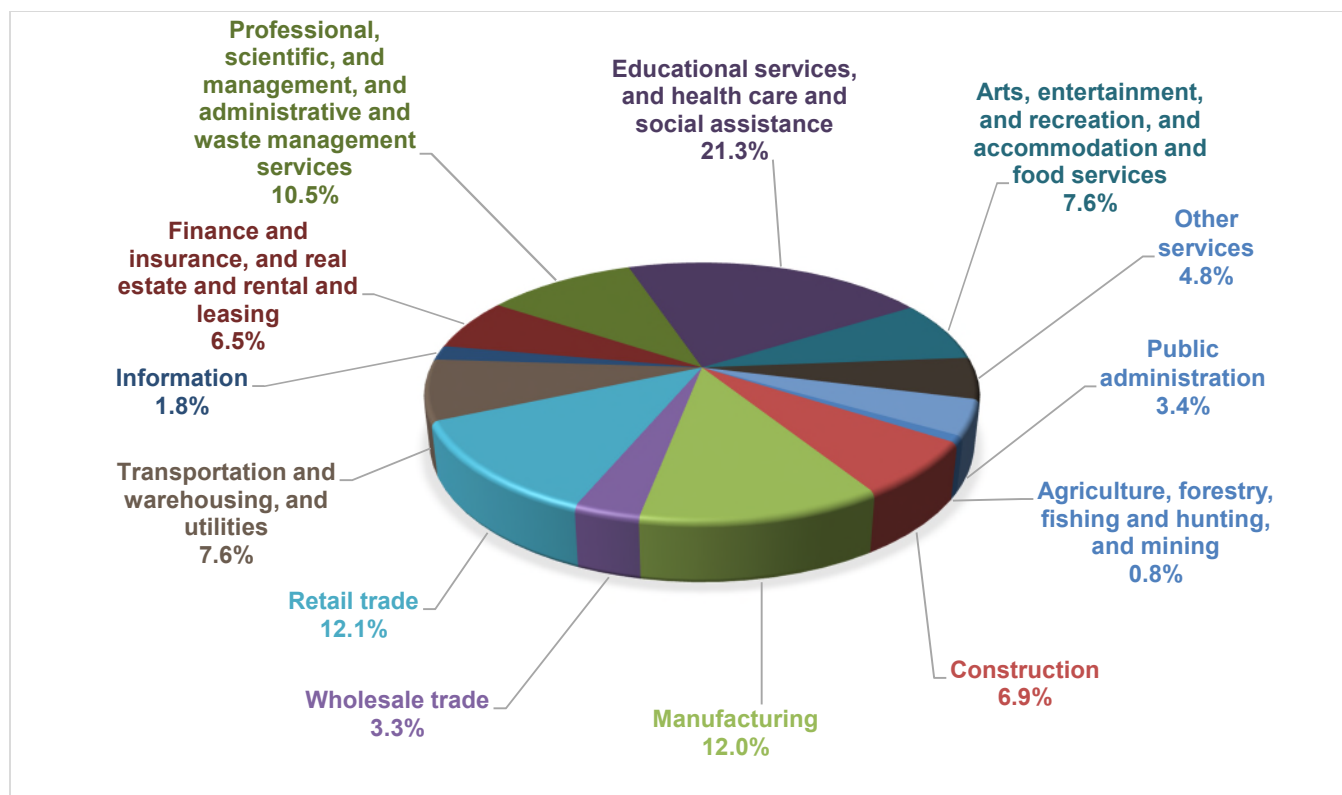


Figure 4-8. Industry in the Planning Area

Source: Washington ESD, 2015

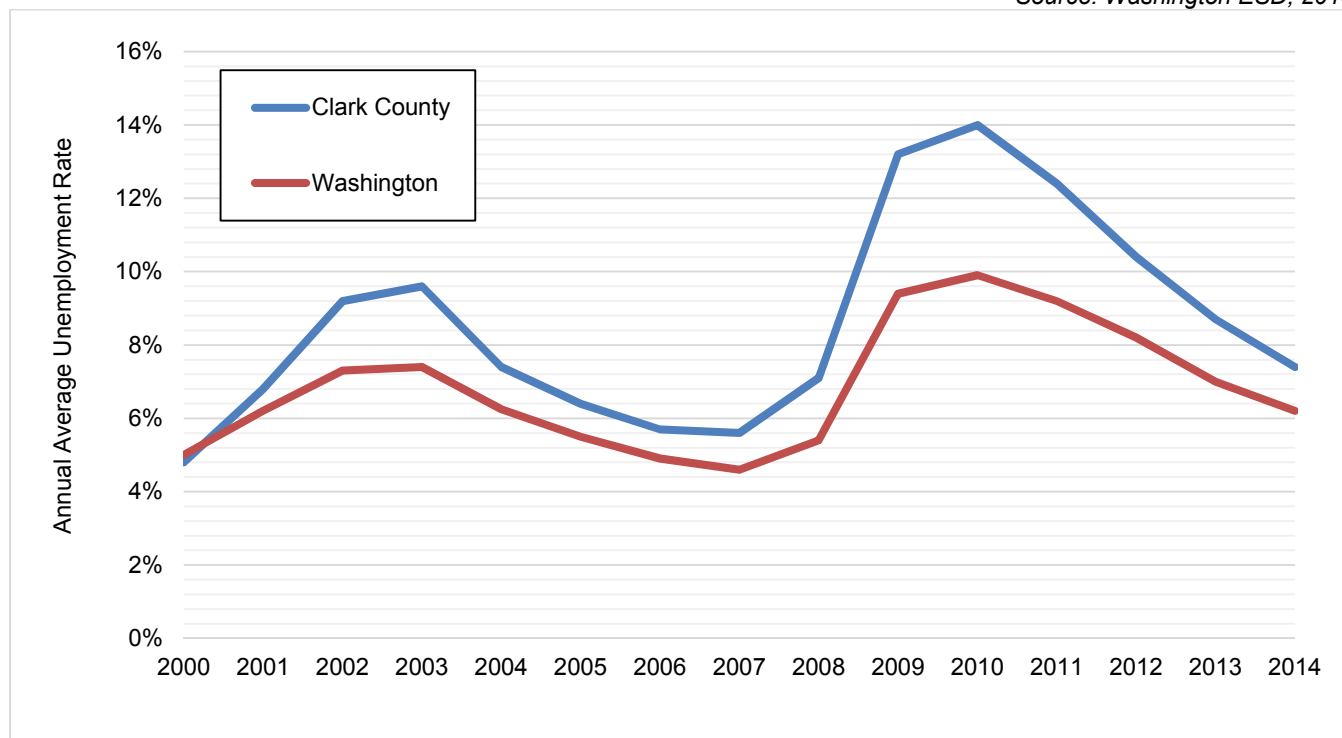


Figure 4-9. Clark County and Washington State Unemployment Rate

Over one-third of employed workers in Clark County (34.8 percent) are in management, business science and arts occupations. Another 24.4 percent have sales and office jobs, and 17.7 percent are in service occupations (see Figure 4-10) (U.S. Census Bureau, 2015).

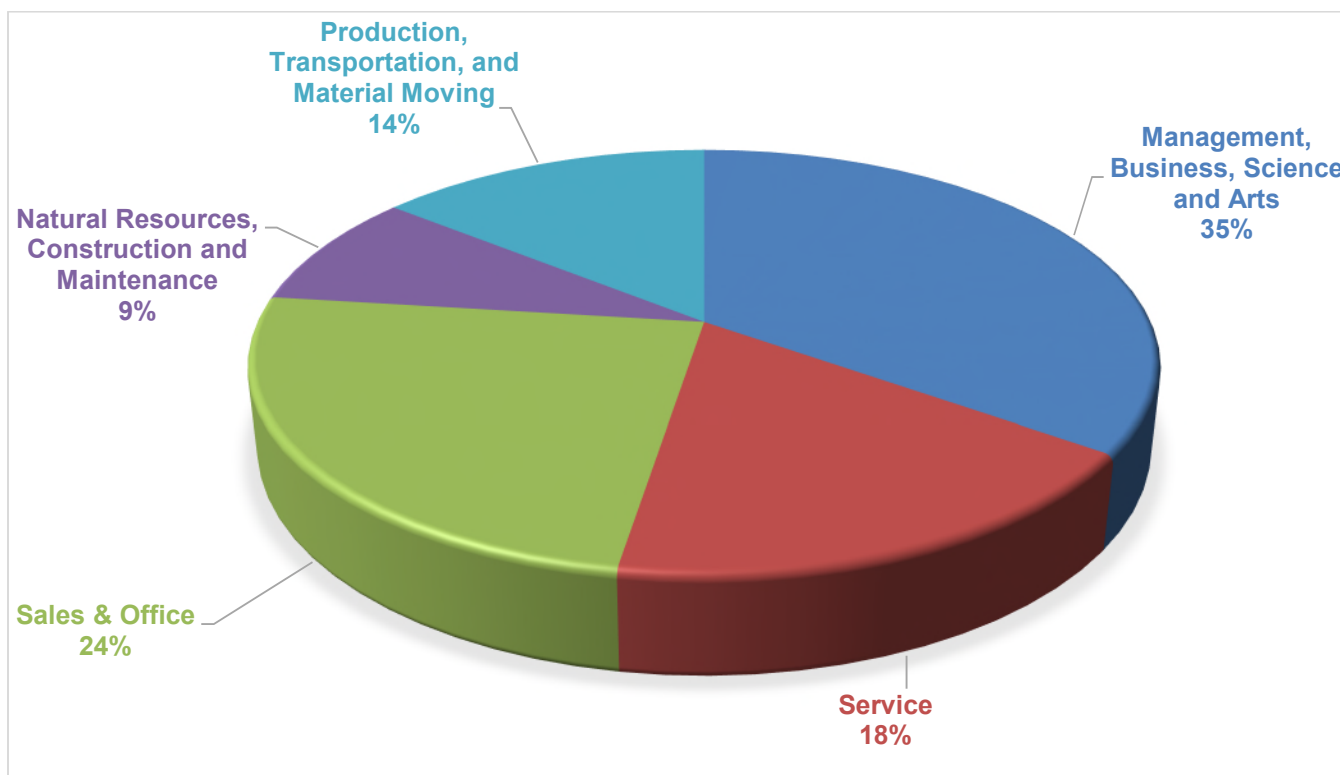


Figure 4-10. Occupations in the Planning Area

The largest employer in Clark County is PeaceHealth (4,374 full time equivalent employees as of 2015), followed by the Bonneville Power Administration (2,946 employees in 2015), and Evergreen Public Schools (2,764 employees as of 2015). Other large employers in the county are Vancouver Public Schools, Fred Meyer Stores, Clark County Government, Battle Ground Public Schools, Legacy Salmon Creek Medical Center, the Vancouver Clinic Inc., and WaferTech LLC (Vancouver Business Journal, 2015).

The U.S. Census estimates that 79.3 percent of Clark County workers commute alone to work (by car, truck or van), and mean travel time to work is 24.9 minutes (U.S. Census Bureau, 2015).

4.7 LAWS, ORDINANCES AND PROGRAMS

Existing laws, ordinances and plans at the federal, state and local level can support or impact hazard mitigation actions identified in this plan. Hazard mitigation planning must include review and incorporation, if appropriate, of existing plans, studies, reports and technical information (44 CFR, Section 201.6(b)(3)). This section provides a review of laws, ordinances and programs in effect within the planning area that can affect hazard mitigation actions. Goals, objectives, policies and actions identified in these programs were reviewed during the development of this plan and used to inform the development of the mitigation strategy. Each planning partner conducted an assessment of its regulatory, technical and financial capabilities to implement hazard mitigation actions (see Volume 2). These jurisdiction-specific capabilities were also used to inform the development of each planning partner's mitigation strategy.

During emergency situations, some Federal, State and Local laws and programs may have emergency protocols that go into effect to waive or expedite certain requirements or procedures. These modifications are limited in scope and duration and all mitigation and recovery projects should be planned for and implemented in ways that they meet all federal, state and local laws.

4.7.1 Federal

Disaster Mitigation Act

The DMA is the current federal legislation addressing hazard mitigation planning. It emphasizes planning for disasters before they occur. It specifically addresses planning at the local level, requiring plans to be in place before Hazard Mitigation Grant Program funds are available to communities. This plan is designed to meet the requirements of DMA, improving the planning partners' eligibility for future hazard mitigation funds.

Endangered Species Act

The federal Endangered Species Act (ESA) was enacted in 1973 to conserve species facing depletion or extinction and the ecosystems that support them. The act sets forth a process for determining which species are threatened and endangered and requires the conservation of the critical habitat in which those species live. The ESA provides broad protection for species of fish, wildlife and plants that are listed as threatened or endangered. Provisions are made for listing species, as well as for recovery plans and the designation of critical habitat for listed species. The ESA outlines procedures for federal agencies to follow when taking actions that may jeopardize listed species and contains exceptions and exemptions. It is the enabling legislation for the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Criminal and civil penalties are provided for violations of the ESA and the Convention.

Federal agencies must seek to conserve endangered and threatened species and use their authorities in furtherance of the ESA's purposes. The ESA defines three fundamental terms:

- Endangered means that a species of fish, animal or plant is "in danger of extinction throughout all or a significant portion of its range." (For salmon and other vertebrate species, this may include subspecies and distinct population segments.)
- Threatened means that a species "is likely to become endangered within the foreseeable future." Regulations may be less restrictive for threatened species than for endangered species.
- Critical habitat means "specific geographical areas that are...essential for the conservation and management of a listed species, whether occupied by the species or not."

Five sections of the ESA are of critical importance to understanding it:

- **Section 4: Listing of a Species**—The National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) is responsible for listing marine species; the U.S. Fish and Wildlife Service is responsible for listing terrestrial and freshwater aquatic species. The agencies may initiate reviews for listings, or members of the public may petition for them. A listing must be made "solely on the basis of the best scientific and commercial data available." After a listing has been proposed, agencies receive comment and conduct further scientific reviews for 12 to 18 months, after which they must decide if the listing is warranted. Economic impacts cannot be considered in this decision, but it may include an evaluation of the adequacy of local and state protections. Critical habitat for the species may be designated at the time of listing.
- **Section 7: Consultation**—Federal agencies must ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed or proposed species or adversely modify its critical habitat. This includes private and public actions that require a federal permit. Once a final listing

is made, non-federal actions are subject to the same review, termed a “consultation.” If the listing agency finds that an action will “take” a species, it must propose mitigations or “reasonable and prudent” alternatives to the action; if the proponent rejects these, the action cannot proceed.

- **Section 9: Prohibition of Take**—It is unlawful to “take” an endangered species, including killing or injuring it or modifying its habitat in a way that interferes with essential behavioral patterns, including breeding, feeding or sheltering.
- **Section 10: Permitted Take**—Through voluntary agreements with the federal government that provide protections to an endangered species, a non-federal applicant may commit a take that would otherwise be prohibited as long as it is incidental to an otherwise lawful activity (such as developing land or building a road). These agreements often take the form of a “Habitat Conservation Plan.”
- **Section 11: Citizen Lawsuits**—Civil actions initiated by any citizen can require the listing agency to enforce the ESA’s prohibition of taking or to meet the requirements of the consultation process.

With the listing of salmon and trout species as threatened or endangered, the ESA has impacted most of the Pacific coast states. Some areas have been more impacted by the ESA than others due to the known presence of listed species, but the entire region is impacted by mandates, programs and policies based on the presumption of the presence of listed species. Most West Coast jurisdictions must now take into account the impact of their programs on habitat. According to the Municipal Research Services Center, “Recent court decisions and federal administrative actions connected to the U.S. Endangered Species Act (ESA) have required 122 units of local and tribal governments in the Puget Sound region in Washington State to make changes in how they administer the National Flood Insurance Program (NFIP). This is an ongoing process due to pending litigation and the complexities of determining the needed changes. Although presently limited to the Puget Sound region, future lawsuits or decisions by FEMA may extend the geographic area covered to more areas in Washington.” (MRSC, 2016).

According to the U.S. Fish and Wildlife Service, there are a number of threatened or endangered species thought to occur in Clark County, including bull trout, chum, chinook, coho and steelhead. Clark County has established a variety of regulations to protect these species including: development codes; habitat protection; enhancement programs; and education and outreach (Clark County Environmental Services, 2016).

Federally funded projects, such as those awarded pre-disaster mitigation or flood mitigation assistance grants, cannot jeopardize the continued existence of endangered or threatened species or adversely modify critical habitat (FEMA, 2015a).

Clean Water Act

The federal Clean Water Act (CWA) employs regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation’s surface waters so that they can support “the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water.”

Evolution of CWA programs over the last decade has included a shift from a program-by-program, source-by-source, pollutant-by-pollutant approach to more holistic watershed-based strategies. Under the watershed approach, equal emphasis is placed on protecting healthy waters and restoring impaired ones. A full array of issues are addressed, not just those subject to CWA regulatory authority. Involvement of stakeholder groups in the development and implementation of strategies for achieving and maintaining water quality and other environmental goals is a hallmark of this approach.

The CWA is important to hazard mitigation in several ways. There are often permitting requirements for any construction within 200 feet of water of the United States, which may have implications for mitigation projects

identified by a local jurisdiction. Additionally, CWA requirements apply to wetlands, which serve important functions related to preserving and protecting the natural and beneficial functions of floodplains and are linked with a community's floodplain management program. Finally, the National Pollutant Discharge Elimination System is part of the CWA and addresses local stormwater management programs. Stormwater management plays a critical role in hazard mitigation by addressing urban drainage or localized flooding issues within jurisdictions. In Washington State, the Department of Ecology develops and administers National Pollutant Discharge Elimination System municipal stormwater permits.

National Flood Insurance Program

The National Flood Insurance Program provides federally backed flood insurance in exchange for communities enacting floodplain regulations. Participation in the NFIP is voluntary; however, participation and good standing under NFIP are prerequisites to grant funding eligibility under the Robert T. Stafford Act. The County and most of the partner cities for this plan participate in the NFIP and have adopted regulations that meet the NFIP requirements.

National Incident Management System

The National Incident Management System (NIMS) is a systematic approach for government, nongovernmental organizations, and the private sector to work together to manage incidents involving hazards. The NIMS provides a flexible but standardized set of incident management practices. Incidents typically begin and end locally, and they are managed at the lowest possible geographical, organizational, and jurisdictional level. In some cases, success depends on the involvement of multiple jurisdictions, levels of government, functional agencies, and emergency responder disciplines. These cases necessitate coordination across a spectrum of organizations. Communities using NIMS follow a comprehensive national approach that improves the effectiveness of emergency management and response personnel across the full spectrum of potential hazards (including natural hazards, terrorist activities, and other human-caused disasters) regardless of size or complexity. Although participation is voluntary, Federal departments and agencies are required to make adoption of NIMS by local and state jurisdictions a condition to receive Federal Preparedness grants and awards (Washington Emergency Management Division, 2016).

Americans with Disabilities Act and Amendments

The Americans with Disabilities Act (ADA) seeks to prevent discrimination against people with disabilities in employment, transportation, public accommodation, communications, and government activities. Title II of the ADA deals with compliance with the Act in emergency management and disaster-related programs, services, and activities. It applies to state and local governments as well as third parties, including religious entities and private nonprofit organizations.

The ADA has implications for sheltering requirements and public notifications. During an emergency alert, officials must use a combination of warning methods to ensure that all residents have all necessary information. Those with hearing impairments may not hear radio, television, sirens, or other audible alerts, while those with visual impairments may not see flashing lights or visual alerts. Two technical documents issued for shelter operators address physical accessibility needs of people with disabilities as well as medical needs and service animals.

The ADA intersects with disaster preparedness programs in regards to transportation, social services, temporary housing, and rebuilding. Persons with disabilities may require additional assistance in evacuation and transit (e.g., vehicles with wheelchair lifts or paratransit buses). Evacuation and other response plans should address the unique needs of residents. Local governments may be interested in implementing a special-needs registry to identify the home addresses, contact information, and needs for residents who may require more assistance.

Civil Rights Act of 1964

The Civil Rights Act of 1964 prohibits discrimination based on race, color, religion, sex or nation origin and requires equal access to public places and employment. The Act is relevant to emergency management and hazard mitigation in that it prohibits local governments from favoring the needs of one population group over another. Local government and emergency response must ensure the continued safety and well-being of all residents equally, to the extent possible.

Rural Development Program

The mission of the U.S. Department of Agriculture (USDA) Rural Development Program is to help improve the economy and quality of life in rural America. The program provides project financing and technical assistance to help rural communities provide the infrastructure needed by rural businesses, community facilities, and households. The program addresses rural America's need for basic services, such as clean running water, sewage and waste disposal, electricity, and modern telecommunications and broadband. Loans and competitive grants are offered for various community and economic development projects and programs, such as the development of essential community facilities including fire stations (USDA, 2015b).

Community Development Block Grant Disaster Resilience Program

In response to disasters, Congress may appropriate additional funding for the Community Development Block Grant programs as Disaster Recovery grants (CDBG-DR) to rebuild the affected areas and provide crucial seed money to start the recovery process. Since CDBG-DR assistance may fund a broad range of recovery activities, The U.S. Department of Housing and Urban Development can help communities and neighborhoods that otherwise might not recover due to limited resources. CDBG-DR grants often supplement disaster programs of the Federal Emergency Management Agency, the Small Business Administration, and the U.S. Army Corps of Engineers. Housing and Urban Development generally awards noncompetitive, nonrecurring CDBG-DR grants by a formula that considers disaster recovery needs unmet by other Federal disaster assistance programs. CDBG-DR monies must be used to: address a disaster-related impact (direct or indirect) in a presidentially declared county for the covered disaster; be a CDBG eligible activity (according to regulations and waivers); and meet a national objective. Incorporating preparedness and mitigation into these actions is encouraged as the goal is to rebuild in ways that are safer and stronger.

Emergency Watershed Program

The USDA Natural Resources Conservation Service (NRCS) administers the Emergency Watershed Protection (EWP) Program, which responds to emergencies created by natural disasters. Eligibility for assistance is not dependent on a national emergency declaration. The program is designed to help people and conserve natural resources by relieving imminent hazards to life and property caused by floods, fires, wind-storms, and other natural occurrences. EWP is an emergency recovery program.

EWP eligible activities include providing financial and technical assistance to:

- Remove debris from stream channels, road culverts, and bridges
- Reshape and protect eroded banks
- Correct damaged drainage facilities
- Establish cover on critically eroding lands
- Repair levees and structures
- Repair conservation practices (National Resources Conservation Service, 2016).

Presidential Executive Orders 11988 and 13690

Executive Order 11988 requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities" for the following actions:

- Acquiring, managing, and disposing of federal lands and facilities
- Providing federally-undertaken, financed, or assisted construction and improvements
- Conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities (FEMA, 2015e).

Executive Order 13690 amends and expands Executive Order 11988 acknowledges that the impacts of flooding are anticipated to increase over time due to the effects of climate change and other threats and mandates a Federal Flood Risk Management Standard, which is a flexible framework to increase resilience against flooding and help preserve the natural values of floodplains. This standard expands management of flood issues from the current base flood level to a higher vertical elevation and corresponding horizontal floodplain to address current and future flood risk and ensure that projects funded with taxpayer dollars last as long as intended (Office of the Press Secretary, 2015).

Presidential Executive Orders 11990

Executive Order 11990 requires federal agencies to provide leadership and take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands in carrying out the agency's responsibilities for (1) acquiring, managing, and disposing of Federal lands and facilities; and (2) providing Federally undertaken, financed, or assisted construction and improvements; and (3) conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities (National Archives, 2016).

Emergency Relief for Federally Owned Roads Program

The U.S. Forest Service's Emergency Relief for Federally Owned Roads Program was established to assist federal agencies with repair or reconstruction of tribal transportation facilities, federal lands transportation facilities, and other federally owned roads that are open to public travel and have suffered serious damage by a natural disaster over a wide area or by a catastrophic failure. The program funds both emergency and permanent repairs (Office of Federal Lands Highway, 2016).

4.7.2 State

Washington State Enhanced Mitigation Plan

The 2013 Washington State Enhanced Hazard Mitigation Plan provides guidance for hazard mitigation throughout Washington (Washington Emergency Management Division, 2014). The plan identifies hazard mitigation goals, objectives, actions and initiatives for state government to reduce injury and damage from natural hazards. By meeting federal requirements for an enhanced state plan (44 CFR parts 201.4 and 201.5), the plan allows the state to seek significantly higher funding from the Hazard Mitigation Grant Program following presidential declared disasters (20 percent of federal disaster expenditures vs. 15 percent with a standard plan).

The *Clark Regional Natural Hazard Mitigation Plan* must be consistent with the Washington State Plan. One major example of this is that the Clark County plan must, at a minimum, address those hazards identified as impacting Clark County in the State Plan.

Growth Management Act

The 1990 Washington State Growth Management Act (Revised Code of Washington (RCW) Chapter 36.70A) mandates that local jurisdictions adopt land use ordinances protect the following critical areas:

- Wetlands
- Critical aquifer recharge areas
- Fish and wildlife habitat conservation areas
- Frequently flooded areas
- Geologically hazardous areas.

The Growth Management Act regulates development in these areas, and therefore has the potential to affect hazard vulnerability and exposure at the local level.

Planning for natural hazards is an integral element of Washington’s statewide land use planning program under the Growth Management Act. Other related parts of the planning framework include the Shoreline Master Program rules and guidelines, which now provide for the integration of master programs and comprehensive plans. Natural Hazard Mitigation Elements are an optional element under the Growth Management Act. The continuing challenge faced by local officials and state government is to keep a network of coordinated local plans effective in responding to changing conditions and needs of communities. This is particularly true in the case of planning for natural and technological hazards, where communities must balance development pressures with detailed information on the nature and extent of hazards. Washington’s land use program has given its communities and residents a unique opportunity to ensure that natural and technological hazards are addressed in the development and implementation of local comprehensive plans.

Shoreline Management Act

The 1971 Shoreline Management Act (RCW 90.58) was enacted to manage and protect the shorelines of the state by regulating development in the shoreline area. A major goal of the act is to prevent the “inherent harm in an uncoordinated and piecemeal development of the state’s shorelines.” Its jurisdiction includes the Pacific Ocean shoreline and the shorelines of Puget Sound, the Strait of Juan de Fuca, and rivers, streams and lakes above a certain size. It also regulates wetlands associated with these shorelines.

Shoreline management activities “implement policies and regulations to help protect water quality for our marine waters, lakes and stream systems; increase protection of lives and property from flood and landslide damage; protect critical habitat as well as fish and wildlife; promote recreational opportunities in shoreline areas.” Often these policies and programs complement or are critical in mitigation programs for communities. Shoreline management programs are local capabilities relevant to mitigation activities.

Washington State Building Code

The Washington State Building Code Council has adopted the 2015 editions of national model codes, with some amendments. The Council also adopted changes to the Washington State Energy Code and Ventilation and Indoor Air Quality Code. Washington’s state-developed codes are mandatory statewide for residential and commercial buildings. The 2015 codes went into effect as the Washington model code on July 1, 2016.

The adoption and enforcement of appropriate building codes is a significant component for hazard mitigation loss avoidance. Using the most up to date and relevant codes reduces risk and increases capability.

Comprehensive Emergency Management Planning

Washington’s Comprehensive Emergency Management Planning law (RCW 38.52) establishes parameters to ensure that preparations of the state will be adequate to deal with disasters, to ensure the administration of state and federal programs providing disaster relief to individuals, to ensure adequate support for search and rescue operations, to protect the public peace, health and safety, and to preserve the lives and property of the people of the state. It achieves the following:

- Provides for emergency management by the state, and authorizes the creation of local organizations for emergency management in political subdivisions of the state.
- Confers emergency powers upon the governor and upon the executive heads of political subdivisions of the state.
- Provides for the rendering of mutual aid among political subdivisions of the state and with other states and for cooperation with the federal government with respect to the carrying out of emergency management functions.
- Provides a means of compensating emergency management workers who may suffer any injury or death, who suffer economic harm including personal property damage or loss, or who incur expenses for transportation, telephone or other methods of communication, and the use of personal supplies as a result of participation in emergency management activities.
- Provides programs, with intergovernmental cooperation, to educate and train the public to be prepared for emergencies.

It is policy under this law that emergency management functions of the state and its political subdivisions be coordinated to the maximum extent with comparable functions of the federal government and agencies of other states and localities, and of private agencies of every type, to the end that the most effective preparation and use may be made of manpower, resources, and facilities for dealing with disasters.

Washington Administrative Code 118-30-060(1)

Washington Administrative Code (WAC) 118-30-060 (1) requires each political subdivision to base its comprehensive emergency management plan on a hazard analysis, and makes the following definitions related to hazards:

- Hazards are conditions that can threaten human life as the result of three main factors:
 - Natural conditions, such as weather and seismic activity
 - Human interference with natural processes, such as a levee that displaces the natural flow of floodwaters
 - Human activity and its products, such as homes on a floodplain.
- The definitions for hazard, hazard event, hazard identification, and flood hazard include related concepts:
 - A hazard may be connected to human activity.
 - Hazards are extreme events.

Hazards generally pose a risk of damage, loss, or harm to people and/or their property

Washington State Floodplain Management Law

Washington’s floodplain management law (RCW 86.16, implemented through WAC 173-158) states that prevention of flood damage is a matter of statewide public concern and places regulatory control with the Department of Ecology. RCW 86.16 is cited in floodplain management literature, including FEMA’s national

assessment, as one of the first and strongest in the nation. A major challenge to the law in 1978, *Maple Leaf Investors v. Ecology*, is cited in legal references to floodplain management issues. The court upheld the law, declaring that denial of a permit to build residential structures in the floodway is a valid exercise of police power and did not constitute a taking. RCW Chapter 86.12 (Flood Control by Counties) authorizes county governments to levy taxes, condemn properties and undertake flood control activities directed toward a public purpose.

This provision also task Counties to develop comprehensive flood control management plans. Following adoption by the county, city, or town, a comprehensive flood control management plan shall be binding on each jurisdiction and special district that is located within an area included in the plan. If within one hundred twenty days of the county's adoption, a city or town does not adopt the comprehensive flood control management plan, the city or county shall request arbitration on the issue or issues in dispute. If parties cannot agree to the selection of an arbitrator, the arbitrator shall be selected according to the process described in *RCW 7.04.050.

Washington State/Ecology Grant Sources

Washington's first flood control maintenance program was passed in 1951, and was called the Flood Control Maintenance Program. In 1984, the state Legislature established the Flood Control Assistance Account Program (FCAAP) (RCW 86.26; State Participation in Flood Control Maintenance) to assist local jurisdictions in comprehensive planning and flood control maintenance efforts. FCAAP rules are found in WAC 173-145. This is one of very few state programs in the country that provides grant funding to local governments for flood plain management planning and implementation actions. The account is funded at \$4 million per state biennium, unless modified by the state legislature. Projects include comprehensive flood hazard management planning, maintenance projects, feasibility studies, purchase of flood prone properties, match for federal projects, and emergency projects. FCAAP grants for non-emergency projects may not exceed \$500,000 per county. However, applications are not currently being accepted for this program due to funding cuts, with the exception of emergency projects.

Floodplains by Design (FbD) is an emerging partnership of local, state, federal and private organizations focused on coordinating investment in and strengthening the integrated management of floodplain areas through Washington State. In 2013, the Washington State Legislature authorized \$44 million in new funding for integrated projects consistent with Floodplains by Design; and a similar level of funding was also authorized in the 2015-17 Biennium. The Washington State Department of Ecology's Floods and Floodplain Management Division administers the Floodplains by Design grant program under a biennial funding cycle. Ecology awards grants on a competitive basis to eligible entities for collaborative and innovative projects throughout Washington State that support the integration of flood hazard reduction with ecological preservation and restoration. Proposed projects may also address other community needs, such as preservation of agriculture, improvements in water quality, or increased recreational opportunities provided they are part of a larger strategy to restore ecological functions and reduce flood hazards.

Washington Silver Jackets

The Washington Silver Jackets team was formed in 2010 and is a mix of Federal and State agencies that work together to address state flood risk priorities in the State. Federal agencies include the U.S. Army Corps of Engineers Seattle District, which facilitates coordination within the group, and individuals from FEMA, NOAA, and USGS. Participating state agencies include the Department of Ecology, Emergency Management Division, and Department of Transportation. The team has been awarded three interagency projects over the last three years. Each project and routine coordination and communication between Silver Jackets agencies is intended to address state needs and ultimately improve flood risk management throughout the full flood life cycle (Silver Jackets, 2016).

Land and Water Conservation Fund

The Land and Water Conservation Fund provides funding to preserve and develop outdoor recreation resources, including parks, trails, and wildlife lands. Congress established the fund in 1965 with the passage of the Land and Water Conservation Fund Act that authorizes the Secretary of the Interior to provide financial assistance to the states for the acquisition and development of public outdoor recreation areas. Funding comes from a portion of federal revenue from selling and leasing off-shore oil and gas resources. Eligible projects include land acquisition and development or renovation projects, such as natural areas and open space. The Washington State Recreation and Conservation Office administers the program (Washington State Recreation and Conservation Office, 2016a).

Salmon Recovery Fund

In 1999, the Washington State Legislature created the Salmon Recovery Funding Board. The board provides grants to protect or restore salmon habitat and assist related activities. Funded projects may include activities that protect existing, high quality habitats for salmon, and that restore degraded habitat to increase overall habitat health and biological productivity; undertake feasibility assessments to determine future projects and for other salmon related activities. Projects may include the actual habitat used by salmon and the land and water that support ecosystem functions and processes important to salmon (Washington State Recreation and Conservation Office, 2016b).

State Environmental Policy Act

The State Environmental Policy Act (SEPA) provides a way to identify possible environmental impacts that may result from governmental decisions. These decisions may be related to issuing permits for private projects, constructing public facilities, or adopting regulations, policies, or plans. Information provided during the SEPA review process helps agency decision-makers, applicants, and the public understand how a proposal will affect the environment. This information can be used to change a proposal to reduce likely impacts, or to condition or deny a proposal when adverse environmental impacts are identified. Actions identified in hazard mitigation plans are frequently subject to SEPA review requirements before implementation (Washington Department of Ecology, 2016b).

4.7.3 Local Programs

Each planning partner has prepared a jurisdiction-specific annex to this plan (see Volume 2). In preparing these annexes, each partner completed a capability assessment that looked at its regulatory, technical and financial capability to carry out proactive hazard mitigation. Refer to these annexes for a review of regulatory codes and ordinances applicable to each planning partner. This section provides an overview of programs in Clark County that can support or enhance the initiatives identified in this plan and apply countywide.

Clark County Comprehensive Plan Update

Clark County is in the process of updating its Comprehensive Growth Management Plan. The County has completed a draft Supplemental Environmental Impact Statement (DSEIS) for the plan (Clark County, 2015a) and is currently developing the update. The draft plan and other relevant documents will be made available as completed on the project website. The DSEIS assesses the impact of various growth management alternatives on potential hazard areas, including waterways, open spaces, liquefiable soils, landslide hazard areas, and wildlife habitat. The DSEIS evaluates how these areas may have changed since the last update in 2007.

The Land Use and Shoreline Use Elements of the County's comprehensive plan determine the general distribution, location and extent of land uses—agriculture, timber production, housing, commerce, industry, recreation, open spaces, public utilities, public facilities, and other uses, as well as transitions between rural and urban areas. These comprehensive plan elements include population densities, building intensities, and estimates

of future population growth inside and outside the UGAs. The Environmental Element of the comprehensive plan contains policies to protect shoreline and critical areas and to develop regulations addressing land use issues such as protection of groundwater, stormwater runoff, flooding, and drainage problems (Clark County, 2015a).

Hazard Impact and Vulnerability Analysis

In 2011, CRESA developed a guidance document to assess hazards and vulnerabilities for the County and its cities (not including Woodland). The analysis identified vulnerability to the following natural and technological hazards (CRESA, 2011):

- Flooding
- Windstorm and tornado
- Severe winter weather
- Earthquake
- Landslide
- Drought
- Chemical emergency
- Terrorism
- Transportation accidents
- Dam failure
- Volcano
- Wildfire.

Each hazard analysis includes a description of the hazard and its potential range of impact and history in the County.

Clark Regional Comprehensive Emergency Management Plan

CRESA prepared a plan in 2013 to identify how it, along with the seven incorporated cities in Clark County (not including Woodland) and partnering agencies, would prepare for, respond to, recover from, and mitigate against hazard events (CRESA, 2013). The plan consists of appendices that delineate authorities, responsibilities, and appropriate references, along with emergency support function and incident annexes, which primarily focus on manmade hazard events.

Region IV Public Health Emergency Response Plan

In 2013, the Counties of Clark, Cowlitz, Skamania, and Wahkiakum (Region IV Public Health) coordinated to develop a regional public health emergency response plan (Region IV Public Health, 2013). Under this plan, the four local health departments in southwest Washington (Clark County Public Health, Cowlitz County Health Department, Skamania County Community Health and Wahkiakum County Health & Human Services), together with the Cowlitz Indian Tribe, have combined efforts and resources to ensure adequate response capacity to events affecting single or multiple jurisdictions. The plan provides each department guidance in ensuring appropriate response according to state, federal, and tribal agency requirements.

Vacant Buildable Lands Model Maps and Data

Clark County uses its Vacant Buildable Lands Model (Clark County, 2015b) as a planning tool to analyze residential, commercial, and industrial lands in urban growth areas. The model is used to monitor growth patterns for comprehensive growth management plan updates and interim periods. It models residential and employment capacity for each urban growth area, based on underutilized and vacant properties. Reports and maps are available free of charge for the County and for its eight incorporated cities (including Woodland).

Hazard mitigation plans must describe current and future risk to the hazards of concern. The Vacant Buildable Lands Model allows for the analysis of areas where future development may occur that may overlap with identified risk areas.

Clark County Local Emergency Planning Committee

CRESA's Local Emergency Planning Committee works closely with the business community to form a safety net around the chemical industry in order to protect the general population from hazardous material incidents. The following committee activities demonstrate its ability to support County emergency management and preparedness initiatives (CRESA, 2015a):

- Clark County Hazardous Materials Response Plan maintenance
- Making chemical inventory information available to the public
- Industrial and transportation-related chemical hazard analysis
- Training and exercise development and coordination
- Public-private preparedness partnerships
- Public education on chemical hazard preparedness and response.

Clark County Volunteer Programs

CRESA promotes several volunteer response organizations to offer local residents a way to safely become involved in disaster management. These programs include the following (CRESA, 2015b):

- Clark Citizen Corps Council—Maintains the Community Emergency Response Teams, Medical Reserve Corps, American Red Cross, Neighbors on Watch, and Volunteer Connections
- Search and Rescue—Volunteers must belong to a recognized and qualified search and rescue team.
- Amateur Radio
- Trauma Intervention Program
- Emergency Operations Center Training and Volunteering.

5. HAZARDS OF CONCERN FOR RISK ASSESSMENT

Risk assessment is the process of measuring the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards. The DMA requires hazard mitigation planning to include risk assessment (44 CFR, Section 201.6(c)(2)). The risk assessment for the *Clark Regional Natural Hazard Mitigation Plan* evaluates all natural hazards that are prevalent in the defined planning area. The first step in the process was to identify which hazards to include in the assessment. This chapter describes the process of identifying these hazards of concern.

5.1 FOCUS ON NATURAL HAZARDS

Natural hazards are naturally occurring severe events that have the potential to result in the loss of life and property. Technological or human-caused hazards also have the potential to result in the loss of life and property, but originate from human activities. Federal hazard mitigation planning guidelines require risk assessment for all natural hazards of concern; risk assessment of non-natural hazards (technological and/or human-caused) is optional. The Steering Committee decided that this plan will focus on natural hazards of concern, based on several factors:

- The federal funding streams for which this plan creates eligibility are focused on natural hazards of concern.
- Clark County already has several plans and programs that address non-natural hazards of concern such as the Hazard Identification and Vulnerability Assessment (CRESA, 2011) and the Comprehensive Emergency Response Plan (CRESA, 2013).
- The expertise needed to identify and implement appropriate mitigation actions for non-natural hazards of concern differs from the expertise needed for assessing natural hazards. The Steering Committee was formed with an emphasis on knowledge of and experience with natural hazards.
- It is difficult to develop a relative ranking of the risk of natural and non-natural hazards because of differences between the two types of hazard in probabilities, consequences and spatial extent.

Clark County's 2004 hazard mitigation plan addressed two non-natural hazards: terrorism and hazardous materials release. Terrorism is not addressed in the 2016 plan update, but the potential for hazardous material releases is discussed for each natural hazard profile as a potential secondary impact.

5.2 IDENTIFIED HAZARDS OF CONCERN

The Steering Committee considered the full range of natural hazards that could impact the planning area and selected those that present the greatest concern. The process incorporated review of state and local hazard planning documents, as well as information on the frequency, magnitude and costs associated with hazards that have impacted or could impact the planning area. Anecdotal information regarding the perceived vulnerability of planning area assets to natural hazards was used as appropriate. Based on the review, this plan addresses the following hazards of concern (in alphabetical order; this listing does not indicate relative risk):

- Dam failure

- Drought
- Earthquake
- Flood
- Landslide
- Severe weather
- Volcano
- Wildfire

All natural hazards identified in the 2004 plan are included in the 2016 plan, and two hazards of concern were added:

- Dam failure—Although dams and the reservoirs behind them are human-constructed, the dam failure hazard shares many characteristics with natural hazards. Inundation resulting from a dam failure has a defined extent and results in damage similar to damage from natural flooding that can be modeled using existing software. Additionally, dam failure is considered to be a flooding hazard that should be addressed in plans seeking approval under the Community Rating System (see Section 10.1.3). The dam failure risk assessment for this plan focuses on impacts on people and property, not the impacts on dam operations.
- Drought—The 2013 Washington State Enhanced Hazard Mitigation Plan (Washington Emergency Management Division, 2014) identifies drought as a hazard of concern and the 2011 Clark County Hazard Identification and Vulnerability Assessment (CRESA, 2011) identifies drought as a moderate risk hazard.

5.3 OTHER HAZARDS NOT ASSESSED

In addition to the hazards of concern listed above, the 2013 Washington State Enhanced Hazard Mitigation Plan identifies avalanche and tsunami as hazards of concern in Washington. Clark County is not identified in the state plan as a jurisdiction vulnerable to either of these hazards. The state plan does not list any major transportation systems in the County as transportation routes threatened by avalanche.

6. RISK ASSESSMENT METHODOLOGY

6.1 OVERALL RISK ASSESSMENT APPROACH

The risk assessments in Chapter 7 through Chapter 14 describe the risks associated with each identified hazard of concern. Each chapter describes the hazard, the planning area's exposure and vulnerability, and probable event scenarios. The planning team reviewed existing studies, reports and technical information to determine the best available data to utilize in the risk assessment (44 CFR, Section 201.6(b)(3)). Information from these sources was incorporated into the hazard profiles and forms the basis of the exposure and vulnerability assessment (see Section 6.6). The following steps were used to define the risk of each hazard:

- Profile each hazard—The following information is given for each hazard:
 - Summary of past events
 - Geographic area most affected by the hazard
 - Event frequency estimates
 - Severity estimates
 - Warning time likely to be available for response
 - Secondary hazards associated with or resulting from the hazard of concern
 - Future trends that may impact risk, including future development and climate trends
 - Worst-case event scenario
 - Key issues related to mitigation of the hazard in the planning area.
- Determine exposure to each hazard—Exposure was determined by overlaying hazard maps with demographic information and an inventory of structures, facilities and systems to determine which of them would be exposed to each hazard. For each hazard of concern, the best available existing data was used to delineate the hazard area, based on scale, age and source. Data available in a GIS-compatible format with coverage of the full extent of the planning area was preferred when available.
- Assess the vulnerability of exposed facilities—Vulnerability of exposed structures and infrastructure was determined by interpreting the probability of occurrence of each event and assessing structures, facilities, and systems that are exposed to each hazard. FEMA's hazard-modeling program, Hazus-MH was used to perform this assessment for some hazards; GIS-based spatial analysis or qualitative assessments were used for others.

6.2 MAPPING

National, state and county databases were reviewed to locate spatially based data relevant to this planning effort. Maps were produced using GIS software to show the spatial extent and location of identified hazards when such data was available. These maps are included in the hazard profile chapters of this document and many of them are available on the CRESA Hazard Mitigation Plan Project website. Additionally, municipal planning partners have jurisdiction-scale maps included in their annexes in Volume 2 of this plan. Information on the data sources and methodologies used for hazard mapping is provided in Appendix E.

6.3 DAM FAILURE, EARTHQUAKE AND FLOOD

6.3.1 Overview of FEMA's Hazus-MH Software

- FEMA developed the Hazards U.S., or Hazus, model in 1997 to estimate losses caused by earthquakes and identify areas that face the highest risk and potential for loss. Hazus was later expanded into a multi-hazard methodology, Hazus-MH, with new models for estimating potential losses from hurricanes and floods. The use of Hazus-MH for hazard mitigation planning offers numerous advantages:
 - Provides a consistent methodology for assessing risk across geographic and political entities.
 - Provides a way to save data so that it can readily be updated as population, inventory, and other factors change and as mitigation planning efforts evolve.
 - Facilitates the review of mitigation plans because it helps to ensure that FEMA methodologies are incorporated.
 - Supports grant applications by calculating benefits using FEMA definitions and terminology.
 - Produces hazard data and loss estimates that can be used in communication with local stakeholders.
 - Is administered by the local government and can be used to manage and update a hazard mitigation plan throughout its implementation.

Hazus-MH is a GIS-based software program used to support risk assessments, mitigation planning, and emergency planning and response. It provides a wide range of inventory data, such as demographics, building stock, critical facilities, transportation and utility lifeline, and multiple models to estimate potential losses from natural disasters. The program can be used to map hazard data and the results of damage and economic loss estimates for buildings and infrastructure.

6.3.2 Levels of Detail for Evaluation

Hazus-MH provides default data for inventory, vulnerability and hazards; this default data can be supplemented with local data to provide a more refined analysis. The model can carry out three levels of analysis, depending on the format and level of detail of information about the planning area:

- **Level 1**—All of the information needed to produce an estimate of losses is included in the software's default data. This data is derived from national databases and describes in general terms the characteristic parameters of the planning area.
- **Level 2**—More accurate estimates of losses require more detailed information about the planning area. To produce Level 2 estimates of losses, detailed information is required about local geology, hydrology, hydraulics and building inventory, as well as data about utilities and critical facilities. This information is needed in a GIS format.
- **Level 3**—This level of analysis generates the most accurate estimate of losses. It requires detailed engineering and geotechnical information to customize it for the planning area.

6.3.3 Application for This Plan

The Hazus model was used as follows for the hazards evaluated in this plan:

- **Flood**—A Level 2, user-defined analysis was performed for general building stock and for critical facilities and infrastructure. GIS building and assessor data (replacement cost values and detailed structure information) were loaded into Hazus-MH. Critical facility default data was updated whenever possible with locally available datasets. Current planning area flood mapping was used to delineate flood hazard areas and estimate potential losses from the 100- and 500-year flood events. To estimate damage that would result from a flood, Hazus uses pre-defined relationships between flood depth at a structure

and resulting damage, with damage given as a percent of total replacement value. Curves defining these relationships have been developed for damage to structures and for damage to typical contents within a structure. By inputting flood depth data and known property replacement cost values, dollar-value estimates of damage were generated.

- **Dam Failure**—The basis for this analysis was the Lewis River Projects dam failure inundation mapping for the Merwin, Swift and Yale dams. This data was imported into Hazus-MH and a Level 2 analysis was run using the flood methodology described above.
- **Earthquake**—A Level 2 analysis was performed to assess earthquake risk and exposure. Earthquake shake maps and probabilistic data prepared by the U.S. Geological Survey (USGS) were used for the analysis of this hazard. An updated general building stock inventory was developed using replacement cost values and detailed structure information from assessor tables. Critical facility default data was updated whenever possible with locally available datasets. Two scenario events and two probabilistic events were modeled:
 - The scenario events were a Magnitude-9.0 event on the Cascadia Subduction Zone and a Magnitude-6.5 event on the Portland Hills Fault.
 - The standard Hazus analysis was run for the 100- and 500-year probabilistic events.

6.4 LANDSLIDE, SEVERE WEATHER, WILDFIRE AND VOLCANO

For landslide, severe weather, volcano and wildfire, historical data was not adequate to model future losses. However, areas and inventory susceptible to some of the hazards of concern were mapped by other means and exposure was evaluated. For other hazards, a qualitative analysis was conducted using the best available data and professional judgment.

6.5 DROUGHT

The risk assessment methodologies used for this plan focus on damage to structures. Because drought does not impact structures to the same degree as other hazards, the risk assessment for drought was more limited and qualitative than the assessment for the other hazards of concern.

6.6 SOURCES OF DATA USED IN RISK ASSESSMENT

6.6.1 Building Count and Replacement Cost Value

GIS building and assessor data (replacement cost values and detailed structure information) were loaded into Hazus-MH and utilized in GIS spatial analysis. When available, an updated inventory was used in place of the Hazus-MH defaults for critical facilities and infrastructure.

Replacement cost is the cost to replace the entire structure with one of equal quality and utility. Replacement cost is based on industry-standard cost-estimation models published in *RS Means Square Foot Costs* (RS Means, 2015). It is calculated using the estimated cost for a structure based on the Hazus occupancy class (e.g., multi-family residential, commercial retail trade) and the square footage of the structure from tax assessor data. For single-family residential, the construction class and number of stories also factor into the square foot costs.

6.6.2 Data Used for Spatial Analysis

Table 6-1 describes the data used for spatially based exposure and vulnerability assessments. If no database was available, it was noted as a gap.

Table 6-1. Summary of Data Used for Spatial Analysis

Data	Source
Base Map Data	County and city boundaries, roads, water features, district boundaries from Clark County GIS. Aerial photos from Clark County GIS. Base map data for City of Woodland from Cowlitz County.
General Building Stock Update	Building footprints, tax lots, address points from Clark County GIS. Parcel data and assessor data extract from Cowlitz County for City of Woodland. Assessor data extract from Clark County GIS.
Critical Facility Database Update^{a,b}	Communication facilities from Clark County Assessor and Hazus Comprehensive Data Management System. Dams from U.S. Army Corps National Inventory of Dams. Emergency services from Clark County GIS. Energy from Clark County GIS and Hazus Comprehensive Data Management System. Government facilities from Clark County GIS. Hazardous materials from Clark County GIS. Healthcare and public health from Clark County GIS. Information technology was not available. Schools from Clark County GIS, Camas School District and Battle Ground School District. Transportation systems from Clark County GIS, Port of Vancouver, and Hazus Comprehensive Data Management System. Water and sanitation systems from Clark County GIS, Clark Regional Wastewater District, Clark Public Utilities, City of Vancouver, City of Battleground and City of Camas.
Flood	Effective digital Flood Insurance Rate Maps downloaded from FEMA website. 2002 10-foot resolution digital elevation model from Clark County GIS. Washington State levee inventory data downloaded from Washington Department of Ecology website. Repetitive loss data acquired from FEMA. 3-meter resolution digital elevation model for City of Woodland area downloaded from USGS website.
Earthquake	Shake maps for Cascadia M-9.0 and Portland Hills M-6.5 downloaded from USGS website. Liquefaction susceptibility and National Earthquake Hazard Reduction Program soils data downloaded from Washington Department of Natural Resources website. Earthquake hazard areas data from Clark County GIS. Faults data downloaded from Washington Department of Natural Resources website.
Landslide	Landslide and soil erosion hazard data from Clark County GIS. Landslides and landforms data downloaded from Washington Department of Natural Resources website.
Dam Failure	Lewis River Projects inundation data from CRESA (includes inundation areas for Merwin, Swift, and Yale dams). Dams data from Clark County GIS.
Wildfire	Wildland urban interface data from Clark County GIS. Wildland urban interface data from the City of Vancouver.
Volcano	Mt. Hood Region, Mount St. Helens, and Mount Adams Region volcano hazards data downloaded from USGS CVO website.
Demographics	2010 Census block boundaries available in Hazus database. 2010 Census statistical data downloaded from the U.S. Census Bureau website.
Current and Future Land Use	Land use, zoning, comprehensive plan designations, urban growth area boundary, vacant buildable lands and critical lands (environmental constraints) data from Clark County GIS.

Note: Additional information on hazard data can be found in Appendix E.

a. Hazus-MH default data was used as appropriate for the City of Woodland.

b. Not all requested data was received, so gaps in the database are present. Future planning efforts will work to address these gaps.

6.7 LIMITATIONS

6.7.1 General Limitations

Loss estimates, exposure assessments and hazard-specific vulnerability evaluations rely on the best available data and methodologies. However, results are subject to uncertainties associated with the following factors:

- Incomplete scientific knowledge about natural hazards and their effects on the built environment
- Approximations and simplifications necessary to conduct a study
- Incomplete or outdated inventory, demographic or economic parameter data
- The unique nature, geographic extent and severity of each hazard
- Mitigation measures already employed
- The amount of advance notice residents have to prepare for a specific hazard event.

Hazus-MH currently represents the industry best management practice for assessing risk in support of hazard mitigation planning. However, Hazus and other models used for this risk assessment are limited by the availability of data to support their working components. Such models must assume where firm data are not available. Assumptions are used, for example, to estimate ground deformation caused by liquefaction. These model limitations can lead to an understatement or overstatement of risk.

These factors can affect loss estimates by a factor of two or more. Therefore, potential exposure and loss estimates are approximate and should be used only to understand relative risk. Over the long term, Clark County and its planning partners will collect additional data to assist in estimating potential losses associated with other hazards.

6.7.2 Specific Limitations Noted During the Planning Process

The following are limitations specific to the datasets used in this planning process:

- Clark County assessor data lacked detailed information on building and foundation type (e.g. masonry construction and slab-on-grade, respectively). Default information was used, which impacts the accuracy of vulnerability estimates because building and foundation type play a major role in how structures will behave during hazard events.
- Model data input requirements necessitate the conversion of building footprints into single point features. Building locations are represented by single points located in the centroid of the building footprint.
- Data used in the wildfire assessment is dated and does not cover the entire planning area.
- Not all critical facility data was available in a digital format. Best available datasets were used.

6.7.3 How Climate Change Affects Hazard Mitigation

An essential aspect of hazard mitigation is predicting the likelihood of hazard events in a planning area. Typically, predictions are based on statistical projections from records of past events. This approach assumes that the likelihood of hazard events remains essentially unchanged over time. Thus, averages based on the past frequencies of, for example, floods are used to estimate future frequencies: if a river has flooded an average of once every five years for the past 100 years, then it can be expected to continue to flood an average of once every five years.

For hazards affected by climate conditions, the assumption that future behavior will be equivalent to past behavior is not valid if climate conditions are changing. As flooding is generally associated with precipitation frequency and quantity, for example, the frequency of flooding will not remain constant if broad precipitation patterns change over time. The risks of landslide, severe weather, and wildfire are all affected by climate patterns as well. Changing risk from climate change to the volcano and earthquake hazard is less understood at this time, but may also be significant.

For this reason, an understanding of climate change is pertinent to efforts to mitigate natural hazards. Information about how climate patterns are changing provides insight on the reliability of future hazard projections used in mitigation analysis. Information pertaining to the likely or expected impacts of climate change on each of hazard of concern is discussed in the hazard profiles.

Part 2. Risk Assessment

7. DAM FAILURE

7.1 GENERAL BACKGROUND

7.1.1 Causes of Dam Failure

Dam failures in the United States typically occur in one of four ways:

- Overtopping of the primary dam structure, which accounts for 34 percent of all dam failures, can occur due to inadequate spillway design, settlement of the dam crest, blockage of spillways, and other factors.
- Foundation defects due to differential settlement, slides, slope instability, uplift pressures, and foundation seepage can also cause dam failure. These account for 30 percent of all dam failures.
- Failure due to piping and seepage accounts for 20 percent of all failures. These are caused by internal erosion, erosion along hydraulic structures such as spillways, erosion due to animal burrows, and cracks in the dam structure.
- Failure due to problems with conduits and valves, typically caused by the piping of embankment material into conduits through joints or cracks, constitutes 10 percent of all failures.

The remaining 6 percent of U.S. dam failures are due to miscellaneous causes. Many dam failures in the United States have been secondary results of other disasters. The prominent causes are earthquakes, landslides, extreme storms, massive snowmelt, equipment malfunction, structural damage, foundation failures, and sabotage (ASDSO, 2016).

Poor construction, lack of maintenance and repair, and deficient operational procedures are preventable or correctable by a program of regular inspections. Terrorism and vandalism are serious concerns that all operators of public facilities must plan for; these threats are under continuous review by public safety agencies.

7.1.2 Regulatory Oversight

The dam failure risk assessment and mitigation strategies developed for this plan focus on impacts on people and property once a dam failure has occurred. The focus is not on dam operations to prevent dam failures from occurring, although a brief synopsis of regulatory programs impacting dam operations is included for reference.

National Dam Safety Act

The potential for catastrophic flooding due to dam failures led to passage of the National Dam Safety Act (Public Law 92-367). The National Dam Safety Program requires a periodic engineering analysis of every major dam in the country. The goal of this FEMA-monitored effort is to identify and mitigate the risk of dam failure so as to protect the lives and property of the public. The program is a partnership between states, federal agencies, and other stakeholders that encourages individual and community responsibility for dam safety. State assistance funds have allowed participating states to improve their programs through increased inspections, emergency action planning, and the purchase of needed equipment. FEMA has also expanded existing and initiated new training programs. Grant assistance from FEMA provides support for improvement of dam safety programs that regulate most of the dams in the United States (FEMA, 2013a).

Washington Department of Ecology Dam Safety Program

The Dam Safety Office (DSO) of the Washington Department of Ecology regulates over 1,000 dams in the state that impound at least 10 acre-feet of water. The DSO has developed dam safety guidelines to provide dam owners, operators, and design engineers with information on activities, procedures, and requirements involved in the planning, design, construction, operation and maintenance of dams in Washington. The authority to regulate dams in Washington and to provide for public safety is contained in the following laws:

- State Water Code (1917)—RCW 90.03
- Flood Control Act (1935)—RCW 86.16
- Department of Ecology (1970)—RCW 43.21A.

Where water projects involve dams and reservoirs with a storage volume of 10 acre-feet or more, the laws provide for the Department of Ecology to conduct engineering review of the construction plans and specifications, to inspect the dams, and to require remedial action as necessary to ensure proper operation, maintenance, and safe performance. The DSO was established within Ecology's Water Resources Program to carry out these responsibilities.

The DSO's five-year periodic inspection program for dams with high and significant hazard classifications achieves the following purposes (Washington Department of Ecology, 2015a):

- Assess the structural integrity and stability of project elements.
- Identify obvious defects, especially due to aging.
- Assess the stability of the structure under earthquake conditions.
- Determine the adequacy of the spillways to accommodate major floods.
- Evaluate project operation and maintenance.

The inspections, performed by professional engineers from the DSO, consist of the following elements (Washington Department of Ecology, 2015a):

- Review and analysis of available data on the design, construction, operation and maintenance of the dam and its appurtenances
- Visual inspection of the dam and its appurtenances
- Evaluation of the safety of the dam and its appurtenances, which may include an assessment of hydrological and hydraulic capabilities, structural stabilities, seismic stabilities, and any other condition that could constitute a hazard to the integrity of the structure
- Evaluation of the downstream hazard classification
- Evaluation of the operation, maintenance and inspection procedures employed by the owner and/or operator
- Review of the emergency action plan for the dam, including review or update of the dam-breach inundation map.

The DSO provides assurance that impoundment facilities will not pose a threat to lives and property, but dam owners bear primary responsibility for the safety of their structures, through proper design, construction, operation, and maintenance.

U.S. Army Corps of Engineers Dam Safety Program

The U.S. Army Corps of Engineers is responsible for safety inspections of some federal and non-federal dams in the United States that meet the size and storage limitations specified in the National Dam Safety Act. The Corps has inventoried dams; surveyed each state and federal agency's capabilities, practices and regulations regarding design, construction, operation and maintenance of the dams; and developed guidelines for inspection and

evaluation of dam safety (U.S. Army Corps of Engineers, 2011). The Corps' National Inventory of Dams lists the following dates of the most recent inspection dates for Clark County dams:

- Anderson Dam: N/A
- Binford Reservoir Dam: May 1, 1965
- Crisman Reservoir Dam: May 1, 1965
- Elmer Dam: May 1, 1965
- Erickson Dam: November 16, 2011
- Fargher Lake Dam: N/A
- Green Mountain Pond: N/A
- Haigh Reservoir Dam: May 1, 1965
- HIIM Reservoir Dam: August 1, 1961
- Jones Dam: N/A
- Lacamas and Round Lakes, Lower Dam: July 22, 1993.
- Lacamas and Round Lakes, Upper Dam: July 15, 1993
- Malar Dam: N/A
- Merwin Dam: June 27, 2012
- Price Reservoir Dam: N/A
- Tri-Mountain Estates Dam: October 14, 2010
- Trout Creek Dam: N/A
- Warman Waterski Lake Dam: N/A
- Yale Dam: March 8, 2012

Federal Energy Regulatory Commission Dam Safety Program

The Federal Energy Regulatory Commission (FERC) cooperates with a large number of federal and state agencies to ensure and promote dam safety. More than 3,000 dams are part of regulated hydroelectric projects in the FERC program. Two-thirds of these are more than 50 years old. As dams age, concern about their safety and integrity grows, so oversight and regular inspection are important. FERC inspects hydroelectric projects on an unscheduled basis to investigate the following:

- Potential dam safety problems
- Complaints about constructing and operating a project
- Safety concerns related to natural disasters
- Issues concerning compliance with the terms and conditions of a license.

Every five years, an independent FERC-approved engineer must inspect and evaluate projects with dams higher than 32.8 feet (10 meters), or with a total storage capacity of more than 2,000 acre-feet.

FERC monitors and evaluates seismic research and applies it in structural analyses of hydroelectric projects. FERC also evaluates the effects of potential and actual large floods on the safety of dams. During and following floods, FERC visits dams and licensed projects, determines the extent of damage, if any, and directs any necessary studies or remedial measures the licensee must undertake. The FERC publication *Engineering Guidelines for the Evaluation of Hydropower Projects* guides the FERC engineering staff and licensees in evaluating dam safety. The publication is frequently revised to reflect current information and methodologies.

FERC requires licensees to prepare emergency action plans and conducts training sessions on how to develop and test these plans. The plans outline an early warning system if there is an actual or potential sudden release of water from a dam due to failure. The plans include operational procedures that may be used, such as reducing reservoir levels and reducing downstream flows, as well as procedures for notifying affected residents and

agencies responsible for emergency management. These plans are frequently updated and tested to ensure that everyone knows what to do in emergency situations (FERC, 2005).

7.2 HAZARD PROFILE

7.2.1 Past Events

Dam failures can occur suddenly and without warning. They may occur during normal operating conditions or during a large storm event. Significant rainfall can quickly inundate an area and cause floodwaters to overwhelm a reservoir. If the spillway of the dam cannot safely pass the resulting flows, water will begin flowing in areas not designed for such flows, and a failure may occur.

According to the Association of State Dam Safety Officials, there have been no recorded dam incidents in Clark County (ASDSO, 2015). Between 1954 and 2015, FEMA has not included the State of Washington in any dam/levee break-related disaster declarations. One incident has been recorded in Skamania County, near the border of Clark County. On April 21, 2002, the retention structure at the west end of Swift Canal catastrophically failed. While there were no injuries, State Route (SR) 503 was completely washed out (CRESA, 2011).

7.2.2 Location

In Clark County, there are 29 dams that impound 10 acre-feet of water or more. Table 7-1 lists the dams in Clark County that the Dam Safety Office rates as High Hazard Class (1A, 1B, 1C). In addition to the dams located in Clark County, dams located on the Lewis River upstream of the County could impact residents. These dams are regularly inspected, well-staffed, and well-maintained (CRESA, 2011). The location of dams within the County can be seen on Figure 4-2.

Table 7-1. High Hazard Class Dams in Clark County (1A, 1B, 1C)

	Merwin Dam (1A)	Curtis Dam (1C)	Erikson Dam (1C)	Tri Mountain Estates Dam (1C)
National ID #	WA00474	WA01980	WA00102	WA00103
Water Course	Lewis River	Not available	Tributary-Rock Creek	Tributary-Mason Creek
Owner	PacifiCorp	Curtis Dam	John & Doreen Paradis	Tri-Mountain Estates LLC
Year Built	1931	1978	1968	1953
Dam Type^a	Concrete single arch	Not available	Earth fill	Earth fill
Crest Length (feet)	1,250	Not available	525	1,355
Height (feet)	313	15	22	30
Storage Capacity (acre-feet)	422,000	25	160	102
Drainage area (sq. mi.)	731	Not available	0.15	0.25

Source: Washington Department of Ecology 2015

7.2.3 Frequency

Dam failure events are infrequent and often coincide with other hazard events that cause them, such as earthquakes, landslides and excessive rainfall and snowmelt. There is a “residual risk” associated with dams. Residual risk is the risk that remains after safeguards have been implemented. For dams, the residual risk is associated with events beyond those that the facility was designed to withstand. However, the probability of any type of dam failure is low in today’s dam safety oversight environment.

7.2.4 Severity

The DSO classifies regulated dams in Washington by hazard class, based on the at-risk population living in the area that could be inundated if the dam fails. The hazard class definitions and number of Clark County dams in each class are as follows (Washington Department of Ecology, 2015a):

- 1 Hazard Class 1A (High - a downstream at-risk population of more than 300)
- 0 Hazard Class 1B (High - a downstream at-risk population of 31 to 300)
- 3 Hazard Class 1C (High - a downstream at-risk population of 7 to 30)
- 3 Hazard Class 2 (Significant - a downstream at-risk population of 1 to 6)
- 22 Hazard Class 3 (Low - no downstream at-risk population).

Four high-hazard dams and three significant hazard dams are located in Clark County—on the Lewis River, Rock Creek, Mason Creek, and Lacamas Creek (CRESA, 2011). These dams could cause a countywide concern were they to fail. Localized problems could occur if one of the minor dams in the county failed.

The U.S. Army Corps of Engineers developed the classification system shown in Table 7-2 for the hazard potential of dam failures. The DSO and Corps of Engineers hazard rating systems are based only on the potential consequences of a dam failure; they do not take into account the probability of such failures.

Table 7-2. Corps of Engineers Hazard Potential Classification

Hazard Category ^a	Direct Loss of Life ^b	Lifeline Losses ^c	Property Losses ^d	Environmental Losses ^e
Low	None (rural location, no permanent structures for human habitation)	No disruption of services (cosmetic or rapidly repairable damage)	Private agricultural lands, equipment, and isolated buildings	Minimal incremental damage
Significant	Rural location, only transient or day-use facilities	Disruption of essential facilities and access	Major public and private facilities	Major mitigation required
High	Certain (one or more) extensive residential, commercial, or industrial development	Disruption of essential facilities and access	Extensive public and private facilities	Extensive mitigation cost or impossible to mitigate

- Categories are assigned to overall projects, not individual structures at a project.
- Loss of life potential based on inundation mapping of area downstream of the project. Analyses of loss of life potential should take into account the population at risk, time of flood wave travel, and warning time.
- Indirect threats to life caused by the interruption of lifeline services due to project failure or operational disruption; for example, loss of critical medical facilities or access to them.
- Damage to project facilities and downstream property and indirect impact due to loss of project services, such as impact due to loss of a dam and navigation pool, or impact due to loss of water or power supply.
- Environmental impact downstream caused by the incremental flood wave produced by the project failure, beyond what would normally be expected for the magnitude flood event under which the failure occurs.

Source: U.S. Army Corps of Engineers, 1995

7.2.5 Warning Time

Warning time for dam failure varies depending on the cause of the failure. In events of extreme precipitation or massive snowmelt, evacuations can be planned with sufficient time. In the event of a structural failure due to earthquake, there may be no warning time. A dam's structural type also affects warning time. Earthen dams do not tend to fail completely or instantaneously. Once a breach is initiated, discharging water erodes the breach until either the reservoir water is depleted or the breach resists further erosion. Concrete gravity dams also tend to have a partial breach as one or more monolith sections are forced apart by escaping water. The time of breach formation ranges from a few minutes to a few hours (U.S. Army Corps of Engineers, 1997).

7.3 SECONDARY HAZARDS

Dam failure can cause severe downstream flooding, depending on the magnitude of the failure. Other potential secondary hazards of dam failure are landslides around the reservoir perimeter, bank erosion on the downstream watercourse, and destruction of downstream habitat. Hazardous materials spills are also a potential secondary hazard of dam failure if storage tanks rupture and spill.

7.4 EXPOSURE

The flood module of Hazus-MH was used for a Level 2 assessment of dam failure. Hazus-MH uses census data at the block level, which has a level of accuracy acceptable for planning purposes. Where possible, the Hazus-MH data was enhanced for this risk assessment using GIS data from county, state and federal sources. The exposure and vulnerability analyses use inundation mapping for a cascading failure of the Swift, Yale and Merwin dams, which are part of the PacifiCorp Lewis River project. The mapping used a risk-based approach to establish the inflow design flood, which allows for the evaluation of downstream consequences for a range of hydrologic dam failure events. This assessment does not capture all risk from all dams in the county, but was selected because of the substantial impacts and available data. Inundation maps were prepared for this analysis, but are not included in the publicly available version of this plan due to security concerns.

7.4.1 Population

All populations in a dam failure inundation zone would be exposed to the risk of a dam failure. The potential for loss of life is affected by the capacity and number of evacuation routes available to populations living in areas of potential inundation. The estimated population living in the mapped inundation areas within the planning area is 34,346 or 7.6 percent of the county's population. Table 7-3 summarizes the at-risk population in the planning area by jurisdiction.

Table 7-3. Population within Dam Failure Inundation Areas^c

	Population Exposed ^a	% of Total Population
Battle Ground	0	0.0%
Camas	2,304	10.9%
La Center	165	5.3%
Ridgefield	1,262	19.7%
Vancouver	9,031	5.3%
Washougal	1,183	7.8%
Woodland	5,839	99.9%
Yacolt	0	0.0%
Unincorporated	14,562	6.8%
Total	34,346	7.6%^b

a. Represents the percent of total buildings that are exposed multiplied by the estimated 2015 per-household population

b. Represents the total affected population as a percent of total Clark County population.

c. These estimates are derived from the planning scenario event, not for all possible dam failure risk in the county.

7.4.2 Property

Table 7-4 summarizes the value of planning area buildings in the mapped inundation area. Over 10 percent of the total replacement value of the planning area is exposed to the dam failure hazard. Table 7-5 lists the structure type of buildings in the inundation areas. Residential properties make up over 90 percent of this exposure. The distribution of land uses in dam inundation area is in Table 7-6.

Table 7-4. Value of Structures in Dam Failure Inundation Area^b

	Value Exposed			% of Total Replacement Value ^a
	Building	Contents	Total	
Battle Ground	\$0	\$0	\$0	0.0%
Camas	\$651,757,000	\$596,720,000	\$1,248,477,000	16.5%
La Center	\$53,074,000	\$48,780,000	\$101,854,000	12.7%
Ridgefield	\$206,190,000	\$152,250,000	\$358,440,000	17.3%
Vancouver	\$2,741,206,000	\$2,423,901,000	\$5,165,107,000	10.8%
Washougal	\$447,433,000	\$390,519,000	\$837,952,000	20.1%
Woodland	\$948,973,000	\$827,704,000	\$1,776,677,000	99.9%
Yacolt	\$0	\$0	\$0	0.0%
Unincorporated	\$1,553,548,000	\$976,661,000	\$2,530,209,000	5.6%
Total	\$6,602,181,000	\$5,416,535,000	\$12,018,716,000	10.6%

a. Percentages are based on the total replacement value for individual jurisdictions, not for the planning area as a whole. The “total” percentage shown is based on the sum of replacement values for jurisdictions in this table.

b. These estimates are derived from the planning scenario event, not for all possible dam failure risk in the county.

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

Table 7-5. Structure Type in Dam Failure Inundation Areas^b

	Number of Structures ^a							
	Residential	Commercial	Industrial	Agriculture/ Forestry	Religion	Government	Education	Total
Battle Ground	0	0	0	0	0	0	0	0
Camas	726	67	11	4	5	3	0	816
La Center	49	5	0	3	0	1	1	59
Ridgefield	434	13	5	2	1	4	0	459
Vancouver	2,349	262	17	17	1	5	4	2,655
Washougal	340	79	3	2	5	3	0	432
Woodland	1,641	169	26	1	16	4	5	1,862
Yacolt	0	0	0	0	0	0	0	0
Unincorporated County	4,939	44	1	88	9	2	0	5,083
Total	10,478	639	63	117	37	22	10	11,366

a. Structure type assigned to best fit Hazus occupancy classes based on present use classifications provided by Clark and Cowlitz County assessor’s data. Where conflicting information was present in the available data, parcels were assumed to be improved.

b. These estimates are derived from the planning scenario event, not for all possible dam failure risk in the county.

Table 7-6. Present Land Use in Planning Area^a

Present Use Classification ^b	Area in Dam Inundation Hazard Areas (acres) ^{c, d}	% of total exposed acreage
Agriculture/Resource Land	9,216.29	18.2%
Commercial	5,926.12	11.7%
Education	134.08	0.3%
Governmental Services	241.08	0.5%
Industrial	1,259.56	2.5%
Religious Services	57.81	0.1%
Residential	27,997.70	55.1%
Vacant or uncategorized	5,938.74	11.7%
Total	50,771.38	100%

- a. Present land use information in this plan is for planning purposes only. Discrepancies may exist between these estimates and official records maintained by participating jurisdictions.
- b. Present use classification provided by Clark and Cowlitz County assessor's data assigned to best fit occupancy classes in the Hazus model (see Section 6.3.1). Parcels for which conflicting information on current development was available were assumed to be improved. Some designated resource land may also be included in the vacant or uncategorized category.
- c. Acreage covers only mapped parcels; it excludes many rights of way and major water features.
- d. Acreage includes Clark County and the incorporated areas of the City of Woodland.

7.4.3 Critical Facilities

GIS analysis determined that there are 167 critical facilities in the mapped inundation area (see Table 7-7). In addition, the following linear features are exposed to the dam failure hazard:

- Interstate 5
- State Route 500
- Northwest Pipeline
- Interstate 205
- State Route 501
- Olympic Pipeline
- State Route 14
- State Route 503
- All watercourse levees.

Additional critical facilities and infrastructure are likely to be located in inundation areas where mapping was not available.

Table 7-7. Critical Facilities and Infrastructure in the Swift Dam Inundation Area

	Communication Facilities	Dams	Emergency Services	Energy	Government Facilities	Hazardous Materials	Health Care & Public Health	Information Technology	Schools	Transportation Systems	Water & Sanitation Systems	Total
Battle Ground	0	0	0	0	0	0	0	0	0	0	0	0
Camas	0	0	0	0	0	0	0	0	0	4	13	17
La Center	0	0	0	0	0	0	0	0	0	0	0	0
Ridgefield	0	0	0	0	0	0	0	0	0	0	2	2
Vancouver	0	0	0	6	0	20	1	0	0	66	20	113
Washougal	0	0	2	0	0	1	0	0	0	0	2	5
Woodland	0	0	3	1	0	2	0	0	5	0	0	11
Yacolt	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated	0	2	0	1	0	0	0	0	0	11	5	19
Total	0	2	5	8	0	23	1	0	5	81	42	167

7.4.4 Environment

The environment would be exposed to a number of risks in the event of dam failure. The inundation could introduce many foreign elements into local waterways, including hazardous materials. This could result in destruction of downstream habitat and could have detrimental effects on many species of animals, especially endangered species, such as salmon.

7.5 VULNERABILITY

7.5.1 Population

Vulnerable populations are all populations downstream from dam failures that are incapable of escaping the area within the allowable time frame. This includes the elderly and young, who may be unable to get themselves out of the inundation area. Vulnerable populations also include those who would not have adequate warning from a television or radio emergency warning system. Impacts on persons and households in the planning area were estimated for dam failure events through the Level 2 Hazus-MH analysis. Table 7-8 summarizes the results.

Table 7-8. Estimated Dam Failure Impact on Persons and Households^{a, c}

	Displaced Households		Persons Requiring Short-Term Shelter	
	Number	% of Population	Persons	% of Population
Battle Ground	0	0.0%	0	0.0%
Camas	702	3.3%	556	2.6%
La Center	30	1.0%	15	0.5%
Ridgefield	58	0.9%	27	0.4%
Vancouver	2,241	1.3%	1,996	1.2%
Washougal	410	2.7%	322	2.1%
Woodland^b	5,839	99.9%	4,788	81.9%
Yacolt	0	0.0%	0	0.0%
Unincorporated	1,968	0.9%	1,515	0.7%
Total	11,248	2.5%	9,219	2.0%

- Displaced population and shelter need estimates were based on updated general building stock dataset at a census block analysis level.
- Due to the way Hazus calculates results inside each county, the City of Woodland results for displaced population and short-term shelter needs using Cowlitz County data were higher than total population. To compensate, the displaced population for the City of Woodland was calculated by multiplying the estimated 2015 population by the percentage of population exposed. The short-term shelter requirements were determined by calculating the percentage of total scenario short-term shelter requirements over displaced population and applying it to the City of Woodland displaced population.
- These estimates are derived from the planning scenario event, not for all possible dam failure risk in the county.

7.5.2 Property

Vulnerable properties are those closest to the dam inundation area. These properties would experience the largest, most destructive surge of water. Low-lying areas are also vulnerable since they are where the dam waters would collect. Table 7-9 summarizes estimated losses associated with planning area buildings in the mapped inundation area. About 2.5 percent of the total replacement value of the planning area is vulnerable to the dam failure hazard.

Table 7-9. Loss Estimates for Structures in Dam Failure Inundation Area^a

	Estimated Loss Associated with Dam Failure			% of Total Replacement Value
	Building	Contents	Total	
Battle Ground	\$0	\$0	\$0	0.00%
Camas	\$84,485,000	\$127,631,000	\$212,116,000	2.80%
La Center	\$2,514,000	\$4,111,000	\$6,625,000	0.82%
Ridgefield	\$37,402,000	\$46,564,000	\$83,966,000	4.05%
Vancouver	\$396,975,000	\$589,260,000	\$986,235,000	2.05%
Washougal	\$17,267,000	\$29,195,000	\$46,462,000	1.12%
Woodland	\$607,581,000	\$628,226,000	\$1,235,807,000	69.51%
Yacolt	\$0	\$0	\$0	0.00%
Unincorporated	\$161,955,000	\$128,100,000	\$290,055,000	0.65%
Total	\$1,308,179,000	\$1,553,087,000	\$2,861,266,000	2.52%

a. These estimates are derived from the planning scenario event, not for all possible dam failure risk in the county.

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

7.5.3 Critical Facilities

On average, critical facilities expected to sustain damage during a dam failure event would receive 42.9 percent damage to the structure and 96.5 percent damage to the contents during a dam failure event. The estimated time to restore these facilities to 100 percent of their functionality is 846 days. In addition, transportation routes are vulnerable to dam inundation and have the potential to be wiped out, creating isolation issues. This includes all roads, railroads and bridges in the path of the dam inundation. Those that are most vulnerable are those that are already in poor condition and would not be able to withstand a large water surge. Utilities such as overhead power lines, cable and phone lines could also be vulnerable. Loss of these utilities could create additional isolation issues for the inundation areas. Estimated damage to critical facilities and infrastructure in the dam inundation area is summarized in Table 7-10.

Table 7-10. Estimated Damage to Critical Facilities and Infrastructure from Dam Failure

	Number of Facilities Affected	Average % of Total Value Damaged		Days to 100% Functionality
		Building	Content	
Communication Facilities	0	--	--	--
Dams	0	--	--	--
Emergency Services	5	59.8%	93.0%	792
Energy	5	18.7%	--	--
Government Facilities	0	--	--	--
Hazardous Materials	17	22.8%	--	--
Health Care & Public Health	0	--	--	--
Information Technology	0	--	--	--
Schools	5	94.0%	100.0%	900
Transportation Systems^a	27	N/A	N/A	N/A
Water & Sanitation Systems	31	19.1%	--	--
Total	90	42.9%	96.5%	846

a. Due to an issue with the Hazus software, analysis of transportation facilities was not able to be conducted for this scenario. It is expected that there would be extensive impacts to many of the facilities in the inundation area.

7.5.4 Environment

The extent of the vulnerability of the environment is the same as the exposure of the environment. As with any significant natural hazard event, large amounts of debris generated from the damaged buildings and infrastructure could have significant environmental impacts. These impacts were estimated for the dam failure event through the Level 2 Hazus-MH analysis. Table 7-11 summarizes the results.

Table 7-11. Estimated Dam Failure-Caused Debris

	Debris to Be Removed (tons) ^a	Truck Loads ^b
Battle Ground	0	0
Camas	31,791,450	1,271,658
La Center	179,750	7,190
Ridgefield	6,175,230	247,009
Vancouver	80,547,430	3,221,897
Washougal	1,586,430	63,457
Woodland	68,553,860	2,742,154
Yacolt	0	0
Unincorporated	24,637,680	985,507
Total	213,471,830	8,538,873

a. Debris generation estimates were based on updated general building stock dataset at a Census Block analysis level.

b. Hazus assumes 25 tons per truck.

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

7.5.5 Economic Impact

In general, dam failure presents the potential for significant disruption, including loss of life, massive property damage, and other long-term consequences. All of these are likely to impact the local economy, directly and indirectly. Economic losses can include the cost to rebuild structures and properties, the cost of response, and recovery, downstream damage, and long-term costs to repair environmental damage. It can also have a hidden impact, by reducing public morale and confidence, resulting in decreased spending in local stores and businesses near the event's occurrence. Such indirect and cascading impacts, however, are difficult to quantify, even though FEMA recognizes their significance and probability. FEMA provides resources to assist jurisdictions in estimating both direct and indirect economic consequences after a dam failure (Homeland Security, 2011).

7.6 FUTURE TRENDS

7.6.1 Development

Land use in the planning area will be directed by local comprehensive plans adopted under state law. The planning partners have established comprehensive policies regarding sound land use in identified flood hazard areas. While some of the areas vulnerable to the more severe impacts from dam failure intersect the mapped flood hazard areas, the inundation areas from a dam failure cover a much larger portion of the planning area.

Flood-related policies in these comprehensive plans and in the local municipal code will help to reduce the risk associated with the dam failure hazard for development in the planning area, but will be unlikely to help reduce risk to all structures within the dam inundation area. Table 7-12 shows the land acreage identified as underutilized or vacant in urban growth areas in the County that intersect the dam failure inundation areas.

Table 7-12. Buildable Lands in Planning Area Urban Growth Areas that Intersect Dam Inundation Areas^a

Urban Growth Area Name ^b	Residential		Commercial (acres)	Industrial (acres)	Total (acres) ^c
	Acres	Units			
Battle Ground	0	0	0	0	0
Camas	19.03	114	2.54	28.35	49.92
La Center	13.10	52	1.97	0	15.06
Ridgefield	28.94	174	0.27	0	29.21
Vancouver	114.27	914	26.63	674.78	815.68
Washougal	4.42	26	20.67	33.29	58.37
Woodland^d	25.24	101	0	0	25.24
Yacolt	0	0	0	0	0
Total	205.00	1,381	52.08	736.42	993.48

- Buildable lands information in this plan is for planning purposes only. Discrepancies may exist between these estimates and official records maintained by participating jurisdictions.
- Unincorporated areas outside of urban growth areas are excluded from this assessment. Development in these areas consists largely of rural lands, open space and large residential lots.
- Acreage covers only mapped parcels; it excludes many rights of way and major water features.
- Acreage estimates exclude the portions of the City of Woodland in Cowlitz County and thus may be underestimated.

7.6.2 Climate Change

Dams are designed partly based on assumptions about a river's flow behavior, expressed as hydrographs. Changes in weather patterns can have significant effects on the hydrograph used for the design of a dam. If the hydrograph changes, it is conceivable that the dam can lose some or all of its designed margin of safety, also known as freeboard. If freeboard is reduced, dam operators may be forced to release increased volumes earlier in a storm cycle in order to maintain the required margins of safety. Such early releases of increased volumes can increase flood potential downstream.

Dams are constructed with safety features known as "spillways." Spillways are put in place on dams as a safety measure in the event of the reservoir filling too quickly. Spillway overflow events, often referred to as "design failures," result in increased discharges downstream and increased flooding potential. Although climate change will not increase the probability of catastrophic dam failure, it may increase the probability of design failures.

The climate of Washington state is already changing and will continue to change over the course of this century. The number of extreme weather events is increasing, and warmer temperatures are resulting in greater amounts of rain (as opposed to snow) during winter months. This results in higher winter stream flows and more frequent floods, earlier spring snowmelt, and earlier peak spring stream flow (already 10-30 days earlier than in 1948) (Washington Department of Ecology, 2015). While most of these predicted concerns relate to limited water supply, the potential increase in flooding could impact dams' capacities to contain excess water.

7.7 SCENARIO

An earthquake in the region could lead to liquefaction of soils around a dam. This could occur without warning during any time of the day. Failure of a high hazard dam in the county would likely result in the loss of life, roadways, structures and property and cause severe impacts on the local economy. While the possibility of failure is remote, results of such an event would be devastating.

While the probability of dam failure is very low, the probability of flooding associated with changes to dam operational parameters in response to climate change is higher. Dam designs and operations are developed based

on hydrographs from historical records. If these hydrographs experience significant changes over time due to the impacts of climate change, the dam design and operations may no longer be valid for the changed condition. Specified release rates and impound thresholds may have to be changed. This would result in increased discharges downstream of these facilities, thus increasing the probability and severity of flooding.

7.8 ISSUES

In the late 1980s, the Department of Ecology DSO was reorganized to better use its resources to minimize public safety problems. The DSO has recognized the key role of other government agencies in carrying out its public safety charge. For example, the dam approval process now requires that dams located above populated areas develop emergency action plans in conjunction with local and county emergency management agencies.

The most significant issue associated with dam failure involves properties and populations in the inundation zones. Flooding as a result of a dam failure would significantly impact these areas. In certain scenarios there would be little or no warning time. Dam failure events are frequently associated with other natural hazard events such as earthquakes, landslides or severe weather, which limits their predictability and compounds the hazard. Important issues associated with dam failure hazards include the following:

- The dam failure scenario utilized in the risk assessment brings forward the following issues:
 - More than 11,000 people would be displaced and more than 9,000 people would require short term shelter following the scenario event.
 - More than \$2.8 billion (2.5 percent) in damages to the expected building stock would be expected. More than half of this damage would be expected within the City of Woodland.
 - More than 213 million tons of debris from structures impacted would be expected.
 - There are estimated to be more than 11,300 structures located within inundation areas. More than 92 percent are residential structures.
- It is unclear whether dam failure warning and notification strategies will be viable if dam failure occurs as a result of a significant earthquake that interrupts communication systems.
- Changes in hydrographs in the region as a result of climate change are likely to include more instances of winter flooding. This could alter dam operations and increase the potential for design failures.
- Downstream populations are often not aware that they are located in a dam failure inundation area and do not know the risks associated with probable dam failure.
- Balancing the need to address security concerns and the need to inform the public of the risk associated with dam failure is a challenge for public officials.
- Dam failure inundation areas are often located outside of special flood hazard areas under the National Flood Insurance Program, so flood insurance coverage in these areas is not common.
- Most dam failure mapping required at federal levels requires determination of the probable maximum flood. While the probable maximum flood represents a worst-case scenario, it is generally the event with the lowest probability of occurrence. For non-federal-regulated dams, mapping of dam failure scenarios that are less extreme than the probable maximum flood but have a higher probability of occurrence can be valuable to emergency managers and community officials downstream of these facilities. This type of mapping can show areas potentially impacted by more frequent events, to be used in support of emergency response and preparedness measures.
- Limited financial resources for dam maintenance during economic downturns result in decreased attention to dam structure operational integrity, because available funding is often directed to more urgent needs. This could increase the potential for maintenance failures.
- Unpermitted dams may exist within the planning area. These dams may present risks to people and property. In 2008 Washington DOE inspected 95 unpermitted dams, 30 of which were classified as high

hazard. Eleven of these high hazard dams (36.6 percent) were determined to need immediate repairs (Washington Department of Ecology, 2016).

- Model results indicate that more than 90 critical facilities would sustain damages from the dam failure scenario modeled for this assessment. Some of these facilities may require almost 2.5 years to regain full functionality after the event.
- Exposure to the dam failure hazard may increase in the planning area. It is anticipated that new development will occur within the mapped inundation area, including up to 1,381 residential units.

8. DROUGHT

8.1 GENERAL BACKGROUND

Drought is a normal phase in the climatic cycle of most geographical regions. Drought originates from a deficiency of precipitation over an extended period of time, usually a season or more, and results in a water shortage for some activity, group or environmental sector. Unlike most disasters, droughts normally occur slowly but last a long time. There are four generally accepted operational definitions of drought (National Drought Mitigation Center, 2006):

- **Meteorological drought** is an expression of precipitation's departure from normal over some period of time. Meteorological measurements are the first indicators of drought. Definitions are usually region-specific, and based on an understanding of regional climatology. A definition of drought developed in one part of the world may not apply to another, given the wide range of meteorological definitions.
- **Agricultural drought** occurs when there is not enough soil moisture to meet the needs of a particular crop at a particular time. Agricultural drought happens after meteorological drought but before hydrological drought. Agriculture is usually the first economic sector to be affected by drought.
- **Hydrological drought** refers to deficiencies in surface and subsurface water supplies. It is measured as stream flow and as lake, reservoir and groundwater levels. There is a time lag between lack of rain and less water in streams, rivers, lakes and reservoirs, so hydrological measurements are not the earliest indicators of drought. After precipitation has been reduced or deficient over an extended period of time, this shortage is reflected in declining surface and subsurface water levels. Water supply is controlled not only by precipitation, but also by other factors, including evaporation (which is increased by higher than normal heat and winds), transpiration (the use of water by plants), and human use.
- **Socioeconomic drought** occurs when a physical water shortage starts to affect people, individually and collectively. Most socioeconomic definitions of drought associate it with the supply and demand of an economic good.

Defining when drought begins is a function of the impacts of drought on water users, and includes consideration of the supplies available to local water users as well as the stored water they may have available in surface reservoirs or groundwater basins. Different local water agencies have different criteria for defining drought conditions in their jurisdictions. Some agencies issue drought watch or drought warning announcements to their customers. Determinations of regional or statewide drought conditions are usually based on a combination of hydrologic and water supply factors. Washington has a statutory definition of drought (RCW 43.83B.400), defining an area as being in a drought condition when the water supply for the area is below 75 percent of normal and water uses and users in the area are likely to incur undue hardships because of the water shortage.

8.2 HAZARD PROFILE

Droughts originate from a deficiency of precipitation resulting from an unusual weather pattern. If the weather pattern lasts a short time (a few weeks or months), the drought is considered short-term. If the weather pattern becomes entrenched and the precipitation deficits last for several months or years, the drought is considered to be long-term. It is possible for a region to experience a long-term circulation pattern that produces drought, and to have short-term changes in this long-term pattern that result in short-term wet spells. Likewise, it is possible for a

long-term wet circulation pattern to be interrupted by short-term weather spells that result in short-term drought. According to the Washington State Emergency Management Division, drought in Washington usually results from low snow accumulation (from low precipitation or warm winter temperatures) or early melt of the snowpack due to warm weather in late winter or early spring (Washington Emergency Management Division, 2014).

8.2.1 Past Events

In the past century, Washington has experienced a number of droughts, including several that lasted for more than a single season—1928 to 1932, 1992 to 1994, and 1996 to 1997. The most recent droughts in the state occurred in 2005 and 2015 (Washington Emergency Management Division, 2014; Washington Department of Ecology, 2015b). NOAA’s National Climatic Data Center does not list any drought events impacting Clark County between 1950 and 2015.

Between 1954 and 2015, Washington experienced one FEMA-declared drought-related emergency (EM-3037). This was the 1977 event, which has been identified as the worst drought in state history; however, Clark County was not included in the declaration (FEMA, 2015c). The U.S. Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans to agricultural producers suffering losses due to drought. One-half to two-thirds of the counties in the U.S. have been designated as drought disaster areas in each of the past several years. Between 2012 and 2015, Washington has been included in 186 USDA drought declarations. Clark County has been included in four of these declarations, all of them in 2015—July 28, 2015; July 28, 2015 (second declaration); August 11, 2015; and July 7, 2015 (USDA, 2015a).

The following are drought events and declarations since 1900 that are known to have impacted Clark County:

- July-August 1902—No measurable rainfall in Western Washington from July 23 to August 25. Pastures lacked moisture. There were a number of major forest fires (CRESA, 2011).
- August 1919—Hot weather was detrimental in non-irrigated counties. Many forest fires occurred (CRESA, 2011).
- July-August 1921—Drought occurred in all agricultural sections. It was too dry for non-irrigated pastures. Rains, preceded by severe dust storms, caused extensive damage to fruit trees (CRESA, 2011).
- July 1944—High temperatures caused dry pastures in Clark County (CRESA, 2011).
- 1966—The entire state was dry throughout the spring (Governor’s Ad Hoc Executive Water Emergency Committee Staff, 1977).
- June – August 1967—No rain fell from the third week in June to the third week in September. 1,767 fires burned throughout the state (City of Covington, 2005)
- March 14, 2001—December 31, 2001—Washington became the first Northwest state to make a drought declaration when the Department of Ecology declared a statewide drought emergency in March. The area had experienced several months of record low precipitation. Because of above-average precipitation in the final two months of the year, the drought emergency expired on December 31.
- March 10, 2005—December 31, 2005—A serious drought in 2005 resulted from the combination of well-below-average precipitation from November 2004 through February 2005, unusually warm fall and winter weather, and a storm with warm temperatures and heavy rain in January that greatly diminished snowpack. The Department of Ecology declared a statewide drought emergency on March 10, 2005. The drought emergency expired on December 31, 2005 (Washington Department of Ecology, 2006).
- April 17, 2015 – December 31, 2015—A drought was declared on March 13 in three regions of Washington State. In mid-April 13 more river basins were added, including the Lewis Water Resource Inventory Area in Clark County. In mid-May the drought emergency was expanded to be statewide. The emergency was largely the result of historically low snowpack accumulation. In August, Clark Public Utility District ceased pumping from a production well near Salmon Creek. The drought emergency expired in December 2015. (Washington Department of Ecology, 2015b)

8.2.2 Location

NOAA has developed several indices to measure drought impacts and severity and to map their extent and locations. These indices change regularly depending on local weather patterns and are snapshots of drought impacts at a specific point in time:

- The **Palmer Crop Moisture Index** measures short-term drought on a weekly scale and is used to quantify drought's impacts on agriculture during the growing season. Figure 8-1 shows this index for the week ending January 30, 2016.
- The **Palmer Z Index** measures short-term drought on a monthly scale. Figure 8-2 shows this index for December 2015.
- The **Palmer Drought Index** measures the duration and intensity of long-term drought-inducing circulation patterns. Long-term drought is cumulative, so the intensity of drought during a given month is dependent on the current weather patterns plus the cumulative patterns of previous months. Weather patterns can change quickly from a long-term drought pattern to a long-term wet pattern, and the Palmer Drought Index can respond fairly rapidly. Figure 8-3 shows this index for December 2015.
- The hydrological impacts of drought (e.g., reservoir levels, groundwater levels, etc.) take longer to develop and it takes longer to recover from them. The **Palmer Hydrological Drought Index**, another long-term index, was developed to quantify hydrological effects. The Palmer Hydrological Drought Index responds more slowly to changing conditions than the Palmer Drought Index. Figure 8-4 shows this index for August 2015.
- While the Palmer indices consider precipitation, evapotranspiration and runoff, the **Standardized Precipitation Index** considers only precipitation. In the Standardized Precipitation Index, an index of zero indicates the median precipitation amount; the index is negative for drought and positive for wet conditions. The Standardized Precipitation Index is computed for time scales ranging from one month to 72 months. Figure 8-5 shows the 12-month Standardized Precipitation Index map for December 2014 to December 2015.

Source: Climate Prediction Center, NOAA

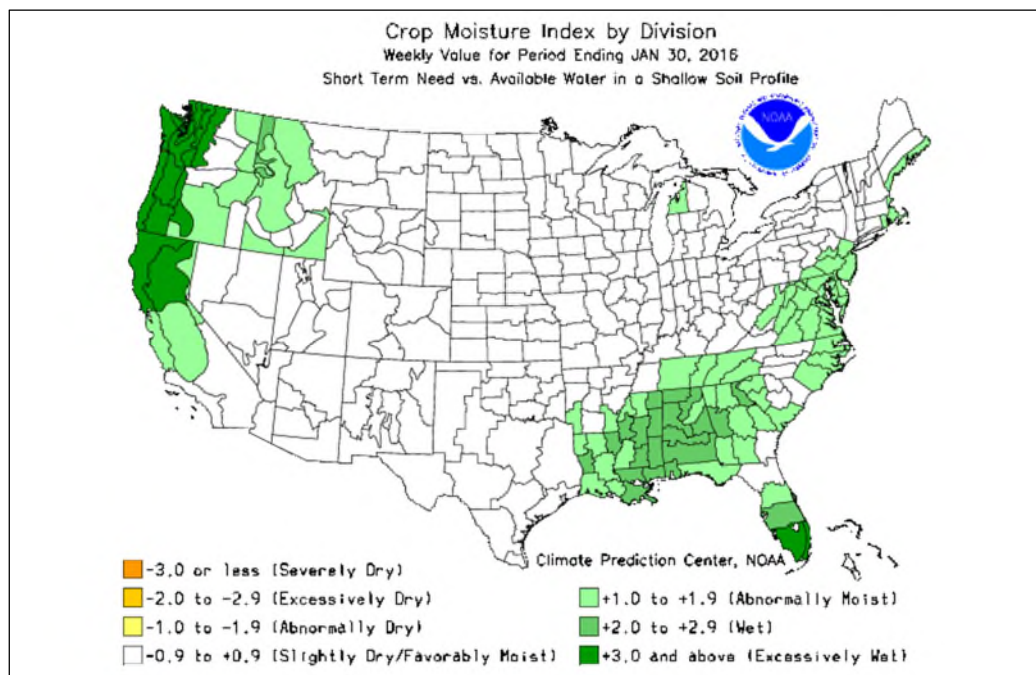


Figure 8-1. Crop Moisture Index for Week Ending January 30, 2016

Source: National Centers for Environmental Information, NOAA

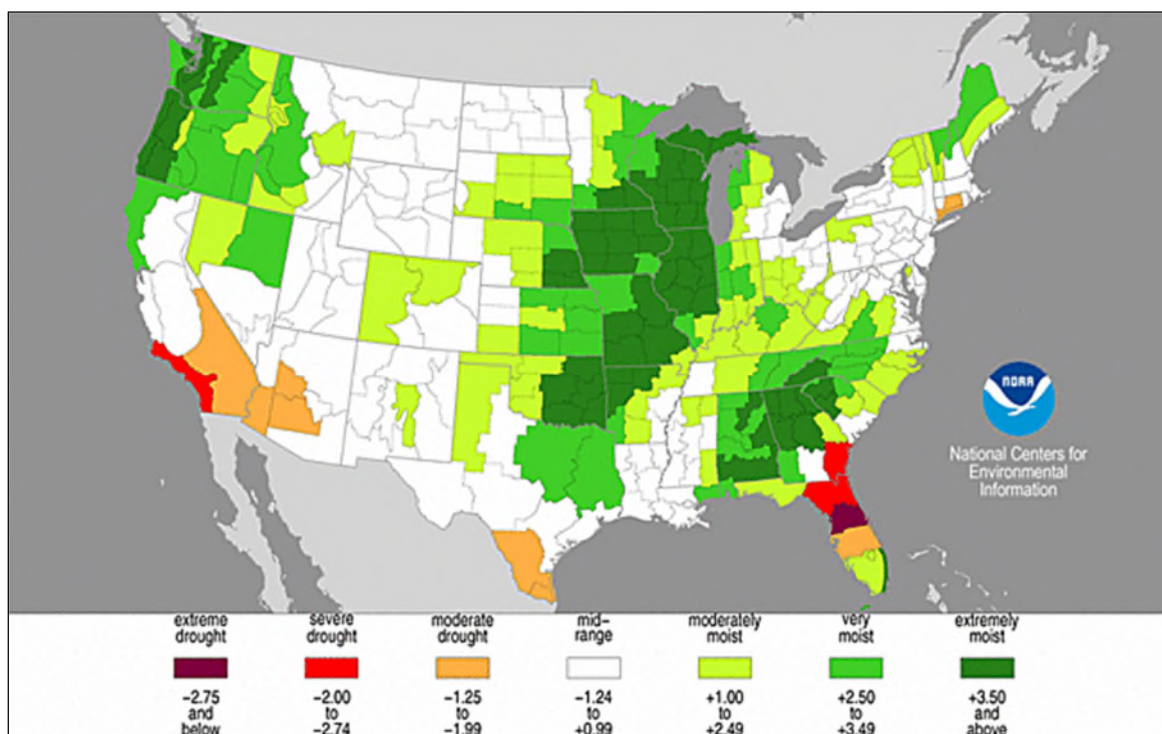


Figure 8-2. Palmer Z Index Short-Term Drought Conditions (December 2015)

Source: National Centers for Environmental Information, NOAA

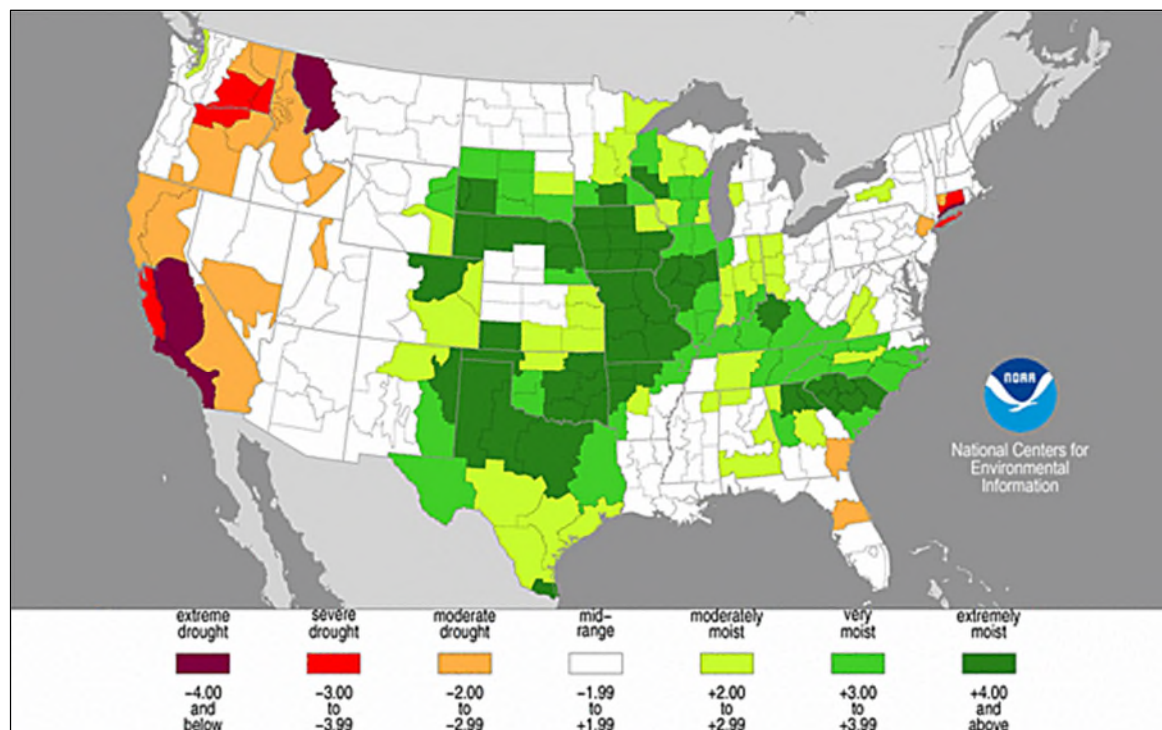


Figure 8-3. Palmer Drought Severity Index (December 2015)

Source: National Centers for Environmental Information, NOAA

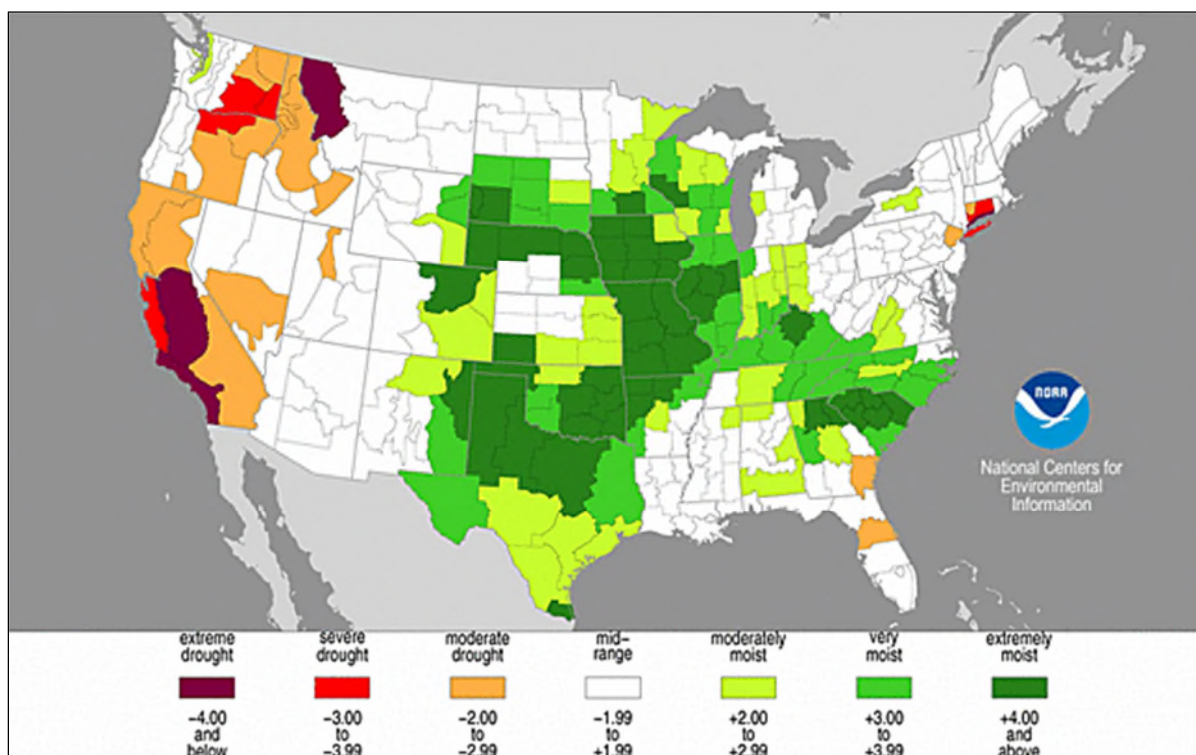


Figure 8-4. Palmer Hydrological Drought Index Long-Term Hydrologic Conditions (December 2015)

Source: Western Regional Climate Center

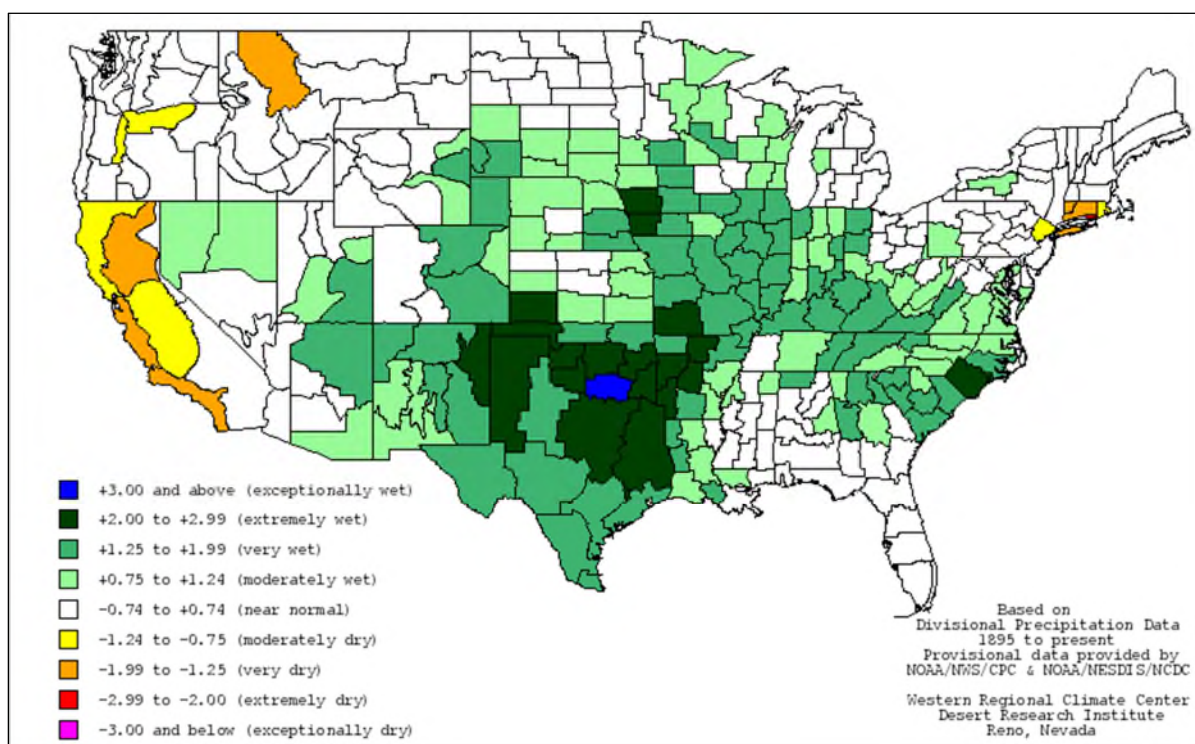


Figure 8-5. 12-Month Standardized Precipitation Index (December 2015)

8.2.3 Frequency

According to the Washington State Emergency Management Division, Washington’s drought history indicates that the state as a whole can expect severe or extreme drought at least 5 percent of the time and much of western Washington can expect severe or extreme drought from 5 to 10 percent of the time (Washington Emergency Management Division, 2013). Climate change is expected to contribute to increasing drought risk in the future (Washington Department of Ecology, 2016a).

8.2.4 Severity

Drought can have a widespread impact on the environment and the economy, depending upon its severity, although it typically does not result in loss of life or damage to property, as do other natural disasters. The severity of a drought depends on the degree of moisture deficiency, the duration, and the size and location of the affected area. The longer the drought and the larger the area impacted, the more severe the potential impacts. From 1980 to 2015 there have been 23 drought events in the United States with losses exceeding \$1 billion. Of these, nine included losses in the State of Washington (NOAA, 2016).

When measuring the severity of droughts, analysts typically look at economic impacts on a planning area. A drought directly or indirectly impacts all people in affected areas. All people could pay more for water if utilities increase their rates due to shortages. Agricultural impacts can result in loss of work for farm workers and those in related food processing jobs. Other water- or electricity-dependent industries are commonly forced to shut down all or a portion of their facilities, resulting in further layoffs. A drought can harm recreational companies that use water (e.g., swimming pools, water parks and river rafting companies) as well as landscape and nursery businesses because people will not invest in new plants if water is not available to sustain them. In Washington, where hydroelectric power plants generate nearly three-quarters of the electricity produced, drought also threatens the supply of electricity, with the potential to affect the cost of power.

According to the Washington Emergency Management Division, “drought generally does not affect groundwater sources as quickly as surface water supplies, but groundwater supplies generally take longer to recover. Reduced precipitation during a drought means that groundwater supplies are not replenished at a normal rate. This can lead to a reduction in groundwater levels and problems such as reduced pumping capacity or wells going dry. Shallow wells are more susceptible than deep wells. About 16,000 drinking water systems in Washington get water from the ground; these systems serve about 5.2 million people” (Washington Emergency Management Division, 2014).

8.2.5 Warning Time

Droughts are climatic patterns that occur over long periods of time. Predicting drought depends on the ability to forecast precipitation and temperature. Anomalies of precipitation and temperature may last from several months to several decades. How long they last depends on interactions between the atmosphere and the oceans, soil moisture and land surface processes, topography, internal dynamics, and the accumulated influence of weather systems on the global scale.

Because drought conditions in Washington State are often related to deficiencies in snowpack accumulation, some warning is available through monitoring snowpack accumulation through the winter. The U.S. Natural Resources Conservation Service’s snow survey and water supply forecasting program conducts snow surveys to develop accurate and reliable water supply forecasts (USDA, 2014). The system, called SNOTEL (short for Snow Telemetry) provides information for local governments, water consumers and providers and the general public on snowpack conditions that may impact water resources in future months. When snowpack levels are below average, communities may make changes to their water management programs and practices to reduce impacts from a possible future drought.

NOAA's National Integrated Drought Information System launched a Drought Early Warning System for the Pacific Northwest in February 2016. The early warning system draws upon new and existing federal, tribal, state, local and academic partner networks to make climate and drought science readily available, easily understandable and usable for decision makers. The system improves stakeholders' abilities to monitor, forecast, plan for and cope with the impacts of drought (NIDIS, 2016).

8.3 SECONDARY HAZARDS

The secondary hazard most commonly associated with drought is wildfire. A prolonged lack of precipitation dries out vegetation, which becomes increasingly susceptible to ignition as the duration of the drought extends.

Drought also is often accompanied by extreme heat. When temperatures reach 90°F and above, people are vulnerable to sunstroke, heat cramps and heat exhaustion. Pets and livestock are also vulnerable to heat-related injuries, and agricultural crops can suffer.

Due to the prevalence of hydroelectric power generation in Washington State, Clark County businesses and residents may also experience a decrease in power supply or an increase in electric supply costs as the result of a prolonged drought. In extreme cases, planned power outages throughout the region may be implemented.

8.4 EXPOSURE

All people, property and environments in the planning area would be exposed to some degree to the impacts of moderate to extreme drought conditions.

8.5 VULNERABILITY

Drought produces a complex web of impacts that spans many sectors of the economy and reaches well beyond the area experiencing physical drought. This complexity exists because water is integral to the ability to produce goods and provide services. Drought can affect a wide range of economic, environmental and social activities. The vulnerability of an activity to the effects of drought usually depends on its water demand, how the demand is met, and what water supplies are available to meet the demand.

The 2013 Washington State Hazard Mitigation Plan defined counties as being vulnerable to drought if they met at least five of the following criteria:

- History of severe or extreme drought conditions:
 - The county must have been in serious or extreme drought at least 10 to 15 percent of the time from 1895 to 1995.
- Demand on water resources based on:
 - Acreage of irrigated cropland. The acreage of the county's irrigated cropland must be in top 20 in the state.
 - Percentage of harvested cropland that is irrigated. The percentage of the county's harvested cropland that is irrigated must be in top 20 in the state.
 - Value of agricultural products. The value of the county's crops must be in the top 20 in the state.
 - Population growth greater than the state average. The county's population growth from 2000 to 2006 must be greater than state average of 8.17 percent.
- A County's inability to endure the economic conditions of a drought, based on:

- The county's median household income being less than 75 percent of the state median income of \$51,749 in 2005.
- The county being classified as economically distressed in 2005 because its unemployment rate was 20 percent greater than the state average from January 2002 through December 2004.

Clark County was not among nine counties in the state that met at least five of the criteria at the time of the 2013 statewide hazard mitigation plan and was not considered to be one of those counties most vulnerable to drought.

8.5.1 Population

No significant life or health impacts are anticipated as a result of drought within the planning area.

8.5.2 Property

No structures are likely to be directly affected by drought conditions, though some structures may become vulnerable to wildfires, which are more likely following years of drought. Droughts can also have significant impacts on landscapes, which could cause a financial burden on property owners. However, these impacts are not considered critical in planning for impacts from the drought hazard.

8.5.3 Critical Facilities

Critical facilities as defined for this plan will continue to be operational during a drought. Local water providers have plans in place including alternate water sources and memorandums of agreement to ensure operations continue during severe drought conditions. The risk to critical facilities will be largely aesthetic. For example, when water conservation measures are in place, landscaped areas will not be watered and may die. These aesthetic impacts are not considered significant.

8.5.4 Environment

Although environmental losses are difficult to quantify, growing public awareness and concern for environmental quality has led public officials to focus greater attention and resources on these effects. Environmental losses from drought are associated with damage to plants, animals, wildlife habitat, and air and water quality; forest and range fires; degradation of landscape quality; loss of biodiversity; and soil erosion. Some of the effects are short-term and conditions quickly return to normal following the end of the drought. Other environmental effects linger for a longer time or may even become permanent. Wildlife habitat, for example, may be degraded through the loss of wetlands, lakes and vegetation. However, many species will eventually recover from this temporary aberration. The degradation of landscape quality, including increased soil erosion, may lead to a more permanent loss of biological productivity. Reductions in groundwater replenishment can impact streams, especially during the summer when precipitation is sparse and all snowmelt has occurred. During these times, much of stream flow comes from groundwater sources. This means that reductions to groundwater can reduce stream flow when it is already low (Washington Emergency Management Division, 2014).

8.5.5 Economic Impact

The economic impact of drought is largely associated with industries that use water or depend on water for their business. For example, landscaping businesses are affected as the demand for their service significantly declines because landscaping is not being watered. Livestock owners experience increased expenses for watering their herds. Agricultural industries are impacted if water usage is restricted for irrigation. Drought can lead to a reduction in power-generating capacity in hydroelectric-dominated systems, such as those found in Washington. Reductions in capacity can lead to interruptions in the power supply that may have economic impacts in the region.

8.6 FUTURE TRENDS

8.6.1 Development

Clark County is updating its Comprehensive Plan, with the goal of completing the draft plan by December 2015 and adopting the plan no later than June 2016. The Comprehensive Plan will include policies directing land use and dealing with water supply issues and water resource protection. The Environmental Element, where these concerns will be addressed, also will prioritize the regulation of development in a manner that protects water quality and quantity (Clark County, 2015a).

8.6.2 Climate Change

Although there is still some uncertainty regarding climate change impacts on the water cycle, most current models project increases in precipitation in winter, spring and fall and decreases in precipitation in summer. This decrease in precipitation, coupled with higher average summer temperatures, may contribute to an increase in the frequency, severity and duration of droughts in the region (Dalton et al., 2013). More frequent extreme events such as droughts could end up being more cause for concern than the long-term change in temperature and precipitation averages. According to the Washington State Department of Ecology, Washington has experienced unusually dry periods almost every year since 2000 (Washington Department of Ecology, 2007).

The potential for water shortages may increase as the timing and duration of precipitation events change. Winter snowpack is crucial to water resource management strategies in Washington and much of the west. Some projections indicate that snowpack in the Cascade Mountain range may decrease as much as 40 percent by the 2040s (Payne et al., 2004). The Washington State Department of Ecology reports that the average mountain snowpack in the North Cascades has declined at 73 percent of mountain sites studied (Washington Department of Ecology, 2007). These declines impact social, natural and built systems within and surrounding Clark County. For example, summer hydropower production may decline 9 to 11 percent by the 2020s, while summer demand for energy increases, due to higher electricity needs from an increase in cooling days coupled with population growth (Washington Department of Ecology, 2012). Additionally, snowmelt is pivotal for the recharge of underground water supply. A decreased snowpack and increased winter rain could create greater stormwater runoff (as opposed to a slow recharge). Increased temperatures in the summer, along with less summer rainfall, would then lead to drier soil. This could lead to wells going dry, as well as potential conflicts over senior water rights and new water rights (Washington Department of Ecology, 2016a).

Historically, drought patterns in the West are related to large-scale climate patterns in the Pacific and Atlantic oceans. The El Niño–Southern Oscillation in the Pacific varies on a 5- to 7-year cycle, the Pacific Decadal Oscillation varies on a 20- to 30-year cycle, and the Atlantic Multidecadal Oscillation varies on a 65- to 80-year cycle. As these large-scale ocean climate patterns vary in relation to each other, drought conditions in the U.S. shift from region to region. El Niño years bring drier conditions to the Pacific Northwest.

Water resource managers need to start addressing current stresses on water supplies and build flexibility and robustness into existing systems. Flexibility helps to ensure a quick response to changing conditions, and robustness helps people prepare for and survive the worst conditions. Washington State’s Integrated Climate Response Strategy identifies five strategies for water resource management in response to a changing climate (Washington Department of Ecology, 2016a):

- Use integrated water resource management approaches in highly vulnerable basins.
- Involve decision-makers and communities in finding balanced sustainable solutions.
- Improve water supply and water quality in vulnerable basins.
- Apply water conservation and efficiency programs to reduce the amount of water needed for irrigation, municipal, and industrial users.

- Build the capacity of state and local governments, tribes, watershed groups, water managers, and communities to identify risks and reduce vulnerability to climate impacts.

With this approach to planning, water system managers will be better able to adapt to the impacts of climate change.

8.7 SCENARIO

The worst-case scenario is an extreme multiyear drought impacting the region. Combinations of low summer precipitation and low winter snowpack accumulation could stretch water resources, resulting in increased pressures to meet all users' needs. Intensified by such conditions, wildfires could threaten the planning area, increasing the need for water. Surrounding communities, also in drought conditions, could increase their demand for water supplies relied upon by Clark County, causing social and political conflicts. If such conditions persist for several years, the local economy could experience setbacks, especially in water-dependent industries and on local farms.

8.8 ISSUES

The planning team identified the following drought-related issues:

- Changes in the timing, frequency and duration of precipitation events may present challenges for current water storage and management practices in the region. Climate change may also increase the frequency and duration of meteorological drought conditions.
- Water resource management strategies have changed significantly over the last several decades. Managers must now consider the needs of communities, industries, power-generating facilities and the environment. Issues associated with meeting the needs of these competing demands with limited resources will likely increase as population growth continues and the impacts of climate change intensify.
- The use and promotion of water-saving and reclamation technologies even during non-drought periods may decrease the effects of drought in the planning area.
- Recent droughts have resulted in the need to stop pumping from some water courses due to limited stream flow.
- Predicting droughts can be challenging, although warning systems are currently under development.

9. EARTHQUAKE

9.1 GENERAL BACKGROUND

9.1.1 How Earthquakes Happen

An earthquake is the vibration of the earth's surface following a release of energy in the earth's crust. This energy can be generated by a sudden dislocation of the crust or by a volcanic eruption. Most destructive quakes are caused by dislocations of the crust. The crust may first bend and then, when the stress exceeds the strength of the rocks, break and snap to a new position. In the process of breaking, vibrations called "seismic waves" are generated. These waves travel outward from the source of the earthquake at varying speeds.

Earthquakes tend to reoccur along faults, which are zones of weakness in the crust. Even if a fault zone has recently experienced an earthquake, there is no guarantee that all the stress has been relieved. Another earthquake could still occur.

9.1.2 Types of Earthquakes

The earth's crust is divided into eight major pieces (or plates) and many minor plates. In Western Washington, the primary plates of interest are the Juan De Fuca and North American plates. The Juan De Fuca plate moves northeastward with respect to the North America plate at a rate of about 3 to 4 centimeters per year. The boundary where these two plates converge, the Cascadia Subduction Zone, lies approximately 50 miles offshore and extends from the middle of Vancouver Island in British Columbia to northern California. As it collides with North America, the Juan De Fuca plate slides beneath the continent and sinks into the earth's mantle. The collision of the Juan De Fuca and North America plates produces three types of earthquakes, as shown on Figure 9-1 and described below.

Subduction Zone Earthquakes

Subduction Zone earthquakes occur at the interface between tectonic plates. A subduction zone earthquake affecting Clark County would be centered in the Cascadia Subduction zone off the coast of Washington or Oregon. Such earthquakes typically have a minute or more of strong ground shaking, and are quickly followed by damaging tsunamis and numerous large aftershocks. The potential exists for large earthquakes along the Cascadia Subduction Zone, up to an earthquake measuring 9 or more on the Richter scale. This could cause coastal areas to drop up to 6 feet in minutes and could produce a tsunami all along the fault line from British Columbia to Mendocino, California. Such an earthquake would last several minutes and produce catastrophic damage in the region.

Source: USGS

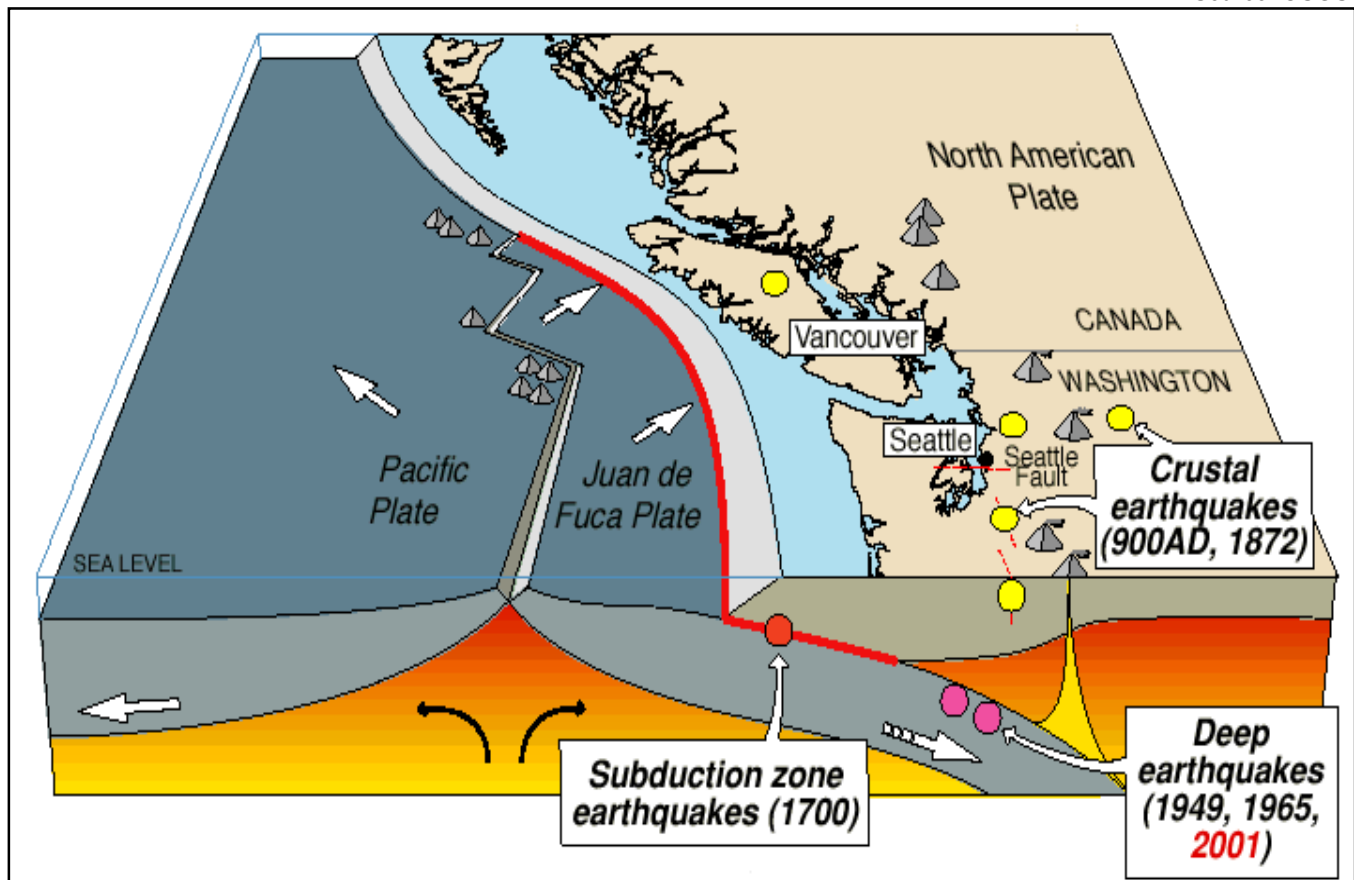


Figure 9-1. Earthquake Types in the Pacific Northwest

Benioff Zone (Deep) Earthquakes

Benioff Zone earthquakes occur within the Juan De Fuca plate as it sinks into the Earth's mantle. These are primarily deep earthquakes, 25 to 100 kilometers in depth. Due to their depth, aftershocks are typically not felt in association with these earthquakes. These earthquakes are caused by mineral changes as the plate moves deeper into the mantle. Minerals that make up the plates are altered to denser, more stable forms as temperature and pressure increase. This results in a decrease in the size of the plate, and stresses build up that pull the plate apart (Washington Department of Natural Resources, 2014). Deep earthquakes generally last 20 to 30 seconds and have the potential of reaching 7.5 on the Richter scale. Geologists have concluded that Benioff earthquakes are a phenomenon centered in the Puget Sound basin and as such their epicenters are at a considerable distance from Clark County. Their impact on Clark County is expected to be minimal to moderate (CRESA 2004).

Shallow Crustal Earthquakes

Shallow crustal earthquakes occur within the North America plate at depths of 30 kilometers or less. Shallow earthquakes within the North America plate account for most of the earthquakes in the region around Clark County. Most are relatively small but the potential exists for major shallow earthquakes as well. Generally, these earthquakes are expected to have magnitudes less than 8 and last from 20 to 60 seconds. Of the three types of earthquake, crustal events are the least understood.

9.1.3 Faults

Geologists classify faults by their relative hazards. Active faults, which represent the highest hazard, are those that have ruptured to the ground surface within the last 11,000 years. Potentially active faults are those that displaced layers of rock within the last 1,800,000 years. Determining if a fault is “active” or “potentially active” depends on geologic evidence, which may not be available for every fault. Additionally, earthquakes may occur on faults that have not been mapped and identified.

Faults are more likely to have earthquakes on them if they have more rapid rates of movement, have had recent earthquakes along them, experience greater total displacements, and are aligned so that movement can relieve accumulating tectonic stresses. A direct relationship exists between a fault’s length and location and its ability to generate damaging ground motion at a given site. In some areas, smaller, local faults produce lower magnitude quakes, but ground shaking can be strong, and damage can be significant as a result of the fault’s proximity to the area. In contrast, large regional faults can generate great magnitudes but, because of their distance and depth, may result in only moderate shaking in the area.

9.1.4 Earthquake Classifications

Earthquakes are typically classified in one of two ways: By the amount of energy released, measured as **magnitude**; or by the impact on people and structures, measured as **intensity**. Magnitude describes the size at the focus of an earthquake and intensity describes the overall felt severity of shaking during the event.

Magnitude

An earthquake’s magnitude is a measure of the energy released at the source of the earthquake. It is expressed by ratings on the Richter scale or the moment magnitude scale. Currently the most commonly used magnitude scale is the moment magnitude (M_w) scale, with the follow classifications of magnitude:

- Great— $M_w \geq 8$
- Major— $M_w = 7.0 - 7.9$
- Strong— $M_w = 6.0 - 6.9$
- Moderate— $M_w = 5.0 - 5.9$
- Light— $M_w = 4.0 - 4.9$
- Minor— $M_w = 3.0 - 3.9$
- Micro— $M_w < 3$

Estimates of moment magnitude roughly match the local magnitude scale (ML) commonly called the Richter scale. One advantage of the moment magnitude scale is that, unlike other magnitude scales, it does not saturate at the upper end. That is, there is no value beyond which all large earthquakes have about the same magnitude. For this reason, moment magnitude is now the most often used estimate of large earthquake magnitudes.

Intensity

The intensity of an earthquake is based on the observed effects of ground shaking on people, buildings and natural features. Intensity of a given earthquake varies with location. The Modified Mercalli (MMI) scale expresses intensity of an earthquake and describes how strong a shock was felt at a particular location. Table 9-1 summarizes earthquake intensity as expressed by the Modified Mercalli scale.

Table 9-1. Mercalli Scale and Peak Ground Acceleration Comparison

Modified Mercalli Scale	Perceived Shaking	Potential Structure Damage		Estimated PGA ^a (%g)
		Resistant Buildings	Vulnerable Buildings	
I	Not Felt	None	None	<0.17%
II-III	Weak	None	None	0.17% - 1.4%
IV	Light	None	None	1.4% - 3.9%
V	Moderate	Very Light	Light	3.9% - 9.2%
VI	Strong	Light	Moderate	9.2% - 18%
VII	Very Strong	Moderate	Moderate/Heavy	18% - 34%
VIII	Severe	Moderate/Heavy	Heavy	34% - 65%
IX	Violent	Heavy	Very Heavy	65% - 124%
X – XII	Extreme	Very Heavy	Very Heavy	>124%

a. PGA measured in percent of g, where g is the acceleration of gravity

Sources: USGS, 2008; USGS, 2010

9.1.5 Ground Motion

Earthquake hazard assessment is also based on expected ground motion. This involves determining the annual probability that certain ground motion accelerations will be exceeded, then summing the annual probabilities over the time period of interest. The most commonly mapped ground motion parameters are the horizontal and vertical peak ground accelerations (PGA) for a given soil or rock type. Instruments called accelerographs record levels of ground motion due to earthquakes at stations throughout a region. These readings are recorded by state and federal agencies that monitor and predict seismic activity.

Maps of PGA values form the basis of seismic zone maps that are included in building codes such as the International Building Code. Building codes that include seismic provisions specify the horizontal force due to lateral acceleration that a building should be able to withstand during an earthquake. PGA values are directly related to these lateral forces that could damage “short period structures” (e.g. single-family dwellings). Longer period response components determine the lateral forces that damage larger structures with longer natural periods (apartment buildings, factories, high-rises, bridges). Table 9-1 lists damage potential and perceived shaking by PGA factors, compared to the Mercalli scale.

9.1.6 Effect of Soil Types

The impact of an earthquake on structures and infrastructure is largely a function of ground shaking, distance from the source of the quake, and liquefaction, a secondary effect of an earthquake in which soils lose their shear strength and flow or behave as liquid, thereby damaging structures that derive their support from the soil. Liquefaction generally occurs in soft sedimentary soils. A program called the National Earthquake Hazard Reduction Program (NEHRP) creates maps based on soil characteristics to help identify locations subject to liquefaction. Table 9-2 summarizes NEHRP soil classifications. NEHRP Soils B and C typically can sustain ground shaking without much effect, dependent on the earthquake magnitude. The areas that are commonly most affected by ground shaking have NEHRP Soils D, E and F. In general, these areas are also most susceptible to liquefaction.

Table 9-2. NEHRP Soil Classification System

NEHRP Soil Type	Description	Mean Shear Velocity to 30 m (m/s)
A	Hard Rock	1,500
B	Firm to Hard Rock	760-1,500
C	Dense Soil/Soft Rock	360-760
D	Stiff Soil	180-360
E	Soft Clays	< 180
F	Special Study Soils (liquefiable soils, sensitive clays, organic soils, soft clays >36 m thick)	

9.2 HAZARD PROFILE

9.2.1 Past Events

Like most of the northwestern coast of the United States, Clark County is susceptible to Cascadia Subduction Zone events, which are generally major in scale. On January 26, 1700, an approximate Magnitude 9 Cascadia Subduction Zone earthquake occurred. This earthquake inundated coastal areas from British Columbia to northern California and lowered coastal land elevations by as much as 6 feet (CRESA 2004).

Clark County has also been susceptible to shallow, crustal earthquakes. The 1872 earthquake in the North Cascades was the largest crustal earthquake in the recorded history of Washington and Oregon. It had an estimated magnitude of 7.4 and was followed by many aftershocks. In 1993, a Magnitude 5.6 earthquake in the Willamette Valley of Oregon caused \$28 million in damage, including damage to the Oregon State capital building in Salem. A pair of earthquakes near Klamath Falls, Oregon of Magnitude 5.9 and 6.0 caused two fatalities and \$7 million in damage (CRESA 2004).

The two most damaging Benioff earthquakes in Washington occurred in 1949 and 1965. The 1949 earthquake occurred near Olympia and had a magnitude of 7.1. The earthquake of 1965 occurred between Seattle and Tacoma with a magnitude of 6.5. These were centered in the Puget Sound region and had little impact on Clark County (CRESA 2004).

On February 28, 2001, the Nisqually earthquake, with a magnitude of 6.8, occurred northeast of Olympia, Washington. Most of the damage was concentrated in localized areas in central Puget Sound with poor site conditions and older construction. This earthquake caused minor damage in some areas of Clark County as well (CRESA 2004).

The USGS notes a moderately strong earthquake on November 5, 1962. This earthquake reportedly caused minor damage in Vancouver, Washington and nearby towns. The Magnitude 4.75 event was felt over an approximately 20,000-square-mile area (USGS, 1978).

Figure 9-2 is a Washington State map of historical earthquakes in the state. Most of the events were well north of Clark County, though some smaller magnitude events occurred in the county. Larger magnitude events that occurred in the surrounding region may also have been felt by Clark County residents.

Source: Washington Emergency Management Division, 2013

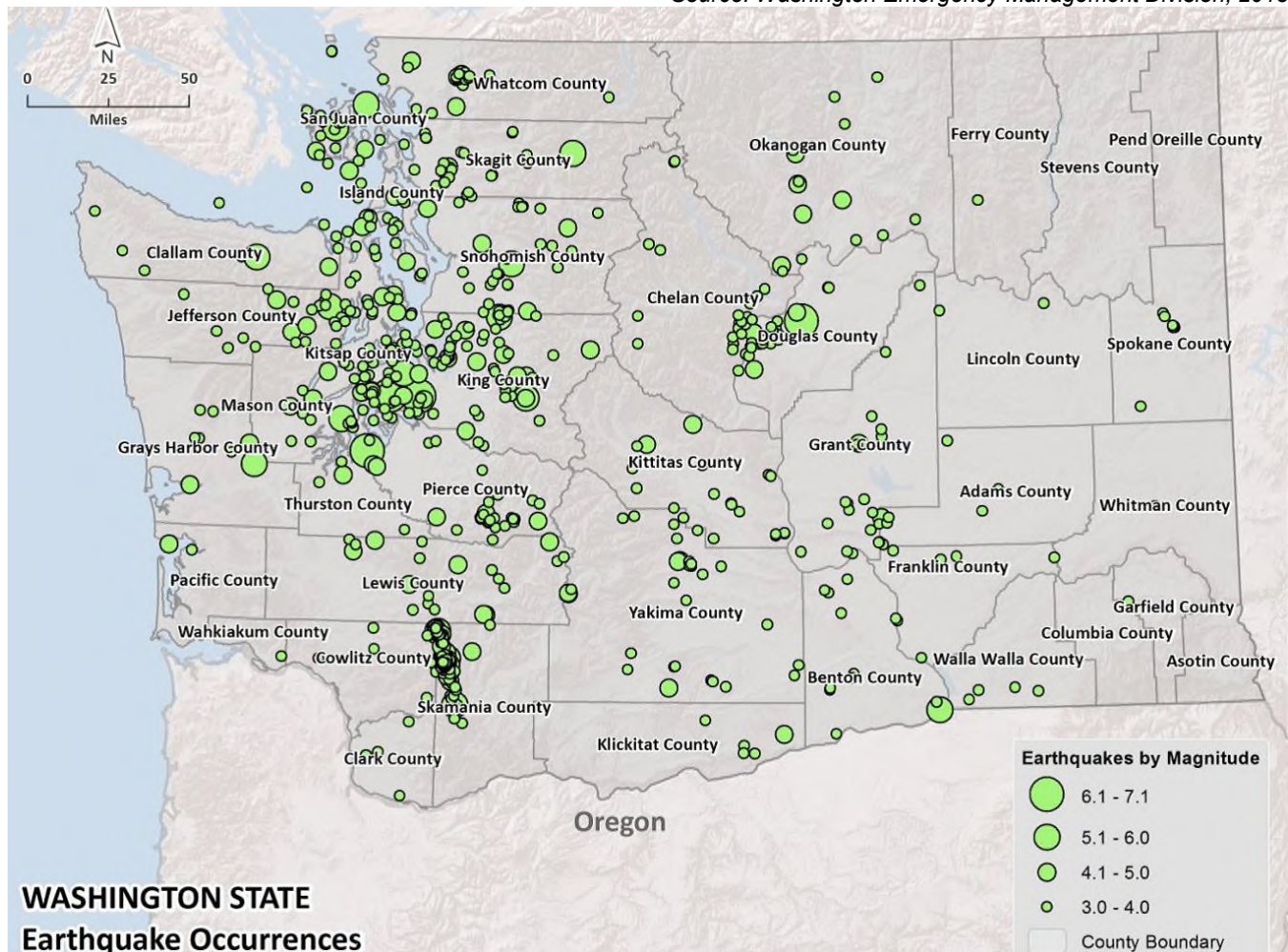


Figure 9-2. Historic Earthquakes in Washington State

9.2.2 Location

Identifying the extent and location of an earthquake is not as simple as it is for hazards such as flood, landslide or wildfire. The impact of an earthquake is largely a function of the following components:

- Ground shaking (ground motion accelerations)
- Liquefaction (soil instability)
- Distance from the source (both horizontally and vertically).

Mapping that shows the impacts of these components was used to assess the risk of earthquakes within the planning area as described below. While the impacts from each of these components can build upon each other during an earthquake, the mapping looks at each component individually.

Identified Faults

In 1993, the U.S. Geological Survey began developing a database of Quaternary faults and folds in the United States. The database includes information on geographic, geologic, and seismic parameters for making assessments of seismic hazards. There is only one known fault within Clark County: the Lacamas Lake Fault. The

geologic age of the fault is estimated to be greater than 750,000 years (mid- to late-Quaternary) and the magnitude of an event on the fault is likely to be about 6.5 (USGS, 2014).

Faults outside the planning area but nearby, such as the Portland Hills fault in northern Oregon, may also cause damage in Clark County. The Portland Hills fault is about 30-miles long and runs northwest to southeast through Portland (CRESA 2004). Geophysical studies suggest that earthquakes of Magnitude 6 or larger should occur in the Portland region every 300 to 350 years, and an event of Magnitude 6.5 or larger every 800 to 900 years (CRESA, 2011). Figure 9-3 shows the identified faults in and near the planning area.

Source: <http://earthquake.usgs.gov/hazards/qfaults/map/>

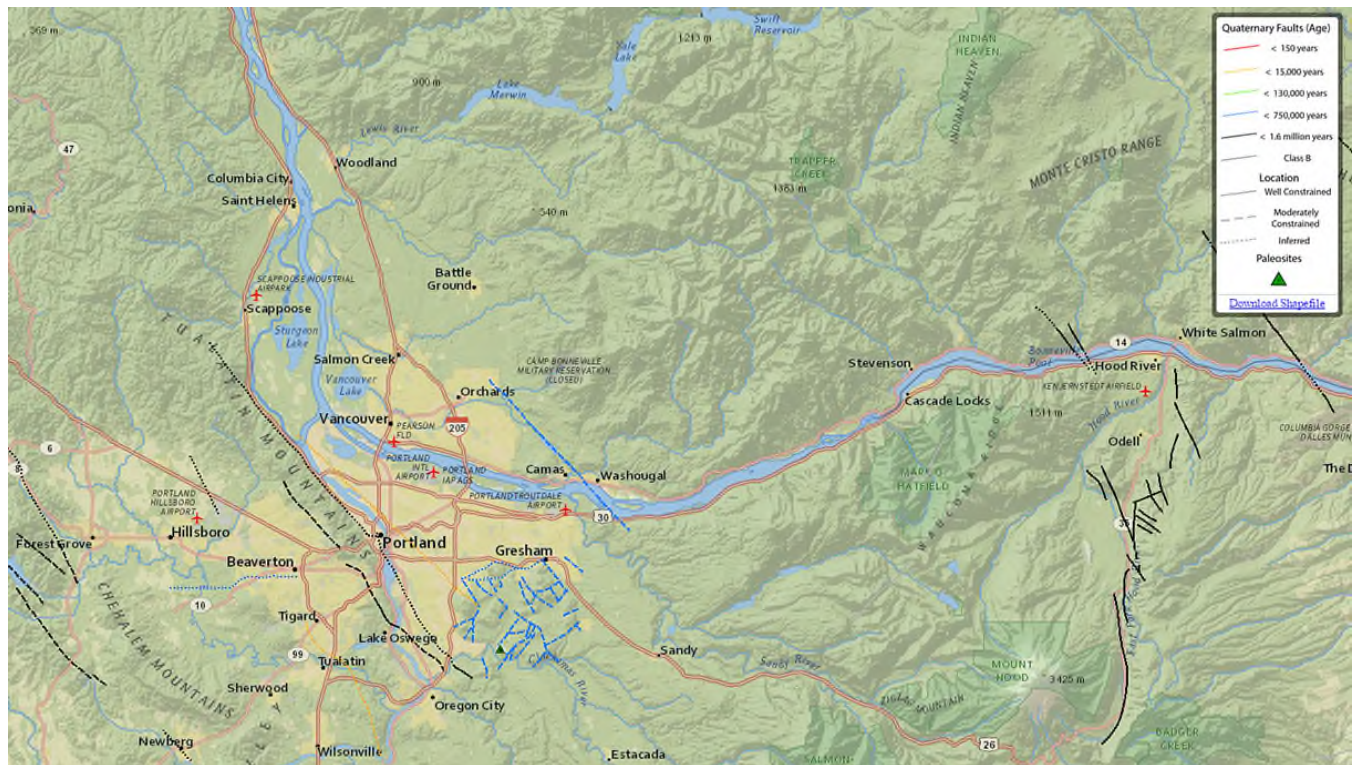


Figure 9-3. Planning Area Active Faults and Folds

Shake Maps

A shake map is a representation of ground shaking produced by an earthquake. The information it presents is different from the earthquake magnitude and epicenter that are released after an earthquake because shake maps focus on the ground shaking resulting from the earthquake, rather than the parameters describing the earthquake source. An earthquake has only one magnitude and one epicenter, but it produces a range of ground shaking at sites throughout the region, depending on the distance from the earthquake, the rock and soil conditions at sites, and variations in the propagation of seismic waves from the earthquake due to complexities in the structure of the earth's crust. A shake map shows the extent and variation of ground shaking in a region immediately following significant earthquakes.

Ground motion and intensity maps are derived from peak ground motion amplitudes recorded on seismic sensors (accelerometers), with interpolation based on estimated amplitudes where data are lacking, and site amplification corrections. Color-coded instrumental intensity maps are derived from empirical relations between peak ground motions and Modified Mercalli intensity. Two types of shake map are typically generated from the data:

- A probabilistic seismic hazard map shows the hazard from earthquakes that geologists and seismologists agree could occur. The maps are expressed in terms of probability of exceeding a certain ground motion, such as the 10-percent probability of exceedance in 50 years. This level of ground shaking has been used for designing buildings in high seismic areas. Figure 9-4 and Figure 9-5 show the estimated ground motion for the 100-year and 500-year probabilistic earthquakes in the planning area
- Earthquake scenario maps describe the expected ground motions and effects of hypothetical large earthquakes for a region. Maps of these scenarios can be used to support all phases of emergency management. Two scenarios were chosen for this plan:
 - Cascadia Subduction Zone Scenario—A Magnitude 9.0 event off the Pacific Coast. See Figure 9-6.
 - Portland Hills Fault Scenario—A Magnitude 6.5 event with the epicenter southwest of the planning area, near the border of Washington and Oregon. See Figure 9-7.

NEHRP Soil Maps

NEHRP soil types define locations that will be significantly impacted by an earthquake. NEHRP Soils B and C typically can sustain low-magnitude ground shaking without much effect. The areas most commonly affected by ground shaking have NEHRP Soils D, E and F. Figure 9-8 shows NEHRP soil classifications in Clark County.

Liquefaction Maps

Soil liquefaction maps are useful tools to assess potential damage from earthquakes. When the ground liquefies, sandy or silty materials saturated with water behave like a liquid, causing pipes to leak, roads and airport runways to buckle, and building foundations to be damaged. In general, areas with NEHRP Soils D, E and F are also susceptible to liquefaction. If there is a dry soil crust, excess water will sometimes come to the surface through cracks in the confining layer, bringing liquefied sand with it, creating sand boils. Figure 9-9 shows the liquefaction susceptibility in the planning area.

9.2.3 Frequency

Earthquake events occurring along the Cascadia Subduction Zone reoccur on average every 500 to 600 years, although the recurrence interval appears to be irregular. The intervals between earthquakes in this subduction zone have ranged from 200 years to more than 1,000 years. The probability of a magnitude 9.0 earthquake occurring along the subduction zone is estimated to be about 10 percent in the next 50 years (Cascadia Region Earthquake Workgroup, 2013).

A Portland Hills earthquake is a surface event with lower likelihood of occurrence, about 2 percent in the next 50 years (CRESA, 2004).

9.2.4 Severity

The severity of an earthquake can be expressed in terms of intensity or magnitude. Intensity represents the observed effects of ground shaking on people, buildings, and natural features. The USGS has created ground motion maps based on current information about several fault zones. These maps show the PGA that has a certain probability (2 percent or 10 percent) of being exceeded in a 50-year period. The PGA is measured in numbers of g's (the acceleration associated with gravity). Figure 9-10 shows the PGAs with a 2-percent exceedance chance in 50 years in the United States.

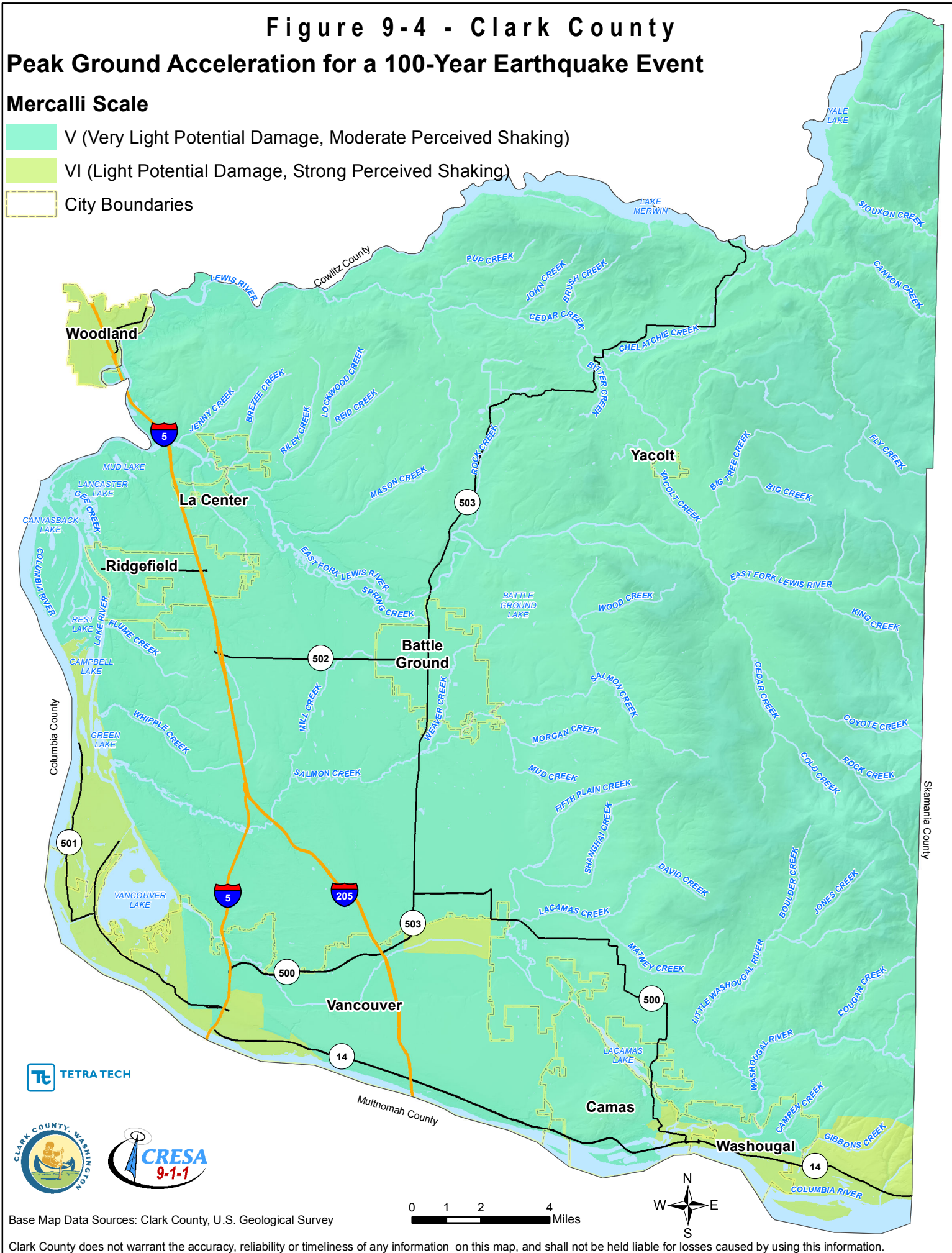
Magnitude is related to the amount of seismic energy released at the hypocenter of an earthquake. It is determined by the amplitude of the earthquake waves recorded on instruments. Whereas intensity varies depending on location with respect to the earthquake epicenter, magnitude is represented by a single, instrumentally determined value for each earthquake event.

Figure 9-4 - Clark County

Peak Ground Acceleration for a 100-Year Earthquake Event

Mercalli Scale

- V (Very Light Potential Damage, Moderate Perceived Shaking)
- VI (Light Potential Damage, Strong Perceived Shaking)
- City Boundaries



Base Map Data Sources: Clark County, U.S. Geological Survey

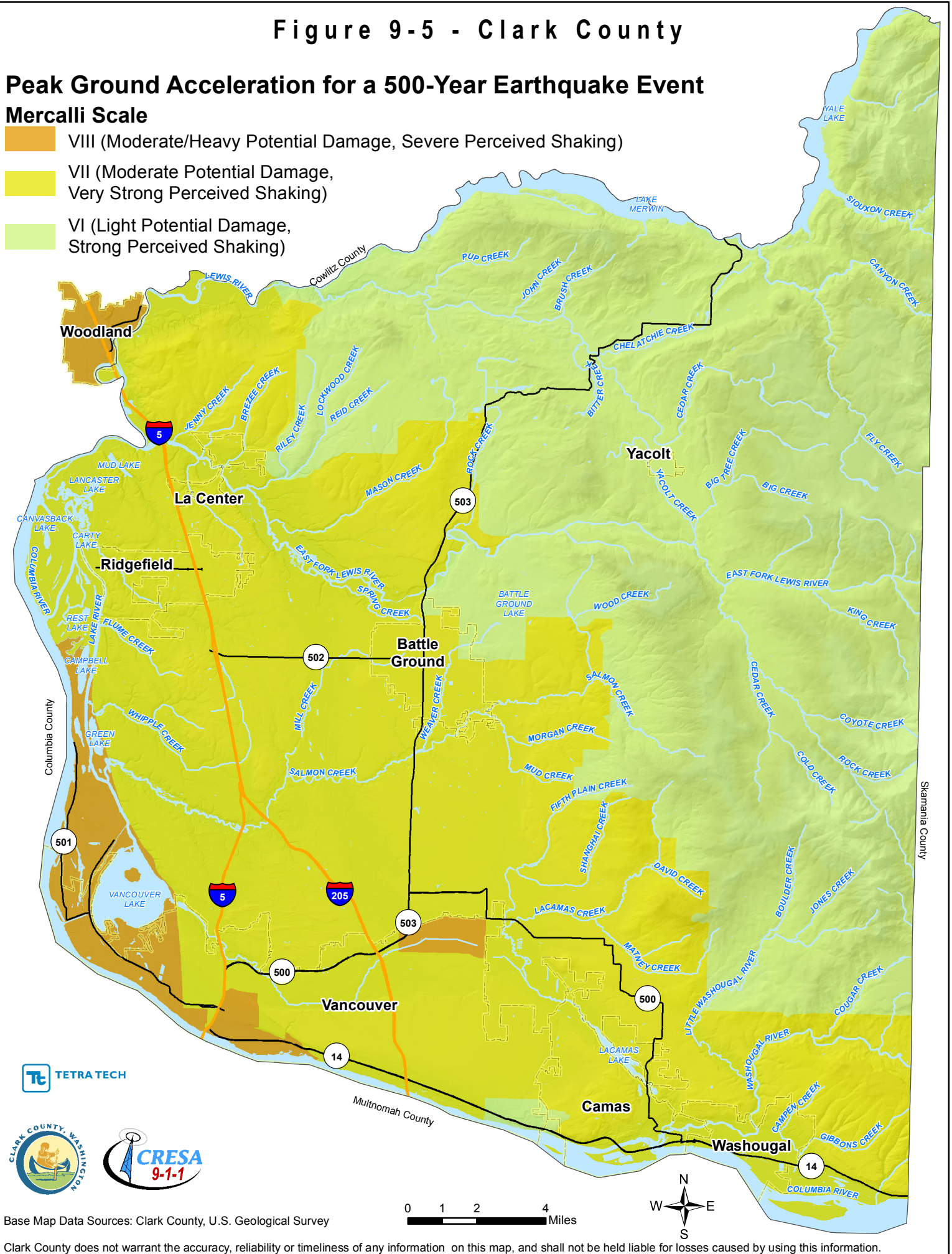
Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

Figure 9-5 - Clark County

Peak Ground Acceleration for a 500-Year Earthquake Event

Mercalli Scale

- VIII (Moderate/Heavy Potential Damage, Severe Perceived Shaking)
- VII (Moderate Potential Damage, Very Strong Perceived Shaking)
- VI (Light Potential Damage, Strong Perceived Shaking)




Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

Figure 9-6 - Clark County

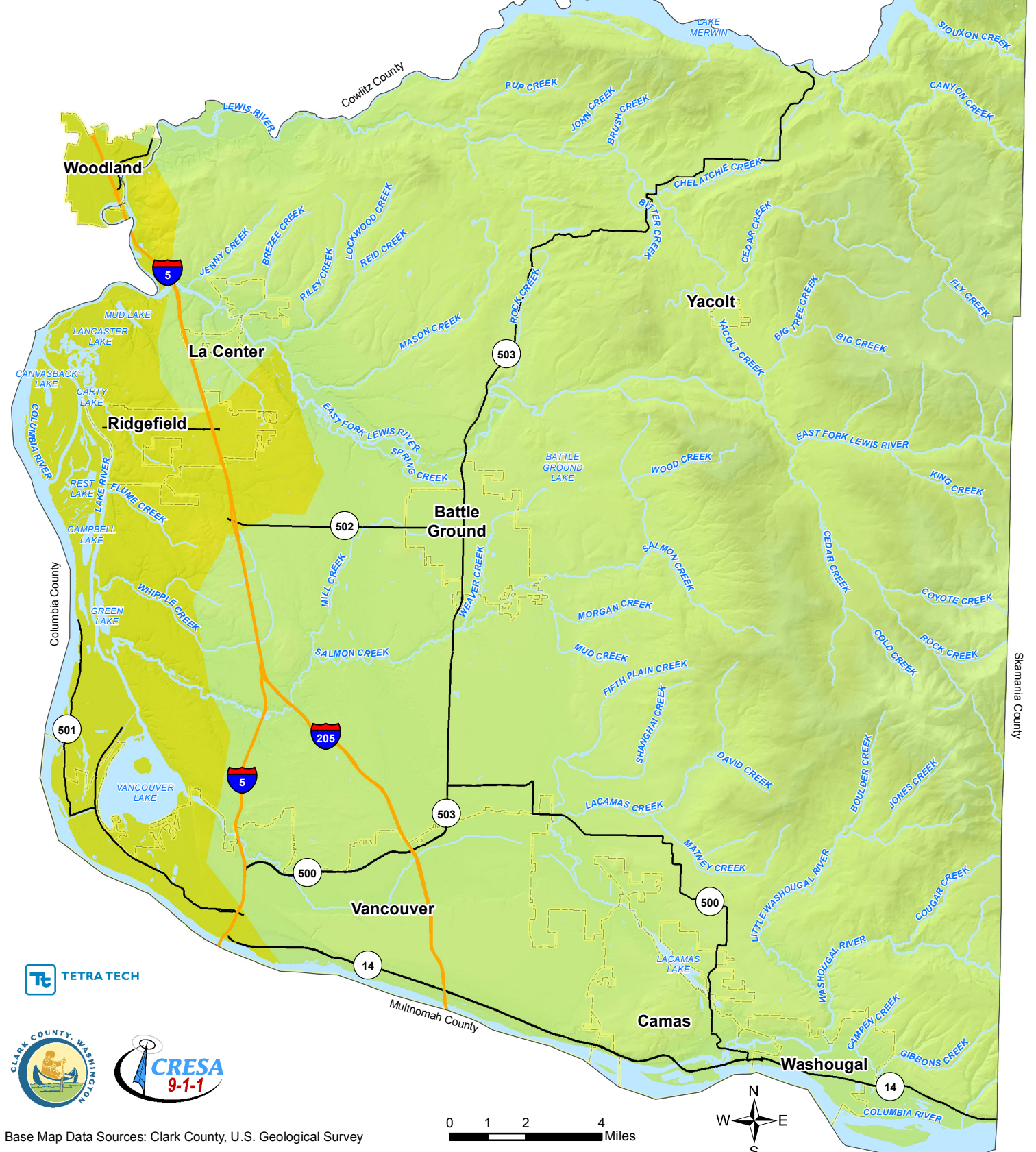
Cascadia M9.0 Scenario Peak Ground Acceleration

 City Boundaries

Mercalli Scale

 VI (Light Potential Damage, Strong Perceived Shaking)

 VII (Moderate Potential Damage, Very Strong Perceived Shaking)



Base Map Data Sources: Clark County, U.S. Geological Survey

0 1 2 4 Miles



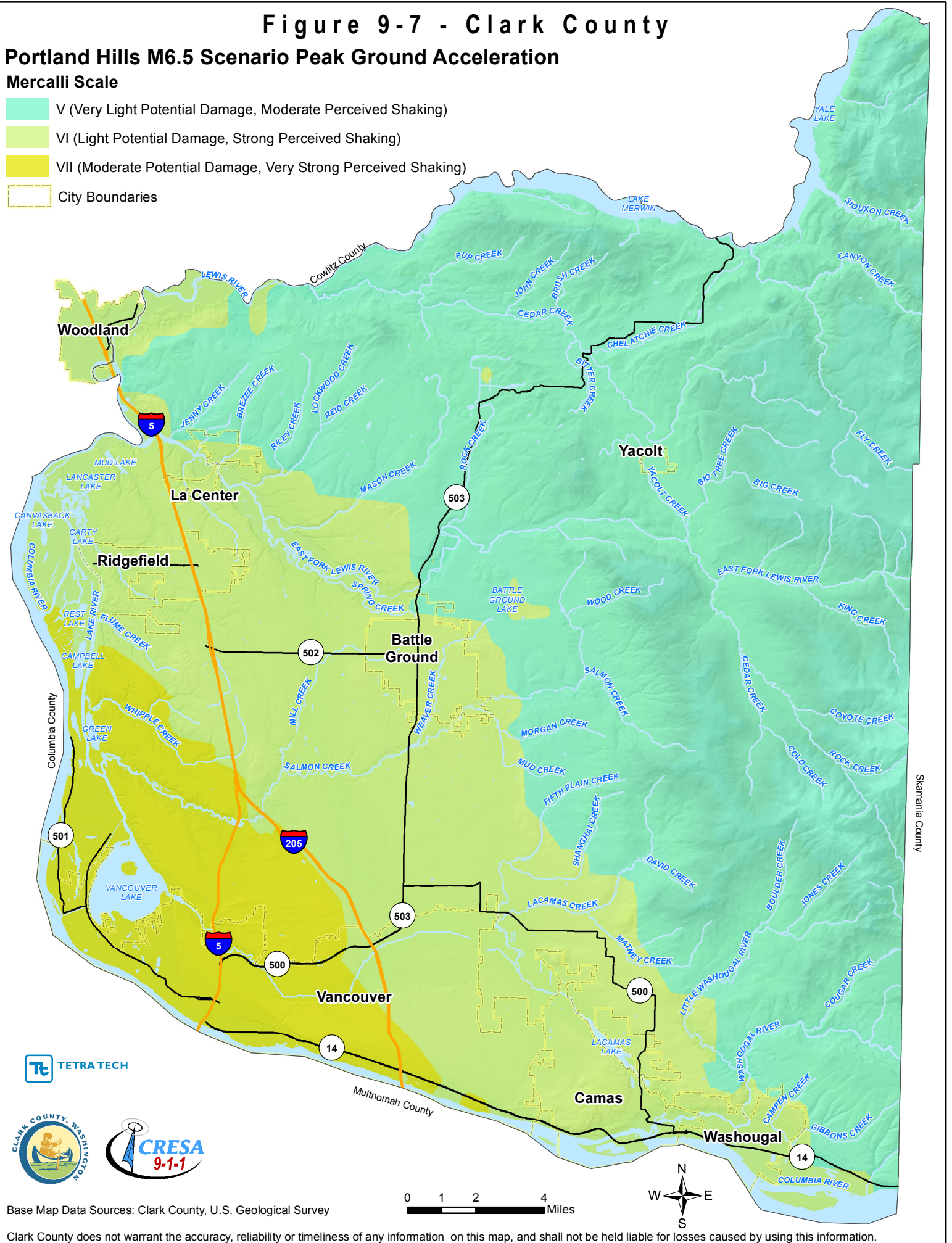
Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

Figure 9-7 - Clark County

Portland Hills M6.5 Scenario Peak Ground Acceleration

Mercalli Scale

- V (Very Light Potential Damage, Moderate Perceived Shaking)
- VI (Light Potential Damage, Strong Perceived Shaking)
- VII (Moderate Potential Damage, Very Strong Perceived Shaking)
- City Boundaries




Base Map Data Sources: Clark County, U.S. Geological Survey


Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

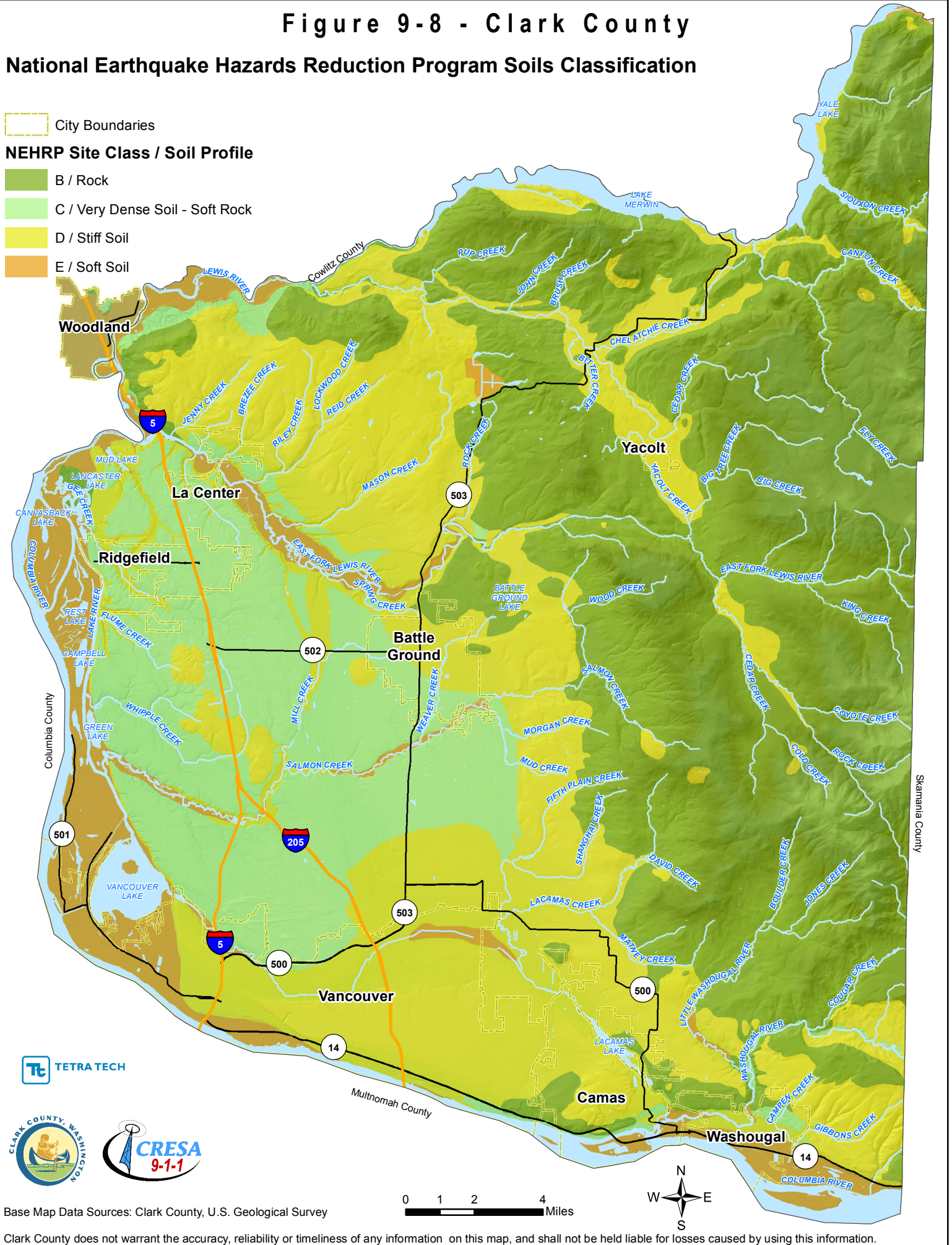
Figure 9-8 - Clark County

National Earthquake Hazards Reduction Program Soils Classification

 City Boundaries

NEHRP Site Class / Soil Profile

-  B / Rock
-  C / Very Dense Soil - Soft Rock
-  D / Stiff Soil
-  E / Soft Soil



Base Map Data Sources: Clark County, U.S. Geological Survey

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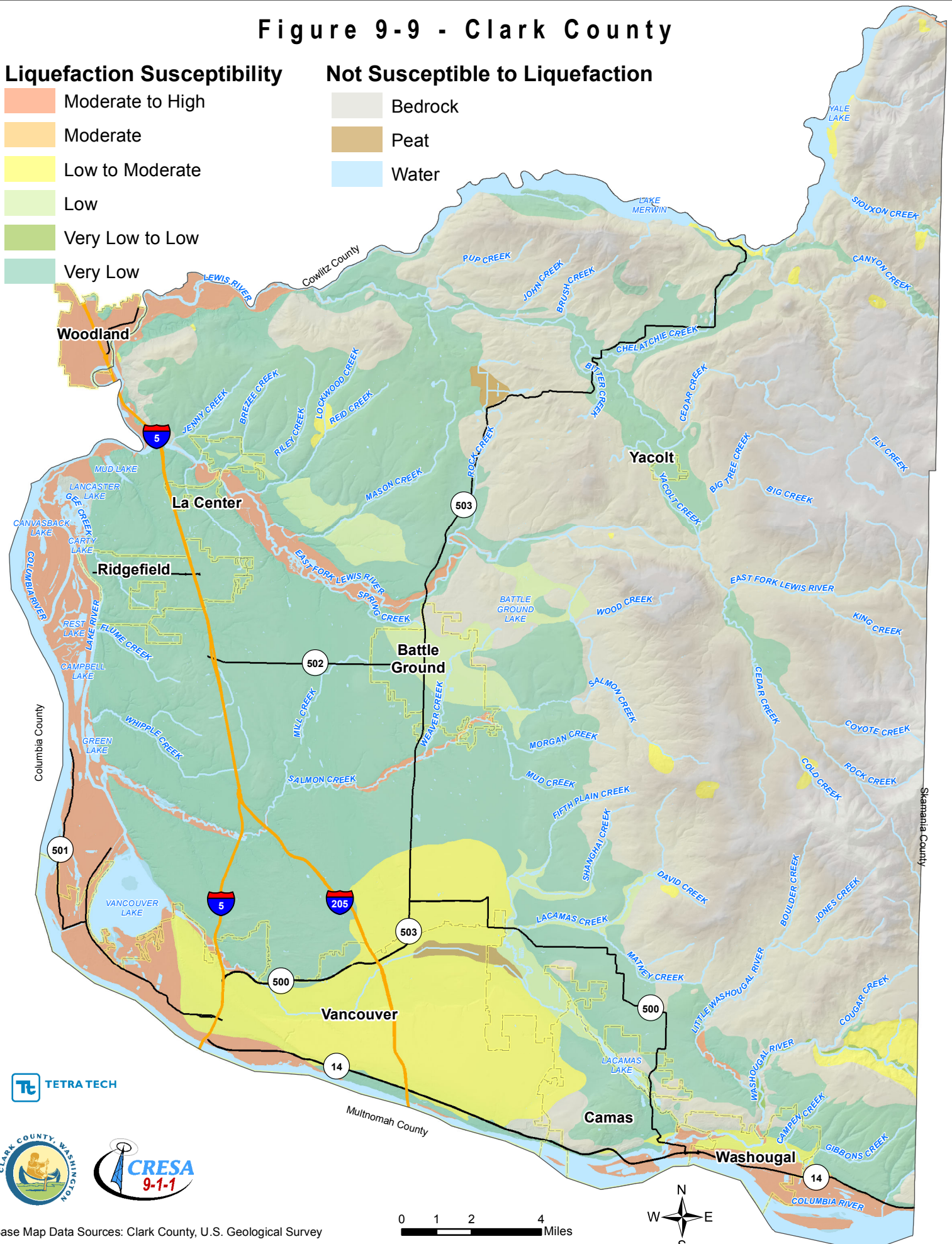
Figure 9-9 - Clark County

Liquefaction Susceptibility

- Moderate to High
- Moderate
- Low to Moderate
- Low
- Very Low to Low
- Very Low

Not Susceptible to Liquefaction

- Bedrock
- Peat
- Water



Base Map Data Sources: Clark County, U.S. Geological Survey

0 1 2 4 Miles



Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

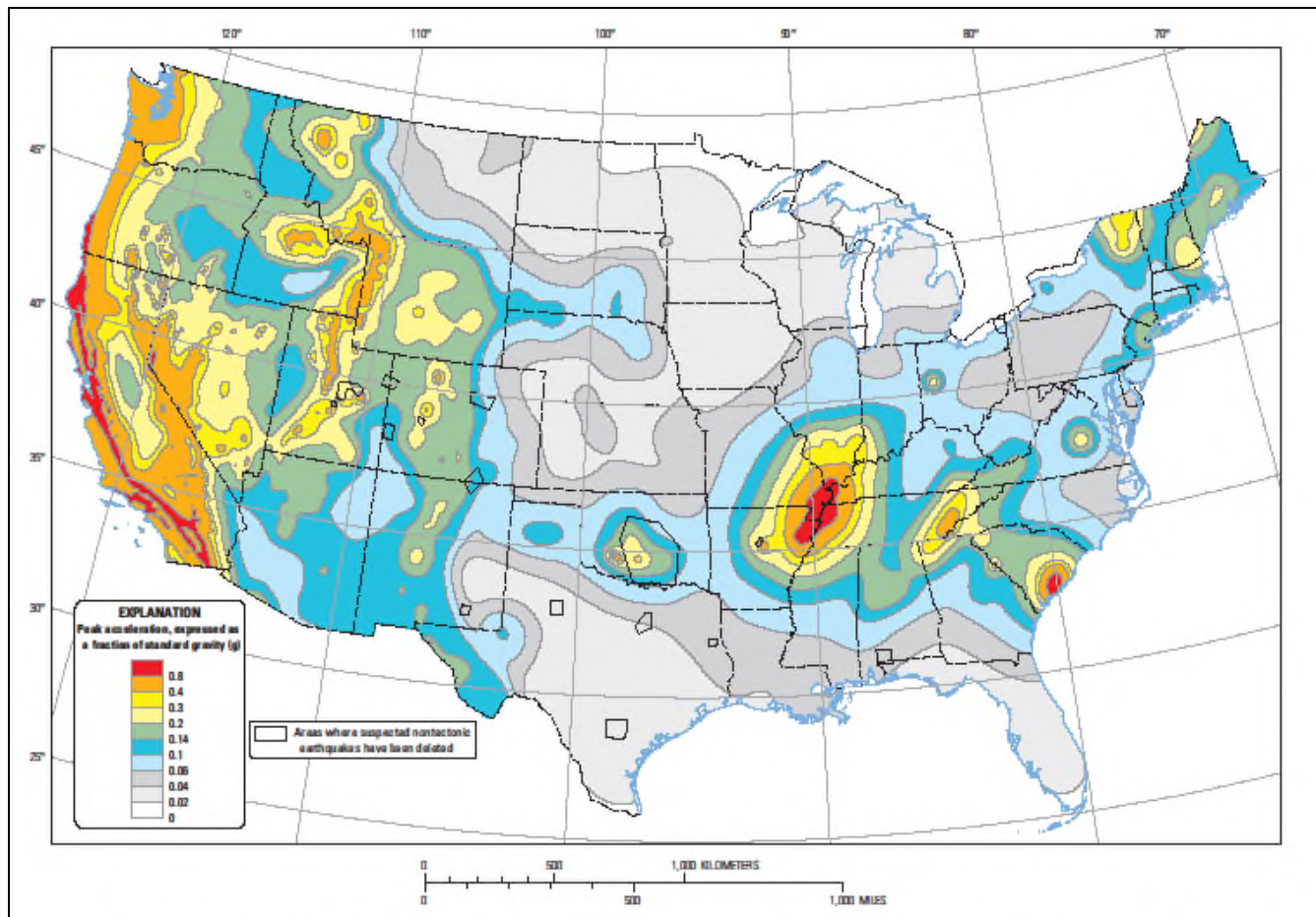


Figure 9-10. PGA with 2-Percent Probability of Exceedance in 50 Years

In simplistic terms, the severity of an earthquake event can be measured in the following terms:

- How hard did the ground shake?
- How did the ground move? (Horizontally or vertically)
- How stable was the soil?
- What is the fragility of the built environment in the area of impact?

9.2.5 Warning Time

There is currently no reliable way to predict the day or month that an earthquake will occur at any given location. Research is being done with warning systems that use the low energy waves that precede major earthquakes. The USGS and university partners are developing and testing an early warning system called ShakeAlert for the West Coast of the United States. The potential warning ranges from a few seconds to tens of seconds notice that a major earthquake is about to occur (Earthquake Early Warning, 2016). The warning time is very short but it could allow for someone to get under a desk, step away from a hazardous material they are working with, or shut down a computer system.

Although the warning system is not yet being publically tested, it is known that aftershocks are likely after both subduction and Portland Hills events, so there might be some preparation for these. It is likely that aftershocks may be close in timing to the actual earthquake event (CRESA, 2004).

9.3 SECONDARY HAZARDS

Earthquakes can cause large and sometimes disastrous landslides and mudslides. River valleys are vulnerable to slope failure, often as a result of loss of cohesion in clay-rich soils. Soil liquefaction occurs when water-saturated sands, silts or gravelly soils are shaken so violently that the individual grains lose contact with one another and float freely in the water, turning the ground into a pudding-like liquid. Building and road foundations lose load-bearing strength and may sink into what was previously solid ground. Unless properly secured, hazardous materials can be released, causing significant damage to the environment and people. Earthen dams and levees are highly susceptible to seismic events and the impacts of their eventual failures can be considered secondary risks for earthquakes. Disruptions in utility services, including power, communication, gas, wastewater and potable water, may also occur. Structure fires also pose a significant hazard after earthquake events.

9.4 EXPOSURE

9.4.1 Population

The entire population of Clark County is potentially exposed to direct and indirect impacts from earthquakes. The degree of exposure is dependent on many factors, including the age and construction type of the structures people live in, the soil type their homes are constructed on, their proximity to fault location, etc. Whether directly impacted or indirectly impacted, the entire population will have to deal with the consequences of earthquakes to some degree. Business interruption could keep people from working, road closures could isolate populations, and loss of functions of utilities could impact populations that suffered no direct damage from an event itself.

9.4.2 Property

According to County Assessor records, there are 149,741 buildings in the planning area, with a total replacement value of \$113.5 billion. Since all structures in the planning area are susceptible to earthquake impacts to varying degrees, this total represents the countywide property exposure to seismic events. Most of the buildings (approximately 95 percent) are residential.

9.4.3 Critical Facilities and Infrastructure

All critical facilities in the planning area are exposed to the earthquake hazard. Table 4-5 lists the number of each type of facility by jurisdiction.

9.4.4 Environment

Secondary hazards associated with earthquakes will likely have some of the most damaging effects on the environment. Earthquake-induced landslides can significantly impact surrounding habitat. It is also possible for streams to be rerouted after an earthquake. This can change water quality, possibly damaging habitat and feeding areas. There is a possibility of streams fed by groundwater drying up because of changes in underlying geology or that new flows may be released. Major concentrations of hazardous materials on port industrial lands along the Columbia River shoreline upriver of the Lake Vancouver wetland area and the Ridgefield National Wildlife Refuge create significant exposure for the natural environment (CRESA 2004).

9.5 VULNERABILITY

Earthquake vulnerability data was evaluated using a Level 2 Hazus-MH analysis. Once the location and size of a hypothetical earthquake are identified, Hazus-MH estimates the intensity of the ground shaking, the number of buildings damaged, the damage to critical facilities and infrastructure, the number of people displaced from their homes, and additional information that can be used to estimate the costs of repair and cleanup.

9.5.1 Population

There are estimated to be 35,010 people in over 13,093 households living on soils with moderate to high liquefaction potential or peat soils in the planning area. This is about 8 percent of the total population. Two groups are particularly vulnerable to earthquake hazards:

- Population Below Poverty Level**—An estimated 2,265 households in the planning area census blocks with moderate to high liquefaction potential or peat soils have household incomes less than \$20,000 per year. This is about 17 percent of all households located on moderate to high liquefaction potential or peat soils. These households may lack the financial resources to improve their homes to prevent or mitigate earthquake damage. Economically disadvantaged residents are also less likely to have insurance to compensate for losses in earthquakes.
- Population Over 65 Years Old**—An estimated 4,316 residents in the planning area census blocks with moderate to high liquefaction potential or peat soils are over 65 years old. This is about 12 percent of all residents in these census blocks. This population group is vulnerable because they are more likely to need special medical attention, which may not be available due to isolation caused by earthquakes. Elderly residents also have more difficulty leaving their homes during earthquake events and could be stranded in dangerous situations.

Impacts on persons and households in the planning area were estimated for the 100-year and 500-year earthquakes and the two scenario events through the Level 2 Hazus-MH analysis. Table 9-3 summarizes the results.

Table 9-3. Estimated Earthquake Impact on Persons and Households

	Number of Displaced Households	Number of Persons Requiring Short-Term Shelter
100-Year Earthquake	23	14
500-Year Earthquake	1,350	822
Cascadia Fault, M9.0 Scenario	345	215
Portland Hills Fault, M6.5 Scenario	142	91

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

9.5.2 Property

Building Age

Table 9-4 identifies significant milestones in building and seismic code requirements that directly affect the structural integrity of development. Using these time periods, the planning team used Clark County and Cowlitz County assessor’s data to identify the number of structures in the planning area by date of construction. The number of structures does not reflect the number of total housing units, as many multi-family units and attached housing units are reported as one structure. Approximately 23.8 percent of the planning area’s structures were constructed before there were state minimums regarding residential seismic construction standards. Approximately 41.8 percent were built after seismic Zone 3 standards were required.

Table 9-4. Age of Structures in Planning Area

Time Period	Number of Current Planning Area Structures Built in Period ^a	Significance of Time Frame
Pre-1972	35,664	Adoption of building codes was at the discretion of individual cities and counties. There were no state minimums regarding residential construction, although newly constructed schools, hospitals and places of assembly were required to withstand a lateral force of 5 percent of the building weight.
1972-1993	51,402	Houses built after 1972 are in compliance with the 1970 Uniform Building Code, which required that all structures be constructed to Zone 2 seismic standards.
1994-2003	38,146	Zone 3 standards of the Uniform Building Code went into effect in western Washington in 1994, requiring all new construction to be capable of withstanding the effects of 0.3 times the force of gravity.
2004-2006	12,858	Adoption of new codes that became effective in July of 2004 brought Washington State's building codes to the highest level nationwide addressing the state's seismic hazard.
2007-present	11,671	Amendments to the International Building Code that took effect in July of 2007 included provisions for structural design for earthquake loads and flood hazards. The code applies to all building permits in the state of Washington. The codes are driven in part by soil and liquefaction maps prepared.
Total	149,741	

a. Year built information was collected from Clark and Cowlitz County tax assessor data. When year built information was unavailable, it was estimated based on census block or county-wide average year built dates.

Source: Western States Seismic Policy Council, 2016

Liquefaction Potential

Table 9-5 shows the estimated number of structures located on moderate to high potential liquefaction areas or peat soils. There are estimated to be 2,234 such structures in the planning area that were built before 1972 (32.9 percent). An estimated 429 structures on liquefiable soils have been built since 2007 (6.3 percent).

Table 9-5. Structures Located on Moderate to High Liquefaction Potential

Jurisdiction	Structures on Liquefiable Soils	Total Structures	Percent of Total Structures
Battle Ground	0	5,854	0.0%
Camas	349	7,513	4.6%
La Center	0	1,110	0.0%
Ridgefield	54	2,328	2.3%
Vancouver	2,209	50,098	4.4%
Washougal	1,416	5,539	25.6%
Woodland	1,849	1,864	99.2%
Yacolt	0	533	0.0%
Unincorporated	894	74,902	1.2%
Total	6,771	149,741	4.5%

Loss Potential

Structural and Non-Structural Loss

Property losses were estimated through the Level 2 Hazus-MH analysis for the 100-year and 500-year earthquakes and the two scenario events. Table 9-6 and Table 9-7 show the results for two types of property loss: structural loss (damage to building structures); and non-structural loss (the value of lost contents).

Table 9-6. Loss Estimates for Probabilistic Earthquakes

Jurisdiction	Estimated Loss Associated with Earthquake							
	100- Year Earthquake				500- Year Earthquake			
	Structure	Contents	Total	% of Total Value	Structure	Contents	Total	% of Total Value
Battle Ground	\$7,702,384	\$2,504,623	\$10,207,007	0.3%	\$126,603,887	\$36,962,449	\$163,566,336	4.1%
Camas	\$21,150,784	\$7,508,475	\$28,659,259	0.4%	\$434,388,396	\$141,940,597	\$576,328,993	7.6%
La Center	\$1,669,746	\$557,716	\$2,227,461	0.3%	\$23,089,793	\$7,439,052	\$30,528,845	3.8%
Ridgefield	\$4,508,121	\$1,506,279	\$6,014,400	0.3%	\$81,460,429	\$25,484,320	\$106,944,749	5.2%
Vancouver	\$129,170,801	\$44,902,228	\$174,073,029	0.4%	\$2,883,634,647	\$871,943,387	\$3,755,578,034	7.8%
Washougal	\$15,754,583	\$5,214,119	\$20,968,702	0.5%	\$346,332,544	\$105,512,514	\$451,845,057	10.9%
Woodland	\$12,468,825	\$4,592,914	\$17,061,739	1.0%	\$247,836,758	\$89,373,231	\$337,209,990	19.0%
Yacolt	\$123,362	\$33,080	\$156,443	0.1%	\$1,973,430	\$755,599	\$2,729,028	0.9%
Unincorporated	\$60,313,915	\$18,209,930	\$78,523,845	0.2%	\$984,008,141	\$306,616,992	\$1,290,625,133	2.9%
Total	\$252,862,521	\$85,029,364	\$337,891,885	0.3%	\$5,129,328,025	\$1,586,028,142	\$6,715,356,166	5.9%

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

Table 9-7. Loss Estimates for Cascadia and Portland Hills Fault Scenario Earthquakes

Jurisdiction	Estimated Loss Associated with Earthquake							
	Cascadia Fault, M9.0				Portland Hills Fault, M6.5			
	Structure	Contents	Total	% of Total	Structure	Contents	Total	% of Total
Battle Ground	\$55,961,241	\$15,037,033	\$70,998,274	1.8%	\$12,565,086	\$6,270,833	\$18,835,919	0.5%
Camas	\$78,513,607	\$24,461,975	\$102,975,582	1.4%	\$28,095,911	\$13,994,049	\$42,089,959	0.6%
La Center	\$5,933,361	\$2,373,416	\$8,306,776	1.0%	\$626,988	\$386,700	\$1,013,688	0.1%
Ridgefield	\$50,081,043	\$13,081,752	\$63,162,795	3.0%	\$5,690,364	\$3,278,681	\$8,969,044	0.4%
Vancouver	\$1,096,996,587	\$262,385,378	\$1,359,381,965	2.8%	\$639,121,124	\$232,439,643	\$871,560,767	1.8%
Washougal	\$30,283,011	\$8,453,341	\$38,736,351	0.9%	\$10,958,868	\$5,712,285	\$16,671,153	0.4%
Woodland	\$87,133,236	\$23,773,277	\$110,906,513	6.2%	\$10,177,446	\$3,846,130	\$14,023,576	0.8%
Yacolt	\$949,658	\$455,241	\$1,404,899	0.5%	\$118,443	\$85,610	\$204,053	0.1%
Unincorporated	\$544,728,735	\$155,275,222	\$700,003,957	1.6%	\$325,936,412	\$133,643,686	\$459,580,098	1.0%
Total	\$1,950,580,479	\$505,296,633	\$2,455,877,112	2.2%	\$1,033,290,641	\$399,657,617	\$1,432,948,257	1.3%

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

A summary of the property-related loss results is as follows:

- For a 100-year probabilistic earthquake, the estimated damage potential is \$337.9 million, or 0.3 percent of the total replacement value for the planning area.
- For a 500-year probabilistic earthquake, the estimated damage potential is \$6.7 billion or 5.9 percent of the total replacement value for the planning area.
- For a 9.0-magnitude Cascadia Fault event, the estimated damage potential is \$2.5 billion, or 2.2 percent of the total replacement value for the planning area.
- For a 6.5-magnitude Portland Hills Fault event, the estimated damage potential is \$1.4 billion, or 1.3 percent of the total replacement value for the planning area.

Building Damage

Damage states vary for each type of structure. Moderate to very heavy damage will occur in older residential neighborhoods, business districts, communities with concentrations of non-seismically designed buildings, and areas built on soft soils. Particularly vulnerable are homes built before 1950, turn of the century un-reinforced masonry buildings, homes that were built prior to the 1970 Uniform Building Code that required anchoring to foundations, pre-1980 tilt-up buildings, and buildings with large windows or parking doors that weaken the first floor. Least vulnerable are structures built since 1994 when the earthquake Zone 3 standards of the Uniform Building Code were applied (CRESA 2004).

The Hazus-MH analysis estimated the expected building damage by occupancy for the least damaging and most damaging earthquake events—the 100-year and 500-year events, respectively.

- For a 100-year probabilistic earthquake, about 1 percent (1,267) of planning area buildings are expected to be at least moderately damaged. Less than 0.1 percent are expected to be damaged beyond repair.
- For a 500-year probabilistic earthquake, about 12.5 percent (almost 19,000) of planning area buildings are expected to be at least moderately damaged. Less than 1 percent (753) are expected to be damaged beyond repair, including more than 270 residential structures.

Damage would be especially severe in taller buildings, which would experience large displacements. The movement of taller buildings may damage adjacent buildings by pounding against them, causing significant damage to buildings that otherwise would have been undamaged (CRESA 2004).

Earthquake-Caused Debris

The Hazus-MH analysis estimated the amount of earthquake-caused debris in the planning area for the 100-year and 500-year earthquakes and the two scenario events, as summarized in Table 9-8.

Table 9-8. Estimated Earthquake-Caused Debris

	Debris to Be Removed (tons) ^a	Estimated Number of Truckloads ^b
100-Year Earthquake	94,070	3,763
500-Year Earthquake	2,416,280	96,651
Cascadia Fault, M9.0 Scenario	113,690	4,548
Portland Hills Fault, M6.5 Scenario	358,030	14,321

a. Debris generation estimates were based on updated general building stock dataset at a Census Tract analysis level.

b. Hazus-MH assumes 25 tons/trucks

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

9.5.3 Critical Facilities and Infrastructure

Level of Damage

Hazus-MH classifies the vulnerability of critical facilities to earthquake damage in five categories: no damage, slight damage, moderate damage, extensive damage, or complete damage. The model was used to assign a vulnerability category to each critical facility in the planning area. The analysis was performed for the Cascadia M9.0 scenario and 500-year probabilistic events. Results are summarized in Table 9-9 and Table 9-10.

Table 9-9. Estimated Damage to Critical Facilities from Cascadia M9.0 Scenario Earthquake

Category ^a	Damage Extent				
	None	Slight	Moderate	Extensive	Complete
Communication Facilities	8	1	0	0	0
Dams ^b	--	--	--	--	--
Emergency Services	61	0	0	0	0
Energy	56	16	0	0	0
Government Facilities	0	60	0	0	0
Hazardous Materials	0	116	0	0	0
Health Care & Public Health	5	345	0	0	0
Information Technology	--	--	--	--	--
Schools	157	0	0	0	0
Transportation Systems	211	54	0	0	0
Water & Sanitation Systems	337	56	0	0	0
Total	835	648	0	0	0

a. Damage extent was determined by selecting the highest probability damage state for each facility.

b. Hazus-MH does not produce damage estimates for dams. It is likely that owner/operators have already performed in depth, site-specific seismic hazard analysis.

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

Table 9-10. Estimated Damage to Critical Facilities from 500-Year Earthquake

Category ^a	Damage Extent				
	None	Slight	Moderate	Extensive	Complete
Communication Facilities	0	9	0	0	0
Dams	--	--	--	--	--
Emergency Services	61	0	0	0	0
Energy	1	59	12	0	0
Government Facilities	0	56	0	0	4
Hazardous Materials	0	73	0	0	43
Health Care & Public Health	5	343	0	0	2
Information Technology	--	--	--	--	--
Schools	157	0	0	0	0
Transportation Systems	256	4	0	0	5
Water & Sanitation Systems	78	254	57	0	4
Total	558	798	69	0	58

a. Damage extent was determined by selecting the highest probability damage state for each facility.

b. Hazus-MH does not produce damage estimates for dams. It is likely that owner/operators have already performed in depth, site-specific seismic hazard analysis.

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

Time to Return to Functionality

Hazus-MH estimates the time to restore critical facilities to fully functional use. Results are presented as probability of being functional at specified time increments: 1, 3, 7, 14, 30 and 90 days after the event. For example, Hazus-MH may estimate that a facility has 5 percent chance of being fully functional at Day 3, and a 95-percent chance of being fully functional at Day 90. Results from the 100-year probability event and the 500-year probability event are summarized in Table 9-11 and Table 9-12.

Table 9-11. Functionality of Critical Facilities for Cascadia M9.0 Scenario Earthquake

	# of Critical Facilities	Probability of Being Fully Functional (%) ^a					
		at Day 1	at Day 3	at Day 7	at Day 14	at Day 30	at Day 90
Communication Facilities	9	92	99	99	100	100	100
Dams^a	3	--	--	--	--	--	--
Emergency Services	61	88	88	98	98	99	99
Energy	72	67	88	94	97	99	100
Government Facilities	60	4	6	55	55	81	94
Hazardous Materials	115	4	7	56	56	81	92
Health Care & Public Health	350	5	8	59	59	84	96
Information Technology	0	--	--	--	--	--	--
Schools	157	87	88	99	99	99	99
Transportation Systems	265	93	95	96	97	97	98
Water & Sanitation Systems	393	37	50	78	78	90	96
Total/Average	1,485	53	59	82	82	92	97

a. Hazus-MH does not produce functionality estimates for dams. It is likely that owner/operators have already performed in depth, site-specific seismic hazard analysis.

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

Table 9-12. Functionality of Critical Facilities for 500-Year Earthquake

	# of Critical Facilities	Probability of Being Fully Functional (%) ^a					
		at Day 1	at Day 3	at Day 7	at Day 14	at Day 30	at Day 90
Communication Facilities	9	82	95	97	99	100	100
Dams^a	3	--	--	--	--	--	--
Emergency Services	61	65	65	87	88	95	95
Energy	72	47	70	83	90	95	99
Government Facilities	60	2	4	44	44	71	88
Hazardous Materials	116	2	3	37	37	63	81
Health Care & Public Health	350	3	6	49	49	76	91
Information Technology	0	--	--	--	--	--	--
Schools	157	66	67	90	90	96	96
Transportation Systems	265	83	88	90	90	91	94
Water & Sanitation Systems	393	27	43	64	64	79	89
Total/Average	1,485	42	49	71	72	85	93

a. Hazus-MH does not produce functionality estimates for dams. It is likely that owner/operators have already performed in depth, site-specific seismic hazard analysis.

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

Liquefaction Potential

Structures located with the Port of Vancouver facilities and containing hazardous materials are particularly susceptible to liquefaction and flow into the Columbia impacting down river wetlands. When liquefaction occurs, the ground loses the capability to support structures, resulting in subsidence and/or tipping of buildings and bridge supports. Lateral spreading pulls apart some types of buildings and rupture pipelines. Several tall grain elevators could potentially fail. (CRESA 2004).

In addition other facilities located on liquefiable soil may be particularly vulnerable to the earthquake hazards. The following infrastructure is located on or passes through these areas:

- Interstate 5
- State Route 500
- Northwest Pipeline
- Interstate 205
- State Route 501
- Olympic Pipeline
- State Route 14
- State Route 503
- All watercourse levees.

9.5.4 Environment

The environment vulnerable to earthquake hazard is the same as the environment exposed to the hazard.

9.5.5 Economic Impact

Economic impact will be largely associated with the disruption of services caused by an earthquake event. In general, significant events may cause damage to land, buildings, transportation infrastructure, and businesses. With an event of such significance, economic recovery could take years depending on available recovery funds.

9.6 FUTURE TRENDS

9.6.1 Development

Land use in the planning area will be directed by comprehensive plans adopted under Washington’s Growth Management Act. The information in this plan provides the participating partners a tool to ensure that there is no increase in exposure in areas of high seismic risk. Development in the planning area will be regulated through building standards and performance measures so that the degree of risk will be reduced. The geologic hazard portions of the planning area are regulated under each jurisdiction’s critical areas ordinances. The most recently adopted building codes take liquefaction and soil mapping into account in their standards.

Areas targeted for future growth and development have been identified across the County. It is anticipated that the human exposure and vulnerability to earthquake impacts in newly developed areas will be similar to those that currently exist within the County. New development in areas with softer NEHRP soil classes, liquefaction and landslide-susceptible areas may be more vulnerable to the earthquake hazard. Table 9-13 shows the area identified as underutilized or vacant in urban growth areas in the County that intersect moderate to high liquefaction potential or peat soils. Development in these areas has the potential to increase vulnerability to the earthquake hazard if proper structural measures are not taken. Critical areas ordinances in the planning area may restrict development in portions of these parcels where liquefaction is likely.

9.6.2 Climate Change

The impacts of global climate change on earthquake probability are unknown. Some scientists say that melting glaciers could induce tectonic activity. As ice melts and water runs off, tremendous amounts of weight are shifted on the earth’s crust. As newly freed crust returns to its original, pre-glacier shape, it could cause seismic plates to slip and stimulate volcanic activity, according to research into prehistoric earthquakes and volcanic activity. NASA and USGS scientists found that retreating glaciers in southern Alaska may be opening the way for future earthquakes (NASA, 2004).

Secondary impacts of earthquakes could be magnified by climate change. Soils saturated by repetitive storms could experience liquefaction or an increased propensity for slides during seismic activity due to the increased saturation. Dams storing increased volumes of water due to changes in the hydrograph could fail during seismic events. There are currently no models available to estimate climate-change related impacts on the earthquake hazard.

Table 9-13. Buildable Lands in Planning Area Urban Growth Areas that Intersect Liquefaction Areas^a

Urban Growth Area Name ^b	Residential		Commercial (acres)	Industrial (acres)	Total (acres) ^c
	Acres	Units			
Battle Ground	22.8	137	2.1	0	24.9
Camas	17.3	104	3.1	19.2	39.6
La Center	0	0	0	0	0
Ridgefield	0		0	0	0
Vancouver	141.6	1,132	35.0	830.6	1,007.1
Washougal	51.4	308	51.1	73.1	175.5
Woodland^d	25.2	101	0	0	25.2
Yacolt	0	0	0	0	0
Total	258.2	1,782	91.2	922.9	1,272.3

- Buildable lands information in this plan is for planning purposes only. Discrepancies may exist between these estimates and official records maintained by participating jurisdictions.
- Unincorporated areas outside of urban growth areas are excluded from this assessment. Development in these areas consists largely of rural lands, open space and large residential lots. Changes in development can be assessed through an increase in structures located outside of incorporated areas.
- Acreage covers only mapped parcels; it excludes many rights of way and major water features.
- Acreage estimates exclude the portions of the City of Woodland in Cowlitz County and thus may be underestimated.

9.7 SCENARIO

Any seismic activity of 6.0 or greater on faults within the planning area's general region would have significant impacts throughout the planning area. An earthquake in the Cascadia subduction zone would have disastrous consequences for the entire state and the region. Potential warning systems could give a few seconds' notice that a major earthquake is about to occur. This would not provide adequate time for preparation.

Large magnitude earthquakes in the region could lead to massive structural failure of property on liquefiable soils. Structural failure may be intensified if the earthquake occurs during winter when soils are saturated. Heavy damage would also occur in areas with poor site conditions, older construction, or construction especially vulnerable to long duration, long period ground motions (CRESA, 2004). Dams, levees and revetments built on poor soils would likely fail, representing a loss of critical infrastructure. Access to and from the County would be challenging, given the likelihood that bridges and major transportation routes may be impassable. These events could cause secondary hazards, including landslides and mudslides that would further damage structures.

9.8 ISSUES

Important issues associated with an earthquake include the following:

- It is estimated that 8 percent of the total population in the planning area resides on soils with moderate to high liquefaction potential or peat soils.
- Approximately 17 percent of households living in moderate to high liquefaction potential areas have household incomes less than \$20,000 per year.
- Approximately 12 percent of the population living in moderate to high liquefaction potential areas are 65 years or older and may require special medical attention or be unable to evacuate without assistance.
- The results of the earthquake scenario events chosen for analysis indicate that between 23 and 1,350 households will be displaced and that between 14 and 822 residents may require short term shelter.
- Over 58 percent of the planning area's building stock was built prior to 1994, when Zone 3 seismic standards were incorporated into the building code.

- Critical facility owners should be encouraged to create or enhance continuity of operations plans using the information on risk and vulnerability contained in this plan.
- Geotechnical standards should be established that take into account the probable impacts from earthquakes in the design and construction of new or enhanced facilities.
- Earthquakes could trigger other natural hazard events such as dam failures, levee failures and landslides, which could severely impact the planning area or regional critical facilities.
- There are likely additional faults in or around Clark County that have not yet been discovered.
- After a major seismic event, Clark County is likely to experience disruptions in the flow of goods and services due to the destruction of major transportation infrastructure across the broader region.
- Major arterials in the planning area cross liquefiable soils and could be impassable after an event.
- The county vehicular intra-county transportation system is generally characterized by the lack of redundancy and dependency on bridges. The County north/south vehicular corridors include Interstate 5 (I-5) and Interstate 205 (I-205). There is limited north/south redundancy via a series of local roads. east/west traffic is restricted to Route 14 along the Washington side of the Columbia River and Route 30 on the Oregon side. Limited East/West redundancies are possible along East Mill Plain Boulevard, NE Fourth Plain, NE 76th Street, and SR 500. Most corridors include numerous bridges (CRESA, 2004).
- Residents are expected to be self-sufficient up to three days following a major earthquake without government response agencies, utilities, private sector services and infrastructure components. Education programs are currently in place to facilitate the development of individual, family, neighborhood and business earthquake preparedness. Government alone can never make this region fully prepared. It takes individuals, families, and communities working in concert with one another to truly be prepared for disaster.
- Natural hazards have a devastating impact on businesses. Of all businesses that close following a disaster, more than 43 percent never reopen, and an additional 29 percent close for good within the next two years. The Institute of Business and Home Safety has developed “Open for Business,” which is a disaster planning toolkit to help guide businesses in preparing for and dealing with the adverse effects of natural hazards. The kit integrates protection from natural disasters into companies’ risk reduction measures to safeguard employees, customers, and the investment itself. The guide helps businesses secure human and physical resources during disasters, and helps to develop strategies to maintain business continuity before, during, and after a disaster occurs.
- An early warning system, ShakeAlert, is currently under development, but is not ready for public use.
- County government buildings, including the Clark Regional Emergency Services Agency, which contains the Emergency Operation Center where all response activities are coordinated, are located within a consolidated campus in Vancouver. Because many government functions are located close together, serious damage in that area could be devastating.
- Many city offices are older and located with their respective jurisdictions (CRESA, 2004).
- Masonry construction is scattered throughout the county. Un-reinforced masonry structures are most common, though not predominant, in downtown Vancouver, downtown Camas, and the Walnut Grove area (CRESA, 2004).
- Model estimates indicate that debris removal from earthquake events would require approximately 3,700 to almost 100,000 truckloads, depending on the event scenario.

10. FLOOD

10.1 GENERAL BACKGROUND

A floodplain is the area adjacent to a river, creek or lake that becomes inundated during a flood. Floodplains may be broad, as when a river crosses an extensive flat landscape, or narrow, as when a river is confined in a canyon.

Connections between a river and its floodplain are most apparent during and after major flood events. These areas form a complex physical and biological system that not only supports a variety of natural resources but also provides natural flood and erosion control. When a river is separated from its floodplain with levees and other flood control facilities, natural, built-in benefits can be lost, altered, or significantly reduced.

10.1.1 Measuring Floods and Floodplains

The frequency and severity of flooding are measured using a discharge probability, which is the probability that a certain river discharge (flow) level will be equaled or exceeded in a given year. Flood studies use historical records to determine the probability of occurrence for the different discharge levels. The flood frequency equals 100 divided by the discharge probability. For example, the 100-year discharge has a 1-percent chance of being equaled or exceeded in any given year. The “annual flood” is the greatest flood event expected to occur in a typical year. These measurements reflect statistical averages only; it is possible for two or more floods with a 100-year or higher recurrence interval to occur in a short time period. The same flood can have different recurrence intervals at different points on a river. For example, the December 1977 flood event exceeded a 500-year flood (0.2 percent annual chance) on the Washougal River at USGS Gage # WASW1 but was less than a 100-year flood on some of its tributaries.

The extent of flooding associated with a 1-percent annual probability of occurrence (the base flood or 100-year flood) is used as the regulatory boundary by many agencies. Also referred to as the special flood hazard area, this boundary is a convenient tool for assessing vulnerability and risk in flood-prone communities. Many communities have maps that show the extent and likely depth of flooding for the base flood. Corresponding water-surface elevations describe the elevation of water that will result from a given discharge level, which is one of the most important factors used in estimating flood damage.

10.1.2 Effects of Human Activities

Because they border water bodies, floodplains have historically been popular sites to establish settlements. Human activities tend to concentrate in floodplains for a number of reasons: water is readily available; land is fertile and suitable for farming; transportation by water is easily accessible; and land is flatter and easier to develop. But human activity in floodplains frequently interferes with the natural function of floodplains. It can affect the distribution and timing of drainage, thereby increasing flood problems. Human development can create local flooding problems by altering or confining drainage channels. This increases flood potential in two ways: it reduces the stream’s capacity to contain flows, and it increases flow rates or velocities downstream during flood events. Human activities can interface effectively with a floodplain as long as steps are taken to mitigate the activities’ adverse impacts on floodplain functions.

10.1.3 Federal Flood Programs

National Flood Insurance Program

The NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in participating communities. For most participating communities, FEMA has prepared a detailed Flood Insurance Study. The study presents water surface elevations for floods of various magnitudes, including the 1-percent annual chance flood and the 0.2-percent annual chance flood (the 500-year flood). Base flood elevations and the boundaries of the 1-percent and 0.2-percent annual chance floodplains are shown on Flood Insurance Rate Maps (FIRMs), which are the principle tool for identifying the extent and location of the flood hazard. FIRMs are the most detailed and consistent data source available, and they represent the minimum area of oversight for many communities' floodplain management programs.

Participants in the NFIP must, at a minimum, regulate development in floodplain areas in accordance with NFIP criteria. Before issuing a permit to build in a floodplain, participating jurisdictions must ensure that the following criteria are met:

- New buildings and those undergoing substantial improvements must, at a minimum, be elevated to protect against damage by the base flood.
- New floodplain development must not aggravate existing flood problems or increase damage to other properties.
- New floodplain development must exercise a reasonable and prudent effort to reduce its adverse impacts on listed threatened/endangered species.

Communities participating in the NFIP may adopt regulations that are more stringent than those contained in 44 CFR 60.3, but not less stringent. The Washington State Building Code Act requires new construction to be elevated to 1 foot above the base flood elevation or to the design flood elevation, whichever is higher. Some communities in Clark County have adopted more stringent standards. For example, a 1-foot freeboard (height above the base flood elevation) is standard for most structures in unincorporated Clark County.

In NFIP participating communities, structures permitted or built in the planning area before NFIP and related building code regulations went into effect are called “pre-FIRM” structures, and structures built afterwards are called “post-FIRM.” Historically, the insurance rate has been different for the two types of structures. However, recent flood insurance reform legislation (Biggert-Waters Flood Insurance Reform Act of 2012) changes the way flood insurance is rated, with a move to full actuarial rates based on flood risk.

Clark County and all cities and towns in it except La Center are participants in NFIP. All participating communities are currently in good standing with the provisions of the NFIP. All cities and towns have identified actions to regain or maintain continued compliance with the provisions of the NFIP. The current effective FIRM for Clark County is dated September 5, 2012. The City of Woodland lies in both Clark and Cowlitz Counties, and most of its floodplain is in Cowlitz County. The preliminary FIRM for Cowlitz County was issued August 16, 2013.

In Washington, the Department of Ecology is the coordinating agency for floodplain management. Ecology works with FEMA and local governments by providing grants and technical assistance, evaluating community floodplain management programs, reviewing local floodplain ordinances, and participating in statewide flood hazard mitigation planning. Compliance is monitored by FEMA regional staff and by Ecology. Maintaining compliance under the NFIP is an important component of flood risk reduction. All planning partners that participate in the NFIP have identified actions to maintain their compliance and good standing. Planning partners who do not currently participate have identified actions to consider re-enrollment in the program.

The Community Rating System

The CRS is a voluntary program within the NFIP that encourages floodplain management activities that exceed the minimum NFIP requirements. Flood insurance premiums are discounted to reflect the reduced flood risk resulting from community actions meeting the following three goals of the CRS:

- Reduce flood losses.
- Facilitate accurate insurance rating.
- Promote awareness of flood insurance.

For participating communities, flood insurance premium rates are discounted in increments of 5 percent. Class 1 communities receive a 45-percent premium discount, and Class 9 communities receive a 5-percent discount. (Class 10 communities are those that do not participate in the CRS; they receive no discount.) The CRS classes are based on 18 creditable activities in the following categories:

- Public information
- Mapping and regulations
- Flood damage reduction
- Flood preparedness.

Figure 10-1 shows the nationwide number of CRS communities by class as of October 1, 2015, when there were 1,368 communities receiving flood insurance premium discounts under the CRS program. In Washington there are 36 CRS communities. Although CRS communities represent only 6 percent of the over 22,000 communities participating in the NFIP, more than 70 percent of all flood insurance policies are written in CRS communities. CRS activities can help to save lives and reduce property damage.

Source: FEMA, 2015

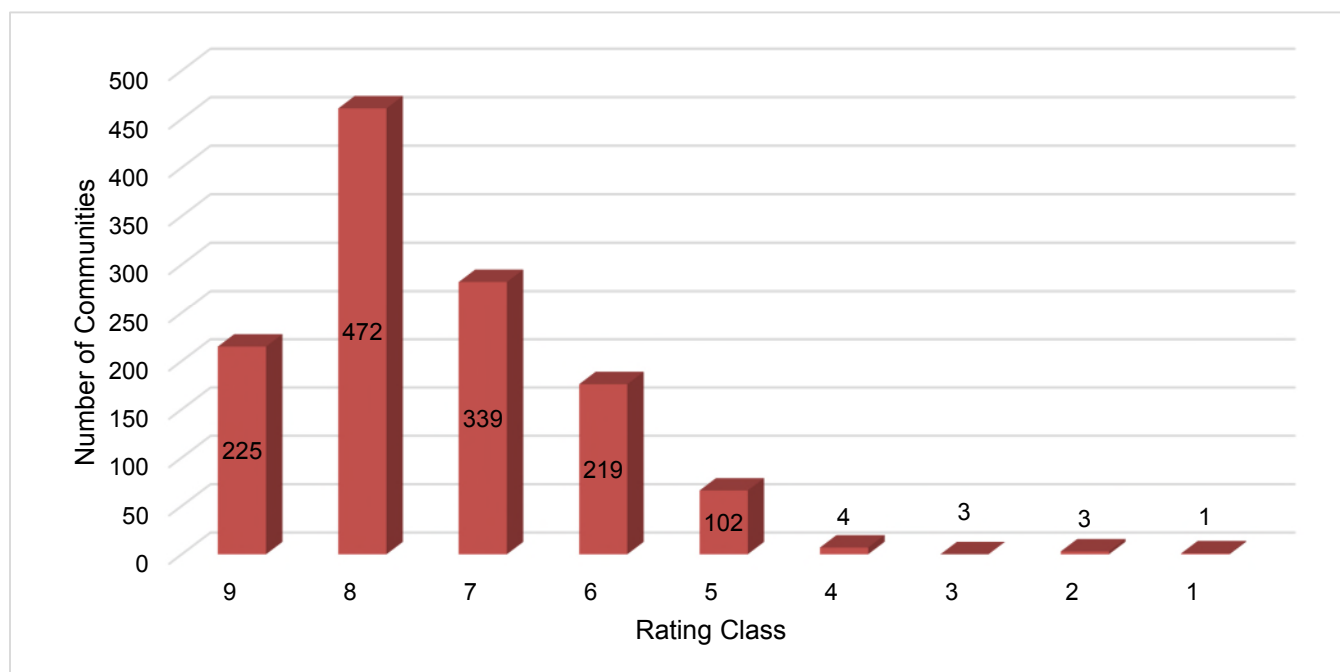


Figure 10-1. CRS Communities by Class Nationwide as of October 1, 2015

Clark County, the only CRS participant in the planning area, has participated in the program since 2004. The County has a Class 5 rating, so citizens who live in a special flood hazard area can receive a 25-percent discount

on flood insurance; outside the 1-percent annual chance flood hazard area they receive a 10-percent discount. This equates to a savings of \$56 to \$314 per policy, for a total county-wide premium savings of \$93,393. To maintain or improve its rating, the County goes through an annual recertification and a re-verification every five years. The County is among 12 Washington CRS communities with a Class 5 rating; 21 have a better (lower) rating and three have a worse (higher) rating.

10.1.4 The Value of Floodplains

Floodplains are a natural component of the Clark County environment. Understanding and protecting their natural function can reduce flood damage and protect people and property. The benefits of preserving floodplains include the following:

- Flood and erosion control. Floodplains are natural sponges, storing and slowly releasing floodwaters. This reduces the height of a flood and the speed of a river. When a river is cut off from its floodplain by levees and dikes, flood heights often increase and downstream damage can be greater.
- Water quality improvement. As water travels through floodplains, plants serve as natural filters, trapping sediments and capturing pollutants. Floodplains help to moderate temperature fluctuations that can harm aquatic life. They also reduce sedimentation (soil and pollutants in the water) that can harm aquatic life.
- Groundwater recharge. Floodplains promote infiltration and recharge of underlying aquifers.
- Fish and wildlife habitat. Floodplains maintain biodiversity. They provide breeding and feeding grounds, create and enhance waterfowl areas, and protect habitat for rare and endangered species.

The natural processes of flooding add sediment and nutrients to fertile floodplain areas. When floodwaters recede after a flood event, they leave behind layers of rock and mud. These gradually build up to create a new floor of the floodplain. Floodplains generally contain accumulations of sand, gravel, loam, silt, and/or clay, often extending below the bed of the stream. These sediments provide a natural filtering system, with water percolating back into the ground and replenishing groundwater. These are often important aquifers, the water drawn from them being filtered compared to the water in the stream. Fertile, flat reclaimed floodplain lands are commonly used for agriculture, commerce and residential development.

As buildable land becomes scarce with ongoing urban development, pressure builds to develop in floodplains. Building homes and businesses in floodplains not only puts people in harm's way, but it also reduces the environmental benefits of floodplains (Clark County, 2015a).

10.2 HAZARD PROFILE

10.2.1 Types of Flood Related Hazards

Riverine Flooding

Riverine flooding is the overbank flooding of rivers and streams. Flooding in large river systems typically results from large-scale weather systems that generate prolonged rainfall over a wide geographic area, causing flooding in hundreds of smaller streams, which then drain into the major rivers. Shallow area flooding is a special type of riverine flooding. FEMA defines shallow flood hazards as areas that are inundated by the base flood with flood depths of only 1 to 3 feet. These areas are generally flooded by low velocity sheet flows of water. Two types of flood hazards are generally associated with riverine flooding:

- **Inundation**—Inundation occurs when there is floodwater and debris flowing through an area that is not normally covered by water. Such events cause minor to severe damage, depending on the velocity and

depth of flows, the duration of the flood event, the quantity of logs and other debris carried by the flows, and the amount and type of development and personal property along the floodwater's path.

- **Channel Migration**—Channel migration results when erosion to flowing water wears away banks and soils due. This erosion, combined with sediment deposition, causes the migration or lateral movement of a river channel across a floodplain. A channel can also move by abrupt change in location, called avulsion, which can shift the channel location a large distance in as short a time as one flood event.

Urban Flooding

In urbanized areas, localized or urban flooding not associated with stream overflow can occur where there are no drainage facilities to control flows or when runoff volumes exceed the design capacity of drainage facilities. As land is converted from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. Urbanization of a watershed changes the hydrologic systems of the basin. Heavy rainfall collects and flows faster on impervious concrete and asphalt surfaces. The water moves from the clouds to the ground and then into streams at a much faster rate in urban areas. Adding these elements to the hydrological systems can result in floodwaters that rise rapidly and peak with violent force. During periods of urban flooding, streets can become swiftly moving rivers and basements can fill with water. Storm drains often back up with vegetative debris, causing additional, localized flooding. Urban flooding issues are generally addressed through stormwater management plans at the local level.

10.2.2 Principal Flooding Sources

Floods occur in Clark County every few years, and major events occur with some frequency. There have been seven major events since 1964. In Clark County, flooding is most likely to occur due to a severe winter storm that brings snow to higher elevations, followed by warmer weather and rain. The sudden influx of new rain and melting snow can overwhelm both natural and man-made water drainage systems (CRESA 2004). Floods in Clark County can generally be classified into four different types (CRESA 2004):

- Flooding resulting from overflow of the Columbia River, distinct from general riverine flooding both because of the magnitude of flooding possible and because of the slow rising nature of these floods.
- Riverine flooding, which occurs primarily in designated floodplains in the interior of the county and side drains to the Columbia River.
- Shallow flooding or ponding in “sink areas,” which may occur well outside of mapped floodplains and generally results either from areas of very high water table (which can oversaturate during storm events), or from areas of poor soil percolation (where rain water does not drain effectively during storm events).
- Isolated urban flooding from clogged or overflowing storm drainage systems and culverts.

Columbia River Flooding

Historically, most development in Clark County has been along the Columbia River, which forms the southern and western boundaries of the county. The river is the major inland waterway in the northwestern United States. It drains approximately 241,000 square miles of southwestern Canada and the northwestern United States upstream of Vancouver. Although many large Columbia River floods have occurred in Clark County, existing flood control storage structures (reservoirs and dams) reduce flood elevations and provide increased warning time for those who live in the flood's path (CRESA 2004).

The entire Columbia River Basin includes more than 50 storage projects, significantly reducing flood levels. The following Clark County flood control structures provide varying levels of flood protection (CRESA 2004; FEMA 2012a):

- The drainage districts along the Columbia River in Clark County have levees of varying flood protection capacities. Thus, safe water levels have been established by the Corps of Engineers. The safe water level is the highest flood elevation, considering surveillance and minor remedial work, for which reasonable assurance can be given that a levee system will not fail. The determination of the levee safe water level was based on need for freeboard, structural deficiencies observed in the field, knowledge of levee and foundation materials, and flood fighting records. Although the perimeter levee of a particular drainage district may be capable of withstanding large floods, major rainstorms could cause extensive interior ponding in low areas if runoff exceeds the capacity of the dewatering-drainage pumps.
- In the vicinity of Vancouver, some protection from Columbia River flooding is provided by levees along the Lower River Road and at Fruit Valley. However, known deficiencies in their design and maintenance limit the degree of protection to below the 1-percent-annual-chance flood level for the Lower River Road area and below the 0.2-percent-annual-chance flood level for the Fruit Valley area.
- Two projects southwest of Ridgefield at Lake River Delta and Bachelor Island include levees, pumping stations, tide boxes, and interior drainage canals. However, known deficiencies limit the degree of protection they provide to well below 1-percent-annual-chance flood levels.
- The Washougal Area Drainage District, constructed by the Corps of Engineers in 1965 and 1966, extends 5.5 miles along the Columbia River from Lawton Creek west to Camas and includes levee embankment, revetment, tide box, and freshwater inlets, and a pumping plant with interior drainage canals.

These flood control structures have reduced the frequency and severity of flooding along the Columbia River. The floodplain is well defined and residents have experienced several weeks' notice of approaching floodwaters. However, continued maintenance is crucial if these structures are to remain successful. Should they be ignored, the severity of the impact of a future flood would be greater than if the structures had not been built to begin with (CRESA 2004).

Riverine Flooding

Clark County watercourses generally flow west and south from sources in the steep timberland watershed, pass through lower reaches of gently sloping agricultural and developing residential lands, and flow into the Columbia River. Flooding along these rivers and streams differs from Columbia River flooding in two ways (CRESA 2004):

- The rivers have less capacity for carrying water, so the flooding, while no less severe for those experiencing it, affects a smaller number of homes.
- There are fewer dams and reservoirs along the interior rivers, making flooding less predictable.

In general, minor flooding occurs along the banks of the upper reaches of most streams. However, when two streams merge, floodwaters can back up into the smaller stream, creating a backwater that can mean more severe and more frequent flooding for residents near the confluence. In the 1995 floods, this scenario was the principle cause of flooding along the Lewis River. Floodwaters from the Columbia backed up into the Lewis, flooding the area. Salmon Creek, the East Fork of the Lewis River, the Washougal River, Burnt Bridge Creek, and Mill Creek all follow this pattern of flooding (CRESA 2004).

Washougal River

The largest flood on the Washougal River since a USGS stream gauge was installed in 1944 was in December 1977, 6 miles upstream of the City of Washougal. There was little damage however, largely because at that time there was limited development along that stretch of the river. As development increased over time, damage from future floods may be more likely (CRESA 2004).

Lewis River

The Lewis River is regulated by three storage projects: Swift Reservoir, Yale Reservoir and Lake Merwin Reservoir, all of which are operated by Pacific Power and Light (PP&L). The largest flood on the Lewis River occurred in 1933 before these were built. Under the present Federal Energy Regulatory Commission license, PP&L is not required to reserve storage for flood protection. However, on August 18, 1983, FEMA and PP&L agreed to make approximately 70,000 acre-feet available for flood control storage on the Lewis River System at Merwin Dam, thus reducing the 100-year discharge at Woodland from 128,000 cubic feet per second to 102 cubic feet per second, further reducing the risk of flooding to Woodland residents (CRESA 2004). PP&L has prepared emergency operation procedures for three danger conditions:

- Non-failure emergency (high flows)
- Potentially hazardous conditions
- Failure is imminent or has occurred.

PP&L has not established the risk of each condition occurring, but states that the dams are in very good condition as certified by independent consultants (CRESA 2004). Chapter 7 provides additional discussion on the dam failure hazard.

Shallow Flooding and Urban Flooding

Much of the south and western urban growth area has poorly to moderately drained soils, a condition that leads to the ponding of water in lower elevations. During heavy rainstorms, water neither seeps into the soil nor drains off, instead collecting into ponds and potentially flooding homes (CRESA, 2004).

An analysis after the 1995 floods showed drainage structures to be a major contributor to ponding and flooding during the event. Many culverts and drainages were judged to have been inadequate to efficiently move the rainwater that fell onto urban infrastructures (road, roofs, sidewalks, etc.) into rivers. This led to urban flooding distant from mapped floodplains and floodways. According to this post-1995 flood engineering report, a lack of well-functioning storm sewer structures and increasing runoff from urbanization had led to an increasing number of drainage problems during storms. Limited resources meant that maintenance crews were unable to respond to flooding problems in many areas in a timely manner. The report commented that maintenance crews can manage some drainage problems, such as plugged inlets, but capacity problems (under-designed subdivision storm systems) require significantly more complex solutions. Operations crews were unable to prevent flooding in these situations (CRESA, 2004).

In rural counties, drainage problems tend to be minimal and are manageable within the limits of a rural public services budget. However, Clark County has experienced significant growth in recent decades and County funding may not be sufficient to provide a reasonable level of drainage and flood control services to county citizens. Significant capital funding may need to be developed to provide drainage and flood control infrastructure extensions and improvements within the County. Alternatively, the use of “softer structures” such as contouring, engineered swales and introduced vegetation, may present opportunities for improved stormwater management (CRESA, 2004).

In some cases, blocked drainage structures can provide important retention functions, and actually slow the process of water moving downstream in the same way that a natural system, such as a wetland, might. Basin-wide analysis is necessary to determine which drainages should be improved to speed the flow of stormwater, and which should be maintained (CRESA, 2004).

10.2.3 Past Events

Seven federal flood-related disaster declarations have affected Clark County since 1964 (see Table 10-1). An example of the type of flooding typical throughout the county is the event that occurred on November 29, 1995. It resulted from an extended series of rainstorms generated over the Pacific Ocean that moved north and east across California, Oregon and Washington. Flooding in Clark County occurred when relatively intense rain fell on saturated ground surfaces and already swollen creeks and rivers. Runoff from snowmelt also contributed to high flows in the North and East Forks of the Lewis River, and the Little Washougal and Washougal Rivers. Peak flows in county streams ranged from approximately a 2-year flood in Burnt Bridge Creek to a 25-year flood in Salmon Creek (CRESA, 2004).

Table 10-1. History of Flood Events

Date	Declaration #	Type of event	Estimated Damage
December 29, 1964	DR-185	Heavy Rains and Flooding	N/A
December 10, 1977	DR-545	Severe Storms, Mudslides, Flooding	N/A
November 7, 1995	DR-1079	Storms, High Winds, Floods	\$862,992 ^a
January 26, 1996	DR-1100	Severe Storms, Flooding	N/A
December 26, 1996	DR-1159	Severe Winter Storms, Flooding	N/A
November 2, 2006	DR-1671	Severe Storms, Flooding, Landslides, and Mudslides	N/A
December 1, 2015	DR-4253	Severe Winter Storm, Straight Line Winds, Flooding, Landslides, Mudslides, Tornado	N/A

a. Data obtained from Spatial Hazard Events and Losses Database for the United States

N/A = Information is not available

The storm of November 1995 was not considered to be a major flood-producing storm for the Columbia River. However, relatively high stream base flows and tides did combine to produce river levels exceeding flood stage within the portion of the Columbia River flowing through Clark County. Ten houseboats were evacuated at Ridgefield due to sewer problems caused by high river elevations. Higher Columbia River elevations also produced backwater in the lower reaches of Salmon Creek, requiring evacuation of 15 additional houses. Some condominiums and restaurants also experienced flooding along the Columbia River (CRESA, 2004).

10.2.4 Location

Flooding in Clark County has been documented by gage records, high water marks, damage surveys and personal accounts. This documentation was the basis for the September 5, 2012, Flood Insurance Study that is incorporated in the currently effective FIRMs for Clark County and the preliminary FIRMs (issued August 8, 2016) for the City of Woodland. The FIRMs are the most detailed and consistent data source available for determining flood extent. The 2012 and 2013 Flood Insurance Studies are the sole source of data used in this risk assessment to map the extent and location of the flood hazard, as shown in Figure 10-2. Mapped 1-percent annual chance flood hazard areas cover about 2.5 percent of the planning area.

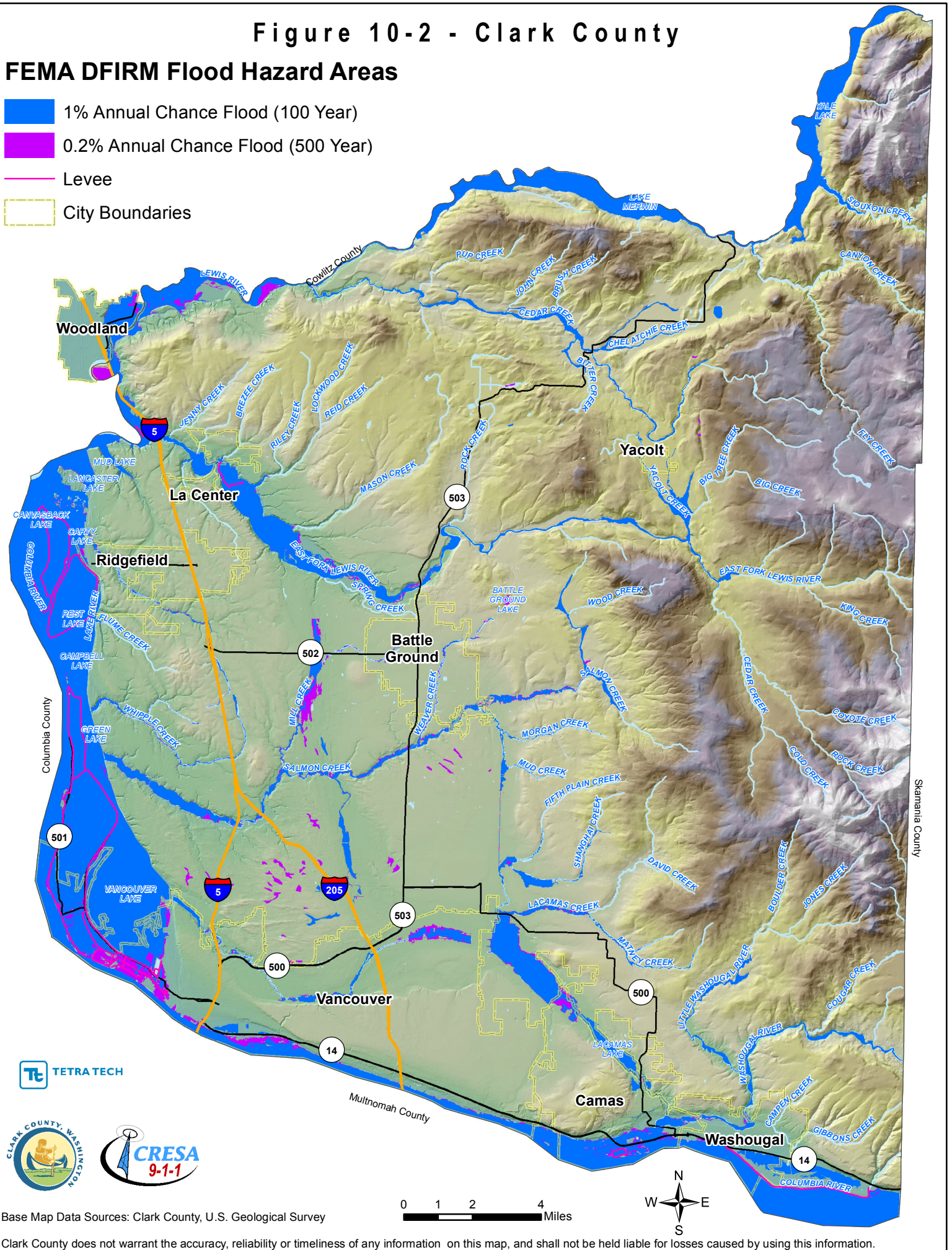
10.2.5 Frequency

Based on the seven flood declarations affecting Clark County since 1964 (see Table 10-1), major floods in Clark County can be expected on average about once every seven years. The County also typically experiences one episode of minor river flooding each winter. Urban portions of the county annually experience nuisance flooding related to drainage issues.

Figure 10-2 - Clark County

FEMA DFIRM Flood Hazard Areas

- 1% Annual Chance Flood (100 Year)
- 0.2% Annual Chance Flood (500 Year)
- Levee
- City Boundaries



Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

10.2.6 Severity

The principal factors affecting flood damage are flood depth and velocity. The deeper and faster flood flows become, the more damage they can cause. Shallow flooding with high velocities can cause as much damage as deep flooding with slow velocity. This is especially true when a channel migrates over a broad floodplain, redirecting high velocity flows and transporting debris and sediment. Flood severity is often evaluated by examining peak discharges; Table 10-2 lists peak flows used by FEMA to map the floodplains of Clark County.

Table 10-2. Summary of Peak Discharges in Clark County

Source/Location	Drainage area (sq. mi.)	Discharge (cubic feet/second)			
		10-Year	50-Year	100-Year	500-Year
Burnt Bridge Creek					
At Mouth	22.5	115	220	255	330
At USGS Gage	19.8	120	230	270	340
At N.E. 112th Ave	5.0	55	110	135	180
China Ditch					
At Mouth	8.9	495	665	740	915
Curtin Creek					
At Mouth	11.0	335	460	520	670
At N.E. 109th St	4.5	225	360	405	530
At N. E. 83rd St	1.0	60	85	95	130
E. Fork Lewis River					
At Mouth	212.0	19,200	24,400	26,900	32,000
Upstream of confluence with Lockwood Creek	185.0	17,000	21,700	23,800	28,300
Approximately 17,000' downstream of Daybreak Rd.	165.0	20,650	28,630	32,200	40,900
At Daybreak Rd.	152.0	18,600	26,050	29,300	37,210
At Lewisville Park	150.0	15,300	19,400	21,400	25,400
Fifth Plain Creek					
At Mouth	20.2	1,280	1,750	1,960	2,460
Upstream of China Ditch	9.0	650	895	1,000	1,260
Upstream of Shanghai Creek	4.6	360	495	555	700
At 119th St.	2.6	225	315	330	445
Gee Creek					
At Burlington Northern Railroad	13	850	1,010	1,080	1,260
At County Rd.	9	580	695	745	870
Lacamas Creek					
At Goodwin Rd.	52.8	4,170	5,740	6,430	8,080
At Fourth Plain Rd.	22.7	1,990	2,740	3,060	3,850
Lewis River					
At Mouth	1,046	75,000 ^a	114,000 ^a	132,700 ^a	181,000 ^a
At Woodland	820	54,400 ^a	86,300 ^a	102,000 ^a	142,000 ^a
At USGS Gage near Ariel	731	49,000 ^a	79,000 ^a	94,000 ^a	132,000 ^a
Mill Creek					
At Mouth	11.5	670	985	1,140	1,570
Downstream of unnamed tributary (RM 0.85)	11.0	595	860	1,000	1,370
Upstream of unnamed tributary (RM 0.85)	9.1	510	780	915	1,300
At confluence with unnamed tributary (RM 3.12)	6.7	285	585	685	975
At N.E. 199th St.	4.8	290	415	480	655
Packard Creek					

Source/Location	Drainage area (sq. mi.)	Discharge (cubic feet/second)			
		10-Year	50-Year	100-Year	500-Year
At Mouth	2.4	135	180	200	250
Upstream of unnamed tributary (RM 1.0)	0.6	43	58	64	79
Padden Creek					
At confluence with Curtin Creek	1.0	39	45	48	53
Downstream of N.E. 76th St.	0.8	21 2	21 2	22 2	22 ^b
At Interstate 205	0.7	43	57	64	79
Salmon Creek					
At Mouth	88	3,230	4,460	5,020	6,490
At County gage SMN020, Kline Park	80	2,970	4,100	4,620	5,970
Below Mill Creek	72	2,710	3,730	4,210	5,430
Downstream of confluence with Curtin Creek	60	2,330	3,250	3,700	4,860
At County gage SMN045, N.E. 156th St.	45	1,960	2,740	3,110	4,090
Downstream of confluence with Morgan Creek	31	1,290	1,920	2,240	3,140
At County gage S-01, Battle Ground, WA	18.0	1,130	1,770	2,110	3,120
Spring Branch Creek					
At Mouth	1.8	105	140	155	190
Unnamed Tributary to Gee Creek					
At Mouth	1.7	85	100	105	125
Washougal River					
At Mouth	168	29,800	39,000	43,000	51,900
At USGS gage (RM 9.2)	108	21,500	28,400	31,300	38,000
Weaver Creek					
At Mouth	7.1	350	495	565	755
At N.E. 199th St.	5.9	310	440	500	665
Upstream of unnamed tributary (RM 3.45)	4.4	225	330	385	535
At N.E. 167th Ave.	1.5	85	125	150	205
Whipple Creek					
At mouth Upstream of unnamed tributary (RM 1.19)	11.1	510	685	755	925
Upstream of unnamed tributary (RM 1.19)	9.5	450	600	665	815
Upstream of Packard Creek (RM 2.47)	6.4	320	430	475	580
Upstream of N.E. 157th Ave. (RM 4.53)	4.5	240	320	355	430
Upstream of Interstate 5 Freeway (RM 6.45)	1.9	115	150	170	210
Upstream of NE 179th Street (RM 7.74)	0.9	55	75	85	110
Lewis River^c					
At confluence with Columbia River	1,046	75,000 ^a	114,100 ^a	132,700 ^a	181,000 ^a
At CC Street Bridge	820	54,400 ^a	86,300 ^a	102,000 ^a	142,000 ^a
At USGS Gage No. 14220500	731	49,000 ^a	79,000 ^a	94,000 ^a	132,000 ^a

Source: FEMA, 2012a and FEMA, 2013a

a. Regulated by Merwin Dam

b. Maximum flow passing NE 76th Street Culvert. Additional flow is diverted out of the basin by NE 76th Street

c. Cowlitz County Flood Insurance Study

10.2.7 Warning Time

Due to the sequential pattern of meteorological conditions needed to cause serious flooding, it is unusual for a flood to occur without warning. Warning times for floods can be between 24 and 48 hours. Flash flooding can be less predictable, but potential hazard areas can be warned in advanced of potential flash flooding danger.

The National Oceanic and Atmospheric Administration and the Washington State Department of Ecology operate river gauges. NOAA stations also provide 4-10 day trend forecasts of near-term river levels. These gauges allow residents to monitor river levels before, during and after a flood. Clark County provides links to seven gauge stations at: <https://www.clark.wa.gov/public-works/river-gauge-data>.

The National Weather Service Seattle Forecast Office provides weather observations and forecasts for western Washington and issues warnings for many types of hazards, including floods, severe weather, windstorms, snowstorms and fire conditions. The National Weather Service issues a statement when heavy rain is expected to cause flooding or aggravate existing flood conditions. These statements are generally issued two to three days before the potential event. Flood watches for specific areas and rivers are issued one to two days before an event. Flood warnings are issued up to one day in advance when flooding is imminent. This applies to a specific river forecast point that is expected to exceed a flood stage based on predictive computer river modeling output, including dam operation information, and to other streams and urban areas. For large storms and major floods, the National Weather Service conducts direct internet briefings and uses follow-up phone calls to Clark County. National Weather Service statements and information are communicated to other government agencies and the public via NOAA Weather Radio, radio and television, the Internet, telephone recordings and media outlets.

10.3 SECONDARY HAZARDS

The main secondary hazard for flooding is bank erosion, which in some cases can be more harmful than actual flooding. This is especially true in the upper courses of rivers with steep gradients, where floodwaters may pass quickly and without much damage but scour the banks, edging properties closer to the floodplain or causing them to fall in. Flooding is also responsible for hazards such as landslides when high flows over-saturate soils on steep slopes, causing them to fail. Hazardous materials spills are also a secondary hazard of flooding if storage tanks rupture and spill into streams, rivers or storm sewers. Septic systems may cause additional water contamination.

10.4 EXPOSURE

The Level 2 (user-defined) Hazus-MH protocol was used to assess the risk and vulnerability to flooding in the planning area. The model used census data at the block level and FEMA floodplain data, which has a level of accuracy acceptable for planning purposes. Where possible, the Hazus-MH default data was enhanced using local GIS data from county, state and federal sources.

10.4.1 Population

Population counts of those living in the floodplain in the planning area were generated by estimating the percent of the total buildings in each jurisdiction within the 1 percent and 0.2 percent annual chance flood hazard areas and multiplying this percentage by the total population in the planning area. Using this approach, it was estimated that the exposed population for the entire county is 6,720 persons within the 1-percent annual chance flood hazard area (1.5 percent of the total county population) and 12,199 within the 0.2-percent annual chance flood hazard area (2.7 percent of the total). For unincorporated portions of the county, it is estimated that the exposed population is 2,702 within the 1 percent annual chance flood hazard area (1.3 percent of the total unincorporated county population) and 4,028 within the 0.2 percent annual chance flood hazard area (1.9 percent of the total). Table 10-3 shows the population estimates by jurisdiction.

Table 10-3. Population within Flood Hazard Areas

	1-Percent Annual Flood Hazard		0.2-Percent Annual flood hazard	
	Population Exposed ^a	% of Total Population	Population Exposed ^a	% of Total Population
Battle Ground	72	0.4%	112	0.6%
Camas	133	0.6%	342	1.6%
La Center	8	0.3%	8	0.3%
Ridgefield	159	2.5%	162	2.5%
Vancouver	616	0.4%	4,449	2.6%
Washougal	159	1.0%	299	2.0%
Woodland	2,758	47.2%	2,935	50.2%
Yacolt	49	3.0%	49	3.0%
Unincorporated	2,702	1.3%	4,028	1.9%
Total	6,656	1.5%^b	12,199	2.7%^b

a. Represents the percent of total buildings that are exposed multiplied by the estimated 2015 per-household population

b. Represents the total affected population as a percent of total Clark County population.

10.4.2 Property

Structures in the Floodplain

Table 10-4 and Table 10-5 summarize the total area and number of structures in the floodplain by municipality. Spatial analysis determined that there are 2,199 structures within the 1-percent annual chance flood hazard area and 3,992 structures within the 0.2-percent annual chance flood hazard area. In the 1-percent annual chance flood hazard area, about 40 percent of the structures are in the City of Woodland and 43 percent are in unincorporated County areas. It is assumed that 92 percent (2,023) of the structures in the 1-percent annual chance flood hazard area are residential.

Table 10-4. Area and Structures in the 1-Percent Annual Chance Flood Hazard Area

	Area in Floodplain (Acres)	Number of Structures in Floodplain							
		Residential	Commercial	Industrial	Agriculture	Religion	Government	Education	Total
Battle Ground	144	16	6	0	0	0	0	0	22
Camas	1,885	39	6	0	0	2	0	0	47
La Center	34	2	0	0	1	0	0	0	3
Ridgefield	163	53	5	0	0	0	0	0	58
Vancouver	5,901	134	43	2	2	0	0	0	181
Washougal	960	37	17	4	0	0	0	0	58
Woodland	533	859	5	1	0	5	1	0	871
Yacolt	17	14	0	0	2	0	0	0	16
Unincorporated	35,218	869	25	0	41	4	3	1	943
Total	44,855	2,023	107	7	46	11	4	1	2,199

Table 10-5. Area and Structures in the 0.2-Percent Annual Chance Flood Hazard Area

	Area in Floodplain (Acres)	Number of Structures in Floodplain							
		Residential	Commercial	Industrial	Agriculture	Religion	Government	Education	Total
Battle Ground	171	20	14	0	0	0	0	0	34
Camas	2,114	101	11	5	1	2	1	0	121
La Center	35	2	0	0	1	0	0	0	3
Ridgefield	186	54	5	0	0	0	0	0	59
Vancouver	7,124	1,173	123	7	5	0	0	0	1,308
Washougal	992	88	17	4	0	0	0	0	109
Woodland	585	923	5	1	0	5	1	1	936
Yacolt	17	14	0	0	2	0	0	0	16
Unincorporated	36,873	1,302	46	2	42	6	5	3	1,406
Total	48,098	3,677	221	19	51	13	7	4	3,992

Exposed Value

Table 10-6 and Table 10-7 summarize the estimated value of exposed buildings in the planning area. This methodology estimated \$2 billion worth of building-and-contents exposed to the 1-percent annual chance flood, representing 1.8 percent of the total replacement value of the planning area, and \$4.65 billion worth of building-and-contents exposed to the 0.2-percent annual chance flood, representing 4.1 percent of the total.

Land Use in the Floodplain

Some land uses, such as single-family homes, are more vulnerable to flooding than others, such as agricultural land or parks. Table 10-8 shows the existing land use of parcels that intersect the 1-percent annual chance flood hazard area and 0.2-percent annual chance flood hazard area. More than 21 percent of the parcels that intersect the 1-percent annual chance flood hazard area are estimated to be agriculture, vacant, or uncategorized uses. These are favorable, lower-risk uses for the floodplain. The majority of the acreage of land area in the floodplain is categorized as residential, although, much of this acreage is likely to be zoned for low densities given that most floodplain acreage in the County is located in the unincorporated areas.

10.4.3 Critical Facilities and Infrastructure

Critical facilities and infrastructure in the 1-percent annual chance flood hazard area and 0.2-percent annual chance flood hazard area of the planning area are summarized in Table 10-9 and Table 10-10. Details are provided in the following sections.

Hazardous Material Facilities

Tier II facilities are those that use or store materials that can harm the environment if damaged by a flood. The planning area includes 7 businesses in the 1-percent annual chance flood hazard area and 18 businesses in the 0.2-percent annual chance flood hazard area that report having Tier II hazardous materials. During a flood event, containers holding these materials can rupture and leak into the surrounding area, having a disastrous effect on the environment as well as residents.

Table 10-6. Value of Structures in 1-Percent Annual Chance Flood Hazard Area

	Value Exposed			% of Total Replacement value
	Structure	Contents	Total	
Battle Ground	\$18,084,598	\$16,738,872	\$34,823,470	0.9%
Camas	\$80,316,052	\$71,731,971	\$152,048,023	2.0%
La Center	\$3,462,254	\$3,342,247	\$6,804,500	0.8%
Ridgefield	\$9,204,301	\$5,923,557	\$15,127,858	0.7%
Vancouver	\$278,749,595	\$265,720,572	\$544,470,168	1.1%
Washougal	\$86,686,255	\$88,425,937	\$175,112,192	4.2%
Woodland	\$188,416,451	\$110,077,142	\$298,493,593	16.8%
Yacolt	\$8,640,290	\$7,542,385	\$16,182,674	5.3%
Unincorporated County	\$435,510,126	\$329,454,660	\$764,964,787	1.7%
Total	\$1,109,069,922	\$898,957,343	\$2,008,027,265	1.8%

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

Table 10-7. Value of Structures in 0.2-Percent Annual Chance Flood Hazard Area

	Value Exposed			% of Total Replacement value
	Structure	Contents	Total	
Battle Ground	\$35,145,967	\$34,400,310	\$69,546,277	1.7%
Camas	\$225,726,464	\$260,645,291	\$486,371,755	6.4%
La Center	\$3,462,254	\$3,342,247	\$6,804,500	0.8%
Ridgefield	\$9,356,528	\$5,999,671	\$15,356,199	0.7%
Vancouver	\$1,201,876,649	\$1,135,344,038	\$2,337,220,687	4.9%
Washougal	\$100,510,404	\$95,338,012	\$195,848,415	4.7%
Woodland	\$209,535,680	\$124,872,914	\$334,408,594	18.8%
Yacolt	\$8,640,290	\$7,542,385	\$16,182,674	5.3%
Unincorporated County	\$679,908,753	\$510,421,979	\$1,190,330,732	2.7%
Total	\$2,474,162,989	\$2,177,906,847	\$4,652,069,833	4.1%

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

Table 10-8. Present Land Use Within Parcels Intersecting the Floodplain^a

Land Use ^b	1-Percent Annual Chance Flood Hazard Area		0.2-Percent Annual Chance Flood Hazard Area	
	Area (acres) ^c	% of Total Area	Area (acres) ^c	% of Total Area
Agriculture/Resource Land	9,561	12.8%	10,216	12.6%
Commercial	7,726	10.3%	8,406	10.4%
Education	423	0.6%	319	0.4%
Governmental Services	311	0.4%	346	0.4%
Industrial	1,130	1.5%	1,142	1.4%
Religious Services	88	0.1%	93	0.1%
Residential	49,133	65.6%	53,684	66.4%
Vacant or uncategorized	6,823	9.1%	6,987	8.6%
Total	75,195	100%	81,193	100%

- a. Present land use information in this plan is for planning purposes only. Discrepancies may exist between these estimates and official records maintained by participating jurisdictions.
- b. Present use classification provided by Clark and Cowlitz County assessor's data assigned to best fit occupancy classes in the Hazus model (see Section 6.3.1). Parcels for which conflicting information on current development was available were assumed to be improved. Some designated resource land may also be included in the vacant or uncategorized category.
- c. Acreage covers only mapped parcels; it excludes many rights of way and major water features. Acreage includes Clark County and the incorporated areas of the City of Woodland.

Table 10-9. Critical Facilities in 1-Percent Annual Chance Flood Hazard Area

	Communi- cation Facilities	Dams	Emer- gency Services	Energy	Govern- ment Facilities	Hazardous Materials	Health Care & Public Health	Infor- mation Technol- ogy	Schools	Trans- portation Systems	Water & Sanitation Systems	Total
Battle Ground	0	0	0	0	0	0	0	0	0	1	1	2
Camas	0	2	0	1	0	0	0	0	0	5	6	14
La Center	0	0	0	0	0	0	0	0	0	0	0	0
Ridgefield	0	0	0	0	0	0	0	0	0	1	1	2
Vancouver	0	0	0	2	0	4	0	0	0	18	2	26
Washougal	0	0	0	0	0	3	0	0	0	0	3	6
Woodland	0	0	1	1	0	0	0	0	0	0	0	2
Yacolt	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated	0	1	0	2	0	0	0	0	0	38	9	50
Total	0	3	1	6	0	7	0	0	0	63	22	102

Table 10-10. Critical Facilities in 0.2-Percent Annual Chance Flood Hazard Area

	Communi- cation Facilities	Dams	Emer- gency Services	Energy	Govern- ment Facilities	Hazardous Materials	Health Care & Public Health	Infor- mation Technol- ogy	Schools	Trans- portation Systems	Water & Sanitation Systems	Total
Battle Ground	0	0	0	0	0	0	0	0	0	1	1	2
Camas	0	2	0	4	0	0	0	0	0	5	7	18
La Center	0	0	0	0	0	0	0	0	0	0	0	0
Ridgefield	0	0	0	0	0	0	0	0	0	1	1	2
Vancouver	0	0	0	3	0	13	0	0	0	37	14	67
Washougal	0	0	0	0	0	3	0	0	0	0	3	6
Woodland	0	0	1	1	0	0	0	0	1	0	0	3
Yacolt	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated	0	1	0	2	0	2	0	0	1	40	13	59
Total	0	3	1	10	0	18	0	0	2	84	39	157

Utilities and Infrastructure

Flood damage to infrastructure presents numerous risks. Roads or railroads that are blocked or damaged can isolate residents and can prevent access throughout the county, including for emergency service providers needing to get to vulnerable populations or to make repairs. Bridges washed out or blocked by floods or debris also can cause isolation. Floodwaters can back up drainage systems, causing localized flooding. Culverts can be blocked by debris from flood events, also causing localized urban flooding. Floodwaters can get into drinking water supplies, causing contamination. Sewer systems can be backed up, causing waste to spill into homes, neighborhoods, rivers and streams. Underground utilities can also be damaged. Dikes and levees can fail or be overtopped, inundating the land that they protect.

Roads and Bridges

The following major roads pass through the 1-percent annual chance flood hazard area and thus are exposed to flooding:

- Interstate 205
- Interstate 5
- State Road 500
- State Route 501
- State Route 502
- State Road 503
- State Road 14.

Some of these roads are built above the flood level, and others function as levees to prevent flooding. Still, in severe flood events these roads can be blocked or damaged, preventing access to some areas.

Flooding can affect bridges that provide access to neighborhoods. There are 39 bridges in or over the 1-percent annual chance flood hazard area and 41 bridges in or over the 0.2-percent annual chance flood hazard area.

Levees

Clark County's flood protection system includes more than 49 miles of levees. Levee locations can be seen in Figure 10-2. The mileage on each watercourse is as follows (FEMA, 2012a):

- Bachelor Island Slough—6.79 miles
- Columbia River—29.97 miles
- East Fork Lewis River—1.33 miles
- Lake River—3.66 miles
- Lewis River—0.38 miles.

10.4.4 Environment

Flooding is a natural event, and floodplains provide many natural and beneficial functions. Nonetheless, with human development factored in, flooding can impact the environment in negative ways. Migrating fish can wash into roads or over dikes into flooded fields, with no possibility of escape. Pollution from roads, such as oil, and hazardous materials can wash into rivers and streams. During floods, these can settle onto normally dry soils, polluting them for agricultural uses. Human development such as bridge abutments and levees, and logjams from timber harvesting can increase stream bank erosion, causing rivers and streams to migrate into non-natural courses.

Many species of mammals, birds, reptiles, amphibians and fish live in Clark County in plant communities that are dependent upon streams, wetlands and floodplains. Changes in hydrologic conditions can result in a change in the plant community. Wildlife and fish are impacted when plant communities are eliminated or fundamentally altered to reduce habitat. Wildlife populations are limited by shelter, space, food and water. Since water supply is a major limiting factor for many animals, riparian communities are of special importance. Riparian areas are the zones along the edge of a river or stream that are influenced by or are an influence upon the water body. Human disturbance to riparian areas can limit wildlife's access to water, remove breeding or nesting sites, and eliminate suitable areas for rearing young. Wildlife relies on riparian areas and is associated with the flood hazard in the following ways:

- Mammals depend upon a supply of water for their existence. Riparian communities have a greater diversity and structure of vegetation than other upland areas. Beavers and muskrats are now recolonizing streams, wetlands and fallow farm fields, which are converted wetlands. As residences are built in rural areas, there is an increasing concern with beaver dams causing flooding of low-lying areas and abandoned farm ditches being filled in, which can lead to localized flooding.
- A great number of birds are associated with riparian areas. They swim, dive, feed along the shoreline, or snatch food from above. Rivers, lakes and wetlands are important feeding and resting areas for migratory and resident waterfowl. Other threatened or endangered species (such as the bald eagle or the peregrine falcon) eat prey from these riparian areas.
- Amphibians and reptiles are some of the least common forms of wildlife in riparian areas. However, some state threatened species, such as the western pond turtle and the spotted frog, are known to inhabit the waterways and wetlands.
- Fish habitat throughout the county varies widely based on natural conditions and human influence. Many ditches were dug throughout the county to make low, wet ground better for farming. As the water drained away and the wetlands were converted to farm fields, natural stream conditions were altered throughout the county. Agriculture along many rivers extends to the water's edge and smaller side channels have been tiled to drain better. Within developing areas, small streams were placed in pipes and wetland was filled in to support urban development. While salmonids prefer clear, free-flowing streams, other species like the Olympic mud-minnow inhabit the calm, backwater areas of sloughs and wetlands.

10.5 VULNERABILITY

10.5.1 Columbia River Vulnerabilities

Few residential structures are directly exposed to flooding from the Columbia River, in part because much of the area along the river is not residentially zoned. Residential structures that are impacted by high water when the Columbia River floods are generally flooded as a result of the restricted flows of rivers and streams draining into the Columbia (CRESA, 2004).

The commercial development vulnerable to the flooding of the Columbia River includes primarily hotels and restaurants. During the 1995 flood, most commercial uses along the river were interrupted. Newer commercial development is appropriately elevated above the 1-percent annual chance flood level. Since these floodplain fringe areas did not experience high floodwater velocities or large debris in the flows, the elevated structures fared well in the floods. Older structures, however, are more vulnerable (CRESA, 2004).

Industrial development along the floodplain is largely protected through a combination of building elevation and fill (as at the Port of Vancouver), or by levees. Perimeter levees of a drainage district may be capable of withstanding large floods, yet major rainstorms could cause extensive interior ponding in lower areas if runoff exceeds the capacity of the dewatering-drainage pumps. Without regular maintenance, the functionality of any levee will decline (CRESA, 2004).

Port facilities are protected by levee systems and fill and ring dikes around vulnerable structures, but an extreme flood on the Columbia River could breach dikes and lead to flooding in port areas. The port is a major employer and a regional economic driver. Any loss of function at the port would impact the entire region (CRESA, 2004).

The Vancouver water treatment facility is located in the floodplain and protected by a series of ring dikes. These were not severely damaged during the 1995 floods and operation was not interrupted (CRESA, 2004).

The Ridgefield National Wildlife Refuge, which lies downriver from the Port of Vancouver and the Vancouver sewage treatment facilities, is potentially vulnerable to floods and the pollution they may carry. During the 1995 event, floodwaters flowed over port lands and onto these critical areas. However, because the port chemical storage tanks and the Vancouver sewage treatment facilities remained intact, the sanctuary was not severely impacted (CRESA, 2004).

10.5.2 Riverine Flooding Vulnerabilities

The major issue related to riverine flooding in Clark County is the large number of new homes that could be constructed in floodplains. Any new development built in a floodplain increases the number of residences and other structures exposed to flooding, increasing risk to life and property along with the damage figures from any flood event. Large numbers of additional homes in the floodplain mean that even floods that are now considered minor could cause large amount of damage in the future (CRESA, 2004).

While new construction in Clark County floodplains exceeds the development standards required by the National Flood Insurance Program, risk is not entirely eliminated. Development, even when compliant with NFIP standards, is served by infrastructure that is vulnerable to flooding. Individual homes may be resistant to flooding, but the roads and drainage systems that serve them could flood, leading to isolation and property damage. Almost 80 percent of all of the structures insured through the NFIP cover structures constructed since 1980, and 60 percent have been built since 1990. Since flood insurance is required on new development if it falls within the floodplain, this figure evidences the increasing number of structures in flood-prone areas (CRESA, 2004).

10.5.3 Stormwater Problems and Shallow Flooding Areas

Much of southwestern Clark County is relatively flat, with poorly drained soils. During heavy rainstorms, water ponds in this area. In 1995, many homeowners suffered water damage that was not directly associated with flooding in a river (CRESA, 2004). This type of flooding is more than a nuisance to homeowners. Severe structural damage can result from wet shifting soils, and damp foundations can allow mildew and related harmful agents. These shallow flooding areas, while causing challenging building environments, often provide excellent natural habitat (CRESA, 2004).

Increased development and the accompanying built land cover are causing increased flood elevations and increased runoff in the stormwater system. With increased development, the vulnerability of local road and drainage systems would increase from overland flow and blocked culverts. These impacts could isolate some residents from emergency services during a major event (CRESA, 2004).

10.5.4 Population

Vulnerable Populations

A geographic analysis of demographics using the Hazus-MH model identified populations vulnerable to the flood hazard as follows:

- **Economically Disadvantaged Populations**—An estimated 14 percent (543) of households within the 1-percent annual chance flood hazard area are economically disadvantaged, defined as having household incomes of \$20,000 or less.
- **Population over 65 Years Old**—An estimated 13 percent (1,390) of the population in the census blocks that intersect the 1-percent annual chance flood hazard area are over 65 years old.
- **Population under 16 Years Old**—An estimated 26 percent (2,717) of the population within census blocks located in or near the 1-percent annual chance flood hazard area are under 16 years of age.

Impacts on Persons and Households

Table 10-11 summarizes estimated impacts on persons in the planning area for the 1-percent annual chance and 0.2-percent annual chance flood events.

Table 10-11. Estimated Flood Impact on Persons ^a				
	1 Percent Annual Chance		0.2 Percent Annual Chance	
	Displaced Persons	Persons Requiring Short-Term Shelter	Displaced Persons	Persons Requiring Short-Term Shelter
Battle Ground	235	95	304	153
Camas	459	360	546	456
La Center	30	18	30	19
Ridgefield	93	18	121	30
Vancouver	2,195	1,899	3,622	3,209
Washougal	302	226	405	336
Woodland	2,236	2,169	2,445	2,369
Yacolt	82	17	76	14
Unincorporated	4,433	2,491	6,191	3,846
Total	10,065	7,293	13,740	10,432

a. Hazus-MH results in this table are not intended to be precise estimates of damage after a hazard event. They represent generalized estimates of damage that may occur as the result of the modeled scenario, based on the available data.

Public Health and Safety

Floods and their aftermath present the following threats to public health and safety:

- **Unsafe food**—Floodwaters contain disease-causing bacteria, dirt, oil, human and animal waste, and farm and industrial chemicals. They carry away whatever lies on the ground and upstream. Their contact with food items, including food crops in agricultural lands, can make that food unsafe to eat and hazardous to human health. Power failures caused by floods damage stored food. Refrigerated and frozen foods are

affected during the outage periods, and must be carefully monitored and examined prior to consumption. Foods kept inside cardboard, plastic bags, jars, bottles, and paper packaging are subject to disposal if contaminated by floodwaters. Even though the packages do not appear to be wet, they may be unhygienic with mold contamination and deteriorate rapidly.

- **Contaminated drinking and washing water and poor sanitation**—Flooding impairs clean water sources with pollutants. Contact with the contaminants—whether through direct food intake, vector insects such as flies, unclean hands, or dirty plates and utensils—can result in waterborne illnesses and life-threatening infectious disease. The pollutants also saturate into the groundwater or can infiltrate into sanitary sewer lines through the ground. Wastewater treatment plants, if flooded and caused to malfunction, can be overloaded with polluted runoff waters and sewage beyond their disposal capacity, resulting in backflows of raw sewage to homes and low-lying grounds. Private wells can be contaminated or damaged severely by floodwaters, while private sewage disposal systems can become a cause of infection if they are broken or overflow. Unclean drinking and washing water and sanitation, coupled with lack of adequate sewage treatment, can lead to disease outbreaks.
- **Mosquitoes and animals**—Prolonged rainfall and floods provide new breeding grounds for mosquitoes—wet areas and stagnant pools—and can lead to an increase in the number of mosquito-borne diseases such as malaria and dengue and West Nile fevers. Rats and other rodents and wild animals also can carry viruses and diseases. The public should avoid such animals and should dispose of dead animals in accordance with guidelines issued by local animal control authorities. Leptospirosis—a bacterial disease associated predominantly with rats—often accompanies floods in developing countries, although the risk is low in industrialized regions unless cuts or wounds have direct contact with disease-contaminated floodwaters or animals.
- **Mold and mildew**—Excessive exposure to mold and mildew can cause flood victims—especially those with allergies and asthma—to contract upper respiratory diseases, triggering cold-like symptoms. Molds grow in as short a period as 24 to 48 hours in wet and damp areas of buildings and homes that have not been cleaned after flooding, such as water-infiltrated walls, floors, carpets, toilets and bathrooms. Very small mold spores can be easily inhaled by human bodies and, in large enough quantities, cause allergic reactions, asthma episodes, and other respiratory problems. Infants, children, elderly people and pregnant women are considered most vulnerable to mold-induced health problems.
- **Carbon monoxide poisoning**—Carbon monoxide poisoning is as a potential hazard after major floods. In the event of power outages following floods, flood victims tend to use alternative sources of fuels for heating or cooking inside enclosed or partly enclosed houses, garages or buildings without an adequate level of air ventilation. Carbon monoxide can be found in combustion fumes such as those generated by small gasoline engines, stoves, generators, lanterns, gas ranges, or the burning of charcoal or wood. Built-up carbon monoxide from these sources can poison people and animals.
- **Hazards when reentering and cleaning flooded homes and buildings**—Flooded buildings can pose significant health hazards to people entering and cleaning damaged buildings or working to restore utility service after floodwaters recede. Electrical power systems, including fallen power lines, can become hazardous. Gas leaks from pipelines or propane tanks can trigger fire and explosion. Flood debris—such as broken bottles, wood, stones and walls—may cause wounds and injuries to those removing contaminated mud and cleaning damaged buildings. Containers of hazardous chemicals, including pesticides, insecticides, fertilizers, car batteries, propane tanks and other industrial chemicals, may be hidden or buried under flood debris. A health hazard can also occur when hazardous dust and mold in ducts, fans and ventilators of air-conditioning and heating equipment are circulated through a building and inhaled by those engaged in cleanup and restoration.
- **Mental stress and fatigue**—Having experienced a devastating flood and seen loved ones lost or injured and homes damaged or destroyed, flood victims can experience long-term psychological impact. The expense and effort required to repair flood-damaged homes places severe financial and psychological burdens on the people affected, in particular the unprepared and uninsured. Post-flood recovery—

especially when it becomes prolonged—can cause mental disorders, anxiety, anger, depression, lethargy, hyperactivity, sleeplessness, and, in an extreme case, suicide. Behavior changes may also occur in children such as an increase in bed-wetting and aggression. There is also a long-term concern among the affected that their homes can be flooded again in the future.

Current loss estimation models such as Hazus are not equipped to measure public health impacts such as these. The best level of mitigation for these impacts is to be aware that they can occur, educate the public on prevention, and be prepared to deal with them in responding to flood events.

10.5.5 Property

Hazus-MH calculates flood losses to structures based on flooding depth and structure type. Using historical flood insurance claim data, Hazus-MH estimates the percentage of damage to structures and their contents by applying established damage functions to an inventory. For this analysis, local data on facilities was used instead of the default inventory data provided with Hazus-MH. The analysis is summarized in Table 10-12 and Table 10-13 for the 1-percent annual chance and 0.2-percent annual chance flood events, respectively.

Table 10-12. Loss Estimates for 1-Percent Annual Chance Flood Event

	Structures Impacted ^a	Estimated Loss Associated with Flood			% of Total Replacement value
		Structure	Contents	Total	
Battle Ground	22	\$3,549,389	\$10,326,798	\$13,876,187	0.3%
Camas	38	\$23,742,188	\$27,038,281	\$50,780,469	0.7%
La Center	3	\$882,359	\$2,187,192	\$3,069,551	0.4%
Ridgefield	55	\$1,531,604	\$2,112,225	\$3,643,828	0.2%
Vancouver	144	\$15,911,588	\$28,909,855	\$44,821,442	0.1%
Washougal	41	\$13,545,721	\$23,465,441	\$37,011,162	0.9%
Woodland	789	\$24,378,452	\$18,152,121	\$42,530,573	2.4%
Yacolt	8	\$254,442	\$222,024	\$476,466	0.2%
Unincorporated	813	\$60,179,196	\$78,011,896	\$138,191,093	0.3%
Total	1913	\$143,974,939	\$190,425,833	\$334,400,771	0.3%

a. Impacted structures are those structures with finished floor elevations below the 100-year water surface elevation. These structures are the most likely to receive significant damage in a 1-percent annual chance flood event

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

Table 10-13. Loss Estimates for 0.2-Percent Annual Chance Flood Event

	Structures Impacted ^a	Estimated Loss Associated with Flood			% of Total Replacement value
		Structure	Contents	Total	
Battle Ground	32	\$6,591,957	\$21,942,920	\$28,534,877	0.7%
Camas	114	\$65,196,208	\$122,131,590	\$187,327,798	2.5%
La Center	3	\$1,289,064	\$2,252,823	\$3,541,886	0.4%
Ridgefield	57	\$2,952,044	\$3,788,517	\$6,740,561	0.3%
Vancouver	1,176	\$301,910,535	\$527,418,002	\$829,328,537	1.7%
Washougal	91	\$18,005,170	\$28,734,345	\$46,739,516	1.1%
Woodland	925	\$58,559,688	\$51,536,180	\$110,095,867	6.2%
Yacolt	7	\$184,226	\$197,653	\$381,878	0.1%
Unincorporated	1,231	\$99,413,476	\$138,695,856	\$238,109,333	0.5%
Total	3,636	\$554,102,368	\$896,697,886	\$1,450,800,253	1.3%

a. Impacted structures are those structures with finished floor elevations below the 500-year water surface elevation. These structures are the most likely to receive significant damage in a 0.2-percent annual chance flood event

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

It is estimated that there would more than \$334.4 million of flood loss from a 1-percent annual chance flood event in the planning area. This represents 16.7 percent of the total exposure to the 1-percent annual chance flood and 0.3 percent of the total replacement value for the planning area. It is estimated that there would be \$1.45 billion of flood loss from a 0.2-percent annual chance flood event, representing 31 percent of the total exposure to a 0.2-percent annual chance flood event and 1.3 percent of the total replacement value.

National Flood Insurance Program

Table 10-14 lists flood insurance statistics for the jurisdictions in the planning area that participate in the NFIP. In these jurisdictions, 1,519 flood insurance policies provide \$414.7 million in insurance coverage. According to FEMA, 145 flood insurance claims were paid between January 1, 1978 and November 30, 2015, for a total \$2.84 million, an average of \$19,618 per claim (FEMA, 2015b). During this time, 55 claims were closed without payment.

Table 10-14. Flood Insurance Statistics

Jurisdiction	Date of Entry Initial FIRM Effective Date	# of Flood Insurance Policies as of 11/30/2015	Insurance In Force	Total Annual Premium	Total Claims, 11/1978 to 11/30/2015	Value of Claims paid, 11/1978 to 11/30/2015
Battle Ground	04/15/81	21	\$4,548,000	\$11,259	3	\$3,265.40
Camas	02/18/81	65	\$18,405,500	\$33,992	5	13,710.27
La Center ^a	N/A	0	\$0	\$0	0	\$0
Ridgefield	05/19/81	1	\$350,000	\$412	0	\$0
Vancouver	08/17/81	365	\$105,016,900	\$303,906	10	101,610.40
Washougal	03/02/81	47	\$14,465,000	\$37,692	10	71,369.59
Woodland	02/01/78	367	\$86,102,700	\$291,619	69	988,025.89
Yacolt	09/05/12	6	\$799,300	\$5,888	0	\$0
Unincorporated	08/02/82	647	\$185,016,900	\$422,554	103	\$1,666,659.68
Total		1,519	\$414,704,300.00	\$1,107,322.00	200	\$2,844,641.23

a. La Center has been suspended from the NFIP program as of September 6, 2012.

Source: FEMA, 2015b and FEMA, 2015d

Repetitive Loss

A repetitive loss property is defined by FEMA as an NFIP-insured property that has experienced any of the following since 1978, regardless of any changes in ownership:

- Four or more paid losses in excess of \$1,000
- Two paid losses in excess of \$1,000 within any rolling 10-year period
- Three or more paid losses that equal or exceed the current value of the insured property.

Repetitive loss properties represent only 1 percent of all flood insurance policies, but historically they account for nearly one-third of the claim payments (National Wildlife Federation, 2006). The government has instituted programs encouraging communities to identify and mitigate the causes of repetitive losses. A report on repetitive losses by the National Wildlife Federation found that 20 percent of these properties are outside any mapped 1-percent annual chance flood hazard area (National Wildlife Federation, 1998). The key identifiers for repetitive loss properties are the existence of flood insurance policies and claims paid by the policies. With the potential for

minor flood events every year and major events every five to seven years, the County and its planning partners consider all of the mapped floodplain areas as susceptible to repetitive flooding.

FEMA has identified five repetitive loss properties in the planning area as of July 31, 2015. FEMA records indicate that these properties fall in several communities within the County; however, it was determined through spatial analysis that all five properties are in unincorporated areas of the County. A further review of the properties determined that four are in the 1-percent annual chance flood hazard area. The remaining property is located outside of the 1-percent and 0.2-percent annual chance flood hazard areas and is not located near any mapped flood hazard areas. The dates and amounts of loss were not provided by FEMA, so they cannot be correlated to any known flood or storm events. Based on this information, it is assumed that the repetitive losses are a result of localized drainage issues. All of the properties are single-family residential structures.

A repetitive loss area is the portion of a floodplain holding structures that FEMA has identified as meeting the definition of repetitive loss. The CRS requires participating communities to identify repetitive loss areas. Identifying the broader area helps to identify structures that are at risk but are not on FEMA's list of repetitive loss structures because no flood insurance policy was in force at the time of loss. Figure 10-3 shows the repetitive loss areas in Clark County.

10.5.6 Critical Facilities and Infrastructure

Hazus-MH was used to estimate potential flood damage to critical facilities exposed to the flood risk. Using depth/damage function curves to estimate the percent of damage to the building and contents of critical facilities, Hazus-MH correlates these estimates into an estimate of functional down-time (the estimated time it will take to restore a facility to 100 percent of its functionality). This helps to gauge how long the planning area could have limited usage of facilities deemed critical to flood response and recovery. The Hazus critical facility results are shown in Table 10-15 and Table 10-16:

- **1-percent annual chance flood event**—On average, critical facilities would receive 22 percent damage to the structure and 70 percent damage to the contents during a 1-percent annual chance flood.
- **0.2-percent annual chance flood**—A 0.2-percent annual chance flood event would damage the structures an average of 22 percent and the contents an average 67 percent.

Table 10-15. Estimated Damage to Critical Facilities and Infrastructure from 1-Percent Annual Chance Flood

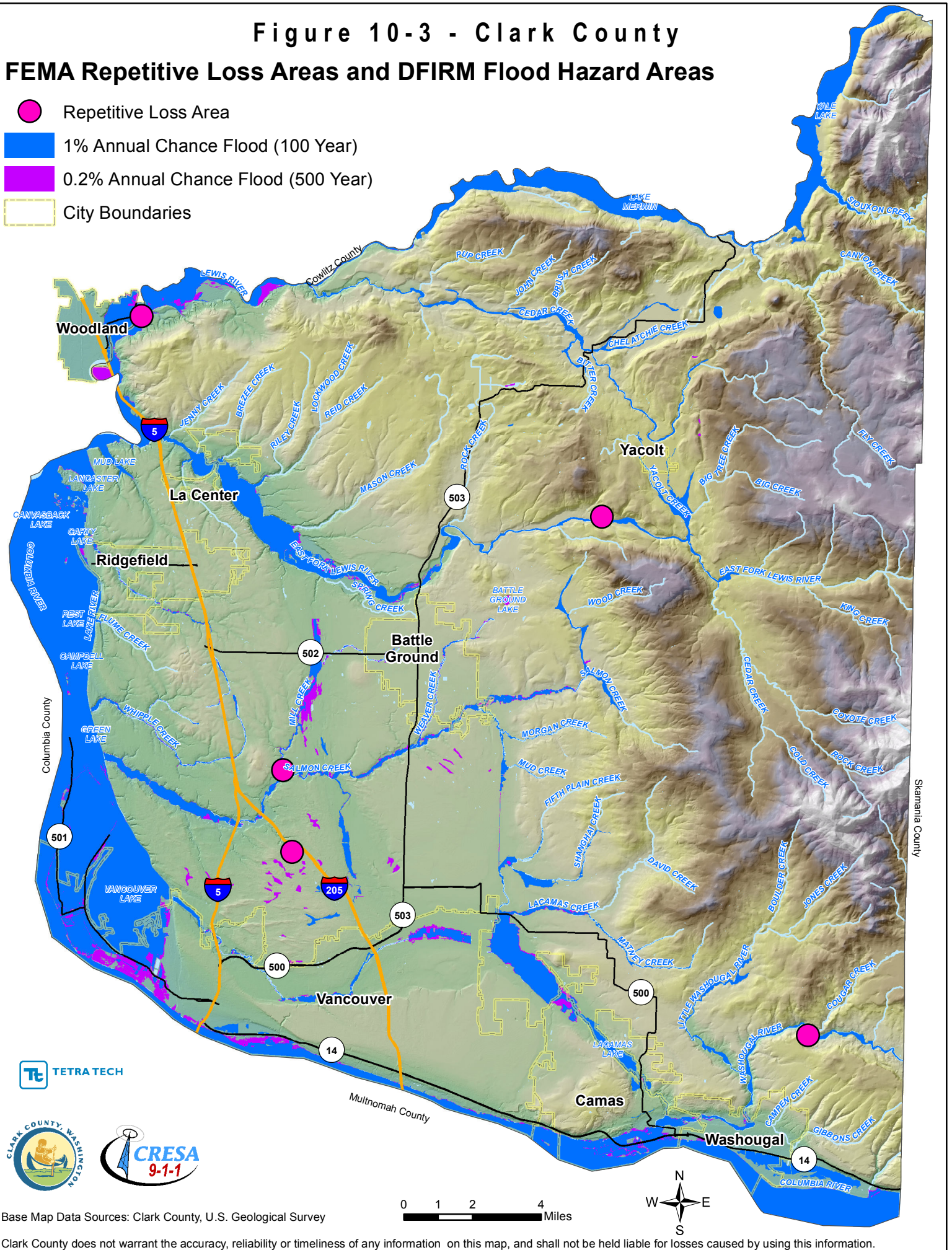
	Number of Facilities Affected	Average % of Total Value Damaged		Days to 100% Functionality
		Building	Content	
Communication Facilities	0	--	--	--
Dams ^a	N/A	N/A	N/A	N/A
Emergency Services	1	15%	70%	630
Energy	3	22%	N/A	N/A
Government Facilities	0	--	--	--
Hazardous Materials	7	28%	N/A	N/A
Health Care & Public Health	0	--	--	--
Information Technology	--	--	--	--
Schools	0	--	--	--
Transportation Systems	49	21%	N/A	N/A
Water & Sanitation Systems	22	23%	N/A	N/A
Total	82	22%	70%	630

a. Hazus-MH does not produce damage estimates for dams.

Figure 10-3 - Clark County

FEMA Repetitive Loss Areas and DFIRM Flood Hazard Areas

- Repetitive Loss Area
- 1% Annual Chance Flood (100 Year)
- 0.2% Annual Chance Flood (500 Year)
- City Boundaries



Base Map Data Sources: Clark County, U.S. Geological Survey

0 1 2 4 Miles



Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

Table 10-16. Estimated Damage to Critical Facilities and Infrastructure from 0.2-Percent Annual Chance Flood

	Number of Facilities Affected	Average % of Total Value Damaged		Days to 100% Functionality
		Building	Content	
Communication Facilities	0	--	--	--
Dams ^a	N/A	N/A	N/A	N/A
Emergency Services	1	27%	100%	720
Energy	5	25%	--	--
Government Facilities	0	--	--	--
Hazardous Materials	16	25%	--	--
Health Care & Public Health	0	--	--	--
Information Technology	0	--	--	--
Schools	1	6%	33%	480
Transportation Systems	71	24%	--	--
Water & Sanitation Systems	33	26%	--	--
Total	127	22%	67%	600

a. Hazus-MH does not produce damage estimates for dams.

10.5.7 Environment

The environment vulnerable to flood hazard is the same as the environment exposed to the hazard. As with any significant natural hazard event, large of amounts of debris generated from the damaged buildings and infrastructure could have significant environmental impacts. These impacts were estimated for the flood hazard events through the Level 2 Hazus-MH analysis. Table 10-17 summarizes the results.

Table 10-17. Estimated Flood-Caused Debris

	1-percent annual chance event		0.2 percent annual chance event	
	Debris to Be Removed (tons) ^a	Truck Loads ^b	Debris to Be Removed (tons) ^a	Truck Loads ^b
Battle Ground	300.34	12	392.09	16
Camas	31,223.38	1,249	38,173.52	1,527
La Center	1,513.84	61	1,564.54	63
Ridgefield	1,126.04	45	3,050.12	122
Vancouver	74,823.08	2,993	141,288.97	5,652
Washougal	8,348.10	334	10,315.27	413
Woodland	2,447.70	98	4,634.97	185
Yacolt	45.39	2	45.44	2
Unincorporated	31,501.58	1,260	38,887.05	1,555
Total	151,329.47	6,053	238,351.97	9,534

a. Debris generation estimates were based on updated general building stock dataset at a Census Block analysis level.

b. Hazus assumes 25 tons per truck.

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

At this time this is the best approximation available to measure environmental impacts of flood hazards. The best gauge of vulnerability of the environment would be a review of damage from past flood events. Loss data that segregates damage to the environment was not available at the time of this plan. Capturing this data from future events could be beneficial in measuring the vulnerability of the environment for future updates.

10.5.8 Economic Impact

Economic impact will be largely associated with the location in which flooding occurred. In such areas, commercial buildings may need to be renovated, causing a disruption in associated services. Additionally, many of the port facilities lie within flood hazard areas, which could cause significant economic disruption.

10.6 FUTURE TRENDS

10.6.1 Development

Municipal comprehensive plans guide development in the planning area. The County's Comprehensive Plan sets goals, objectives, policies and actions for frequently flooded areas. The County has developed several plans and initiatives to promote healthy watersheds and to manage stormwater runoff by directing future development away from flood risk areas. Clark County's critical areas regulations regulate how development and redevelopment can safely occur on lands that contain critical areas. Additionally, Clark County and all but one of the municipal planning partners participate in the NFIP and have adopted flood damage prevention regulations in response to its requirements.

Clark County's population increased an average of 2.1 percent per year between 2000 and 2010, a total of 23.2 percent. It is estimated that Clark County's population will increase by an additional 29.5 percent by 2040. County plans and regulations will reduce the impacts of this future growth on floodplains and critical areas and lessen the impacts of flooding on future development. State-mandated growth management, stormwater management and critical areas regulations have been effective in limiting an increase in flood risk throughout Washington.

Table 10-18 shows the area identified as underutilized or vacant in urban growth areas in the County that intersect the 0.2 percent annual flood hazard, but are outside of the 1 percent annual flood hazard areas generally regulated pursuant to critical areas ordinances and the NFIP.

Table 10-18. Buildable Lands in Urban Growth Areas Intersecting the 0.2-Percent Annual Flood Hazard^a

Urban Growth Area ^b	Buildable Area ^c (acres)				
	Residential		Commercial	Industrial	Total
	Acres	Units			
Battle Ground	60.59	364	54.10	0	114.69
Camas	21.18	127	12.62	55.97	89.77
La Center	4.92	20	0.29	0	5.21
Ridgefield	98.21	589	0	7.13	105.33
Vancouver	374.00	2,992	61.37	865.79	2,991.99
Washougal	13.96	84	3.36	0	17.31
Woodland ^d	24.97	100	0	0	24.97
Yacolt	0	0	0	0	0
Total	597.83	4,276.00	131.74	928.89	3,349.27

- Buildable lands information in this plan is for planning purposes only. Discrepancies may exist between these estimates and official records maintained by participating jurisdictions.
- Unincorporated areas outside of urban growth areas are excluded from this assessment. Development in these areas consists largely of rural lands, open space and large residential lots. Changes in development can be assessed through
- Acreage covers only mapped parcels; it excludes many rights of way and major water features.
- Acreage estimates exclude the portions of the City of Woodland in Cowlitz County and thus may be underestimated.

10.6.2 Climate Change

According to the University of Washington Climate Impacts Group, floods are expected to be more extreme and occur more often as a result of climate change. Warmer temperatures result in more winter precipitation falling as rain rather than snow throughout much of the Pacific Northwest. This change will result in the following (University of Washington Climate Impacts Group, 2013):

- Higher winter stream flows with more floods
- Less winter snow accumulation
- Earlier spring snowmelt.
- Earlier peak spring stream flow (already 10 to 30 days earlier than 1948)
- Lower summer stream flows.

Future floods are expected to exceed the capacity and protective abilities of existing flood protection facilities, threatening lives, property, major transportation corridors, communities and regional economic centers.

Changes in Hydrology

Use of historical hydrologic data has long been the standard of practice for designing and operating water supply and flood protection projects. For example, historical data are used for flood forecasting models and to forecast snowmelt runoff for water supply. This method of forecasting assumes that the climate of the future will be similar to that of the period of historical record. However, the hydrologic record cannot be used to predict changes in frequency and severity of extreme climate events such as floods. Going forward, model calibration or statistical relation development must happen more frequently, new forecast-based tools must be developed, and a standard of practice that explicitly considers climate change must be adopted. Climate change is already impacting water resources, and resource managers have observed the following:

- Historical hydrologic patterns can no longer be solely relied upon to forecast the water future.
- Precipitation and runoff patterns are changing, increasing the uncertainty for water supply and quality, flood management and ecosystem functions.
- Extreme climatic events will become more frequent, necessitating improvement in flood protection, drought preparedness and emergency response.

The amount of snow is critical for water supply and environmental needs, but so is the timing of snowmelt runoff into rivers and streams. Rising snowlines caused by climate change will allow more mountain area to contribute to peak storm runoff. High frequency flood events (e.g. 10-year floods) in particular will likely increase with a changing climate. Along with reductions in the amount of the snowpack and accelerated snowmelt, scientists project greater storm intensity, resulting in more direct runoff and flooding. Changes in watershed vegetation and soil moisture conditions will likewise change runoff and recharge patterns. As stream flows and velocities change, erosion patterns will also change, altering channel shapes and depths, possibly increasing sedimentation behind dams, and affecting habitat and water quality. With potential increases in the frequency and intensity of wildfires due to climate change, there is potential for more floods following fire, which increase sediment loads and water quality impacts.

As hydrology changes, what is currently considered a 1-percent annual chance flood may strike more often, leaving many communities at greater risk. Planners will need to factor a new level of safety into the design, operation, and regulation of flood protection facilities such as dams, bypass channels and levees, as well as the design of local sewers and storm drains.

10.7 SCENARIO

A likely flooding event would be one similar to the winter 1995 flood. A rainy and cold winter would be broken by warm weather, causing mountain snow to melt and stream runoff to increase. A severe winter storm with strong winds and heavy precipitation would accompany the flooding. Creeks would be overwhelmed at the same time that soil would be less permeable because of frozen ground. The combination would lead to watersheds draining water at overcapacity. Streams would rise above their natural banks, flooding homes and streets in the floodplains. Drainage structures would be overwhelmed, a situation further complicated by blockage from branches downed by the wind. Water would pond and stagnate in flat areas and areas with already-high water tables. Continued warm, rainy weather in the larger Columbia watershed would result in flood stages along the Columbia River. Water would penetrate the levee system in several areas leading to ponding in low-lying industrial areas (CRESA, 2004).

This scenario could be more costly in the future. There would be increased development in mapped floodplains, meaning greater exposure as well as increased flood levels due to increased impervious surfaces. Flood stages would be higher. Ponding would occur for longer periods of time and be more extensive. More human debris would block a greater number of culverts. Existing ring dikes that had protected sewage treatment structures and chemical storage structures might fail, impacting downriver wildland sanctuaries and other critical habitat (CRESA, 2004).

More homes would be present on vulnerable slopes, leading to increased numbers of landslides, with potential to destroy homes and damage roadways. The county emergency services response operations could be over-taxed by such an event. Residents, especially those in the more rural parts of the county, would experience isolation (CRESA, 2004).

10.8 ISSUES

The planning team has identified the following flood-related issues relevant to the planning area:

- The following are issues associated with a 1-percent annual chance flood event:
 - More than 6,650 people are estimated to live within the special flood hazard area.
 - There may be more than 150 million tons of debris following a 1-percent annual chance flood.
 - More than \$334 million in damage to building structure and contents would be expected.
 - More than 2,100 structures are within the special flood hazard area. Of these, 92 percent are residential.
- The following are issues associated with a 0.2-percent annual chance flood event:
 - More than 12,100 people are estimated to live within the special flood hazard area.
 - There may be more than 238 million tons of debris following a 0.2-percent annual chance flood.
 - More than \$1.45 billion in damage to building structure and contents would be expected.
 - Almost 4,000 structures are within the special flood hazard area. Of these, 92 percent are residential structures.
- There are five repetitive loss properties in the planning area. All are located in the unincorporated areas of the County.
- A sustained effort should be made to gather historical damage data, such as high water marks on structures and damage reports. The collection of this information will assist with determining the cost-effectiveness of future mitigation projects and will provide more information on the nature of the hazard.
- Ongoing flood hazard mitigation will require funding from multiple sources.

- Flood hazards do not recognize jurisdictional boundaries, and actions in jurisdictions can impact upstream or downstream neighbors. Coordination is necessary to ensure that these connections are understood and hazards are effectively mitigated.
- Floodplain residents need to continue to be educated about flood preparedness and the resources available during and after floods. Flood preparedness can help residents reduce risk to property and lives. Resources that are made available after flood events can help residents make informed decisions that may mitigate future risk to lives and property.
- The risk associated with the flood hazard overlaps the risk associated with other hazards, such as earthquake and landslide. This provides an opportunity to seek mitigation alternatives that can reduce risk for multiple hazards.
- The location of hazardous materials within the floodplain could result in secondary hazards during or after a flood event. Additional risk analysis should be performed on any hazardous-material facilities in the County.
- FEMA maps do not recognize residual risk outside the mapped area. Where levees are accredited, there may be a misperception that there is no flood risk. Public outreach and awareness efforts should emphasize the residual risk behind levees.
- The concept of residual risk should be considered in the design of future capital flood control projects and should be communicated with residents living in the floodplain.
- The impacts of climate change on flooding in the planning area are uncertain.
- The promotion of flood insurance as a means of protecting private property owners from the economic impacts of frequent flood events should continue.
- Existing floodplain-compatible uses such as agricultural and open space need to be maintained. There is constant pressure to convert these existing uses to more intense uses within the planning area during times of moderate to high growth.

11. LANDSLIDE

11.1 GENERAL BACKGROUND

A landslide is a mass of rock, earth or debris moving down a slope. Landslides may be minor or very large, and can move at slow to very high speeds. They can be initiated by storms, earthquakes, fires, volcanic eruptions or human modification of the land.

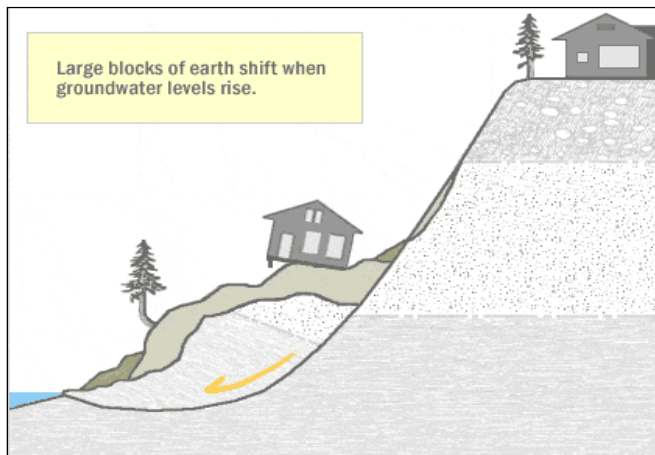
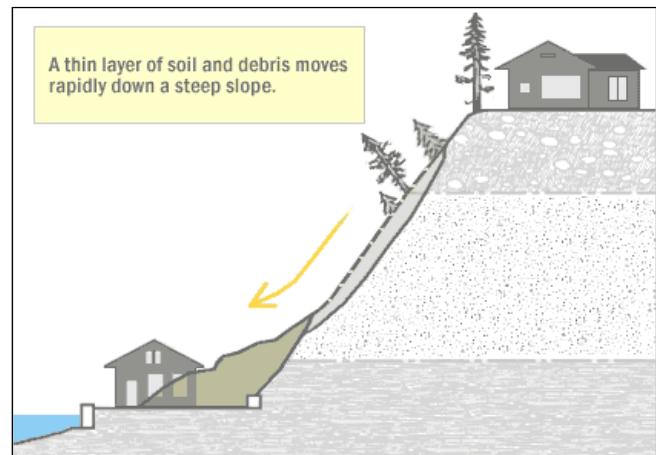
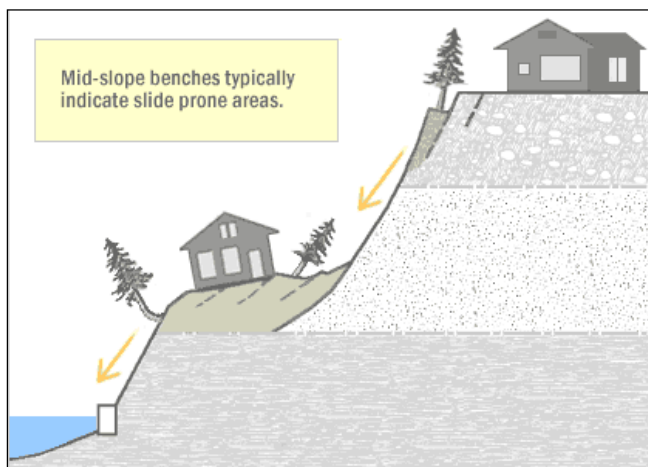
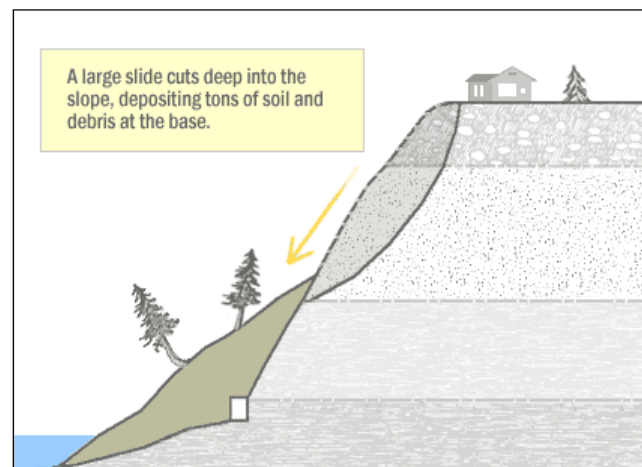
Mudslides (or mudflows or debris flows) are rivers of rock, earth, organic matter and other soil materials saturated with water. They develop in the soil overlying bedrock on sloping surfaces when water rapidly accumulates in the ground, such as during heavy rainfall or rapid snowmelt. Water pressure in the pore spaces of the material increases to the point that the internal strength of the soil is drastically weakened. The soil's reduced resistance can then easily be overcome by gravity, changing the earth into a flowing river of mud. A mudflow can move rapidly down slopes or through channels and can strike with little or no warning. The material can travel miles from its source, growing as it descends, picking up trees, boulders, cars and anything else in its path. Although these slides behave as fluids, they pack many times the hydraulic force of water due to the mass of material included in them.

Landslides can be some of the most destructive events in nature, posing a serious hazard to properties on or below hillsides. When landslides occur—in response to such changes as increased water content, earthquake shaking, addition of load, or removal of downslope support—they deform and tilt the ground surface. The result can be destruction of foundations, offset of roads, breaking of underground pipes, or overriding of downslope property and structures.

11.1.1 Landslide Failure Types and Runout

Landslides are commonly categorized by the type of initial ground failure. Figure 11-1 through Figure 11-4 show common types of slides (Washington Department of Ecology, 2014). The most common is the shallow colluvial slide, occurring particularly in response to intense, short-duration storms. The largest and most destructive are deep-seated slides, although they are less common than other types.

In addition to the failure type, landslide risk assessment evaluates the post-failure movement of loosened material, called “runout.” Runout is assessed for its travel distance and velocity. Mapping of landslide risk areas generally indicates the location of the potential failure, but mapping of areas that would be affected by the runout after the failure is not currently well-developed.

**Figure 11-1. Deep Seated Slide****Figure 11-2. Shallow Colluvial Slide****Figure 11-3. Bench Slide****Figure 11-4. Large Slide**

11.1.2 Landslide Causes

Mass movements are caused by a combination of geological and climate conditions, as well as the encroaching influence of urbanization. Vulnerable natural conditions are affected by human residential, agricultural, commercial and industrial development and the infrastructure that supports it. The following factors can contribute to landslide:

- Change in slope of the terrain
- Increased load on the land
- Shocks and vibrations
- Change in water content
- Groundwater movement
- Frost action
- Weathering of rocks
- Removing or changing the type of vegetation covering slopes.

Soil composition is also a factor, with many slides occurring on a slope at the contact between a permeable soil such as sand and an underlying impervious material such as clay. The Missoula flood deposits over much of central Clark County are characterized by alternating sand and clay layers (CRESA 2004).

Excavation and Grading

Slope excavation is common in the development of home sites or roads on sloping terrain. Grading can result in some slopes that are steeper than the pre-existing natural slopes. Since slope steepness is a major factor in landslides, these steeper slopes can be at an increased risk for landslides. The added weight of fill placed on slopes can also result in an increased landslide hazard. Small landslides can be fairly common along roads, in either the road cut or the road fill. Landslides occurring below new construction sites are indicators of the potential impacts stemming from excavation. In addition, historical landslide areas are more susceptible to construction-triggered sliding than are undisturbed slopes (CRESA 2004).

A study conducted by Burns and others (1998) at Portland State University found that changes to the slope through cutting or filling increased the risk of 76 percent of inventoried landslides in the Portland Metro region. The study documented 48 landslides that occurred in Oregon City in February 1996 and found that only about half the slides were considered natural. A Seattle landslide study found that human influence played some role in 84 percent of recorded slides (Winters 2015).

Drainage and Groundwater Alterations

Water flowing through or above ground is often the trigger for landslides. Any activity that increases the amount of water flowing into landslide-prone slopes can increase landslide hazards. Broken or leaking water or sewer lines can be especially problematic, as can water retention facilities that direct water onto slopes. However, even lawn irrigation and minor alterations to small streams in landslide prone locations can result in damaging landslides. Ineffective stormwater management and excess runoff can also cause erosion and increase the risk of landslide hazards. Drainage can be affected naturally by the geology and topography of an area. Development that results in an increase in impervious surface impairs the ability of the land to absorb water and may redirect water to other areas. Channels, streams, flooding, and erosion on slopes all indicate potential slope problems.

Road and driveway drains, gutters, downspouts, and other constructed drainage facilities can concentrate and accelerate flow. Ground saturation and concentrated velocity flow are major causes of slope problems and may trigger landslides.

Changes in Vegetation

Removing vegetation from very steep slopes can increase landslide hazards. A study by the Oregon Department of Forestry found that landslide hazards in three out of four steeply sloped areas were highest for a period of roughly 10 years after timber harvesting (Oregon Department of Forestry, 1999). A more recent study of a heavy rain event on Vancouver Island, Canada found that low forest density, indicating regrowth areas, and proximity to forest service roads were jointly associated with a 6- to 9-fold increase in the odds of a landslide (Goetz et al 2015). Areas that have experienced wildfire and land clearing for development may have long periods of increased landslide hazard. In addition, woody debris in stream channels (both natural and man-made from logging) may cause the impacts of debris flows to be more severe.

11.1.3 Landslide Management

While small landslides are often a result of human activity, the largest landslides are often naturally occurring phenomena with little or no human contribution. The sites of large landslides are typically areas of previous landslide movement that are periodically reactivated by significant precipitation or seismic events. Such naturally occurring landslides can disrupt roadways and other infrastructure lifelines, destroy private property, and cause

flooding, bank erosion and rapid channel migration. Landslides can create immediate, critical threats to public safety, and engineering solutions to protect structures from large active landslides are often prohibitively expensive.

In spite of their destructive potential, landslides can serve beneficial functions to the natural environment. They supply sediment and large wood to a stream network, contributing to complexity and dynamic channel behavior critical for aquatic and riparian ecological diversity. Effective landslide management should include the following elements:

- Continuing investigation to identify natural landslides, understand their mechanics, assess their risk to public health and welfare, and understand their role in ecological systems
- Regulation of development in or near existing landslides or areas of natural instability.
- Preparation for emergency response to landslides to facilitate rapid, coordinated action among local government and state and federal agencies, and to provide emergency assistance to affected or at-risk residents.
- Evaluation of options including landslide stabilization or structure relocation where landslides are identified that threaten critical public structures or infrastructure.

Critical area ordinances at the local level reduce the impacts of human alterations on critical areas, which include geologically hazardous areas such as areas prone to landslide, erosion, mass-wasting, debris flows and rock falls. The designation of critical areas, including geologically hazardous areas, is a requirement of the Washington State Growth Management Act (WAC 365-190-080(4)). The Clark County Title 40 Unified Development Code discourages development in landslide hazard areas; however, development may be allowed when certain requirements are met. In this same chapter, Chapter 40.430 – Geologic Hazard Areas, the County also establishes regulations for development on slopes greater than 40 percent (Clark County Code, 2015). In general, development in a landslide hazard area requires the following:

- A minimum buffer of 50 feet from the edge of the hazard area,
- Designation of the hazard areas and buffers as landslide protection areas,
- No decrease in slope stability on contiguous properties,
- Promotion of mitigation using best-available engineering
- Certification of all clearing and alteration by a registered geotechnical engineer or geologist licensed in the state.

11.2 HAZARD PROFILE

Clark County is topographically level to gently rolling in the southwestern areas, but the eastern and northern areas of the county contain steep, forested foothills and mountains of the Cascade Range. The elevation ranges from sea level to over 3,500 feet in the foothills in the eastern portion of the county. Historically, Clark County has experienced landslides as a result of slope instability, foundation distress, and poor drainage (Dames and Moore 2000). Landslides have become more common in the last decade and may be attributed to the rapid population growth and development, combined with the intense rainfall that occurs in this area (CRESA 2004).

11.2.1 Past Events

Most significant slide events in Clark County have occurred during or shortly after storm events. Four federal disaster declarations with listed landslide or mudslide impacts have affected Clark County since 1977. The Washington State Hazard Mitigation Plan lists the following landslide events as having impacted Clark County (FEMA, 2016; Washington Emergency Management Division 2013; CRESA 2004; NOAA 2015):

- **December 10, 1977**—Clark County was included in FEMA DR-545 for the Washington Severe Storms, Mudslides, Flooding.
- **1996-1997**—Heavy rains from a series of strong Pacific storms during the last week of December loosened hillsides throughout Southwest Washington. Numerous mudslides cut roads and threatened homes during the first week of January. One major landslide occurred 2 miles north of Woodland (outside of Clark County) in which 32,000 cubic yards of material fell across all lanes of Interstate 5, blocking traffic for several hours. A large slide near Battle Ground slowly flowed down a hillside and threatened nearby homes through the month of January. A slide occurred near Jenny Creek in Northwest Clark County.
- **December 23, 2002**—A landslide blocked a portion of the Washougal River Road, producing traffic problems.
- **November 2-11, 2006**—Clark County was included in FEMA DR-1671 for the Washington Severe Storms, Flooding, Landslides, and Mudslides.
- **December 14-15, 2006**—Clark County was included in FEMA DR-1682 for the Washington Severe Storm, Landslides, and Mudslides.
- **January 2009**—A warm wet storm from the Pacific Ocean brought significant amounts of rainfall, flooding, and soil saturation to the state, causing over 1,500 landslides greater than 5,000 square feet in size. The landslides in Clark County were primarily along the Interstate 5 corridor, in the Kelso and Longview areas, and on or near Highway 504.
- **December 1, 2015**—Clark County was included in FEMA DR-4253 for the Washington Severe Winter Storms, Straight Line Winds, Flooding, Landslides, Mudslides and a Tornado. Northbound Interstate 5 was closed due to a slide near Woodland.

11.2.2 Location

Slides can occur in urban and rural areas throughout the County. In general, landslide hazard areas are where the land has characteristics that contribute to the risk of the downhill movement of material, such as the following (Washington Department of Community, Trade and Economic Development, 2007):

- Areas of historical failures
- Areas with all three of the following characteristics:
 - Slopes steeper than 15 percent
 - Hillsides intersecting geologic contacts with a relatively permeable sediment overlying a relatively impermeable sediment or bedrock
 - Springs or groundwater seepage
- Areas that have shown movement within the last 11,000 years or that are underlain or covered by mass wastage debris of that time period
- Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and fault planes) in subsurface materials
- Slopes with gradients steeper than 80 percent subject to rock-fall during seismic shaking
- Areas potentially unstable as a result of rapid stream incision, stream bank erosion, and undercutting by wave action
- Areas that show evidence of, or that are at risk from, snow avalanches
- Areas in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding
- Any area with a slope of 40 percent or steeper and with a vertical relief of 10 or more feet, except areas composed of consolidated rock.

According to the Washington State Hazard Mitigation Plan, the state has six major landslide provinces. Clark County is in the Southwest Washington landslide province, although the County has a lower frequency of major landslides than elsewhere in the state. Southwest Washington is primarily characterized by a lack of glaciation and local exposure to glacial melt water. Much of this area has deeply dissected terrain and areas of mid-slope benches and gentle slopes. The State Hazard Mitigation Plan notes that Crescent and similar intrusive rocks are the dominant lithology where shallow landslides occur. Deep-seated landslides are found more in surrounding marine and nearshore sediments (Washington Emergency Management Division, 2014).

Landslide hazard areas and steep slopes within the planning area are shown on Figure 11-5. The landslide areas presented are a combination of Clark County and Washington Department of Natural Resources datasets that show historical, potential or active landslide hazard areas compiled from a variety of landslide databases.

11.2.3 Frequency

Landslides are an annual event in Clark County, and significant events occur every five years on average. Landslides are often triggered by other natural hazards such as earthquakes, heavy rain, floods or wildfires, so landslide frequency is often related to the frequency of these other hazards.

Slides can occur at any time, although most occur during the rainy season. All of the significant landslides in Clark County have occurred in November, December or January. These landslides typically occur during and after major storms, so the potential for landslides largely coincides with the potential for sequential severe storms that saturate steep, vulnerable soils. Precipitation influences the timing of landslides on three scales: total annual rainfall, monthly rainfall, and single precipitation events. In general, landslides are most likely during periods of higher than average rainfall.



11.2.4 Severity

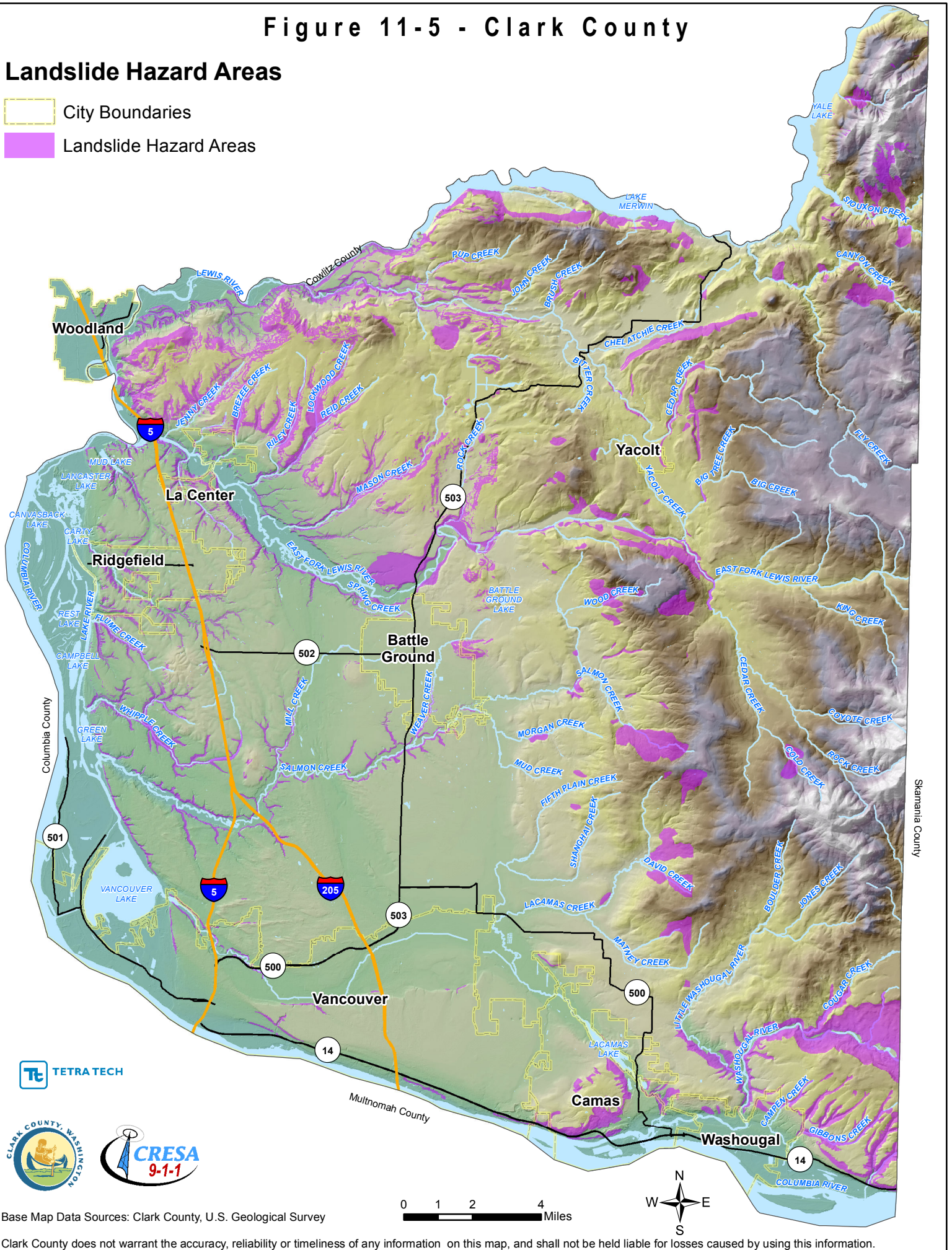
Landslides destroy property and infrastructure and can take the lives of people. Landslides in Clark County are typically not sudden releases of material and are a function of saturation from heavy rain and snowmelt (CRESA 2004). Numerous landslides have occurred in Clark County, but there is no consolidated database of them. Landslide events often occur concurrently with other hazard events, so damage estimates specifically related to landslide are difficult to obtain. There are no records of fatalities attributed to mass movement in the County. However, deaths have occurred in neighboring Washington counties and across the west coast as a result of slides and slope collapses.

The State Road 530 landslide that occurred in Oso, Washington showed the devastating damage that can be caused by landslides. On March 22, 2014, the slide traveled over 60 mph, covering over a square mile of land and depositing a thickness of 15 to 75 feet in some areas. The slide caused 43 fatalities and 12 injuries, destroyed 37 homes, and destroyed State Route 530 for over a mile. The debris blocked the North Fork Stillaguamish River for over 24 hours, backing up a pool of water that flooded the valley about 2 miles upstream and reached approximately 20 feet deep, inundating an additional 6 homes. Total property damage was estimated at \$60 million (NOAA 2015). Although Oso is located in the northern part of the state and Clark County in the southern part, the magnitude of this event as well as its occurrence in the same state have heightened the awareness of the severity of this hazard in the planning area.

Figure 11-5 - Clark County

Landslide Hazard Areas

-  City Boundaries
-  Landslide Hazard Areas



Base Map Data Sources: Clark County, U.S. Geological Survey

0 1 2 4 Miles



Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

11.2.5 Warning Time

Mass movements can occur suddenly or slowly. The velocity of movement may range from inches per year to many feet per second, depending on slope angle, material and water content. Generally accepted warning signs for landslide activity include the following:

- Springs, seeps, or saturated ground in areas that have not typically been wet before
- New cracks or unusual bulges in the ground, street pavements or sidewalks
- Soil moving away from foundations
- Ancillary structures such as decks and patios tilting and/or moving relative to the main house
- Tilting or cracking of concrete floors and foundations
- Broken water lines and other underground utilities
- Leaning telephone poles, trees, retaining walls or fences
- Offset fence lines
- Sunken or down-dropped road beds
- Rapid increase in creek water levels, possibly accompanied by increased turbidity (soil content)
- Sudden decrease in creek water levels though rain is still falling or just recently stopped
- Sticking doors and windows, and visible open spaces indicating frames out of plumb
- A faint rumbling sound that increases in volume as the landslide nears
- Unusual sounds, such as trees cracking or boulders knocking together.

Some methods used to monitor mass movements can provide an idea of the type of movement and the amount of time prior to failure. Assessing the geology, vegetation and amount of predicted precipitation for an area can help in predictions of what areas are generally at risk. Currently, there is no practical warning system for individual landslides. The standard operating procedure is to monitor situations on a case-by-case basis and respond after an event has occurred.

The Washington Division of Geology and Earth Resources, in cooperation with NOAA, has developed a generalized landslide warning system for shallow landslides that is currently in beta testing. The forecasting model is based on recent and predicted rainfall data. The warning system is not intended to forecast individual landslide events before they occur, but it will be a useful system for alerting residents to be more vigilant about landslide risk. The landslide warning map associated with this system provides additional information by county for residents (Washington Department of Natural Resources, 2016b).

11.3 SECONDARY HAZARDS

Landslides can cause several types of secondary effects, such as blocking access to roads, which can isolate residents and businesses and delay commercial, public and private transportation. This could result in economic losses for businesses. Other potential problems resulting from landslides are power and communication failures. Vegetation or poles on slopes can be knocked over, resulting in possible losses to power and communication lines. Landslides also have the potential of destabilizing the foundation of structures, which may result in monetary loss for residents. They also can damage rivers or streams, potentially harming water quality, fisheries and other habitat.

11.4 EXPOSURE

11.4.1 Population

Population could not be examined by landslide hazard area because census block group areas do not coincide with the hazard areas. A population estimate was made using the structure count of buildings within the landslide

hazard areas and applying the census value of 2.7 persons per household for Clark County and 3.17 persons per household for the City of Woodland. Using this approach, the estimated population living in the landslide risk area is 10,580 or 2.3 percent of the total planning area population. This includes only populations within defined landslide risk areas; it does not include persons who may be impacted by landslide runout. Table 11-1 shows the estimated population exposure by city.

Table 11-1. Estimated Population Residing in Landslide Risk Areas

	Population Exposed ^a	% of Total Population
Battle Ground	251	1.3%
Camas	2,084	9.8%
La Center	176	5.7%
Ridgefield	257	4.0%
Vancouver	470	0.3%
Washougal	772	5.1%
Woodland	10	0.2%
Yacolt	162	10.0%
Unincorporated	6,399	3.0%
Total	10,580	2.3%

a. Value calculated as number of buildings exposed multiplied by 2.7 people (Clark Co) / 3.17 people (Woodland) per building. This multiplier is the number of persons per household per the U.S. Census Bureau, State, County and City Quick Facts 2009-2015.

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

11.4.2 Property

Table 11-2 shows the number and replacement value of structures exposed to the landslide risk. Table 11-3 shows the types of structures in landslide hazard areas. There are an estimated 3,918 structures on parcels in the landslide risk areas, with an estimated value of \$1.88 billion. This represents 1.7 percent of the total replacement value for the planning area. Over 98 percent of the exposed structures are estimated to be residential structures. Table 11-4 shows the general land use of parcels exposed to landslides in Clark County. Most of the land area of parcels intersecting landslide hazard areas is residential (56.5 percent); agricultural/resource lands make up 29.3 percent.

Table 11-2. Exposure and Value of Structures in Landslide Risk Areas

	Buildings Exposed	Value Exposed			% of Total Replacement Value
		Structure	Contents	Total	
Battle Ground	93	\$27,118,550	\$13,559,275	\$40,677,825	1.0%
Camas	772	\$290,399,860	\$179,019,753	\$469,419,613	6.2%
La Center	65	\$19,576,851	\$10,324,107	\$29,900,958	3.7%
Ridgefield	95	\$28,711,585	\$15,871,853	\$44,583,438	2.1%
Vancouver	174	\$65,356,297	\$34,422,777	\$99,779,073	0.2%
Washougal	286	\$78,247,726	\$39,123,863	\$117,371,589	2.8%
Woodland	3	\$534,793	\$267,396	\$802,189	0.0%
Yacolt	60	\$7,772,765	\$3,886,382	\$11,659,147	3.8%
Unincorporated	2,370	\$662,389,959	\$407,534,166	\$1,069,924,125	2.4%
Total	3,918	\$1,180,108,386	\$704,009,572	\$1,884,117,957	1.7%

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

Table 11-3. Structures in Landslide Hazard Areas

	Number of Structures in Landslide Hazard Areas							Total
	Residential	Commercial	Industrial	Agriculture	Religion	Government	Education	
Battle Ground	93	0	0	0	0	0	0	93
Camas	763	6	0	2	0	0	1	772
La Center	64	1	0	0	0	0	0	65
Ridgefield	94	0	0	0	1	0	0	95
Vancouver	172	0	0	2	0	0	0	174
Washougal	286	0	0	0	0	0	0	286
Woodland	3	0	0	0	0	0	0	3
Yacolt	60	0	0	0	0	0	0	60
Unincorporated	2,317	6	0	41	4	2	0	2,370
Total	3,852	13	0	45	5	2	1	3,918

Table 11-4. Present Land Use in Parcels Intersecting Landslide Risk Areas^a

Present Use Classification ^b	Area in Landslide Risk Area (acres) ^{c, d}	% of total exposed acreage
Agriculture/Resource Land	38,089	29.3%
Commercial	4,034	3.1%
Education	778	0.6%
Governmental Services	2,904	2.2%
Industrial	1,013	0.8%
Religious Services	64	0.0%
Residential	73,433	56.5%
Vacant or uncategorized	9,643	7.4%
Total	129,957	100%

- a. Present land use information in this plan is for planning purposes only. Discrepancies may exist between these estimates and official records maintained by participating jurisdictions.
- b. Present use classification provided by Clark and Cowlitz County assessor's data assigned to best fit occupancy classes in FEMA's Hazus model (see Section 6.3.1). Parcels for which conflicting information on current development was available were assumed to be improved. Some designated resource land may also be included in the vacant or uncategorized category.
- c. Acreage covers only mapped parcels; it excludes many rights of way and major water features.
- d. Acreage includes Clark County and the incorporated area of the City of Woodland.

11.4.3 Critical Facilities and Infrastructure

Table 11-5 summarizes the critical facilities exposed to the landslide hazard. The following infrastructure can be exposed to mass movements:

- **Roads**—Roads are frequently partially or completely blocked by landslides. Major roads in the planning area that intersect mapped hazard areas include Interstates 5 and 205 and State Routes 14, 500, 501, 502 and 503.
- **Power Lines**—Power lines are generally elevated above steep slopes, but a landslide can trigger failure of the soil underneath the towers supporting them, causing collapse and ripping down the lines.
- **Rail Lines**—The BNSF Railway and the Clark County Railroad cross Clark County. The BNSF Railway passes through Ridgefield along a slope currently classified as potentially unstable. The Lewis and Clark Railway passes between Battleground and Yacolt in an area that is classified as a slope of potential

instability. The BNSF Railway also passes along dangerous slopes in Camas and Washougal, as well as areas where old landslide debris was located (CRESA 2004).

- Pipelines— Pipelines can be damaged or buried by landslides. Both the Northwest and Olympic pipelines cross through landslide hazard areas.

Table 11-5. Critical Facilities and Infrastructure Exposed to Landslide Hazard

	Communi- cation Facilities	Dams	Emer- gency Services	Energy	Govern- ment Facilities	Hazardous Materials	Health Care & Public Health	Infor- mation Technol- ogy	Schools	Trans- portation Systems	Water & Sanitation Systems	Total
Battle Ground	0	0	0	0	0	0	0	0	0	0	0	0
Camas	0	0	0	0	0	0	3	0	1	1	5	10
La Center	0	0	0	0	0	0	0	0	0	0	2	2
Ridgefield	0	0	0	0	0	0	0	0	0	0	1	1
Vancouver	0	0	0	0	0	0	0	0	0	1	0	1
Washougal	0	0	0	0	0	0	0	0	0	0	0	0
Woodland	0	0	0	0	0	0	0	0	0	0	0	0
Yacolt	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated	0	0	0	0	0	0	0	0	1	12	15	28
Total	0	0	0	0	0	0	3	0	2	14	23	42

11.4.4 Environment

Landslides that fall into streams may significantly impact fish and wildlife habitat, as well as affecting water quality. Hillsides that provide wildlife habitat can be lost for prolonged periods due to landslides. Topography may shift, and sediment accumulation downslope can block waterways and roadways, impacting the quality of streams and other water bodies. However, landslides also provide resources for many ecosystems. They contribute sediment and wood needed for building complex in-stream habitats, estuarine marshes, and beaches that are important for fisheries, wildlife and recreation (Washington Department of Community, Trade and Economic Development, 2007).

11.5 VULNERABILITY

11.5.1 Population

Due to the nature of census block group data, it is difficult to estimate populations vulnerable to landslides. In general, all of the estimated 10,580 persons exposed to the landslide hazard are considered to be vulnerable. Increasing population, and the fact that many homes are built on view property atop or below bluffs and on steep slopes subject to mass movement, increases the number of lives endangered by this hazard. In addition, people may be impacted if transportation corridors are disrupted by the landslide hazard.

11.5.2 Property

Loss estimations for the landslide hazard are not based on modeling using damage functions, because no such damage functions have been generated. Instead, loss potential was developed representing 10 percent, 30 percent and 50 percent of the replacement value of exposed structures. This allows emergency managers to select a range of economic impact based on an estimate of the percent of damage to the general building stock. Damage in excess of 50 percent is considered to be substantial by most building codes and typically requires total

reconstruction of the structure. Table 11-6 shows the general building stock loss estimates in landslide risk areas. It is highly unlikely that all landslide-prone areas would slide at the same time.

Table 11-6. Loss Potential for Landslide

	Exposed Value	Estimated Loss Potential from Landslide		
		10% Damage	30% Damage	50% Damage
Battle Ground	\$40,677,825	\$46,941,961	\$140,825,884	\$234,709,807
Camas	\$469,419,613	\$2,990,096	\$8,970,287	\$14,950,479
La Center	\$29,900,958	\$4,458,344	\$13,375,031	\$22,291,719
Ridgefield	\$44,583,438	\$9,977,907	\$29,933,722	\$49,889,537
Vancouver	\$99,779,073	\$11,737,159	\$35,211,477	\$58,685,795
Washougal	\$117,371,589	\$80,219	\$240,657	\$401,095
Woodland	\$802,189	\$1,165,915	\$3,497,744	\$5,829,574
Yacolt	\$11,659,147	\$46,941,961	\$140,825,884	\$234,709,807
Unincorporated	\$1,069,924,125	\$2,990,096	\$8,970,287	\$14,950,479
Total	\$1,884,117,957	\$127,283,658	\$381,850,973	\$636,418,292

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

11.5.3 Critical Facilities and Infrastructure

There are 42 critical facilities exposed to the landslide hazard to some degree. A more in-depth analysis of mitigation measures taken by these facilities should be done to determine if they could withstand impacts of a mass movement. No loss estimates were developed due to the lack of established damage functions for the landslide hazard.

All infrastructure and transportation corridors identified as exposed to the landslide hazard are considered vulnerable until more information becomes available. Protecting roads from hazards becomes particularly important in situations where they provide the only route into and out of an area. Particular areas of concern include some roads that occur in developments in Camas, Washougal, Ridgefield and La Center (CRESA 2004).

11.5.4 Environment

The environment vulnerable to landslide hazard is the same as the environment exposed to the hazard.

11.5.5 Economic Impact

The economic impact of a landslide depends on its severity and location. Minor landslides may not lead to any economic impact if they occur in the woods or non-populated areas. Minor landslides in more populated areas can have an economic impact, as they can lead to temporary road closures that cause isolation in neighborhoods and traffic delays for public and private transportation. This can result in losses for businesses if employees are unable to make it to work or if customers choose to not shop because of transportation difficulties. Landslide economic losses can be categorized in several ways (USGS 2001):

- Direct or indirect:
 - Direct losses include costs for replacement, repair, rebuilding, and maintenance resulting from landslide damage to property.
 - Indirect losses include the following:
 - Reduced real estate values in areas threatened by landslides
 - Loss of tax revenues on properties devalued by landslides

- Loss of industrial, agricultural, and forest productivity, and of tourist revenues
- Loss of human or domestic animal productivity because of death, injury, and psychological trauma
- Costs of mitigation and prevention activities to reduce landslide risks.
- Private or public costs:
 - Private costs are mainly incurred as damage to land and structures, such as private property or industrial facilities.
 - Public costs are those borne by government agencies. The largest public cost is the repair or relocation of highways/roads and accessory structures (sidewalks, storm drains, etc.) after an event.

11.6 FUTURE TRENDS

11.6.1 Development

The State of Washington has adopted the International Building Code by reference in its Washington Building Standards Code. The International Building Code includes provisions for geotechnical analyses in steep slope areas that have soil types considered susceptible to landslide hazards. These provisions ensure that new construction is built to standards that reduce vulnerability to the landslide risk. In addition, all municipal planning partners have comprehensive plans that define landslide hazard areas as critical areas and have adopted critical areas ordinances that regulate development in landslide-prone areas. This will facilitate wise land use decisions as future growth impacts landslide hazard areas. It is anticipated that some new development will be exposed to landslide risk, as runout models do not yet exist and it is likely that not all landslide hazard areas have been identified.

Table 11-7 shows the area identified as underutilized or vacant in urban growth areas in the County that intersect identified landslide hazard areas. These estimates do not include area within parcels that have been designated as critical areas and, thus, are believed to be at the greatest risk from landslide hazards.

Table 11-7. Buildable Lands in Planning Area Urban Growth Areas Intersecting Landslide Hazard Areas^a

Urban Growth Area ^b	Buildable Area ^c (acres)				
	Residential		Commercial	Industrial	Total
	Acres	Units			
Battle Ground	213.81	1,283	23.25	24.35	261.41
Camas	271.02	1,626	0.50	7.21	278.73
La Center	237.66	951	35.32	46.31	319.29
Ridgefield	576.54	3,459	24.65	136.19	737.38
Vancouver	451.57	3,612	51.05	80.31	582.93
Washougal	131.89	792	5.51	68.20	206.60
Woodland^d	--	--	--	--	--
Yacolt	2.50	10	0	5.86	8.36
Total	1,884.99	11,733	140.28	368.43	14,126.70

- a. Buildable lands information in this plan is for planning purposes only. Discrepancies may exist between these estimates and official records maintained by participating jurisdictions.
- b. Unincorporated areas outside of urban growth areas are excluded from this assessment. Development in these areas consists largely of rural lands, open space and large residential lots. Changes in development can be assessed through
- c. Acreage covers only mapped parcels; it excludes many rights of way and major water features.
- d. Acreage estimates exclude the portions of the City of Woodland in Cowlitz County and thus may be underestimated.

11.6.2 Climate Change

Climate change may impact storm patterns, increasing the probability of more frequent, intense storms with varying duration. Increase in global temperature could affect the snowpack and its ability to hold and store water. Warming temperatures also could increase the occurrence and duration of droughts, which would increase the probability of wildfire, reducing the vegetation that helps to support steep slopes. All of these factors would increase the probability for landslide occurrences.

11.7 SCENARIO

The worst-case scenario for landslide in the planning area would be a severe storm with heavy rain that pushes precipitation levels above the thresholds identified by USGS, followed by an earthquake. This scenario is most likely to occur during late winter when the water table is high. An earthquake is likely to trigger landslides across the County that would complicate response and recovery efforts to the initial hazard event.

As a standalone event, a major landslide that occurred during a severe storm would create road obstructions and create isolation problems for residents and businesses in the more sparsely developed areas. It is likely that property owners located on steep slopes would suffer damage to property or structures. In addition to this, landslides carrying vegetation, such as shrubs and trees, may cause a break in power or communication lines, cutting off power and communication access to residents. Continued heavy rains and flooding would complicate this problem further. As emergency responders in Clark County attend to problems with flooding, it is possible they may be unavailable to assist with landslides occurring all over the county. This would worsen the problem of isolation for residents and business (CRESA 2004).

11.8 ISSUES

Landslides are often a secondary hazard related to other natural disasters. Landslide-triggering rainstorms often produce damaging floods. Earthquakes often induce landslides that can cause additional damage. The identification of areas susceptible to landslides is necessary to support grading, building, foundation design, housing density, and other land development regulations in reducing the risk of property damage and personal injury. The most significant effect of landslides in Clark County is the disruption of transportation and the destruction of private and public property. Important issues associated with landslides in the planning area include the following:

- It is estimated that more than 10,000 people (2.3 percent of the population) reside within landslide risk areas. This does not include residences that may be in landslide runout areas.
- An estimated 1.7 percent of the replacement value of the planning area (\$1.88 million) is located in landslide hazard areas; 80 percent of this is in unincorporated areas of the county and the City of Camas.
- There are more than 3,900 structures in landslide hazard areas. About 98 percent of them are residential.
- Although known landslide hazard areas and steep slopes are subject to regulation under critical area ordinances, continued development pressures could lead to more homes in landslide risk areas. Furthermore, landslides may occur that threaten people and property outside of the mapped risk areas.
- Current maps show areas that might be unstable, but do not offer a complete picture of areas at risk, as they do not indicate runout (where a landslide might go). Mapping and assessment of landslide hazards are constantly evolving. As new data and science become available, assessments of landslide risk should be reevaluated.

- The impact of climate change on landslides is uncertain. Climate change impacts that alter vegetation patterns, increase the occurrence of wildfires, or alter precipitation patterns may increase exposure to landslide risks.
- Landslides may cause negative environmental consequences, including water quality degradation.
- Areas with significant landslide risk should be monitored, to the extent possible, immediately following a possible triggering event. Officials may need to focus the majority of attention on emergency response; however, the possibility for a secondary event should not be disregarded.
- Facilities that contain hazardous materials located in landslide hazard areas may present additional risks.
- Additional studies should be performed that assess the risks from seismically induced landslides.
- Landslides in the County often impact transportation corridors limiting ingress and egress and creating issues of isolation.
- There are 42 critical facilities located in mapped landslide hazard areas in the planning area. Most of these facilities are sanitation system and transportation facilities in Camas and unincorporated County areas.
- Buildable lands analysis indicates that there is the potential for exposure to landslide risk to increase in the planning area. Although the most susceptible areas are regulated through critical areas ordinances, exposure can increase as current regulations may not include run out.

12. SEVERE WEATHER

12.1 GENERAL BACKGROUND

Severe weather refers to any dangerous meteorological phenomena with the potential to cause damage, serious social disruption, or loss of human life. Severe weather, technically, is not the same as extreme weather, which refers to unusual weather events at the extremes of the historical distribution for a given area. It includes thunderstorms, hail storms, damaging winds, tornadoes, excessive heat, snowstorms, ice storms, blizzards, and extreme cold. The most common severe weather events that impact Clark County are winter weather (snowstorms, ice storms or extreme cold) and windstorms. All types of severe weather that affect the planning area are described in the following sections. Flooding issues associated with severe weather are discussed in Chapter 10.

12.1.1 Damaging Winds

Winds exceeding 60 mph are classified as damaging winds. There are seven types of damaging winds:

- **Straight-line winds**—Any thunderstorm wind that is not associated with rotation; this term is used mainly to differentiate from tornado winds. Most thunderstorms produce some straight-line winds as a result of outflow generated by the thunderstorm downdraft.
- **Downdrafts**—A small-scale column of air that rapidly sinks toward the ground.
- **Downbursts**—A strong downdraft with horizontal dimensions larger than 2.5 miles resulting in an outward burst or damaging winds on or near the ground. Downburst winds may begin as a microburst and spread out over a wider area, sometimes producing damage similar to a strong tornado. Although usually associated with thunderstorms, downbursts can occur with showers too weak to produce thunder.
- **Microbursts**—A small concentrated downburst that produces an outward burst of damaging winds at the surface. Microbursts are generally less than 2.5 miles across and short-lived, lasting only 5 to 10 minutes, with maximum wind speeds up to 168 mph. There are two kinds of microbursts: wet and dry. A wet microburst is accompanied by heavy precipitation at the surface. Dry microbursts occur with little or no precipitation reaching the ground.
- **Gust front**—A gust front is the leading edge of rain-cooled air that clashes with warmer thunderstorm inflow. Gust fronts are characterized by a wind shift, temperature drop, and gusty winds out ahead of a thunderstorm. Sometimes the winds push up air above them, forming a shelf cloud or detached roll cloud.
- **Derecho**—A derecho is a widespread thunderstorm wind caused when new thunderstorms form along the leading edge of an outflow boundary (the boundary formed by horizontal spreading of thunderstorm-cooled air). The word “derecho” is Spanish and means “straight ahead.” Thunderstorms feed on the boundary and continue to reproduce. Derechos typically occur in summer when complexes of thunderstorms form over plains, producing heavy rain and severe wind. The damaging winds can last a long time and cover a large area.
- **Bow Echo**—A bow echo is a linear wind front bent outward in a bow shape. Damaging straight-line winds often occur near the center of a bow echo. Bow echoes can be 200 miles long, last for several hours, and produce extensive wind damage at the ground.

Damage from winds accounts for half of all severe weather reports in the continental U.S. Winds can reach speeds up to 100 mph and can produce a damage path extending for hundreds of miles. Windstorms in Washington typically occur from October through March (Washington Emergency Management Division, 2014).

12.1.2 Extreme Temperatures

Excessive Heat Events

Excessive heat events are defined by the U.S. EPA as “summertime weather that is substantially hotter and/or more humid than average for a location at that time of year” (U.S. EPA, 2006). Heat waves are excessive heat events that typically last two or more days (CDC, 2014b). Because extreme heat is relative to the usual weather in a region, criteria that define an extreme heat event may differ among jurisdictions and with the time of year. In general, extreme heat events can be characterized by temperatures greater than 90°F, warm stagnant air masses and consecutive nights with higher-than-usual minimum temperatures (CDC, 2009).

Heat Index

Extreme heat events are often a result of more than ambient air temperature. Heat index tables (see Figure 12-1) are commonly used to provide information about how hot it feels based on several meteorological conditions. Heat index values are for shady, light wind conditions; exposure to full sunshine can increase heat index values by up to 15°F. Strong winds with very hot, dry air also can be extremely hazardous (NWS, 2014b).

Source: National Weather Service/NOAA

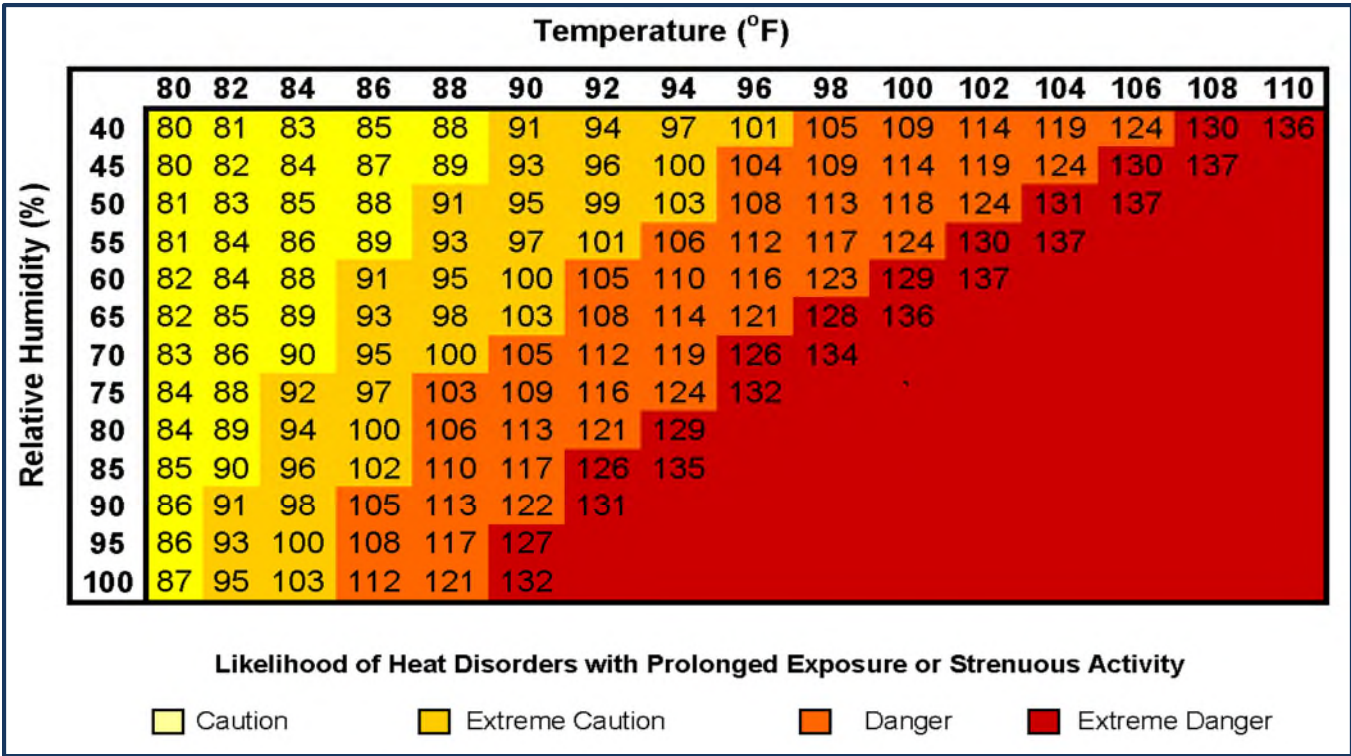


Figure 12-1. Heat Index Chart

Heat Islands

Extreme heat events may be exacerbated in urban areas, where reduced air flow, reduced vegetation and increased generation of waste heat can contribute to temperatures that are several degrees higher than in surrounding rural

or less urbanized areas. When urban buildings, roads and other infrastructure replace open land and vegetation, surfaces that were once permeable and moist become impermeable and dry. These changes cause urban areas to become warmer than the surrounding areas, serving as contiguous regions of higher temperatures. This phenomenon is known as urban heat island effect. Heat islands can affect communities by increasing peak summer energy demand, air pollution, greenhouse gas emissions, heat-related illness and death, and water quality degradation.

Extreme Cold and Wind Chill

Weather that constitutes extreme cold varies across different parts of the U.S. In regions relatively unaccustomed to winter weather, near freezing temperatures are considered extreme cold (CDC, 2014a). Extreme cold can often accompany severe winter storms. Wind can exacerbate the effects of cold temperatures by carrying heat away from the body more quickly, thus making it feel colder than is indicated by the temperature. This phenomenon is known as wind chill. Wind chill is the temperature that your body feels when the air temperature is combined with wind speed (CDC, 2014a). Figure 12-2 shows the value of wind chill based on ambient temperature and wind speed.

Source: National Weather Service/NOAA

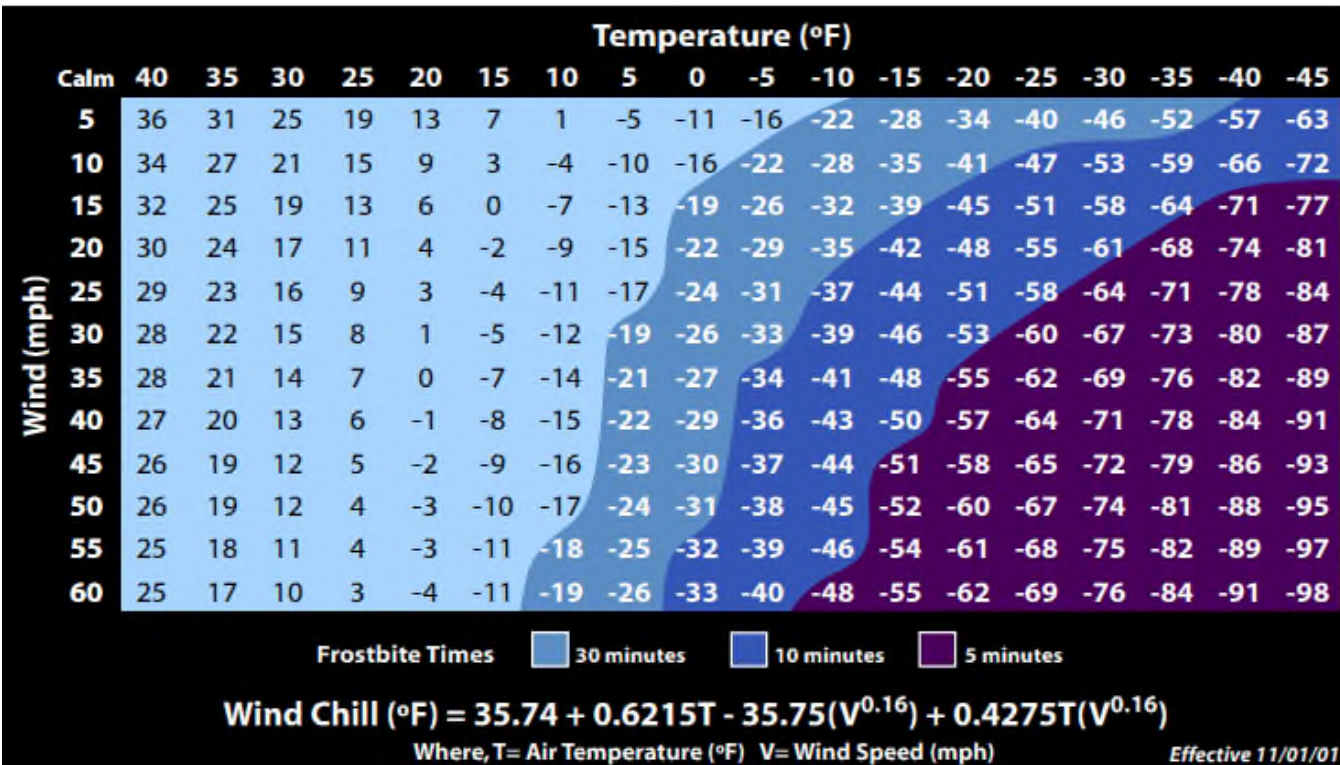


Figure 12-2. Wind Chill Chart

12.1.3 Severe Winter Weather

Blizzards and Snowstorms

The National Weather Service defines a winter storm as having significant snowfall, ice and/or freezing rain; the quantity of precipitation varies by elevation. Heavy snowfall is 4 inches or more in a 12-hour period, or 6 inches or more in a 24-hour period in non-mountainous areas; and 12 inches or more in a 12-hour period or 18 inches or more in a 24-hour period in mountainous areas. There are three key ingredients to a severe winter storm:

- **Cold Air**—Below-freezing temperatures in the clouds and near the ground are necessary to make snow and/or ice.
- **Moisture**—Moisture is required in order to form clouds and precipitation. Air blowing across a body of water, such as a large lake or the ocean, is a typical source of moisture.
- **Lift**—Lift is required in order to raise the moist air to form the clouds and cause precipitation. An example of lift is warm air colliding with cold air and being forced to rise over the cold dome. The boundary between the warm and cold air masses is called a front. Another example of lift is air flowing up a mountain side.

Areas most vulnerable to winter storms are those affected by convergence of dry, cold air from the interior of the North American continent and warm, moist air off the Pacific Ocean. When strong storms crossing the Pacific arrive at the coast, if the air is cold enough, snow falls. As the moisture rises into the mountains, heavy snow closes mountain passes and can cause avalanches. Cold air from the north has to filter through mountain canyons into basins and valleys to the south. If the cold air is deep enough, it can spill over a mountain ridge. As the air funnels through canyons and over ridges, wind speeds can reach 100 mph. High winds with snow results in a blizzard.

Ice Storms

The National Weather Service defines an ice storm as a storm that results in the accumulation of at least 0.25 inches of ice on exposed surfaces. Ice storms occur when rain falls from a warm, moist, layer of atmosphere into a below freezing, drier layer near the ground. The rain freezes on contact with the cold ground and exposed surfaces, causing damage to trees, utility wires, and structures (see Figure 12-3).

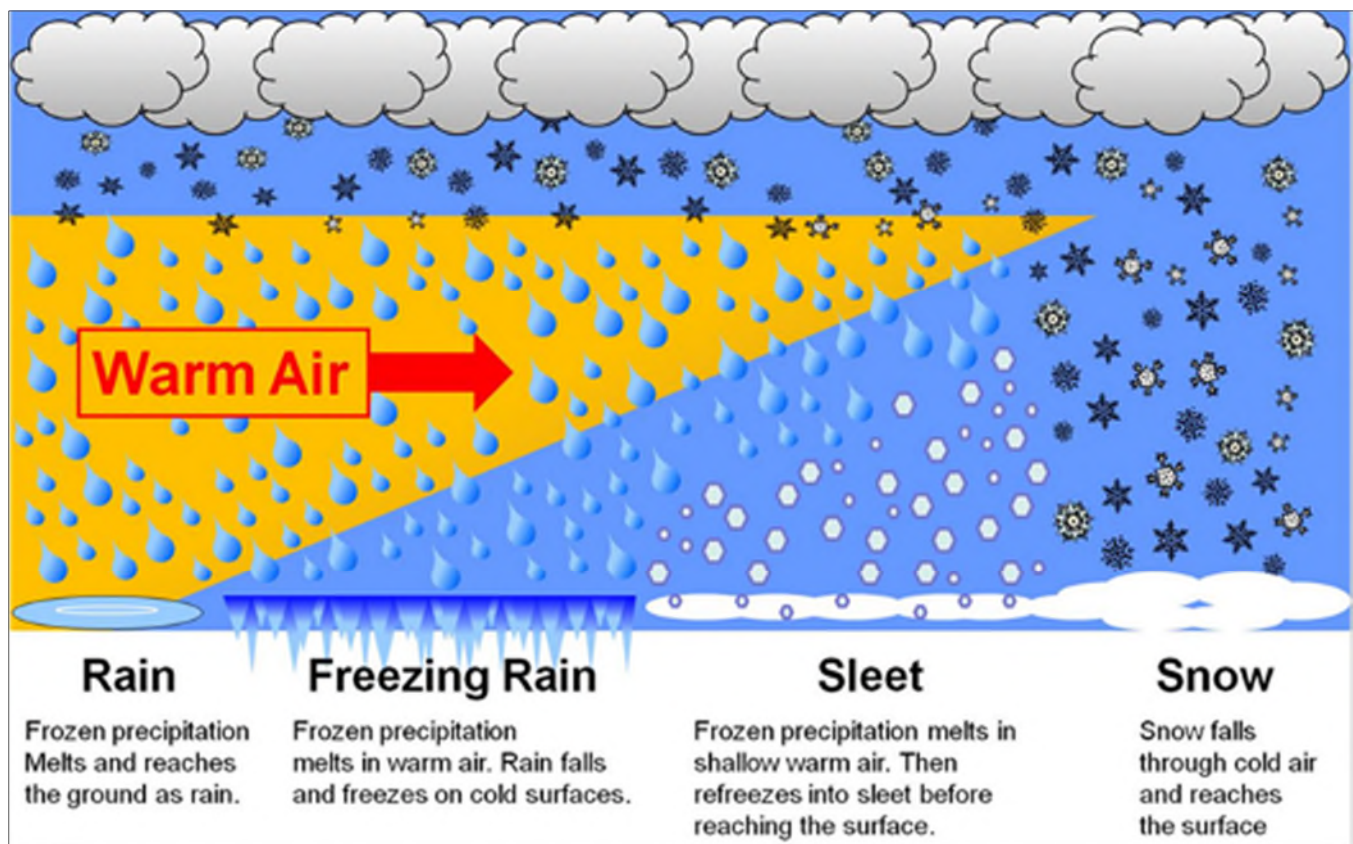


Figure 12-3. The Formation of Different Kinds of Precipitation

Ice accretion generally ranges from a trace to 1 inch. Accumulations between 1/4-inch and 1/2-inch can cause small branch and faulty limb breakage. Accumulations of 1/2-inch to 1 inch can cause significant breakage. Strong winds increase the potential for damage from ice accumulation.

12.1.4 Thunderstorms and Lightning

A thunderstorm is a rain event that includes thunder and lightning. A thunderstorm is classified as “severe” when it contains one or more of the following: hail with a diameter of three-quarter inch or greater, winds gusting in excess of 50 knots (57.5 mph), or tornado. Approximately 10 percent of the 100,000 thunderstorm that occur nationally every year are classified as severe (NOAA, 2014).

Three factors cause thunderstorms to form: moisture, rising unstable air (air that keeps rising when disturbed), and a lifting mechanism to provide the disturbance. The sun heats the surface of the earth, which warms the air above it. If this warm surface air is forced to rise (hills or mountains can cause rising motion, as can the interaction of warm air and cold air or wet air and dry air) it will continue to rise as long as it weighs less and stays warmer than the air around it. As the air rises, it transfers heat from the surface of the earth to the upper levels of the atmosphere (the process of convection). The water vapor it contains begins to cool and it condenses into a cloud. The cloud eventually grows upward into areas where the temperature is below freezing. Some of the water vapor turns to ice and some of it turns into water droplets. Both have electrical charges. Ice particles usually have positive charges, and rain droplets usually have negative charges. When the charges build up enough, they are discharged in a bolt of lightning, which causes the sound waves we hear as thunder. Thunderstorms have three stages (see Figure 12-4):

- The *developing stage* of a thunderstorm is marked by a cumulus cloud being pushed upward by a rising column of air (updraft). The cumulus cloud soon looks like a tower. There is little to no rain during this stage but occasional lightning. The developing stage lasts about 10 minutes.
- As the updraft continues, the thunderstorm enters the *mature stage* when precipitation begins to fall and a downdraft begins (a column of air pushing downward). When the downdraft and rain-cooled air spread out along the ground, they form a gust front, or a line of gusty winds. The mature stage is the most likely time for hail, heavy rain, frequent lightning, strong winds, and tornadoes. The storm occasionally has a black or dark green appearance.
- Eventually, a large amount of precipitation is produced and the updraft is overcome by the downdraft beginning the *dissipating stage*. At the ground, the gust front moves out a long distance from the storm and cuts off the warm moist air that was feeding the thunderstorm. Rainfall decreases in intensity, but lightning remains a danger.

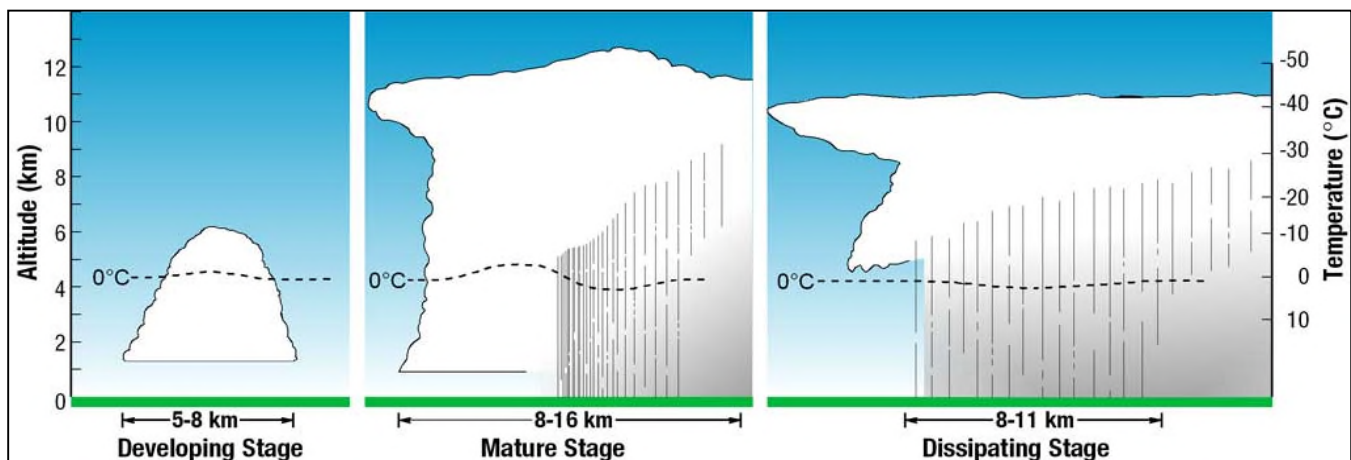


Figure 12-4. The Thunderstorm Life Cycle

There are four types of thunderstorms:

- **Single-Cell Thunderstorms**—Single-cell thunderstorms usually last 20 to 30 minutes. A true single-cell storm is rare, because the gust front of one cell often triggers the growth of another. Most single-cell storms are not usually severe, but a single-cell storm can produce a brief severe weather event. When this happens, it is called a pulse severe storm.
- **Multi-Cell Cluster Storm**—A multi-cell cluster is the most common type of thunderstorm. The multi-cell cluster consists of a group of cells, moving as one unit, with each cell in a different phase of the thunderstorm life cycle. Mature cells are usually found at the center of the cluster and dissipating cells at the downwind edge. Multi-cell cluster storms can produce moderate-size hail, flash floods and weak tornadoes. Each cell in a multi-cell cluster lasts only about 20 minutes; the multi-cell cluster itself may persist for several hours. This type of storm is usually more intense than a single cell storm.
- **Multi-Cell Squall Line**—A multi-cell line storm, or squall line, consists of a long line of storms with a continuous well-developed gust front at the leading edge. The line of storms can be solid, or there can be gaps and breaks in the line. Squall lines can produce hail up to golf-ball size, heavy rainfall, and weak tornadoes, in addition to strong downdrafts. Occasionally, a strong downburst will accelerate a portion of the squall line ahead of the rest of the line to produce a bow echo. Bow echoes can develop with isolated cells as well as squall lines. Bow echoes are easily detected on radar but are difficult to observe visually.
- **Super-Cell Storm**—A super-cell is a highly organized thunderstorm that poses a high threat to life and property. It is similar to a single-cell storm in that it has one main updraft, but the updraft is extremely strong, reaching speeds of 150 to 175 miles per hour. Super-cells are rare. The main characteristic that sets them apart from other thunderstorms is the presence of rotation. The rotating updraft of a super-cell (called a mesocyclone when visible on radar) helps the super-cell to produce extreme weather events, such as giant hail (more than 2 inches in diameter), strong downbursts of 80 miles an hour or more, and strong to violent tornadoes.

Lightning occurs in all thunderstorms. There are two main types of lightning: intra-cloud lightning and cloud-to-ground lightning (NWS, 2014). More information on lightning can be found in the following section.

Lightning

Lightning is an electrical discharge between positive and negative regions of a thunderstorm. A lightning flash is composed of a series of strokes, with an average of about four. The average duration of each stroke is about 30 microseconds.

Lightning is one of the more dangerous weather hazards in the United States. Each year, lightning is responsible for deaths, injuries, and millions of dollars in property damage, including damage to buildings, communications systems, power lines, and electrical systems. Lightning also causes forest and brush fires and deaths and injuries to livestock and other animals. According to the National Lightning Safety Institute, property damage, increased operating costs, production delays, and lost revenue from lightning and secondary effects exceed \$6 billion per year (NLSI, 2008). Impacts can be direct or indirect. People or objects can be directly struck, or damage can occur indirectly when the current passes through or near it.

Intra-cloud lightning is the most common type of discharge. This occurs between oppositely charged centers within the same cloud. Usually it takes place inside the cloud and looks from the outside of the cloud like a diffuse brightening that flickers. However, the flash may exit the boundary of the cloud, and a bright channel can be visible for many miles.

Although not as common, cloud-to-ground lightning is the most damaging and dangerous form of lightning. Most flashes originate near the lower-negative charge center and deliver negative charge to earth. However, many flashes carry positive charge to earth, often during the dissipating stage of a thunderstorm's life. Positive flashes

are more common as a percentage of total ground strikes during the winter months. This type of lightning is particularly dangerous for several reasons. It frequently strikes away from the rain core, either ahead or behind the thunderstorm. It can strike as far as 5 or 10 miles from the storm in areas that most people do not consider to be a threat. Positive lightning also has a longer duration, so fires are more easily ignited. And, when positive lightning strikes, it usually carries a high peak electrical current, potentially resulting in greater damage.

The ratio of cloud-to-ground and intra-cloud lightning can vary significantly from storm to storm. Depending upon cloud height above ground and changes in electric field strength between cloud and earth, the discharge stays within the cloud or makes direct contact with the earth. If the field strength is highest in the lower regions of the cloud, a downward flash may occur from cloud to earth. Using a network of lightning detection systems, the United States monitors an average of 25 million strokes of lightning from the cloud-to-ground every year.

U.S. lightning statistics compiled by the National Oceanic and Atmospheric Administration between 1959 and 1994 indicate that most lightning incidents occur in June, July and August and during the afternoon hours from between 2 and 6 p.m.

Hail Storms

Hail occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice. Super-cooled water may accumulate on frozen particles near the back-side of a storm as they are pushed forward across and above the updraft by the prevailing winds near the top of the storm. Eventually, the hailstones encounter downdraft air and fall to the ground.

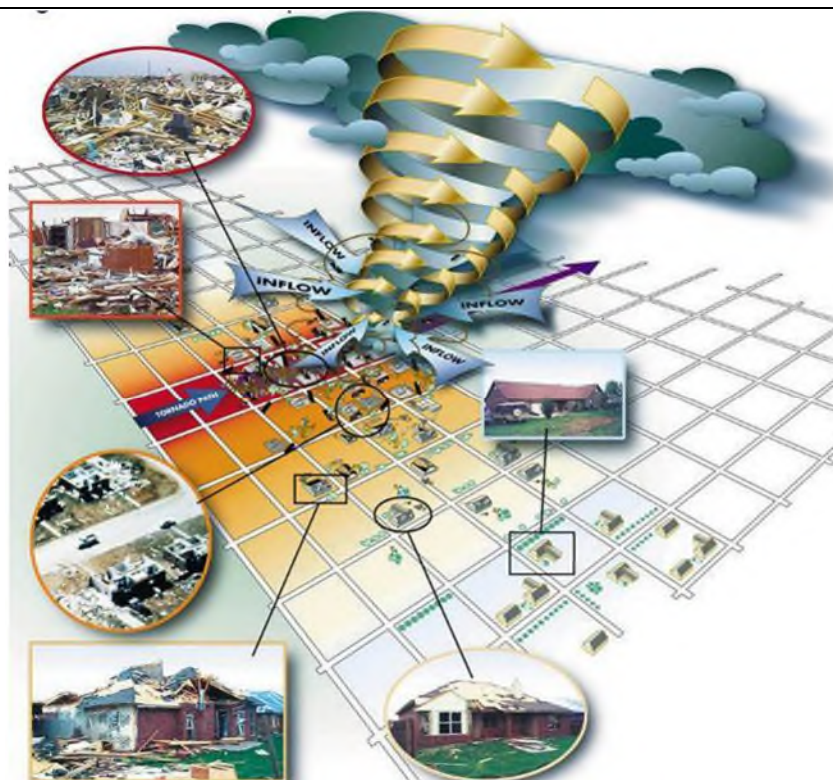
Hailstones grow two ways: by wet growth or dry growth. In wet growth, a tiny piece of ice is in an area where the air temperature is below freezing, but not super cold. When the tiny piece of ice collides with a super-cooled drop, the water does not freeze on the ice immediately. Instead, liquid water spreads across tumbling hailstones and slowly freezes. Since the process is slow, air bubbles can escape, resulting in a layer of clear ice. Dry growth hailstones grow when the air temperature is well below freezing and the water droplet freezes immediately as it collides with the ice particle. The air bubbles are “frozen” in place, leaving cloudy ice.

Hailstones can have layers like an onion if they travel up and down in an updraft, or they can have few or no layers if they are “balanced” in an updraft. Hailstones can begin to melt and then re-freeze together, forming large and very irregularly shaped hail.

12.1.5 Tornado

A tornado is a violently rotating column of air extending between, and in contact with, a cloud and the surface of the earth. Tornadoes are often (but not always) visible as a funnel cloud. On a local-scale, tornadoes are the most intense of all atmospheric circulations, with wind that can reach speeds of more than 300 mph. A tornado’s vortex is typically a few hundred meters in diameter, and damage paths can be up to 1 mile wide and 50 miles long. Tornadoes can occur throughout the year at any time of day but are most frequent in the spring during the late afternoon. Figure 12-5 illustrates the potential impacts and damage from tornadoes of different magnitudes.

As shown in Figure 12-6, Washington has a relatively low risk of tornadoes compared to states in the Midwestern and Southern U.S. Washington has experienced tornadoes on occasion. Some have produced significant damage, injury or death. Washington’s tornadoes can be formed in association with large Pacific storms arriving from the west. Most of them, however, are caused by intense local thunderstorms. These storms also produce lightning, hail and heavy rain, and are more common during the warm season from April to October.



Managing Risk	Damage Color Code	Description of Damage
The Threat to Property and Personal Safety Can Be Minimized Through Compliance With Up-To-Date Model Building Codes and Engineering Standards		Some damage can be seen to poorly maintained roofs. Unsecured light-weight objects, such as trash cans, are displaced.
		Minor damage to roofs and broken windows occur. Larger and heavier objects become displaced. Minor damage to trees and landscaping can be observed.
Property and Personal Protection Can Be Improved Through Wind Mitigation Techniques Not Normally Required by Current Building Codes		Roofs are damaged, including the loss of shingles and some sheathing. Manufactured homes, on nonpermanent foundations can be shifted off their foundations. Trees and landscaping either snap or are blown over. Medium-sized debris becomes airborne, damaging other structures.
		Roofs and some walls, especially unreinforced masonry, are torn from structures. Small ancillary buildings are often destroyed. Manufactured homes on nonpermanent foundations can be overturned. Some trees are uprooted.
Personal Protection Can Only Be Achieved Through Use of a Specially Designed Extreme Wind Refuge Area, Shelter, or Safe Room		Well constructed homes, as well as manufactured homes, are destroyed, and some structures are lifted off their foundations. Automobile-sized debris is displaced and often tumbles. Trees are often uprooted and blown over.
		Strong frame houses and engineered buildings are lifted from their foundations or are significantly damaged or destroyed. Automobile-sized debris is moved significant distances. Trees are uprooted and splintered.

Figure 12-5. Potential Impact and Damage from a Tornado

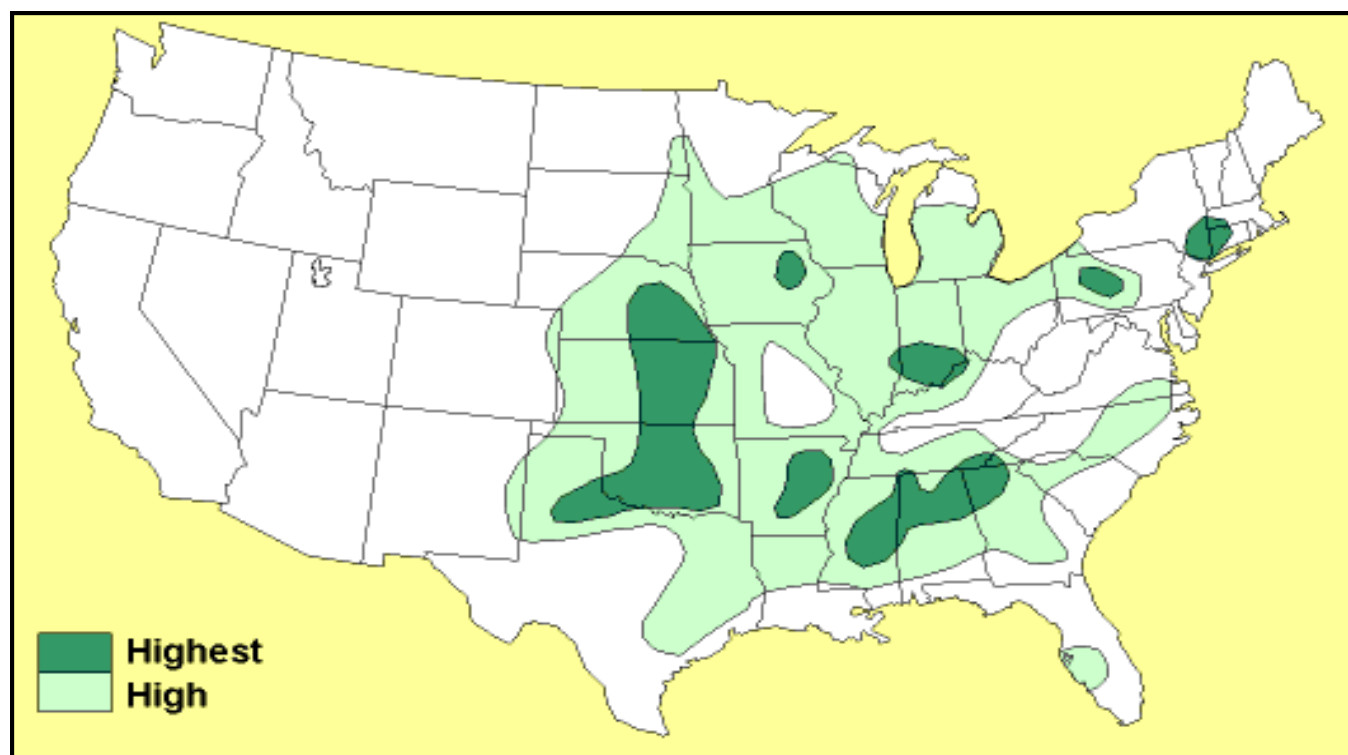


Figure 12-6. Tornado Risk Areas in the United States

12.2 HAZARD PROFILE

12.2.1 Past Events

Table 12-1 provides detailed descriptions of severe weather events in the planning area since 1996 that were reported to cause death, injuries or property damages. Table 12-2 summarizes all severe weather events in the planning area since 1950, as recorded by the National Oceanic and Atmospheric Administration (NOAA).

Table 12-1. Past Severe Weather Events Impacting Planning Area

Date	Type	Deaths or Injuries	Property Damage
12/26/1996	Ice Storm	0	\$0
A severe ice storm crippled travel and communication within the Columbia Gorge and the Vancouver area. Camas and Washougal as well as towns within the Gorge sustained numerous downed trees and prolonged power outages.			
5/31/1997	Tornado (F0)	0	\$10,000
A weak tornado briefly touched down in the Walnut Grove area of Vancouver, near I-205 and 4th Plain. A car was damaged, the roofing of a house was damaged, and a small shed was blown over.			
6/21/1997	Lightning	0	\$10,000
Lightning struck a house in Hockinson and caused a brief fire and damaged home electronics.			
9/10/1997	Lightning	0	\$0
A lightning strike caused a widespread power outage that left 20,000 homes without power for about 3 hours. A large school and several businesses closed for the day, and 3/4 of the traffic lights in Vancouver were out of service.			
9/15/1997	Tornado (F0)	0	\$0
A weak tornado near Yacolt knocked down 3 trees and a telephone pole.			
1/11/1998	Ice Storm	0	\$250,000
The area of Southwest Washington and western Columbia River Gorge experienced an ice storm.			

Date	Type	Deaths or Injuries	Property Damage
12/18/1998	Cold/Wind Chill	0	\$0
An extensive arctic air mass spread over the Pacific Northwest the week before Christmas. Temperatures fell sharply beginning December 18 and were coldest around the winter solstice December 21. High temperatures were only in the teens and 20s then. The lowest temperatures in Southwest Washington were in the Cascades, where overnight lows fell into the teens below zero. Light snow, less than 1 inch, fell on the 19th and 21st, causing widespread traffic problems. Numerous accidents on Interstate 5 near the Oregon/Washington border during rush hour on the 21st caused a massive traffic jam.			
2/6/1999	High Wind (39 knots)	0	\$20,000
A strong Pacific storm resulted in damaging winds when it moved over the interiors of Northwest Oregon and Southwest Washington. Thousands of residents were without power at various times as falling limbs and trees cut power lines. At higher elevations in the Cascade Mountains, very strong wind gusts were reported. No injuries were reported. A newspaper reported very strong winds downing trees in the South Washington Cascades. Winds at the higher elevations were inferred to be in excess of 100 mph at times. The Portland NWS Doppler Radar measured wind speeds at 110 mph at 7000 feet during the height of the storm.			
12/25/1998	Ice Storm	0	\$0
A Christmas Day storm brought high winds to the Kelso/Longview area, freezing rain to the Columbia River Gorge, and heavy rain to Southwest Washington, contributing to a major flood a few days later. Many trees were blown down and roofs damaged in the Kelso/Longview area. The last of the cold air from the arctic outbreak the previous week filtered through the Columbia River Gorge and caused freezing rain that created hazardous holiday driving conditions on State Highway 14.			
8/4/1999	Lightning	0	\$15,000
Lightning from one of the many intense thunderstorms in Northwest Oregon and Southwest Washington struck a maple tree on the BS Ranch in Northeast Clark County and killed four beef cows and a bull.			
5/11/2000	Tornado (F0)	0	\$10,000
A weak tornado moved through Battleground. Three houses had minor damage as did a restaurant (blew away a sign and some metal strips of the awning). A pickup canopy resting on sawhorses was blown about 100 feet. A section of wooden fence was blown down, and 2 to 4 inch limbs were broken off of a tree. No injuries were reported.			
6/27/2001	Thunderstorm Wind	5	\$25,000
Portland Radar tracked a severe thunderstorm through Clark County into Cowlitz County. The Oregonian, The Columbian and KOIN TV reported uprooted trees falling on vehicles and trailer houses, downed power lines and localized flooding of Interstate 5 and Highway 99 in the Battleground area. Clark Public Utilities reported 2,600 lost power. Five were injured, two seriously; one when a tree fell across the trailer house she was in and the other was struck by a limb of a falling tree.			
12/26/2002	High Wind (57 knots)	0	\$0
A Pacific storm moving across the area produced strong winds that downed trees and caused widespread power outages. The Columbian reported a gust of wind blew the 555-foot grain ship Pacific Trader off its anchor and pushed it into a dock at Berth 8. Trees were reportedly downed in the Vancouver-Salmon Creek-Hazel Dell areas, damaging two homes and disrupting traffic. No injuries were reported.			
12/4/2003	High Wind (52 knots)	0	\$0
Strong easterly winds raised havoc in Southwest Washington. Winds reached 60 mph in Hockinson, were estimated to reach 60 mph in Battleground and 61 mph in Vancouver. Power was lost in Hockinson and Battleground. In Vancouver an 80-foot Douglas fir tree with a diameter of 18 to 24 inches blew down. In Orchards a 30-foot Douglas fir fell across the roof of a rental home. 6,000 customers reportedly lost power. No injuries were reported.			
1/6/2004	Winter Storm	0	\$0
A strong winter storm with frigid arctic air, heavy snow, sleet, freezing rain, and strong east winds snarled travel, forced the closure of most schools and businesses, and resulted in widespread power outages and property damage in Southwest Washington. Strong high pressure built up east of the Cascade Mountains by January 5, which forced frigid air through the Columbia River Gorge into Southwest Washington. A Pacific low pressure system brought moist Pacific air over the top of this cold dome, producing snow, sleet and freezing rain throughout the area, and blizzard conditions in Columbia River Gorge. Snowfall totals reached 7 inches in Vancouver and 2 feet in the South Washington Cascades. Accumulations of up to 2 inches of sleet and freezing rain followed the snowfall. Blizzard conditions in the Columbia River Gorge resulted in the closure of Washington State Route 14 between Washougal and White Salmon. Weight from the snow and ice buildup resulted in widespread downed trees and power lines, leaving 2,000 customers without power in Clark County. Clark Public Utilities estimated the storm cost between \$1 and \$1.5 million. The city of Vancouver estimated up to \$500,000 in damage.			

Date	Type	Deaths or Injuries	Property Damage
4/21/2004	Hail (0.50 inches)	0	\$7,500
About an inch of hail one-half inch in diameter accumulated on Interstate Highway 5. The Washington Highway Patrol reported 14 vehicles involved in accidents on the slippery highway, including at least one multi-car accident. At least 7 cars had damage of more than \$750, three of which required towing.			
5/27/2004	Tornado (F0)	0	\$0
A tornado reportedly touched down 2 miles northeast of La Center, uprooted a 1-1/2 foot diameter tree and tore off part of a barn roof.			
9/13/2004	Tornado (F0)	0	\$0
A tornado ripped through the Ridgefield Wildlife Refuge, lifting and damaging a mobile home office, blowing down trees and snapping large tree limbs. A tree was blown down on top of a car.			
1/15/2005	Winter Storm	0	\$0
A moisture-laden Pacific storm riding over cold air pouring out of the Columbia River Gorge resulted in widespread moderate to heavy freezing rain in SW Washington. Accumulations ranged from one quarter to one half inch, with heaviest amounts near the Columbia River Gorge. The freezing rain turned to liquid rain away from the Gorge by early in the day January 16, but lasted through most of January 18 in the Gorge. The storm forced closure of bridges around the Portland/Vancouver metropolitan area. The storm also resulted in cancellation of 225 flights from Portland International Airport, 5,000 power outages, and over 200 motor vehicle accidents in SW Washington and NW Oregon. Numerous trees were toppled by ice accumulation, mainly near the Gorge.			
5/20/2005	Lightning	0	\$6,000
Scattered thunderstorms produced heavy rain over the area. A storm near Ridgefield, WA produced heavy rains, sending 6 to 8 inches of water into a pump station. During that same storm, a lightning strike hit the pump station, burning out a control panel and disabling the station.			
12/18/2005	High Wind (58 knots)	0	\$0
A winter storm brought strong winds to inland portions of southwest Washington. Multiple reports were received of trees blown down in the Vancouver and Camas areas, some of which caused significant damage. In Vancouver, a tree was reported to fall through the roof of a home; in Camas, a roof was partially torn from a home, and an 80-foot tree snapped in two, damaging another roof. Nearly 40,000 customers were without power during the storm.			
2/9/2006	Strong Wind (31 knots)	0	\$200,000
A strong east wind event brought very gusty conditions to inland portions of southwest Washington. Following are some strong wind observations made during this event: Vancouver Airport reported 17 knots with gusts to 31 knots, Larch Mountain Remote Automatic Weather Station reported 28 knots with gusts to 65 knots, Coldwater Ridge Visitors Center reported 31 knots with gusts to 57 knots, and Locks Remote Automatic Weather Station reported 10 knots with gusts to 30 knots. Many trees were knocked down due to high winds, and multiple power outages and areas of damage ensued. In Vancouver, a 110-foot tall tree 3 feet in diameter fell through the roof of a home, causing significant damage.			
7/20/2006	Heat	0	\$0
A strong high pressure ridge brought several days of extremely hot and humid days with record high temperatures. An Excessive Heat Warning was issued for July 20 – 24. Vancouver reported a maximum temperature of 104 degrees on July 21, breaking the old record of 103 set in 1938. Daily maximums were between 10 and 20 degrees above normal. Many areas experienced record high minimum temperatures during. There were no human fatalities attributed to this event, but 35 dogs reportedly perished in a kennel on July 21. Also, 4,500 homes lost power during this event.			
12/14/2006	High Wind (69 knots)	0	\$0
A very strong Pacific storm system brought strong and damaging winds to southwest Washington. Wind speeds near 100 mph were seen on the coast and in the Willapa Hills, and winds of 60-80 mph were recorded in Clark County and through the Columbia River Gorge. The storm brought widespread downed trees and power lines, and at its peak left nearly 500,000 homes across the region without power - some for days. Many roads and highways were left impassable due to downed trees.			
1/10/2008	Tornado (EF1)	0	\$525,000
A tornado with estimated wind speeds of 90 to 110 mph caused 200+ trees down, most of them 12 to 24 inches in diameter, and approximately 6 trees greater than 36 inches. 30 to 40 homes were damaged, with primarily roof damage. 19 power poles were snapped off. 3 lightly constructed structures were destroyed. A parked semi-trailer was tipped over, and several dozen sculling boats were damaged near Vancouver Lake.			

Date	Type	Deaths or Injuries	Property Damage
12/20/2008	Blizzard	0	\$16,000
Heavy snow and strong winds caused blizzard conditions in the Columbia River Gorge. 24 to 36 inches of snow fell in the Gorge combined with 40 to 50 mph winds. Department of Transportation officials closed state Route 14 from Washougal to White Salmon for 3 days.			
11/16/2009	High Wind (50 knots)	0	\$10,000
Strong winds were reported by a spotter in Salmon Creek. He also reported many trees down in his neighborhood, including on his home, which verified other reports by broadcast media of similar conditions bringing damage to private property around Vancouver.			
3/13/2011	High Wind (50 knots)	0	\$0
Strong winds were reported by an NWS employee in Hockinson, with sustained winds of 39 knots and gusts to 50 knots. Strong winds were also reported by another NWS employee in Vancouver, with large broken tree branches and minor damage to a home.			
3/21/2013	Tornado (EF0)	0	\$10,000
A tornado touched down 2 miles NE of Hockinson. A barn roof was partially torn off.			
1/23/2014	Strong Wind (35Kts)	0	\$20,000
Strong east winds tipped a semi-trailer over while traveling across the Glen Jackson Bridge on January 23. This resulted in traffic delays on Interstate 205 and closed boat traffic for just over an hour. Additional winds on January 24 resulted in the collapse of a carport at a Vancouver apartment complex. Over 2,000 Clark Power Utility customers lost power for around an hour due to downed tree limbs on power lines.			
2/8/2014	Ice Storm	0	\$0
The City of Portland issued its first Wireless Emergency Alert in history on March 9 at 8 AM warning people to stay indoors due to dangerous ice conditions. While most of the icing had stopped by then, there was still significant ice loading on branches and power lines as well as several of each downed. Power outages continued into the day due to the ice, but ice slowly melted as temperatures rose above freezing. Ice accumulations reported by spotters includes 0.25 inches in Camas and in Battle Ground.			
7/1/2014	Excessive Heat	0	\$0
A drowning in the Lewis River near Yacolt was indirectly related to the hot temperatures as the victim likely went to the river to gain relief from the heat. The victim was a 44 year old man who drowned after jumping from the rocks at Moulton Falls.			
10/25/2014	High Wind (61 knots)	0	\$10,000
The Port of Vancouver measured a peak gust of 70 mph at around the same time wind damage was reported across the Vancouver metro area. One large maple tree was snapped in Brush Prairie and another one went down near Fort Vancouver, resulting in minor damage to a historical building. A person from the public reported that a 150 pound piece of a pig pen was picked up by the wind and tossed through a double-paned glass window. Clark Public Utilities reported 4,500 homes experienced electricity outages.			
11/11/2014	High Wind (52 knots)	0	\$28,000
Winds in the Vancouver metro area gusted 45 to 60 mph for around 10 hours. Several trees and power lines were downed by high winds near Arnada Park, three homes were damaged by downed trees in Camas, and an 18 to 20 inch diameter tree snapped near the base in Battleground. A NWS employee in the eastern suburbs of Vancouver recorded a 55 mph wind gust.			
6/7/2015	Heat	0	\$0
High temperatures were in the low 90s June 7 through June 9, which is around 20 degrees higher than the seasonal normal. There was one known indirect heat related fatality where a teenage boy drowned while swimming in the Lewis River near Woodland. Newspaper articles suggest that he may have suffered from hypothermia paralysis from the cold water.			
6/26/2015	Excessive Heat	0	\$0
Afternoon temperatures were in the low to mid 90s, which is around 20 degrees higher than the seasonal normal. The low temperatures were in the mid to upper 60s, which is around 10 degrees above the seasonal normal. Several new daily temperature records were set for the warmest low temperatures. A man drowned while swimming in the Lewis River on June 27.			
12/10/2015	Tornado	0	\$311,000
Around 36 homes and 2 businesses sustained damage from the tornado. Dozens of trees with a diameter of 1 to 3 feet were uprooted and blown down, and around a half of a dozen 1 to 2 foot diameter trees were snapped.			

Source: <http://www.ncdc.noaa.gov/stormevents/>

Table 12-2. Summary of Severe Weather Event Impacts in the Planning Area

Hazard Types Includes	# of Reported Events ^a	# of Events with Deaths, Injuries or Property Loss ^{a, b}
Damaging Winds		
Strong Wind	3	3
High Wind	27	8
Extreme Temperatures		
Excessive Heat	6	0
Extreme Cold/Wind Chill	3	0
Severe Winter Weather		
Ice Storm	11	2
Heavy Snow	45	0
Winter Storm	16	1
Blizzard	2	1
Winter Weather	6	0
Sleet	1	0
Thunderstorms and Lightning		
Lightning	4	3
Thunderstorm Wind	10	3
Hail	7	1
Tornado		
Funnel Cloud	1	0
Tornado	11	8
Total	153	30

a. Reported events since 1950.

b. Only events that listed injuries and/or dollar amounts are included in these estimates. Some event descriptions include property damage that was not quantified.

Source: <http://www.ncdc.noaa.gov/stormevents/>

12.2.2 Location

All areas in the County are potentially exposed to severe weather events.

Damaging Winds

All of Clark County is subject to high winds from thunderstorms and other severe weather events. Southwesterly winds are associated with strong storms moving onto the coast from the Pacific Ocean. Southern winds parallel to the Cascade Mountains are the strongest and most destructive winds. Strong eastern winds originate from the Columbia Gorge when high atmospheric pressure is over the Upper Columbia River Basin and low pressure is over the Pacific Ocean. The narrow point of the gorge acts as a funnel, concentrating the intensity of the winds. Strong winds are generated at the outlet of the gorge near Camas and Washougal. Windstorms tend to damage ridgelines that face into the winds (CRESA 2004).

According to FEMA, Clark County is located in Wind Zone I, where wind speeds can reach up to 130 mph. The County is also located in a special wind region along the west coast from Washington to Oregon. Figure 12-7 indicates how the frequency and strength of windstorms impacts the United States and the general location of the most wind activity. This is based on 40 years of tornado data and 100 years of hurricane data collected by FEMA.

Source: FEMA 2010

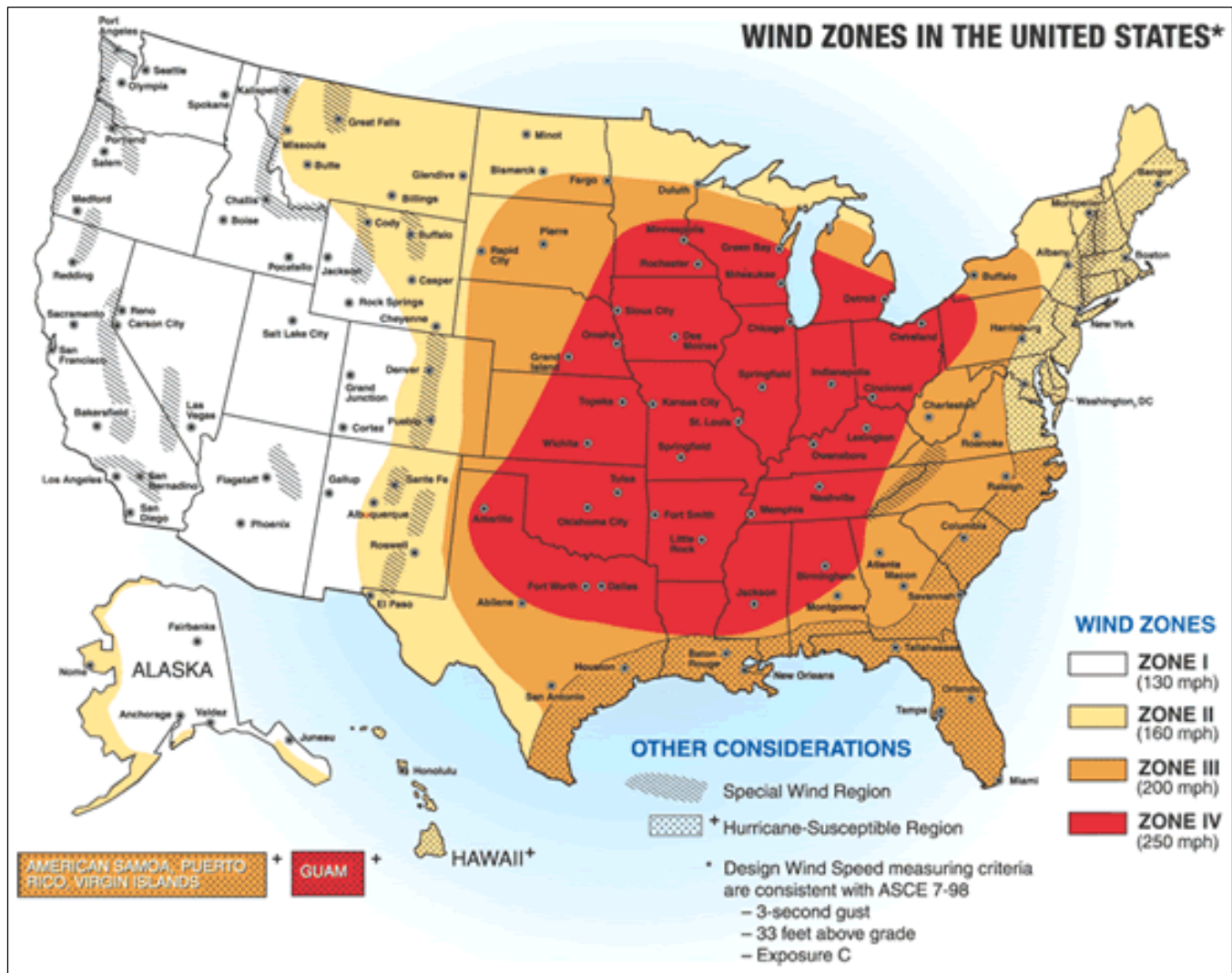


Figure 12-7. Wind Zones in the United States

Extreme Temperatures

Temperature extremes can occur throughout the planning area. The Western Regional Climate Center notes several factors that have a significant impact on the local climate including terrain (such as the Cascade Range), the Pacific Ocean, and low pressure regions over the North Pacific Ocean. These climactic controls can cause significant climate differences in relatively short distances.

In Western Washington, summers tend to be cool and dry, and winters are mild, wet, and cloudy. Specifically in areas west of the Cascade Mountains, minimum temperatures typically range from 30°F (in lower elevations) to 20°F (in higher elevations). Minimum temperatures as low as 0°F to -17°F have been recorded (WRCC 2015).

According to the Office of the Washington State Climatologist, Vancouver has the warmest annual average temperature in the state (averaged from 1981-2010) at 54.1°F (OWSC 2015).

Severe Winter Weather

Snowstorms are a more frequent occurrence in the higher elevations of eastern Clark County, but they can occur in the lower elevations as well. In general, the Cascade Mountain Range acts as a barrier to cold air developing in the eastern part of the state, reducing the likelihood of snowstorms in Clark County. However, cooler air can enter the valley through low points or advance downriver through the Columbia Gorge. When this occurs, it can cause snowstorms in even the lower elevations of the county. Typically, the snow melts rapidly as a result of the warmer air in the valley (CRESA 2004).

Thunderstorms and Lightning

Thunderstorms affect relatively small localized areas, rather than large regions like winter storms and extreme temperature events. Thunderstorms can strike all regions of the United States, although they are most common in central and southern states. It is estimated that there are as many as 40,000 thunderstorms each day worldwide. Clark County can experience an average of 10 to 20 thunderstorm days each year (National Weather Service, 2010).

Tornadoes

Approximately 1,200 tornadoes occur in the United States each year, with the central portion of the country experiencing the most. Tornadoes can occur at any time of the year, with peak seasons at different times for different states (National Severe Storms Laboratory, 2015). The State of Washington and Clark County have a lower risk for tornados than elsewhere in the country. Tornadoes are usually localized. Severe thunderstorms can result in conditions favorable to the formation of numerous or long-lived tornadoes.

12.2.3 Frequency

Many of the severe weather events for Clark County shown in Table 12-1 are related to high winds and severe winter weather. The planning area can expect to experience exposure to some type of severe weather event at least annually. According to records, in 65 years, the county has experienced 153 severe weather events, for an average of 2 to 3 events per year.

According to the Washington State Hazard Mitigation Plan, Clark County is vulnerable to high winds. Counties considered vulnerable to high winds are those that were most affected by conditions that lead to high winds and those with a recurrence rate of 100 percent (i.e., that experienced at least one damaging high wind event per year). Clark County has a recurrence rate of 130 percent.

Clark County is also considered one of the counties most vulnerable to winter storms. This means that the county has a recurrence rate of at least 50 percent, or it experiences at least one damaging winter storm event every two years. Per the State Washington State Hazard Mitigation Plan, Clark County has a recurrence rate of 85 percent.

Six instances of extreme heat events are listed for the planning area between 1996 and 2015; however, this data likely underestimates the occurrence of such events in the planning area. Extreme heat events can occur several times per year, especially in the summer. Three extreme cold events were reported between 1996 and 2015. The actual number may be underreported, and some extreme cold events may be entered under another category, such as winter weather; the more visible impacts of a winter storm or blizzard may reduce the attention paid to extreme cold temperatures.

12.2.4 Severity

The most common problems associated with severe storms are immobility and loss of utilities. Fatalities are uncommon, but can occur. Roads may become impassable due to flooding, downed trees or a landslide. Power lines may be downed due to high winds or ice accumulation, and services such as water or phone may not be able

to operate without power. Lightning can cause severe damage and injury. Physical damage to homes and facilities can be caused by wind or accumulation of snow or ice. Even a small accumulation of snow can cause havoc on transportation systems due to a lack of snow clearing equipment and experienced drivers and the hilly terrain.

Windstorms can be a frequent problem in the planning area and have been known to cause damage to utilities. The predicted wind speed given in wind warnings issued by the National Weather Service is for a one-minute average; gusts may be 25 to 30 percent higher. Lower wind speeds typical in the lower valleys are still high enough to knock down trees and power lines and cause other property damage. Mountainous sections of the County experience much higher winds under more varied conditions.

Ice storms accompanied by high winds can have especially destructive impacts, especially on trees, power lines, and utility services. While sleet and hail can create hazards for motorists when they accumulate, freezing rain can cause the most dangerous conditions within the planning area. Ice buildup can bring down trees, communication towers and wires, creating hazards for property owners, motorists and pedestrians. Rain can fall on frozen streets, cars, and other sub-freezing surfaces, creating dangerous conditions.

The severity of an extreme heat event depends on how early the event occurs in the summer and the number of consecutive days it lasts (U.S. EPA, 2006). Urban heat island effect can exacerbate the severity of an extreme heat event. While the severity of an extreme heat event may vary, impacts include increased energy consumption, elevated emissions of air pollutants and greenhouse gases, compromised human health and comfort, and impaired water quality (U.S. EPA, 2015). Extreme heat can also impact infrastructure by warping bridges, causing roads to buckle, melting runways, and more.

Lightning severity is typically investigated for both property damage and life safety (injuries and fatalities). The number of reported injuries from lightning is likely to be low. County infrastructure losses can be up to thousands of dollars each year.

Tornadoes are potentially the most dangerous of local storms, but they are not common in the planning area. If a major tornado were to strike within the populated areas of the county, damage could be widespread. Businesses could be forced to close for an extended period or permanently, fatalities could be high, many people could be homeless for an extended period, and routine services such as telephone or power could be disrupted. Buildings could be damaged or destroyed.

12.2.5 Warning Time

Meteorologists can often predict the likelihood of a severe storm or other severe weather event with several days of warning time. However, meteorologists cannot predict the exact time of onset or severity of the event. Some storms come on more quickly and have only a few hours of warning time. The Seattle and Spokane Offices of the National Weather Service (NWS) monitor weather stations and issue watches and warnings when appropriate. The Seattle Office is the closest NWS office in Washington, but the Portland, Oregon NWS office provides more accurate watches and warnings for Clark County due to its proximity. Watches and warnings are broadcast over NOAA weather radio and are forwarded to local media for retransmission using the Emergency Alert System. NWS and NOAA also issue outlooks, watches, warnings and advisory information for extreme heat.

12.3 SECONDARY HAZARDS

The most significant secondary hazards associated with severe weather are floods, falling and downed trees, landslides and downed power lines. Rapidly melting snow combined with heavy rain can overwhelm both natural and man-made drainage systems, causing overflow and property destruction. Landslides occur when the soil on slopes becomes oversaturated and fails. Excessive heat events can cause failure of motorized systems, such as ventilation systems used to control temperatures inside buildings, if these systems are operating above typical

operating standards. Demand for cooling systems during these events can overload energy systems and result in controlled or unexpected power outages. Fires (both structural and wild), along with power outages, can occur as a result of lightning strikes.

12.4 EXPOSURE

12.4.1 Population

It is assumed that the entire planning area is exposed to some extent to severe weather events. Certain areas are more exposed due to geographic location and local weather patterns. People living at higher elevations with large stands of trees or power lines may be more susceptible to wind damage and lightning strikes. People in low-lying areas are at risk for possible flooding. People in densely populated urban areas without air conditioning are likely to be more exposed to extreme heat events.

12.4.2 Property

According to the Clark and Cowlitz County Assessor records used for this analysis, there are 149,741 structures within the planning area. Most of these buildings (95.4 percent) are residential. All of these buildings are considered to be exposed to the severe weather hazard.

12.4.3 Critical Facilities and Infrastructure

Critical facilities exposed to floods are at risk from severe weather with heavy rain or snowmelt. Critical facilities on higher ground may be exposed to wind damage, damage from falling trees, heavy snow and ice accumulation, tornadoes, lightning strikes and extreme temperatures. The most common problems associated with severe weather are loss of utilities. The following systems also are at risk (CRESA, 2004):

- **Transportation Systems**—High winds can cause significant damage to trees and power lines, disrupting ingress and egress on roads with obstructing debris. Snowstorms significantly impact the transportation system and the availability of public safety services. Of particular concern are roads providing access to isolated areas and bridges, which tend to become icy before and after other areas are clear.
- **Power and communication lines**—Ice and severe windstorms can create serious impacts on power and above-ground communication lines. Freezing of power and communication lines can cause them to break, disrupting both electricity and communication for households. They can also break as a result of falling trees. This can result in isolation.
- **Water and Sewer lines**—Severe local storms can cause water and sewer lines to freeze, which may crack pipes. This could result in a loss of potable water to households or exposed sewage causing public health hazards. However, extreme and prolonged freezing weather is required to cause underground pipes to crack, which is not likely to occur in Clark County. Above-ground pipes leading to and from individual homes are more likely vulnerabilities than large mainlines.

12.4.4 Environment

Severe local storms can have significant effects on the environment. Heavy rains cause the ground to become saturated and rivers and streams to rise. This results in the potential for flooding and landslides. Additionally, snowmelt after snowstorms can cause riverine flooding, which has the potential to damage riparian habitat (CRESA, 2004).

12.5 VULNERABILITY

12.5.1 Population

Vulnerable populations from severe weather hazards tend to be the elderly, low income or linguistically isolated populations, people with life-threatening illnesses, residents living in areas that are isolated from major roads, and residents who lack proper shelter. Power outages can be life threatening to those dependent on electricity for life support. Isolation of these populations is a significant concern. These populations face isolation and exposure during severe weather events and could suffer more secondary effects of the hazard. Population vulnerabilities to specific types of severe weather event are as follows:

- **Damaging Winds**—Debris carried by extreme winds and trees felled by gusty conditions can contribute directly to loss of life and indirectly to the failure of protective building envelopes. Utility lines brought down by thunderstorms have also been known to cause fires, which start in dry roadside vegetation. Electric power lines falling down to the pavement create the possibility of lethal electric shock.
- **Extreme Temperatures**—Individuals with physical or mobility constraints, cognitive impairments, economic constraints, or social isolation are typically at greater risk to the adverse effects of excessive heat events. The average summertime mortality for excessive heat events is dependent upon the methodology used to derive such estimates. Certain medical conditions, such as heat stroke, can be directly attributable to excessive heat, while others may be exacerbated by excessive heat, resulting in medical emergencies. Individuals who lack shelter and heating are particularly vulnerable to extreme cold and wind chill.
- **Severe Winter Weather**—Many of the deaths that result from severe winter weather are indirectly related to the actual weather event, including deaths resulting from traffic accidents on icy roads and heart attacks while shoveling snow. Icy road conditions that lead to major traffic accidents can make it difficult for emergency personnel to travel. This may pose a secondary threat to life if police, fire, and medical personnel cannot respond to calls. Homeless populations that lack adequate shelter are also vulnerable to severe winter weather events.
- **Thunderstorms**—Nationally, lightning is one of the leading causes of weather-related fatalities (CDC, 2013). Lightning strikes are far more common in other areas of the country than they are in the Pacific Northwest. The majority of injuries and deaths associated with lightning strikes occur when people are outdoors; however, almost one-third of lightning-related injuries occur indoors. Males are five times more likely than females to be struck by lightning and people between the ages of 15 and 34 account for 41 percent of all lightning strike victims (CDC, 2013).
- **Tornado**—All residents in the path of a tornado are vulnerable, especially if there is not adequate warning that tornado spawning conditions are likely.

12.5.2 Property

All property is vulnerable during severe weather events, but properties in poor condition or in particularly vulnerable locations may risk the most damage. Structures in higher elevations and on ridges may be more prone to wind damage. Those that are located under or near overhead lines or near large trees may be damaged in the event of a collapse.

Loss estimates for the severe weather hazard are not based on damage functions, because no such damage functions have been generated. Instead, estimates were developed representing 10 percent, 30 percent and 50 percent of the replacement value of planning area structures. This allows emergency managers to select a range of potential economic impact based on an estimate of the percent of damage to the general building stock. Damage in excess of 50 percent is considered to be substantial by most building codes and typically requires total reconstruction of the structure. Table 12-3 lists the estimates of potential loss.

Table 12-3. Loss Potential for Severe Weather

	Total Replacement value	Estimated Loss Potential from Severe Weather		
		10% Damage	30% Damage	50% Damage
Battle Ground	\$4,036,379,864	\$403,637,986	\$1,210,913,959	\$2,018,189,932
Camas	\$7,575,016,927	\$757,501,693	\$2,272,505,078	\$3,787,508,464
La Center	\$805,148,506	\$80,514,851	\$241,544,552	\$402,574,253
Ridgefield	\$2,075,091,625	\$207,509,162	\$622,527,487	\$1,037,545,812
Vancouver	\$47,993,433,972	\$4,799,343,397	\$14,398,030,192	\$23,996,716,986
Washougal	\$4,159,958,945	\$415,995,894	\$1,247,987,683	\$2,079,979,472
Woodland	\$1,777,992,519	\$177,799,252	\$533,397,756	\$888,996,259
Yacolt	\$306,406,962	\$30,640,696	\$91,922,089	\$153,203,481
Unincorporated	\$44,797,390,449	\$4,479,739,045	\$13,439,217,135	\$22,398,695,224
Total	\$113,526,819,769	\$11,352,681,976	\$34,058,045,931	\$56,763,409,883

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

12.5.3 Critical Facilities and Infrastructure

Incapacity and loss of roads are the primary transportation failures resulting from severe weather. Snow and ice storms can significantly impact the transportation system and the availability of public safety services. Landslides caused by heavy prolonged rains can block roads. High winds can cause significant damage to trees and power lines, blocking roads with debris, incapacitating transportation, isolating population, and disrupting ingress and egress. Of particular concern are roads providing access to isolated areas and to the elderly.

Downed trees and ice can create serious impacts on power and above-ground communication lines. Freezing of power and communication lines can cause them to break, disrupting electricity and communication. Loss of electricity and phone connection would leave certain populations isolated because residents would be unable to call for assistance. Water systems may also be impacted during severe winter weather events. The most frequent water system problem related to cold weather is a break in cast iron mainlines. Breaks frequently occur during severe freeze events, as well as during extreme cooling periods in October, November and December. Another common problem during severe freeze events is the failure of commercial and residential water lines. Inadequately insulated potable water and fire sprinkler pipes can rupture and cause extensive damage to property.

Heavy snow can immobilize a region and paralyze a city, stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can collapse buildings and knock down trees and power lines. In rural areas, homes and farms may be isolated for days, and unprotected livestock may be lost. The cost of snow removal, repairing damage, and loss of business can have large economic impacts on cities and towns.

12.5.4 Environment

The vulnerability of the environment to severe weather is the same as the exposure.

12.5.5 Economic Impact

Prolonged obstruction of major routes due to snow, debris, or floodwaters can disrupt the shipment of goods and other commerce. Large and prolonged storms can have negative economic impacts for an entire region.

12.6 FUTURE TRENDS

12.6.1 Development

All future development will be affected by severe weather. The ability to withstand impacts lies in sound land use practices and consistent enforcement of codes and regulations for new construction. The planning partners have adopted the International Building Code in response to Washington State mandates. This code is equipped to deal with the impacts of severe weather events. Land use policies identified in comprehensive plans within the planning area also address many of the secondary impacts (flood and landslide) of the severe weather hazard. To combat the effects of urban heat island effect, communities can implement design standards and urban planning principles that reduce the impacts of excessive heat events. With these tools, the planning partnership is well equipped to deal with future growth and the associated impacts of severe weather.

12.6.2 Climate Change

Climate change presents a challenge for risk management associated with severe weather. One impact of climate change is an increase in average ambient temperatures. This has several impacts including:

- A likely decrease in the frequency of winter cold spells
- An increased probability of severe weather events (see Figure 12-8)
- More intense heat waves
- Changes in the intensity, duration and frequency of storm events.

As ambient temperatures increase, more water evaporates from land and water sources. The timing, frequency, duration and type of precipitation events will be affected by these changes. In general, more precipitation will fall as rain rather than snow; however, the amount of snowfall may increase where temperatures remain below freezing (U.S. EPA, 2013). Snowfall may also change if typical storm track patterns are altered. Snowfall is already changing in the United States. The EPA reports the following trends (see Figure 12-9; U.S. EPA, 2013):

- Total snowfall has decreased in most parts of the country since widespread observations became available in 1930, with 57 percent of stations showing a decline.
- More than three-fourths of the stations across the contiguous 48 states have experienced a decrease in the proportion of precipitation falling as snow.
- The Pacific Northwest has seen a decline in both total snowfall and the proportion of precipitation falling as snow.

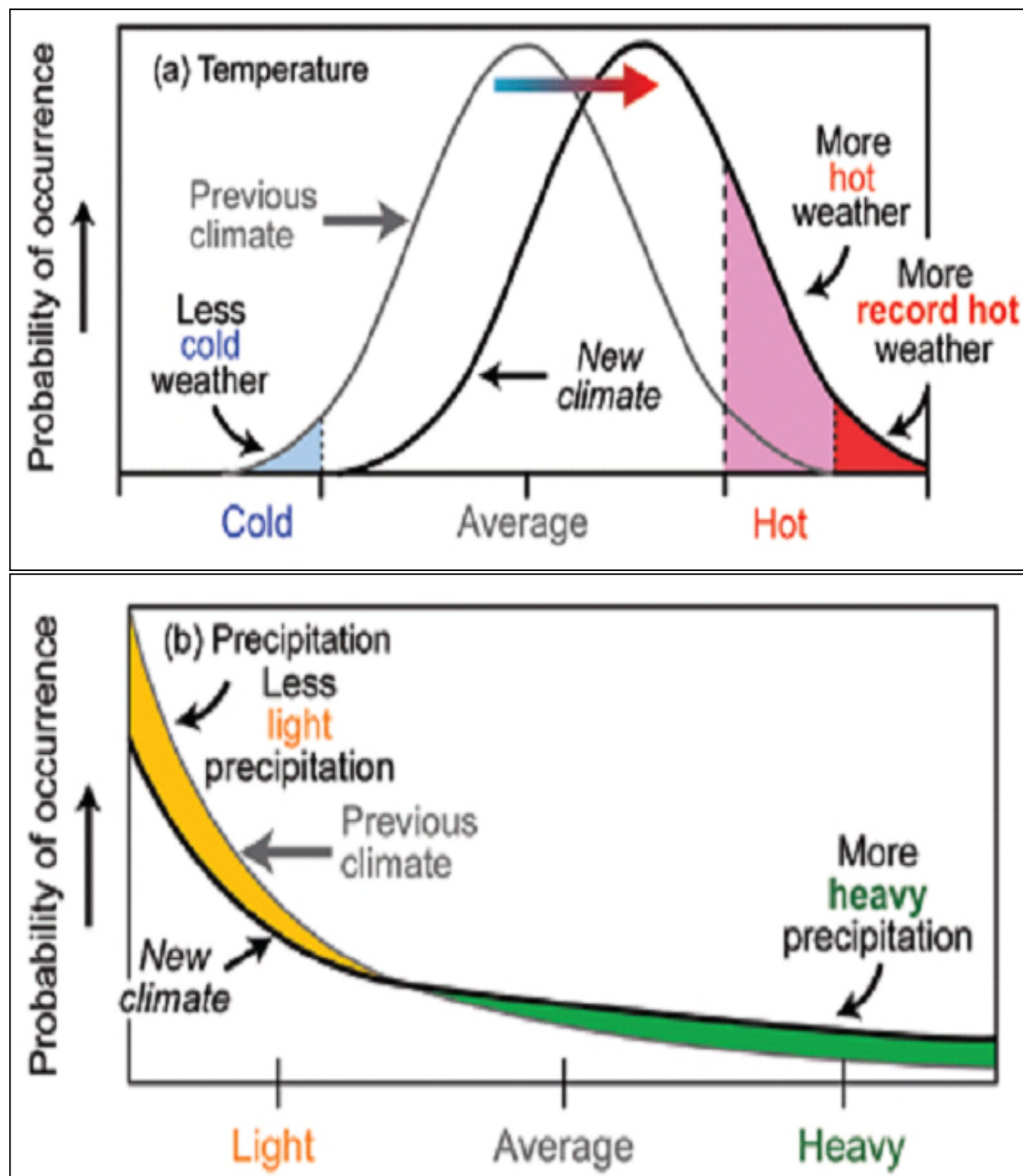


Figure 12-8. Severe Weather Probabilities in Warmer Climates

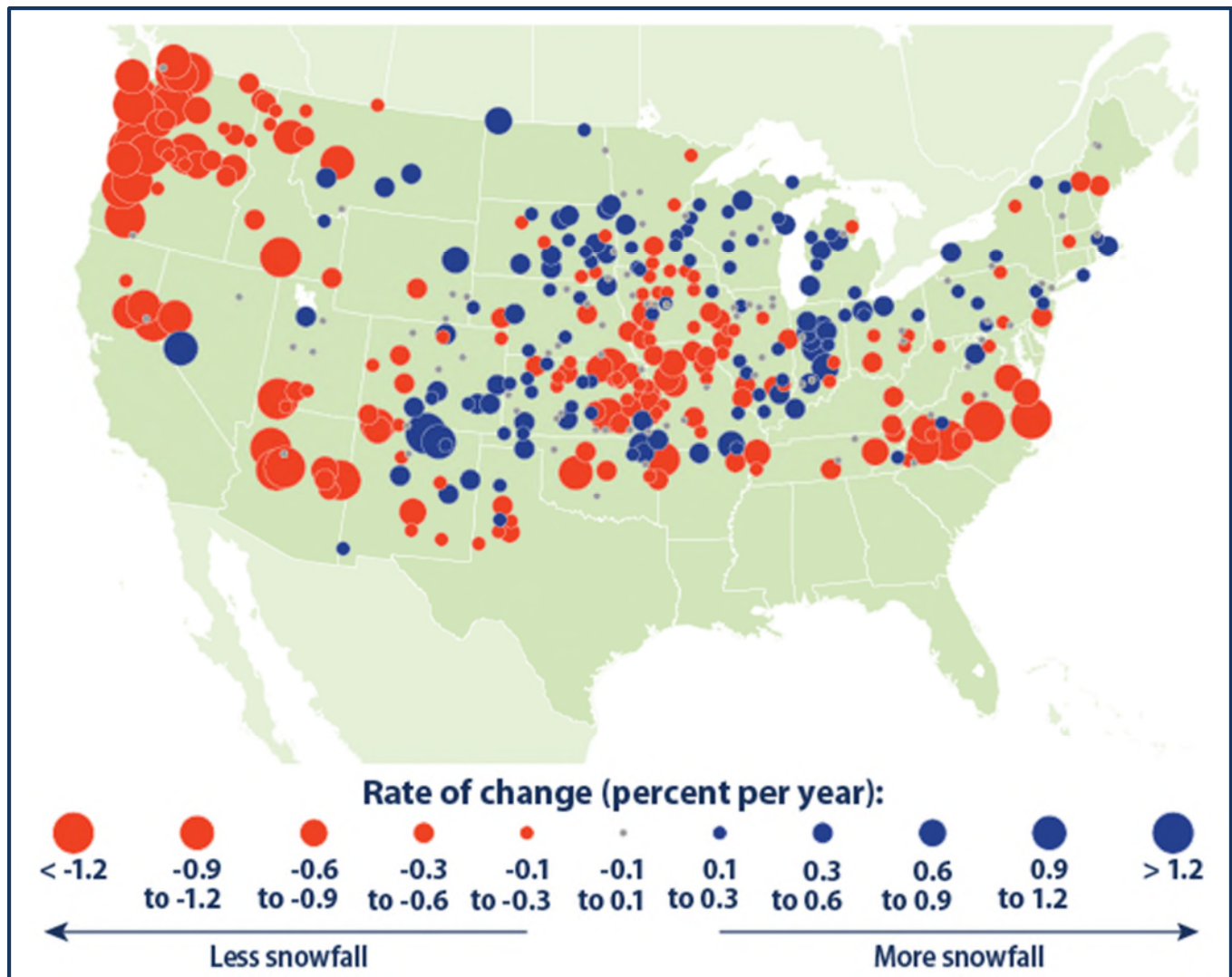


Figure 12-9. Change in Snowfall, 1930-2007

12.7 SCENARIO

Although severe local storms are infrequent, impacts can be significant, particularly when secondary hazards of flood and landslide occur in tandem. A worst-case event would involve prolonged high winds during a snowstorm accompanied by freezing temperatures, followed by warmer weather and continued rain. Such an event would have both short-term and longer-term effects. Initially, schools and roads would be closed due to snow and downed tree obstructions. Power outages would be common throughout the county. In the more rural areas, some subdivisions in unincorporated areas could experience limited ingress and egress. Later, as the weather warms and snow turns to rain, the sudden runoff could produce flooding, overtopped culverts with ponded water on roads, and landslides on steep slopes. Flooding and landslides could further obstruct roads and bridges, further isolating residents (CRESA, 2004).

This combination in November 1995 resulted in flood damage to roads and bridges, dikes and storm drainage systems, residences, businesses and farms throughout Clark County. Power lines were down throughout the county. Total damage was estimated at about \$25 million. Rainfall was measured at approximately 10 inches above average for that period (CRESA, 2004).

12.8 ISSUES

Severe local storms are probably the most common widespread hazard. They affect large numbers of people in the planning area when they occur. Severe storms can quickly overwhelm city and county resources. Residents should be prepared for these types of storms: family plans should be developed, disaster kits should be put in homes, workplaces, schools and cars, and every family member should be taught how to shut off household utilities. Early dismissal from schools and businesses is an effective mitigation measure and should be encouraged.

Severe weather cannot be prevented, but measures can be taken to mitigate the effects. Critical infrastructure and utilities can be hardened to prevent damage during an event. The secondary effect of flooding can be addressed through decreasing runoff and water velocity. Important issues associated with severe weather in the planning area include the following:

- Redundancy of power supply throughout the planning area must be evaluated to better understand what areas may be vulnerable.
- The capacity for backup power generation is limited.
- The County has numerous isolated population centers.
- Public education on dealing with the impacts of severe weather needs to continue so that residents can be better informed and prepared for severe weather events.
- Debris management (downed trees, etc.) must be addressed, because debris can impact the severity of severe weather events, requires coordination efforts, and may require additional funding.
- Older building stock in the planning area is built to low code standards or none at all. These structures could be highly vulnerable to severe winter weather effects such as snow loads or high winds.
- Street tree management programs should be evaluated to help reduce impacts from tree-related damages.
- Priority snow removal routes should continue to be cleared first to ensure navigable routes through and between jurisdictions.

13. VOLCANO

13.1 GENERAL BACKGROUND

A volcano is a vent in the earth's crust through which magma, rock fragments, gases, and ash are ejected from the earth's interior. Over time, accumulation of these products on the earth's surface creates a volcanic mountain. Hazards associated with volcanoes are related to the ways in which volcanic materials and other debris flow from the volcano (CRESA 2004).

13.1.1 Cascade Range Volcanoes

Clark County is near the Cascade Range, an 800-mile-long chain of volcanoes that extends from northern California to southern British Columbia (see Figure 13-1). The volcanoes are the result of a slow slide of dense oceanic crust as it has passed below the North American continent, which releases water and melts overlying rock (USGS, 2013).

13.1.2 Stratovolcanoes and Types of Hazards

The volcanoes in the Cascade Range surrounding Clark County are all stratovolcanoes. They are typically steep-sided, symmetrical cones of large dimension, built of alternating layers of lava, volcanic ash, cinders and blocks of rock. They may rise as much as 8,000 feet above their bases. The sections below describe the hazards associated with Cascade Range volcanoes (CRESA, 2011).

Pyroclastic Flows and Surges

Pyroclastic flows are avalanches of hot (300°C to 800°C), dry, volcanic rock fragments and gases that descend a volcano's flanks at speeds up to 200 miles per hour. They originate from the explosion related to an eruption. Pyroclastic flows and surges are a lethal hazard. They result in incineration, asphyxiation, and burial. Because of their speed they cannot be outrun. Pyroclastic flows are heavier than air and seek topographically low areas. Hot mixtures of gas and rock will flow above the ground and may go over topographical barriers such as ridges and hills.

Lava Flows

Lava flows are normally the least hazardous threat posed by volcanoes. The speed and viscosity of a lava flow are determined by the silica content of the lava. The higher the silica content, the more viscous (thick) the lava becomes. Low silica basalt lava can move 10 to 30 mph. High silica andesite and dacite tend to move more slowly and travel short distances. Cascade volcanoes are normally associated with slow moving andesite or dacite lava. However, 2,000 years ago Mount St. Helens produced a large amount of basalt.

Large lava flows may destroy property and cause forest fires but, since they are slow moving, they pose little threat to human life. The greater hazard presented by lava flows is that their extreme heat can cause snow and ice to melt very quickly, adding to flooding hazards or the lahar and debris avalanche hazards described below.

Source: USGS, 2013

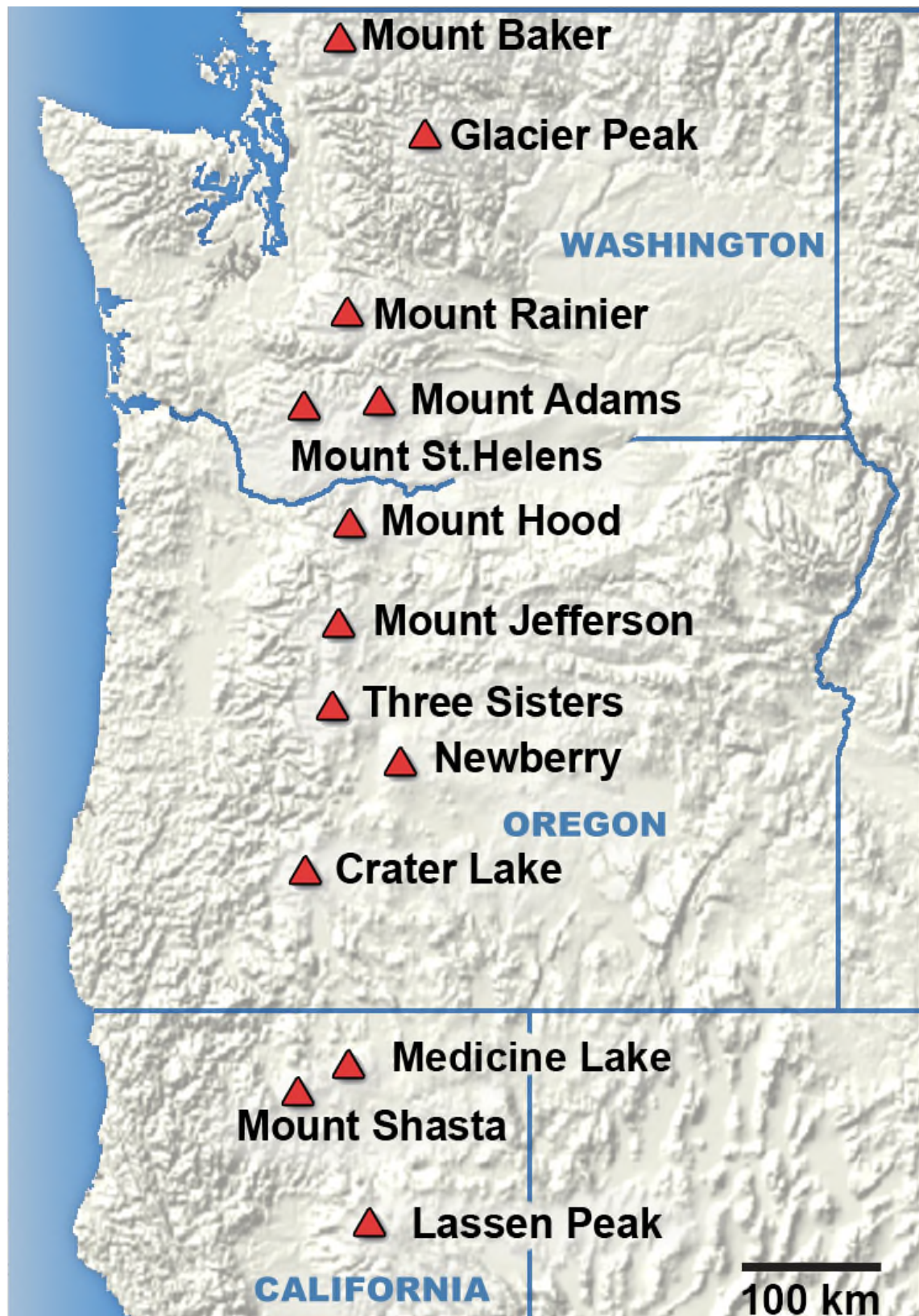


Figure 13-1. Cascade Range Volcanoes

Ash Fall

Ash and large volcanic projectiles can erupt from a volcano into the atmosphere. These materials are sometimes called tephra. The largest fragments (bombs, >64 mm) fall back to the ground fairly near the vents, as close as a few yards and as far as 6 miles. The smallest rock fragments (ash) are composed of rock, minerals, and glass that are less than 2 millimeters in diameter. Tephra plume characteristics are affected by wind speed, particle size, and precipitation.

Ash fall poses a variety of threats. Ash only 1 cm thick can impede the movement of most vehicles and disrupt transportation, communication, and utility systems. During the past 15 years, about 80 commercial jets have been damaged by inadvertently flying into ash, and several have nearly crashed. Airborne tephra will seldom kill people who are a safe distance from the vent. However, ash may cause eye and respiratory problems, particularly for those with existing medical conditions. Short-term exposure should not have any long-term health effects. Some ash fall materials may have acidic aerosol droplets that adhere to them. This may cause acid rain or corrosion of metal surfaces they fall on.

Ash may also clog ventilation systems and other machinery. When ash is mixed with rain it becomes a much greater nuisance. Wet ash is much heavier and it can cause structures to collapse. Most of the 330 deaths associated with the Mt. Pinatubo eruption were caused by roofs collapsing under the weight of rain-soaked ash. Wet ash may also cause electrical shorts. Ash fall also decreases visibility and may cause psychological stress and panic.

Lahars

Lahars are rapidly flowing mixtures of water and rock debris that originate from volcanoes. While lahars are most commonly associated with eruptions, heavy rains, debris accumulation, and even earthquakes may also trigger them. They may also be termed debris or mud flows. Lahars can travel over 50 miles downstream, reaching speeds between 20 and 40 mph. The highest recorded speed of a lahar during the 1980 Mount St. Helens eruption was 88 mph. Beyond the flanks of a volcano, lahars will normally be channeled into waterways. The threat from lahars comes from their speed and from the debris they carry. Abrasion from the heavy sediment and impacts from heavy debris can destroy forests as well as human-made structures, including bridges, dams, roads, pipelines, buildings, and farms. Lahars may also fill in channels, obstructing shipping lanes and impacting a channel's ability to handle large volumes of water.

Debris Avalanches

Volcanoes are prone to debris and mountain rock avalanches that can approach speeds of 100 mph. Volcanoes are characterized by steep slopes of weak rock. Volcanic rock material is weakened by the acidic groundwater that seeps through rock cracks and turns rigid rock into clay. Minor eruptions, earthquakes, or releases of built up water and debris may trigger large avalanches of this material.

Volcanic Gases

All active volcanoes emit gases. These gases may include steam, carbon dioxide, sulfur dioxide, hydrogen sulfide, hydrogen, and fluorine. Sometimes, these chemicals can be absorbed by ash and impact groundwater, livestock, and metal objects. Even when a volcano is not erupting, gases can escape through small surface cracks. The greatest danger to people comes when large quantities of toxic gases are emitted from several sources or when there are topographic depressions that collect gases that are heavier than air. These gases can accumulate to the point where people or animals can suffocate. Neither of these conditions exists in Cascade volcanoes, though this could change if magma were to come close to the surface. Mount St. Helens emitted thousands of tons of sulfur dioxide every day in the early 1980s. These gases were easily dispersed by the wind.

Lateral Blast

Lateral blasts are explosive events in which energy is directed horizontally instead of vertically from a volcano. They are gas-charged, hot mixtures of rock, gas and ash that are expelled at significantly high speeds. Lateral blasts vary in size, but large ones are fairly rare, with only a few historical examples worldwide. The most recent was the 1980 eruption of Mount St. Helens when almost everything within the blast zone (about 230 square miles) perished. The Mount St. Helens lateral blast is estimated to have reached a velocity of 670 mph, and there have been speculations that the velocity may have gone even higher, reaching a supersonic rate of 735+ mph for at least a few moments (USGS, 1997).

13.2 HAZARD PROFILE

13.2.1 Past Events

Cascade Range volcanoes in the U.S. have erupted more than 200 times during the past 12,000 years, for an average of nearly two eruptions per century (CRESA, 2011). Seven Cascade volcanoes have erupted since the beginning of the 18th century (USGS, 2013). At least five of these eruptions have occurred during the past 150 years (CRESA, 2011). Figure 13-2 summarize past eruptions in the Cascades.

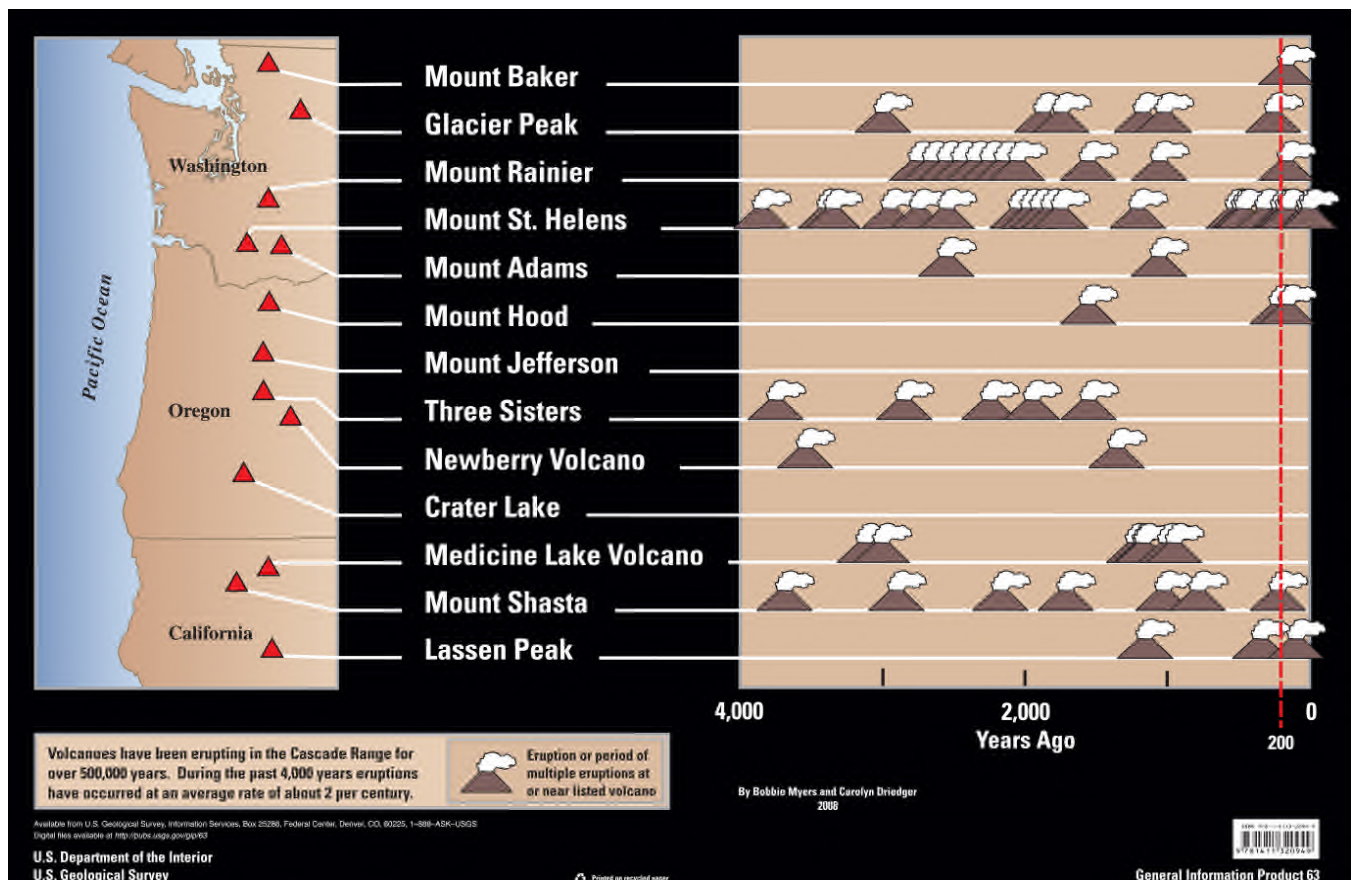


Figure 13-2. Cascade Range Eruptions in the Past 4,000 Years

The most recent major eruptions in the Cascade Range are the well-documented 1980-1986 eruptions of Mount St. Helens. The primary, major eruption on May 18, 1980 claimed 57 lives and caused nearly a billion dollars in damage and response costs. The effects were felt throughout the Northwest (CRESA, 2011). Mount St. Helens

also experienced activity from 2004 to 2008, producing a series of lava spines and millions of small earthquakes (Washington Emergency Management Division, 2014).

In 1781, Mount Hood erupted, which resulted in lahar flows that reached the Columbia River (USGS, 2013). There were additional reports of eruptive activity in 1859 and 1865 from early settlers. Reports included sightings of fire, smoke, flying rock, and steaming (USGS, 2012b).

13.2.2 Location

None of the Cascade volcanoes are located in Clark County. The nearest are Mount Hood in northern Oregon and Mount Adams and Mount St. Helens in southern Washington. Expected impacts from these volcanoes are generally referred to as “distal” hazards, meaning that the hazard areas are relatively far from the volcano itself. Hazard mapping conducted by the USGS indicates that major eruptions of Mount Hood and Mount St. Helens could have direct impacts on small portions of the planning area:

- In the event of a Mount Hood eruption, a small part of the southeastern portion of the county, located along the Columbia River, may experience bank erosion and flooding caused by lahars and sediment-rich floods from the Sandy and Hood Rivers (see Figure 13-3 and Figure 13-5).
- An eruption of Mount St. Helens may directly impact a very small area of the northeastern portion of the county; however, there are no structures within that mapped hazard area (see Figure 13-4).

Ash fall from an eruption of any of the Cascade volcanoes could potentially reach the planning area depending on weather events at the time of the eruption.

13.2.3 Frequency

Mount St. Helens is currently the most active volcano in the Cascades, with four major explosive eruptions in the last 515 years as well as dozens of smaller eruptions. Still, the probability of an eruption in any given year is extremely low. Figure 13-6 shows the annual probability of an ash fall accumulation of 4 inches or more (10 cm). Clark County is in an area of varying probability for such ash fall accumulation, ranging from 0.1 percent in the eastern portion of the county to less than 0.01 percent in the western portion.

13.2.4 Severity

Although Clark County is near both Mount St. Helens and Mount Hood, the planning area does not have a large degree of exposure to direct impacts, aside from ash fall. The severity of impacts from distal hazards would likely depend on the severity of the eruption. The severity of impacts from ash fall accumulation would be related to the extent of the accumulation. Ash fall often causes damage to buildings and building systems. This can range from complete or partial roof collapse to damage to exterior materials or interior rooms and appliances. Effects are dependent on the thickness of the ash, whether it is wet or dry, the roof and building design, air-handling systems, and the amount of ash inside the building. Buildings whose mechanical systems are shut down prior to ash fall typically experience less interior damage.

In addition to the concern for structural collapse, ash is corrosive and can be electrically conductive. This can lead to metallic roof surfaces experiencing increased deterioration. The abrasive and corrosive nature of ash not only causes potential minor but painful burns to humans, it can also damage computer and electronic systems. While volcanic ash is most often associated with structural instability, it can also cause issues with agriculture, health, power supply, water supply, transportation, and wastewater (USGS, 2015a).

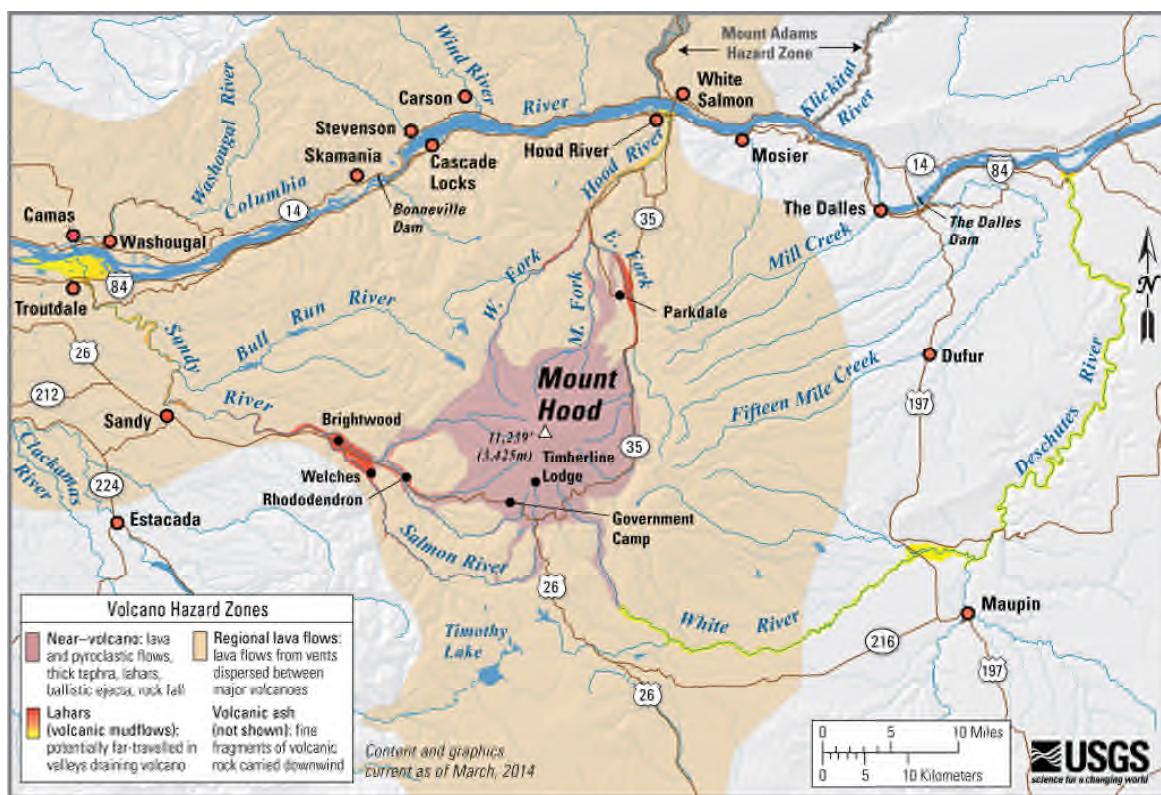


Figure 13-3. Potential Impact Area for Ground-Based Hazards during a Mount Hood Event

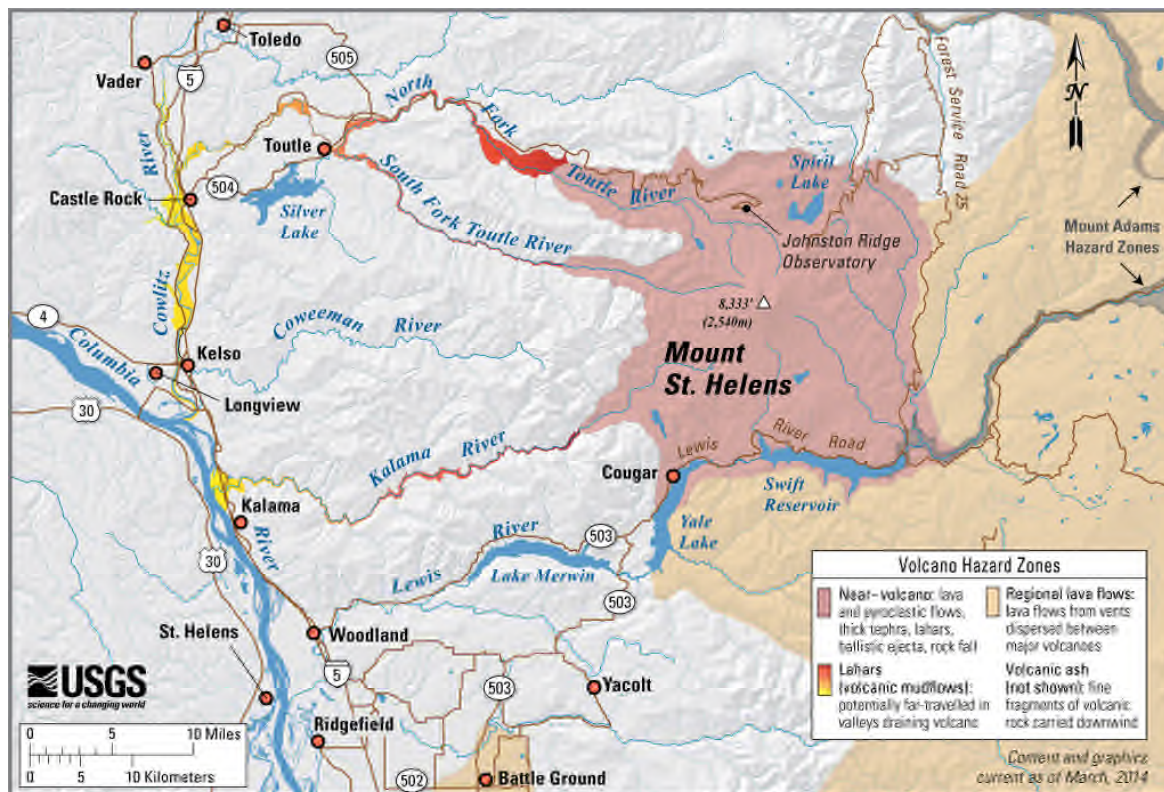
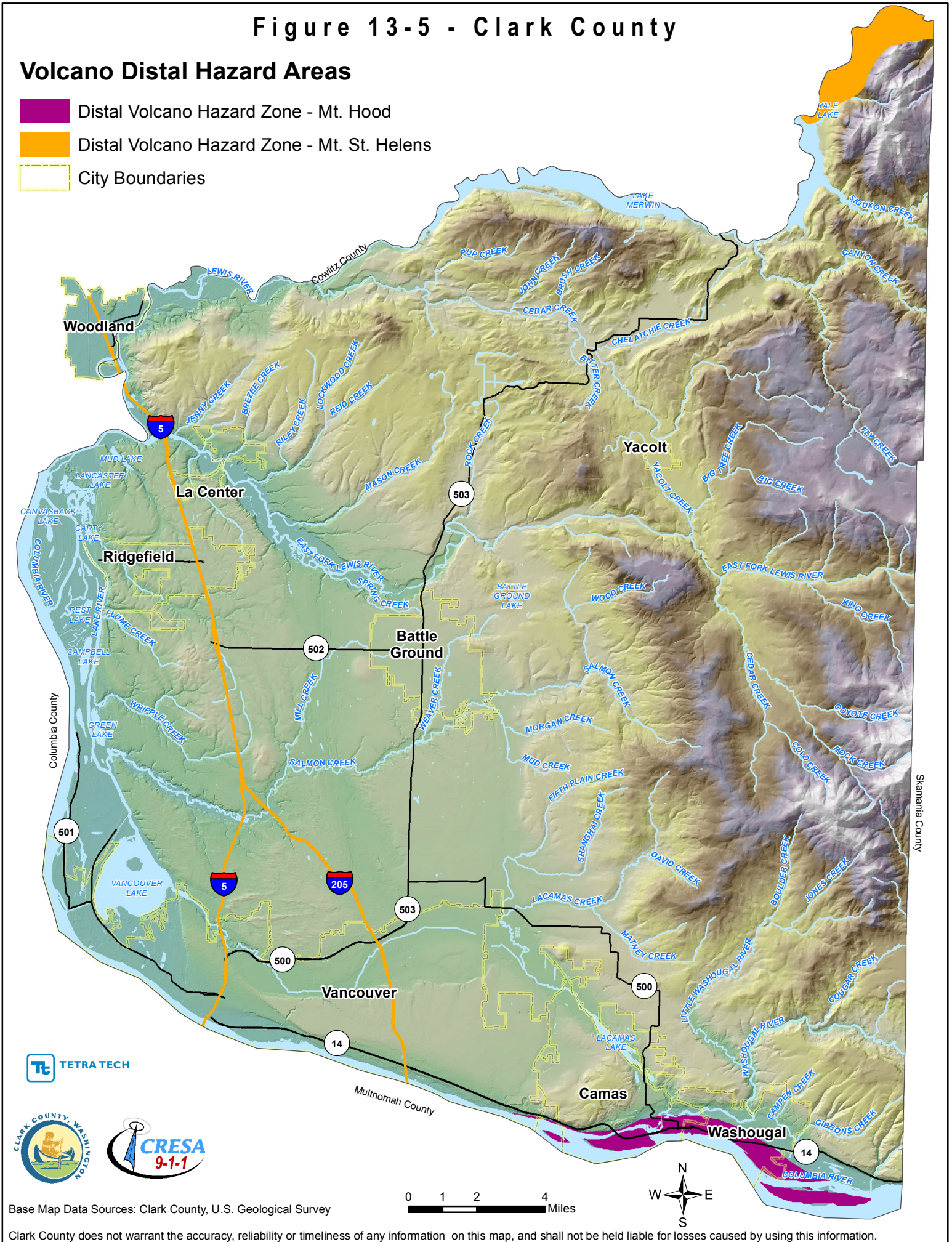


Figure 13-4. Potential Impact Area for Ground-Based Hazards during a Mount Saint Helens Event

Figure 13-5 - Clark County

Volcano Distal Hazard Areas

- Distal Volcano Hazard Zone - Mt. Hood
- Distal Volcano Hazard Zone - Mt. St. Helens
- City Boundaries



Base Map Data Sources: Clark County, U.S. Geological Survey

0 1 2 4 Miles



Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

Source: Hoblitt and Scott, 2011

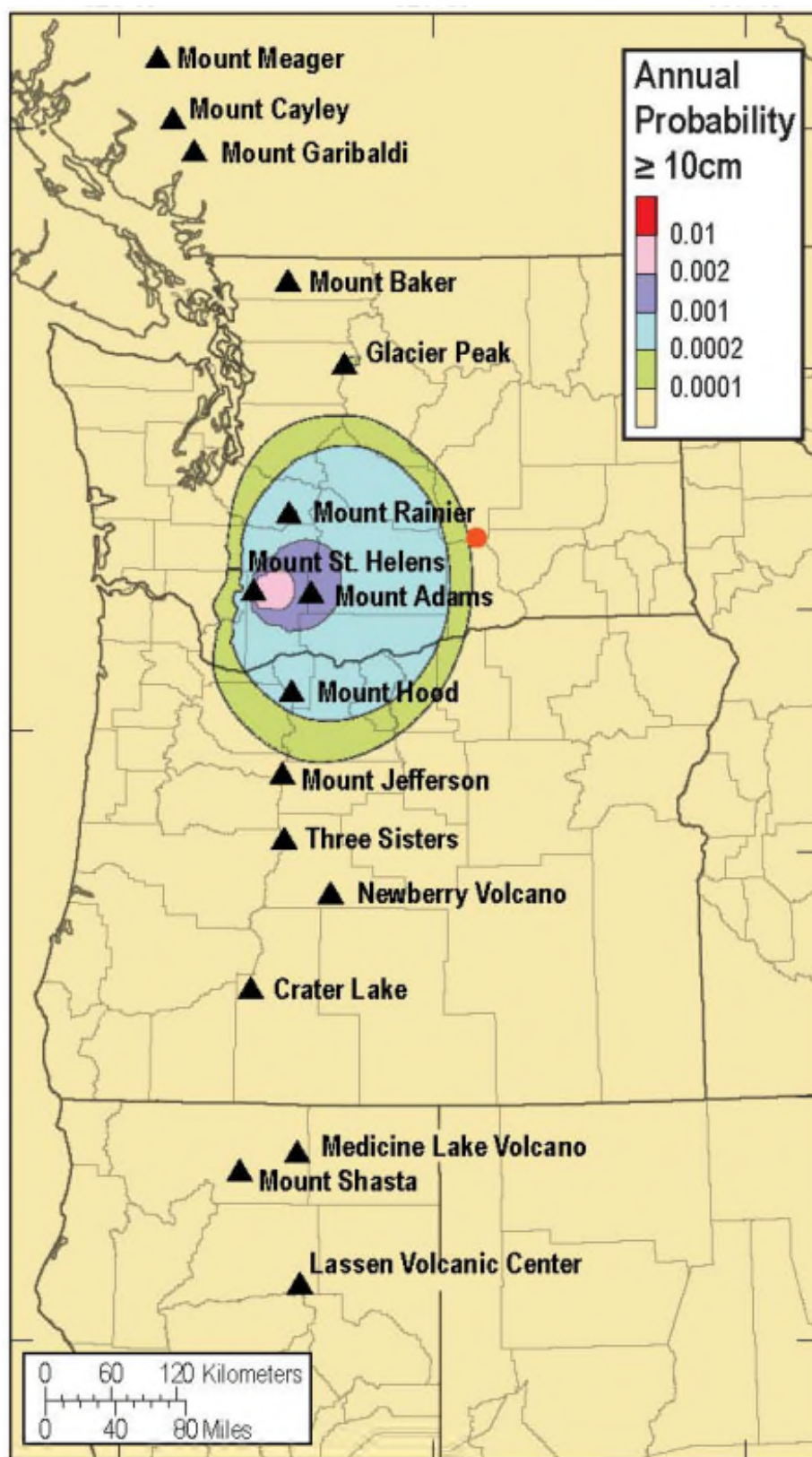


Figure 13-6. Preliminary Probabilistic Ash Fall Hazard Map

13.2.5 Warning Time

The best warning of a volcanic eruption is one that specifies when and where an eruption is likely and what type and size eruption should be expected. Such accurate predictions are sometimes possible but still rare. The most accurate warnings are those in which scientists indicate an eruption is probably only hours to days away, based on significant changes in a volcano's earthquake activity, ground deformation, and gas emissions. Experience from around the world has shown that most eruptions are preceded by such changes over a period of days to weeks. A volcano may begin to show signs of activity several months to a few years before an eruption. However, a warning that specifies months or years in advance when it might erupt are extremely rare.

Monitoring Volcanic Activity

The USGS and the Pacific Northwest Seismograph Network at the University of Washington conduct seismic monitoring of all Cascade volcanoes in Washington and Oregon. During the past decade, monitoring networks on Mount Hood and Mount St. Helen's have been expanded.

Volcanic Event Notification

Members of the public may sign up for the USGS Volcano Notification Service email subscription service on the USGS website. Notifications include several types: volcano activity notices; daily, weekly or monthly updates; status reports; volcano observatory notices for aviation; and information statements.

Volcano-alert notifications are based on analysis of data from monitoring networks, direct observations, and satellite sensors. They are issued for both increasing and decreasing volcanic activity and include text about the nature of the activity and about potential or current hazards. Scientists describe a volcano's status using alert levels and color codes and issue different types of notifications to address specific information needs. These alert levels consist of two parts (USGS, 2016):

- Ranked terms to inform people on the ground about a volcano's status:
 - **Normal**—Volcano is in typical background, non-eruptive state or, after a change from a higher level, volcanic activity has ceased and volcano has returned to non-eruptive background state.
 - **Advisory**—Volcano is exhibiting signs of elevated unrest above known background level or, after a change from a higher level, volcanic activity has decreased significantly but continues to be closely monitored for possible renewed increase.
 - **Watch**—Volcano is exhibiting heightened or escalating unrest with increased potential of eruption, timeframe uncertain, OR, eruption is underway but poses limited hazards.
 - **Warning**—Hazardous eruption is imminent, underway, or suspected.
- Ranked colors to inform the aviation sector about airborne hazards (green, yellow, orange and red generally correspond to alert level term definitions).

This alert level ranking offers a framework that the public and civil authorities can use to gauge and coordinate a response to a developing volcano emergency.

Lahar Travel Times

According to a recent study by the Oregon Department of Geology and Mineral Industries (2016), it would take more than 3.5 hours for distal hazard impacts to reach the planning area (see Figure 13-7).

Source: USGS Simplified from Gardner et al. 2000

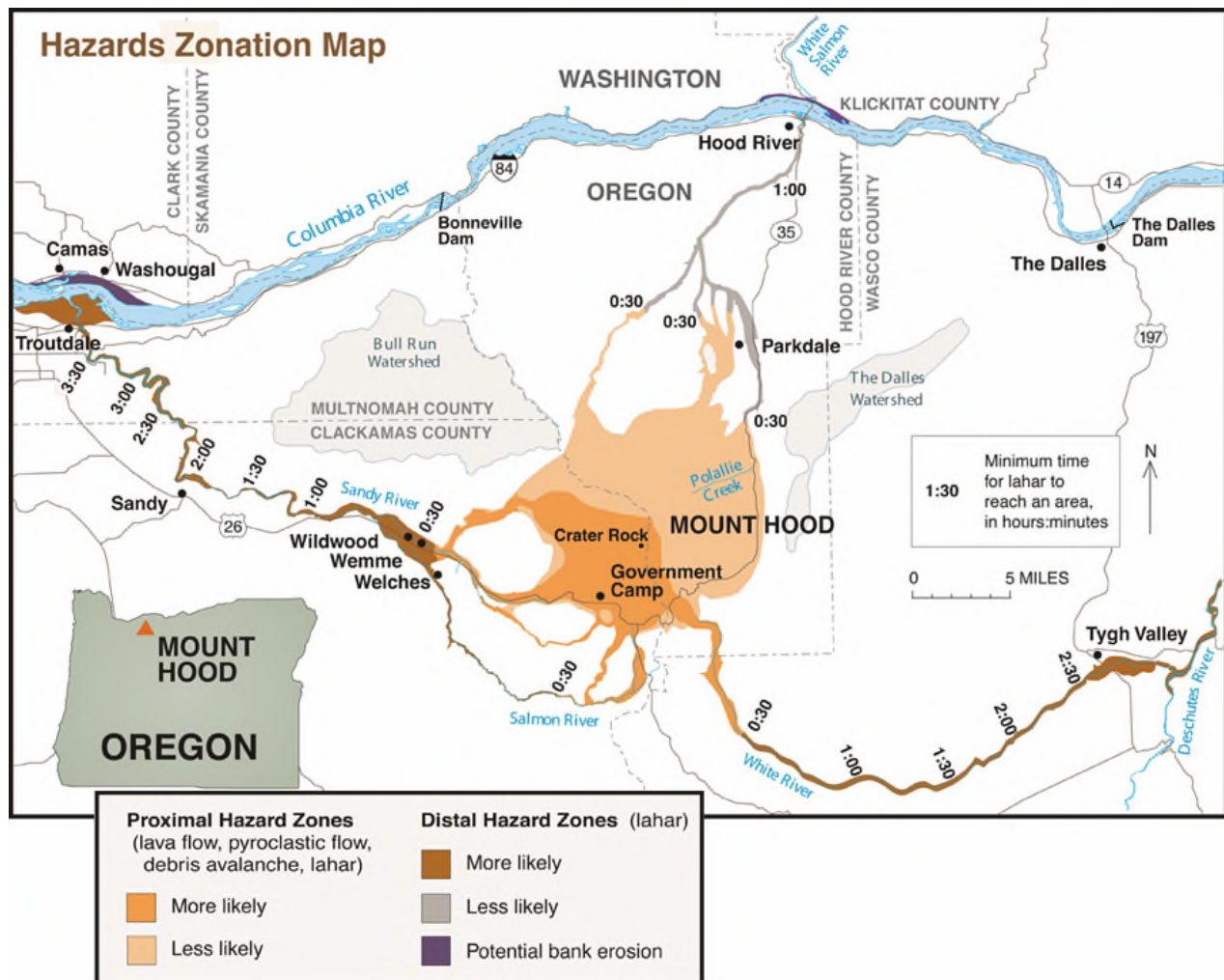


Figure 13-7. Mount Hood Hazard Zones and Lahar Travel times

13.3 SECONDARY HAZARDS

Ground movement often accompanies volcanic eruption. Such movement can result in subsidence, surface ruptures, earthquakes, and potentially tsunamis. Other secondary hazards can include traffic disruptions (such as if ash coats roadways and runways); utility failures (from the weight of ash or the infiltration of ash into electronic systems, particularly with communications, power, and water quality); and structural or building collapse. Areas impacted by volcanic ash and toxic gases can experience long-term secondary public health impacts associated with soil quality. Acid rain may damage water supplies, foliage, paint, machinery, and fabric.

13.4 EXPOSURE

All of the Clark County planning area would be exposed to ash fall from volcanic eruptions in the Cascade Range to some degree. The location of the event as well as the prevailing wind direction would influence the extent of this impact.

13.4.1 Population

The entire population of Clark County is exposed to the effects of ash fall. Populations along the Columbia River islands and areas along the Washington shore could be impacted by distal hazards. Population could not be examined by distal hazard zone because census block groups do not coincide with the hazard risk areas. However, population was estimated using the structure count of buildings within the distal hazard zones and applying the census value for Clark County of 2.7 persons per household. Using this approach, it is estimated that the exposed population is 3,297 (less than 1 percent of the total planning area population). Table 13-1 shows the estimated population exposure by jurisdiction.

Table 13-1. Estimated Population Residing in Distal Hazard Areas

	Population Exposed ^a	% of Total Population
Battle Ground	0	0.0%
Camas	1,291	6.1%
La Center	0	0.0%
Ridgefield	0	0.0%
Vancouver	3	0.0%
Washougal	1,979	13.0%
Woodland	0	0.0%
Yacolt	0	0.0%
Unincorporated	24	0.0%
Total	3,297	0.7%

a. Value calculated as number of buildings exposed multiplied by 2.7 people (Clark County) / 3.17 people (Woodland) per building. This multiplier is the number of persons per household per the U.S. Census Bureau, State, County and City Quick Facts 2009-2015.

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

13.4.2 Property

Distal Hazards

All of the exposure to distal hazards is in the southern portion of the planning area along the Columbia River islands and areas along the river shore. All property in the distal hazard zones would be exposed to bank erosion and flooding. It is possible that dikes and bulkheads along the north bank of the Columbia River could help to protect property from the effects of a lahar-induced flood (CRESA, 2004). The number and value of planning area structures in the distal hazard zones is summarized in Table 13-2. The type of structure is shown in Table 13-3. The breakdown of the present land use in the distal hazard areas is shown in Table 13-4.

Exposed property in the planning area is located in Camas, Washougal, Vancouver and unincorporated areas. The majority of exposed structures are residential (75 percent), although there is substantial exposure of commercial and industrial activities in the Port of Washougal, accounting for the high percentage of the estimated replacement value. Residential and industrial uses make up the majority of exposed land uses in the hazard areas.

Ash Fall

All property in the planning area would be exposed to ash fall accumulation in the event of a volcanic eruption.

Table 13-2. Exposure and Value of Structures in Distal Hazard Zone

Jurisdiction	Buildings Exposed	Value Exposed			% of Total Replacement Value
		Structure	Contents	Total	
Battle Ground	0	\$0	\$0	\$0	0.0%
Camas	478	\$479,346,070	\$500,824,519	\$980,170,589	12.9%
La Center	0	\$0	\$0	\$0	0.0%
Ridgefield	0	\$0	\$0	\$0	0.0%
Vancouver	1	\$1,029,215	\$1,029,215	\$2,058,429	0.0%
Washougal	733	\$991,165,458	\$914,612,600	\$1,905,778,058	45.8%
Woodland	0	\$0	\$0	\$0	0.0%
Yacolt	0	\$0	\$0	\$0	0.0%
Unincorporated	9	\$5,911,142	\$4,566,691	\$10,477,833	0.0%
Total	1,221	\$1,477,451,884	\$1,421,033,025	\$2,898,484,909	2.6%

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

Table 13-3. Structure Type in Distal Hazard Zone

	Number of Structures ^a							
	Residential	Commercial	Industrial	Agriculture/ Forestry	Religion	Government	Education	Total
Battle Ground	0	0	0	0	0	0	0	0
Camas	393	71	11	0	1	2	0	478
La Center	0	0	0	0	0	0	0	0
Ridgefield	0	0	0	0	0	0	0	0
Vancouver	0	1	0	0	0	0	0	1
Washougal	513	175	7	2	11	17	8	733
Woodland	0	0	0	0	0	0	0	0
Yacolt	0	0	0	0	0	0	0	0
Unincorporated County	8	0	0	1	0	0	0	9
Total	914	247	18	3	12	19	8	1,221

a. Structure type assigned to best fit Hazus occupancy classes based on present use classifications provided by Clark and Cowlitz County assessor's data. Where conflicting information was present in the available data, parcels were assumed to be improved.

Table 13-4. Present Land Use in Planning Area^a

Present Use Classification ^b	Area (acres) ^{c, d}	% of total
Agriculture/Resource Land	362	8.6%
Commercial	793	18.8%
Education	3	0.1%
Governmental Services	13	0.3%
Industrial	943	22.3%
Religious Services	4	0.1%
Residential	1,491	35.3%
Vacant or uncategorized	618	14.6%
Total	4,227	100%

- a. Present land use information in this plan is for planning purposes only. Discrepancies may exist between these estimates and official records maintained by participating jurisdictions.
- b. Present use classification provided by Clark and Cowlitz County assessor's data assigned to best fit occupancy classes in FEMA's Hazus model (see Section 6.3.1). Parcels for which conflicting information on current development was available were assumed to be improved. Some designated resource land may also be included in the vacant or uncategorized category.
- c. Acreage covers only mapped parcels; it excludes many rights of way and major water features.
- d. Acreage includes Clark County and the incorporated areas of the City of Woodland.

13.4.3 Critical Facilities and Infrastructure

Distal Hazard Zones

All critical facilities and infrastructure in the mapped hazard areas are exposed to distal hazards, as summarized in Table 13-5. In addition the following linear features are exposed:

- Northwest pipeline
- State Route 14
- State Route 500
- 6.02 miles of Columbia River levees.

Table 13-5. Critical Facilities and Infrastructure Exposed to Distal Hazards

	Communi- cation Facilities	Dams	Emer- gency Services	Energy	Govern- ment Facilities	Hazardous Materials	Health Care & Public Health	Infor- mation Technol- ogy	Schools	Trans- portation Systems	Water & Sanitation Systems	Total
Battle Ground	0	0	0	0	0	0	0	0	0	0	0	0
Camas	0	0	2	1	0	0	0	0	0	4	17	24
La Center	0	0	0	0	0	0	0	0	0	0	0	0
Ridgefield	0	0	0	0	0	0	0	0	0	0	0	0
Vancouver	0	0	0	0	0	0	0	0	0	0	0	0
Washougal	0	0	2	1	3	8	0	0	0	2	7	23
Woodland	0	0	0	0	0	0	0	0	0	0	0	0
Yacolt	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	4	2	3	8	0	0	0	6	24	47

Ash Fall

All critical facilities and infrastructure in the planning area are potentially exposed to ash fall.

13.4.4 Environment

The environment is highly exposed to the effects of a volcanic eruption. Even if ash fall from a volcanic eruption were to fall elsewhere, it could still be spread throughout the county by surrounding rivers and streams. Additionally, excess sediment in rivers and streams could impact water quality and substantially disrupt habitat.

13.5 VULNERABILITY

13.5.1 Population

Distal Hazards

Since there is generally adequate warning time before a volcanic event, the population vulnerable to distal hazards consists of those who choose not to evacuate or are unable to evacuate. The latter includes the elderly, the very young, and those with access and functional needs.

Ash Fall

The entire population of the planning area is vulnerable to the damaging effects of volcanic ash fall in the event of a volcanic eruption. The elderly, very young and those who experience ear, nose and throat problems are especially vulnerable to the ash fall hazard. Ash is harsh, acidic, gritty, and smelly. Although the gases are usually too diluted to constitute danger to a person in normal health, the combination of acidic gas and ash may cause lung problems. Extremely heavy ash can clog breathing passages and cause death. When an ash cloud combines with rain, sulfur dioxide in the cloud combines with water to form diluted sulfuric acid that may cause minor, but painful burns to the skin, eyes, nose, and throat. Hydrochloric acid rains following eruptions have also been reported. Additionally, ash fall decreases visibility and may cause psychological stress and panic.

13.5.2 Property

Distal Hazards

There are currently no generally accepted damage functions for volcanic hazards in risk assessment platforms such as Hazus-MH. All properties listed in Table 13-2 are considered vulnerable to distal hazards. The most vulnerable structures would be those that are located closest to the Columbia River hazard areas, and those that are not structurally sound. Loss estimates for distal hazards are shown in Table 13-6 representing 10, 30, and 50 percent of the exposed property value.

Ash Fall

All of the property exposed to nature in the planning area is exposed to the effects of ash fall. The most vulnerable structures are those that are not as structurally sound and may collapse under the excessive weight of ash and possible rainfall. A 1-inch deep layer of ash weighs an average of 10 pounds per square foot, causing danger of structural collapse.

Vulnerable property includes equipment and machinery left out in the open, such as combines, whose parts can become clogged by the fine dust. Infrastructure, such as drainage systems, is potentially vulnerable to the effects of ash fall, since the fine ash can clog pipes and culverts. This may be more of a problem if an eruption occurs during winter or early spring when precipitation is highest and floods are most likely.

Table 13-6. Loss Estimates for Volcano Distal Hazards

	Exposed Value	Estimated Loss Potential from Distal Hazards		
		10% Damage	30% Damage	50% Damage
Battle Ground	\$0	\$0	\$0	\$0
Camas	\$980,170,589	\$98,017,058.90	\$294,051,176.70	\$490,085,294.50
La Center	\$0	\$0	\$0	\$0
Ridgefield	\$0	\$0	\$0	\$0
Vancouver	\$2,058,429	\$205,842.90	\$617,528.70	\$1,029,214.50
Washougal	\$1,905,778,058	\$190,577,805.80	\$571,733,417.40	\$952,889,029.00
Woodland	\$0	\$0	\$0	\$0
Yacolt	\$0	\$0	\$0	\$0
Unincorporated	\$10,477,833	\$1,047,783.30	\$3,143,349.90	\$5,238,916.50
Total	\$2,898,484,909	\$289,848,491	\$869,545,473	\$1,449,242,455

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

To estimate the loss potential for this hazard, a qualitative approach was used, based on recommendations from FEMA guidelines on state and local mitigation planning. For this analysis, 0.1 percent of total replacement valuations was selected as the loss ratio for the ash fall hazard. The results are summarized in Table 13-7.

Table 13-7. Loss Estimates for Ash Fall

Jurisdiction	Exposed Value	Estimated Loss Potential @ 0.1% Damage
Battle Ground	\$4,036,379,864	\$4,036,380
Camas	\$7,575,016,927	\$7,575,017
La Center	\$805,148,506	\$805,149
Ridgefield	\$2,075,091,625	\$2,075,092
Vancouver	\$47,993,433,972	\$47,993,434
Washougal	\$4,159,958,945	\$4,159,959
Woodland	\$1,777,992,519	\$1,777,993
Yacolt	\$306,406,962	\$306,407
Unincorporated	\$44,797,390,449	\$44,797,390
Total	\$113,526,819,768	\$113,526,820

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

13.5.3 Critical Facilities and Infrastructure

Distal Hazards

All critical facilities and infrastructure in the hazard areas are vulnerable to distal hazards. Flood protection may offer some protection for some facilities, depending on design specifications. Excess sedimentation and resulting bank erosion may significantly impact the Columbia River shipping channel.

Ash Fall

Ash fall accumulation of less than one-half inch is capable of creating temporary disruptions of transportation operations and sewage disposal and water treatment systems. Highways and roads could be closed for hours, days, or weeks afterwards. The gritty ash can cause substantial problems for internal-combustion engines and other

mechanical and electrical equipment. The ash can contaminate oil systems, clog air filters, and scratch moving surfaces. Fine ash can also cause short circuits in electrical transformers, which in turn cause power blackouts.

Heavy airborne ash blots out light. Sudden heavy demand for electric light and air conditioning may cause a drain on power supplies, leading to a partial or full power failure. Ash clogs machinery of all kinds and poses a serious threat to aviation because particles can damage aircraft systems and jet engines. It drifts into roadways, railways, and runways, where it is slippery and dangerous. Its weight may cause structural collapse. Because winds and air currents easily carry it, it remains a hazard to machinery and transportation (particularly aviation) for months after the eruption.

13.5.4 Environment

The increased sedimentation and bank erosion resulting from a volcanic eruption could be damaging to rivers and streams and could redirect water flow and cause changes in water courses. Ash fall would expose the local environment to lower air quality and other effects that could harm vegetation and water quality. The sulfuric acid contained in volcanic ash could be damaging to area vegetation, waters, wildlife and air quality. Secondary impacts from hazardous materials released in distal hazard areas could cause significant damage to the environment and waterways.

13.5.5 Economic Impact

Volcanic eruptions can disrupt the normal flow of commerce and daily human activity without causing severe physical harm or damage. Ash that is a few inches thick can halt traffic, cause rapid wear of machinery, clog air filters, block drains, creeks and water intakes, and impact agriculture. Removal and disposal of large volumes of deposited ash can have significant impacts on government and business. The interconnectedness of the region's economy can be disturbed after a volcanic eruption. Roads, railroads and bridges can be damaged by lahars and mudflows. The Mount St. Helens May 1980 eruption demonstrated the negative effect on the tourism industry. Conventions, meetings, and social gatherings were canceled or postponed in cities and resorts throughout Washington and Oregon in areas not initially affected by the eruption. However, the eruption did lead to the creation of a thriving tourist industry for decades following the event.

The disruption of regional activity is further demonstrated by the 2010 eruption of Iceland's Eyjafallajokull volcano, which led to European air travel being halted for several days. The movement of goods via major highways can also be halted due to tephra in the air. The Mount St. Helens event in May 1980 cost trade and commerce an estimated \$50 million in only two days, as ships were unable to navigate the Columbia River. Clouds of ash often cause electrical storms that start fires, and damp ash can short-circuit electrical systems and disrupt radio communication. Volcanic activity can also lead to the closure of nearby recreation areas as a safety precaution long before the activity ever culminates in an eruption.

13.6 FUTURE TRENDS

13.6.1 Development

Distal Hazards

Mapped distal hazard areas in Clark County overlap significantly with special flood hazard areas, which are held to more restrictive standards for development. These areas are predominantly zoned for commercial and industrial uses. Comprehensive plans will guide future development in these areas. Table 13-8 shows the area identified as underutilized or vacant in urban growth areas in the County that intersect identified distal hazard areas.

Table 13-8. Buildable Lands in Planning Area Urban Growth Areas that Intersect Distal Hazard Areas^a

Urban Growth Area ^b	Buildable Area ^c (acres)				
	Residential		Commercial	Industrial	Total
	Acres	Units			
Battle Ground	0		0	0	0
Camas	11.94		1.83	33.62	47.39
La Center	0		0	0	0
Ridgefield	0		0	0	0
Vancouver	1.98		0	0	1.98
Washougal	31.76		50.87	73.06	155.69
Woodland ^d	0		0	0	0
Yacolt	0		0	0	0
Total	45.68		52.70	106.68	205.06

- a. Buildable lands information in this plan is for planning purposes only. Discrepancies may exist between these estimates and official records maintained by participating jurisdictions.
- b. Unincorporated areas outside of urban growth areas are excluded from this assessment. Development in these areas consists largely of rural lands, open space and large residential lots.
- c. Acreage covers only mapped parcels; it excludes many rights of way and major water features.
- d. Acreage estimates exclude the portions of the City of Woodland in Cowlitz County and thus may be underestimated.

Ash Fall

All future development in the planning area will be susceptible to potential impacts from volcanic eruptions causing ash fall in the region. While this potential impact on the built environment is not considered to be significant, the economic impact on industries that rely on machinery and equipment, such as agriculture or civil engineering projects, could be significant. Since the extent and location of this hazard is difficult to gauge because it is dependent upon many variables, the ability to institute land use recommendations based on potential impacts of this hazard is limited. While the impacts of ash fall are sufficient to warrant risk assessment for emergency management purposes, they are not sufficient to dictate land use decisions.

13.6.2 Climate Change

Climate change is not likely to affect the risk associated with volcanoes; however, volcanic activity can affect climate change. Volcanic clouds absorb terrestrial radiation and scatter a significant amount of incoming solar radiation. By reducing the amount of solar radiation reaching the Earth's surface, large-scale volcanic eruptions can lower temperatures in the lower atmosphere and change atmospheric circulation patterns. The massive outpouring of gases and ash can influence climate patterns for years following a volcanic eruption. Additionally, while climate change is not likely to increase the frequency of eruptions, changes in precipitation amounts could increase the potential for lahars or debris avalanches in volcanic areas.

13.7 SCENARIO

Two volcanic scenarios are most likely to impact Clark County. The first would be an event similar to the 1980 eruption of Mt. Saint Helens. Such an event seems unlikely to directly impact the county, as the eruption would likely happen on the northern side of the volcano. However, depending on wind direction and velocity, ash could be an issue (CRESA, 2004).

The other possibility is a Mt. Hood event, which could trigger a mudflow along the Hood River and the Sandy River into the Columbia River below Cascade Locks. This could cause flooding in Clark County along the Columbia River (CRESA, 2004). This scenario event formed the basis of the risk assessment for this hazard.

13.8 ISSUES

The following issues have been identified for the volcano hazard:

- Researchers continue to develop methods to predict volcanic eruptions accurately. Indications that an eruption may be imminent include swarms of small earthquakes as the magma rises up through the volcano, increases in gas emissions, and physical swelling or deformation of mountain slopes. Although warning time should be sufficient to prevent loss of life, the advent of these signs and the beginning of eruptive activity may be short.
- More than 3,200 people are estimated to live in distal hazard zones in the planning area. The entire population of the planning area could be exposed to ash fall, depending on weather conditions at the time of an eruption.
- Residents may not be aware that they live in distal hazard areas.
- Distal hazard exposure is predominantly concentrated in Camas and Washougal.
- More than \$2.89 billion in structure and content value is exposed to distal hazards. The exposure accounts for 2.6 percent of the total value of the planning area and 13 and 46 percent of the total value of Camas and Washougal, respectively.
- Ash fall from volcanic eruptions can cause significant damage to heating and air conditioning systems, combustion systems, electronic devices and other mechanical equipment.
- Ash fall increases in weight significantly when wet, complicating cleanup efforts.
- Ash fall can cause significant impacts on the local economy due to interruptions to the transportation system and disruptions to tourism-related industries.
- A substantial number of critical facilities and infrastructure in the planning area would be impacted by distal hazards or ash fall.
- A regional Mount Hood Coordination plan has been developed to coordinate and plan for response activities in the event of an eruption. This plan should continue to be updated.

14. WILDLAND FIRE

14.1 GENERAL BACKGROUND

The term wildland fire refers to any uncontrolled burning of grasslands, brush or woodland areas. Forest fire is a kind of wildland fire—specifically the uncontrolled burning of forestland. The wildland-urban interface/intermix area is the area that is susceptible to wildland or forest fires because wildland vegetation and urban or suburban development occur together (CRESA, 2004).

14.1.1 Factors Influencing Wildfires

Wildfires advance through the transmission of heat in the form of conduction, convection and radiation. During the day, fires generally travel uphill. Convection currents and radiation ahead of the fire preheat the fuels and air upslope, allowing the fire to expand rapidly. Radiation has an extreme impact when the fire enters a “chimney,” or a v-shaped area on a slope, such as a drainage gully. South and west facing slopes tend to be warmest and driest. Heavy dry fuels on a southwest-facing slope with chimneys on a hot day will allow for near explosive expansion of a fire. Wind can strengthen and spread a fire, though large fires can generate their own wind. The heat rising from a large fire will create a thermal column that can rise hundreds or thousands of vertical feet. These vertical columns carry burning embers that are often picked up by prevailing winds and spread. At night, the fire slows and travels downhill, following the cooling airflow (CRESA, 2004).

Fire experts attribute the generally worsening wildfire risk to increases in the presence of dry, hazardous fuel. This has been brought about by an overall decline in forest health. Forests that have been clear-cut become crowded with trees struggling against each other for nutrition, water and sunlight. This can weaken them, making them vulnerable to insects and diseases. In Washington State, trees burn hot and fast (CRESA, 2004).

Wildfires can be ignited by lightning or by human activity such as smoking, campfires, equipment use, and arson. Controlled burns are not considered hazards unless they escape control. Wildland fires are influenced by the amount and condition of fuel present, topography, and weather conditions. These factors are described in the following sections.

Fuels

Fuels for wildfires are living and dead vegetation on the ground, brush and small trees on the surface, and tree canopies above the ground. They are assessed by the following conditions:

- **Fuel loading**—Fuel loading, often expressed in tons per acre, is the amount of vegetative material available. If fuel loading doubles, the energy released also can be expected to double.
- **Burn index**—Each fuel type is given a burn index, which is an estimate of the amount of potential energy that may be released, the effort required to contain a fire in a given fuel, and the expected flame length. Different fuels have different burn qualities. Some fuels burn more easily or release more energy than others. Lighter fuels such as grasses, leaves and needles quickly expel moisture and burn rapidly, while heavier fuels such as tree branches, logs and trunks take longer to warm and ignite.

- **Fuel continuity**—Continuity of fuels is expressed in terms of horizontal and vertical dimensions. Horizontal continuity represents the distribution of fuels over the landscape. Vertical continuity links fuels at the ground surface with tree crowns. Trees killed or defoliated by forest insects and diseases are more susceptible to wildfire. As of 2014, over 2 percent (543,000) of Washington’s 22.4 million acres of forestland showed some level of tree mortality, tree defoliation or foliar disease (Washington Department of Natural Resources, 2015).
- **Fuel moisture**—Fuel moisture is expressed as a percentage of total saturation and varies with antecedent weather. Low fuel moistures indicate the probability of severe fires. Given the same weather conditions, moisture in fuels of different diameters changes at different rates. A 1,000-hour fuel, which has a 3- to 8-inch diameter, changes more slowly than a 1- or 10-hour fuel.

Topography

Topography can have a powerful influence on wildfire behavior. The movement of air over the terrain tends to direct a fire’s course. Gulches and canyons can funnel air and act as a chimney, intensifying fire behavior and inducing faster rates of spread. Saddles on ridge tops offer lower resistance to the passage of air and will draw fires. Solar heating of drier, south-facing slopes produces upslope thermal winds that can complicate behavior.

Slope is an important factor. If the percentage of uphill slope doubles, the rate of spread of wildfire will likely double. On steep slopes, fuels on the uphill side of a fire are closer physically to the source of heat. Radiation preheats and dries the fuel, thus intensifying fire behavior. Fire travels downslope much more slowly than it does upslope, and ridge tops often mark the end of wildfire’s rapid spread.

Weather

Of all the factors influencing wildfire behavior, weather is the most variable. Extreme weather leads to extreme fire events, and it is often a moderation of the weather that marks the end of a wildfire’s growth and the beginning of successful containment. High temperatures and low humidity can produce vigorous fire activity. The cooling and higher humidity brought by sunset can dramatically quiet fire behavior.

Fronts and thunderstorms can produce winds that are capable of radical and sudden changes in speed and direction, causing similar changes in fire activity. The rate of spread of a fire varies directly with wind velocity. Winds may play a dominant role in directing the course of a fire. Strong, dry winds produce extreme fire conditions. Such winds generally reach peak velocities during the night and early morning. The effect of wind on fire behavior is a primary safety concern for firefighters. The most damaging firestorms are usually marked by high winds.

14.2 HAZARD PROFILE

14.2.1 Past Events

Fire is a normal part of most forest and range ecosystems in temperate regions of the world. Fires historically burn on a fairly regular cycle, recycling carbon and nutrients stored in the ecosystem and strongly affecting the species within the ecosystem. Annual acreage consumed by wildfires in the lower 48 states of the U.S. dropped from about 40 to 50 million acres per year in the 1930s to under 5 million acres by 1970 (Cohen, 2008).

Clark County’s fire season usually runs from mid-May through October (CRESA, 2011). However, changes in climatic conditions, such as drought, snowpack and localized weather, can expand the length of the fire season. In July through early September, lightning strikes are the cause of most wildland fires in Washington State. Human-caused fires are more prevalent at the beginning and end of the fire season. Only 30 percent of fires in the state are in Western Washington (Washington Emergency Management Division, 2014). Large fires reported in Clark

County since the turn of the century include the following (CRESA, 2011; Washington Emergency Management Division, 2014):

- 1902 Yacolt Fire—38 lives lost and 238,900 acres burned in Clark and Skamania Counties
- 1919 Sunset Fire—26,900 acres burned in Clark and Skamania Counties
- 1929 Dole Valley Fire—227,500 acres burned in Clark and Skamania Counties.

The Washington Department of Natural Resources’ database of wildfires since 1970 on lands protected by the agency lists more than 1,050 fires in Clark County. Table 14-1 lists the 25 that were reported to have burned 10 acres or more.

Table 14-1. Wildfires in Clark County Greater than 10 Acres, 1970-2016 (January)

Incident ID	Fire Name	Cause	Start Date	Area Burned (acres) ^a
11334	N/A	Fireworks	7/22/1972	40
13989	N/A	Debris Burn	9/1/1974	11
14008	N/A	Debris Burn	9/21/1974	12
16739	N/A	Debris Burn	1/24/1977	15
18939	N/A	Debris Burn	10/3/1979	24
26505	N/A	Sparks from Vehicle	8/3/1987	15
26588	N/A	Debris Burn	10/6/1987	10
26598	N/A	Debris Burn	10/10/1987	68
26604	N/A	Debris Burn	10/11/1987	20
27916	N/A	Railroad (Hot brakes)	9/2/1988	16
29101	N/A	Railroad (Carbon)	7/5/1989	15
29146	N/A	Debris Burn	10/6/1989	10
33865	N/A	Children	8/17/1992	35
36831	N/A	Recreation	9/2/1994	14
38603	N/A	Debris Burn	5/31/1995	30
41321	N/A	Debris Burn	11/15/1997	20
46367	N/A	Debris Burn	4/15/1999	10
4710	RV	Vehicle Fire	8/15/2008	10
6062	Alworth Fire	Debris Burn	10/26/2008	12
11362	Jackson 3	Arson	10/11/2009	60
16861	Hilltop	Recreation	8/14/2010	110
29648	Steigerwald	Smoker	10/5/2012	140
40452	South Jones	Under Investigation	6/11/2015	10
41045	South Padden	Arson	7/4/2015	13
41703	Big Creek One	Under Investigation	7/17/2015	12

a. Area may not represent the full extent of the fire across all ownerships. It may, in some cases represent only the area of Washington Department of Natural Resources managed land.

Source: Washington Department of Natural Resources Fire Statistics, 1970-2007, <http://fortress.wa.gov/dnr/app1/dataweb/dmmatrix.html>;
Washington Department of Natural Resources Fire Statistics, 2008 – Present, <http://fortress.wa.gov/dnr/app1/dataweb/dmmatrix.html>

14.2.2 Location

The probability of a wildland fire in any one locality on a particular day depends on fuel conditions, topography, the time of year, the past and present weather conditions, and activities (debris burning, land clearing, camping, etc.) taking place (CRESA, 2011).

Communities at Risk

The Washington Department of Natural Resources and its federal and local partners have determined that five communities in Clark County are at a high risk of wildfire: Amboy, Hockinson, Washougal, Woodland, and Yacolt. According to the Washington State Emergency Management Division, areas of significant fire hazards are mapped based on fire behavior potential, fire protection capability, and risk to social, cultural and community resources. Risk is determined based on area fire history, type and density of vegetative fuels, extreme weather conditions, topography, number and density of structures and their distance from fuels, location of municipal watershed, and likely loss of housing or business (Washington Emergency Management Division, 2014).

Local Risk Area Designations

Clark County GIS maintains a database of areas in unincorporated Clark County with increased fire hazard as urban type development occurs in areas once considered wilderness. This data is used by the County's Department of Community Development during development review to determine minimum fire protection requirements needed to protect life, property, and natural wilderness resources from wildfire (Clark County, 2016).

Infrastructure and buildings in wildland-urban interface/intermix areas are especially susceptible to wildfires because they are close to fire fuel sources (trees and undergrowth in forests) and because their presence increases the likelihood that a wildfire will begin. Some of the triggers that can cause fire are natural, such as lightning, but fires are more likely to be caused by human activity. Humans can directly cause fires with careless campfires, sparks from ATVs, or inappropriate disposal of lit cigarettes. Downed electric lines during windstorms can also cause fires (CRESA, 2004). Clark County Code (Section 15.13.030) defines wildland-urban interface/intermix areas as areas at elevation of 500 feet or more that meet any of the following criteria (CRESA, 2004):

- Slope equal to or greater than 25 percent
- Forest type vegetation
- Outside an organized fire protection district.

If more than half of a parcel meets the criteria, the entire parcel is included in the wildland urban interface/intermix area.

The City of Vancouver maintains a dataset of wildfire risk areas similar to the County's wildland-urban interface/intermix area designation. While this definition and the resulting regulations are only applicable in unincorporated Clark County and to some extent the City of Vancouver, they provide the best available data to assess wildfire risk for planning. Figure 14-1 shows the wildfire risk areas in the County.

14.2.3 Frequency

Fire Regime Mapping

The LANDFIRE project (a program of the U.S. Forest Service and the U.S. Department of the Interior, under the direction of the Wildland Fire Leadership Council) produces maps of historical fire regimes and vegetation and maps of current vegetation and its departure from historical conditions. The maps categorize mean fire return intervals and fire severities into five fire regimes (Hann et al., 2004):

- Fire Regime I—0 to 35 year frequency, low to mixed severity
- Fire Regime II—0 to 35 year frequency, replacement severity
- Fire Regime III—35 to 200 year frequency, low to mixed severity
- Fire Regime IV—35 to 200 year frequency, replacement severity
- Fire Regime V—200+ year frequency, any severity.


Figure 14-1 - Clark County

Wildland Urban Interface (WUI) Classification

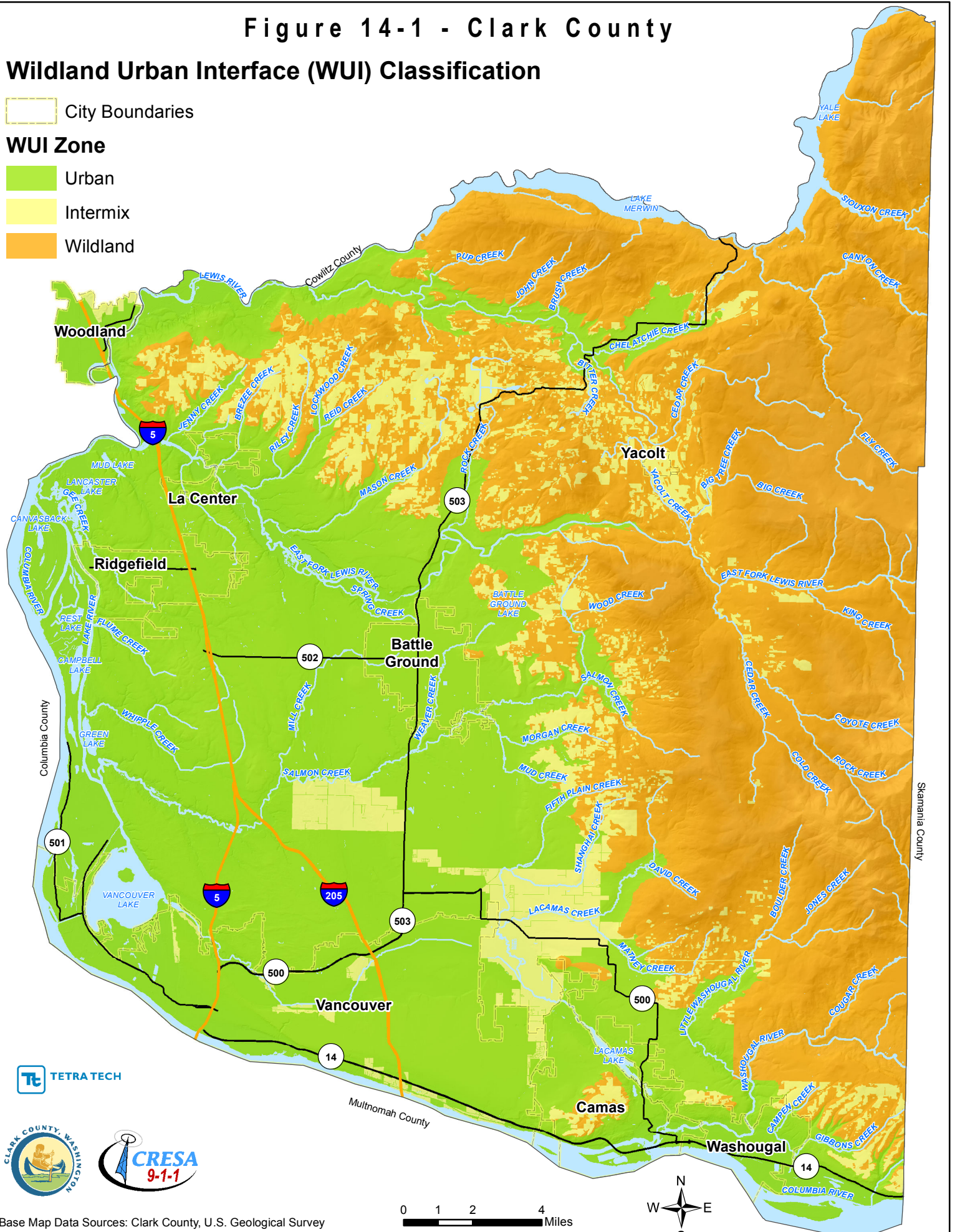
 City Boundaries

WUI Zone

 Urban

 Intermix

 Wildland



 TETRA TECH



Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

These maps support fire and landscape management planning outlined in the goals of the National Fire Plan, Federal Wildland Fire Management Policy, and the Healthy Forests Restoration Act. Figure 14-2 shows fire regimes in the planning area based on LANDFIRE models. The vast majority of Clark County falls within Fire Regime V, although all regimes are present in the county. Higher frequency regimes occur in the southwestern portion of the county, often near population centers.

Source: Washington Department of Natural Resources, Fire Prevention & Fuel Management Mapping System

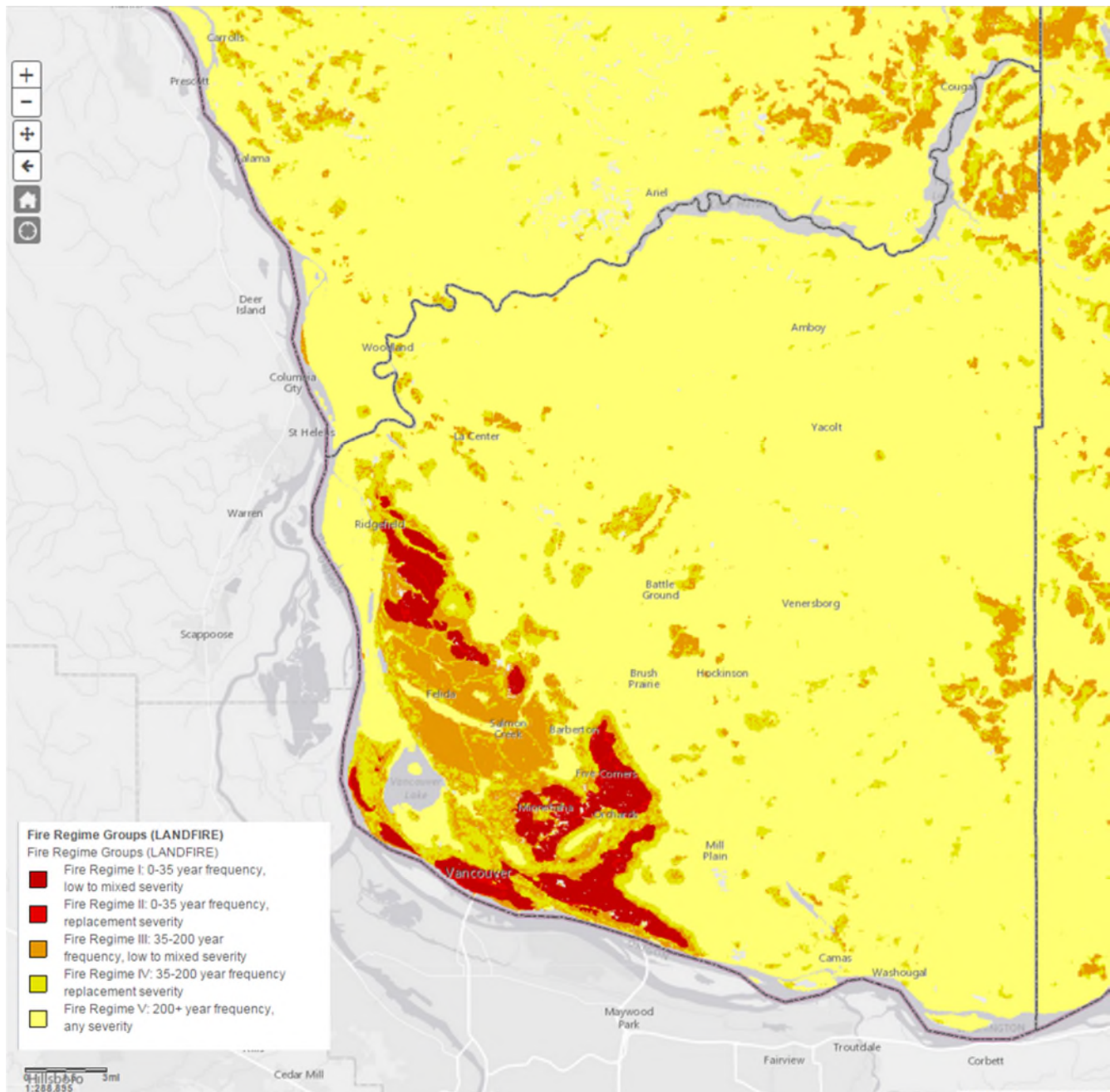


Figure 14-2. Fire Regime Groups (LANDFIRE)

The Washington Department of Natural Resources maintains an on-line Fire Prevention and Fuel Management mapping system, which provides wildfire-related information such as fire statistics, large fire burn areas and LANDFIRE fire regime groups (Washington Department of Natural Resources, 2016).

Natural Fire Rotation

Natural fire rotation is defined as the number of years necessary for fires to burn over an area equal to that of the study area. Natural fire rotation is calculated from the historical record of fires by dividing the length of the record period in years by the percentage of total area burned during that period. It represents the average period between fires under a presumed historical fire regime. Since 1970, Clark County has seen an average of 23 wildfires per year. The vast majority of these fires burn less than 10 acres, with an overall average of 1.6 acres per incident. Fires occur annually, but fires that burn more than 10 acres occur only once every 2 years, on average.

14.2.4 Severity

Wildfires can range from isolated burns affecting a few acres to severe events that burn hundreds of thousands of acres. Large fires usually occur when groups of smaller fires merge. Property damage from wildfires can be severe and can significantly alter entire communities. The source of ignition should be discounted in evaluating the wildfire risk. If conditions are right for a major fire, any source of ignition—natural or human-caused—will bring about the same end results. Lightning on dry fuels, recreational uses, interface development or arson can all trigger fires. Mitigation efforts that limit human interaction with fuels can extend the fire cycle or change the location of ignition. However, if the fire cycle is extended and the fuel load is not mitigated, the ultimate fire will burn hotter, move faster, and generate more secondary fires. Such a fire can rapidly overwhelm response capabilities (CRESA, 2004).

14.2.5 Warning Time

Wildfires are often caused by humans, intentionally or accidentally. There is no way to predict when a human-caused wildfire might break out. Since fireworks often cause brush fires, extra diligence is warranted around the Fourth of July when the use of fireworks is highest. Dry seasons and droughts are factors that greatly increase fire likelihood. Dry lightning may trigger wildfires. Severe weather can be predicted, so special attention can be paid during weather events that may include lightning. Reliable National Weather Service lightning warnings are available on average 24 to 48 hours prior to a significant electrical storm.

If a fire does break out and spread rapidly, residents may need to evacuate within days or hours. A fire's peak burning period generally is between 1 p.m. and 6 p.m. Once a fire has started, fire alerting is reasonably rapid in most cases. The rapid spread of cellular and two-way radio communications in recent years has further contributed to a significant improvement in warning time.

The Washington Department of Natural Resources maintains an online Burn Risk Map. Residents can view current information about the wildfire danger in Washington, as well as any information on outdoor burning restrictions. This site provides information on when conditions are right for destructive wildfires (Washington Department of Natural Resources, 2016).

14.3 SECONDARY HAZARDS

Wildland fires can generate a range of secondary effects, which in some cases may cause more widespread and prolonged damage than the fire itself. Fires can cause direct economic losses in the reduction of harvestable timber and indirect economic losses in reduced tourism. Wildland fires cause the contamination of reservoirs, destroy transmission lines and contribute to flooding. Landslides can be a significant secondary hazard of wildfires. Wildfires strip slopes of vegetation, exposing them to greater amounts of rain and run-off. This in turn

can weaken soils and cause failures on slopes. Major landslides can occur several years after a wildfire (CRESA, 2004). Most wildfires burn hot and for long durations that can bake soils, especially those high in clay content, thus increasing the imperviousness of the ground. This increases the runoff generated by storm events, thus increasing the chance of flooding.

14.4 EXPOSURE

14.4.1 Population

Exposed population for the wildfire risk areas (wildland-urban interface/intermix areas) was estimated using the percentage of total building value in these areas multiplied by the total population. The results are shown in Table 14-2. Approximately 3.4 percent of the total County population lives in areas identified as wildland and 6.2 percent of the total population lives in areas identified as intermix.

Table 14-2. Population Within Wildland Fire Hazard Areas

	Wildland (Relatively High)			Intermix (Relatively Moderate)		
	Buildings	Population		Buildings	Population	
		Number	% of Total		Number	% of Total
Battle Ground	9	20	0.1%	0	0	0.0%
Camas	819	1,347	6.3%	1,624	3,142	14.8%
La Center	0	0	0.0%	0	0	0.0%
Ridgefield	0	0	0.0%	0	0	0.0%
Vancouver	0	0	0.0%	1,629	4,703	2.8%
Washougal	50	206	1.4%	155	267	1.8%
Woodland	0	0	0.0%	269	213	3.6%
Yacolt	42	240	14.8%	491	1,380	85.2%
Unincorporated	5,929	13,571	6.3%	6,102	18,757	8.7%
Total	6,849	15,384	3.4%	10,270	28,462	6.2%

In addition to the populations living in wildfire risk areas, people working or recreating in resource lands, such as loggers and hikers, are exposed to the wildfire risk. Firefighting crews are exposed as they work to combat fires and to protect property. All county residents are potentially exposed to the health-related impacts of reduced air quality from wildland fires.

14.4.2 Property

Table 14-3 and Table 14-4 show the number of structures in the planning area that are located in the wildland and intermix areas and their values.

Parcels that intersect designated wildland areas and intermix areas were analyzed to assess the types of land uses that are exposed. Table 14-5 shows the area of present land uses exposed to this hazard and the percent of total exposed area for each land use. Agricultural/resource lands and vacant areas combined make up 59 percent of the total exposed acres in the wildland risk area. An additional 38 percent is residential. In the intermix risk area, more than 72 percent of exposed area is residential. It is estimated that 47 percent and 21 percent of the land area of the County is within wildland and intermix hazard areas, respectively.

Table 14-3. Exposure and Value of Structures in Wildland (Relatively High) Areas

Jurisdiction	Buildings Exposed	Value Exposed			% of Total Replacement value
		Structure	Contents	Total	
Battle Ground	9	\$2,854,388	\$1,427,194	\$4,281,582	0.1%
Camas	819	\$308,680,888	\$172,296,984	\$480,977,872	6.3%
La Center	0	\$0	\$0	\$0	0.0%
Ridgefield	0	\$0	\$0	\$0	0.0%
Vancouver	0	\$0	\$0	\$0	0.0%
Washougal	50	\$31,933,485	\$24,480,983	\$56,414,468	1.4%
Woodland	0	\$0	\$0	\$0	0.0%
Yacolt	42	\$24,529,095	\$20,918,921	\$45,448,015	14.8%
Unincorporated	5,929	\$1,730,292,816	\$1,102,850,918	\$2,833,143,735	6.3%
Total	6,849	\$2,098,290,672	\$1,321,975,000	\$3,420,265,672	3.0%

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

Table 14-4. Exposure and Value of Structures in Intermix (Relatively Moderate) Areas

Jurisdiction	Buildings Exposed	Value Exposed			% of Total Replacement value
		Structure	Contents	Total	
Battle Ground	0	\$0	\$0	\$0	0.0%
Camas	1,624	\$671,729,875	\$450,389,080	\$1,122,118,954	14.8%
La Center	0	\$0	\$0	\$0	0.0%
Ridgefield	0	\$0	\$0	\$0	0.0%
Vancouver	1,629	\$821,506,677	\$503,178,488	\$1,324,685,165	2.8%
Washougal	155	\$48,728,506	\$24,364,253	\$73,092,759	1.8%
Woodland	269	\$42,682,361	\$22,120,936	\$64,803,297	3.6%
Yacolt	491	\$145,374,966	\$115,583,981	\$260,958,947	85.2%
Unincorporated	6,102	\$2,308,816,716	\$1,606,952,258	\$3,915,768,974	8.7%
Total	10,270	\$4,038,839,101	\$2,722,588,996	\$6,761,428,096	6.0%

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

Table 14-5. Present Land Use in Planning Area Parcels Intersecting Wildland Fire Hazard Areas^a

Present Use Classification ^b	Wildland (Relatively High)		Intermix (Relatively Moderate)	
	Area (acres) ^{c, d}	% of total	Area (acres) ^{c, d}	% of total
Agriculture/Resource Land	105,300.02	48.5%	15,541.60	16.0%
Commercial	2,160.26	1.0%	1,837.64	1.9%
Education	54.24	0.0%	202.09	0.2%
Governmental Services	3,189.00	1.5%	2,014.88	2.1%
Industrial	208.02	0.1%	341.04	0.4%
Religious Services	111.11	0.1%	217.82	0.2%
Residential	83,109.03	38.3%	70,778.68	72.7%
Vacant or uncategorized	22,802.54	10.5%	6,406.44	6.6%
Total	216,934.22	100%	97,340.19	100%

- a. Present land use information in this plan is for planning purposes only. Discrepancies may exist between these estimates and official records maintained by participating jurisdictions.
- b. Present use classification provided by Clark and Cowlitz County assessor's data assigned to best fit occupancy classes in FEMA's Hazus model (see Section 6.3.1). Parcels for which conflicting information on current development was available were assumed to be improved. Some designated resource land may also be included in the vacant or uncategorized category.
- c. Acreage covers only mapped parcels; it excludes many rights of way and major water features.
- d. Acreage is likely overestimated as all parcels that intersect hazard areas were included.

14.4.3 Critical Facilities and Infrastructure

Table 14-6 and Table 14-7 identify critical facilities and infrastructure exposed to the wildfire hazard areas in the county. In addition the following linear features are exposed to the wildfire hazard:

- State Route 500
- State Route 503
- State Route 14
- A small portion of Interstate 205
- The Northwest pipeline, although the vast majority of the pipeline is located in areas designated as “urban.”

Table 14-6. Critical Facilities in Wildland (Relatively High) Risk Areas

	Commu- nication Facilities	Dams	Emer- gency Services	Energy	Govern- ment Facilities	Hazardous Materials	Health Care & Public Health	Infor- mation Technol- ogy	Schools	Trans- portation Systems	Water & Sanitation Systems	Total
Battle Ground	0	0	0	0	0	0	0	0	0	0	0	0
Camas	0	0	0	0	0	0	0	0	0	0	2	2
La Center	0	0	0	0	0	0	0	0	0	0	0	0
Ridgefield	0	0	0	0	0	0	0		0	0	0	0
Vancouver	0	0	0	0	0	0	0	0	0	0	0	0
Washougal	0	0	0	0	0	0	0	0	0	0	1	1
Woodland	0	0	0	0	0	0	0	0	0	0	0	0
Yacolt	0	0	0	0	0	0	0	0	0	0	0	0
Unincorporated	0	1	6	2	0	1	1	0	0	1	40	52
Total	0	1	6	2	0	1	1	0	0	1	43	55

Table 14-7. Critical Facilities in Intermix (Relatively Moderate) Risk Areas

	Commu- nication Facilities	Dams	Emer- gency Services	Energy	Govern- ment Facilities	Hazardous Materials	Health Care & Public Health	Infor- mation Technol- ogy	Schools	Trans- portation Systems	Water & Sanitation Systems	Total
Battle Ground	0	0	0	0	0	0	0	0	0	0	0	0
Camas	1	0	0	0	0	0	5	0	2	0	3	11
La Center	0	0	0	0	0	0	0	0	0	0	0	0
Ridgefield	0	0	0	0	0	0	0	0	0	0	0	0
Vancouver	0	0	0	0	0	0	0	0	0	0	0	0
Washougal	0	0	0	0	0	0	0	0	0	0	0	0
Woodland	0	0	0	0	0	0	0	0	0	0	0	0
Yacolt	2	0	2	0	1	1	0	0	1	0	0	7
Unincorporated	0	0	5	1	0	2	2	0	2	1	34	47
Total	3	0	7	1	1	3	7	0	5	1	37	65

14.4.4 Environment

Fire is a natural and critical process in most ecosystems, dictating in part the type, structure, and spatial extent of native vegetation. However, wildfires can cause severe environmental impacts:

- **Damaged Fisheries**—Critical trout fisheries throughout the west and salmon and steelhead fisheries in the Pacific Northwest can suffer from increased water temperatures, sedimentation, and changes in water quality and chemistry.
- **Soil Erosion**—The protective covering provided by foliage and dead organic matter is removed, leaving the soil fully exposed to wind and water erosion. Accelerated soil erosion occurs, causing landslides and threatening aquatic habitats.
- **Spread of Invasive Plant Species**—Non-native woody plant species frequently invade burned areas. When weeds become established, they can dominate the plant cover over broad landscapes and become difficult and costly to control.
- **Disease and Insect Infestations**—Unless diseased or insect-infested trees are swiftly removed, infestations and disease can spread to healthy forests and private lands. Timely active management actions are needed to remove diseased or infested trees.
- **Destroyed Endangered Species Habitat**—Catastrophic fires can have devastating consequences for endangered species. For instance, the Biscuit Fire in Oregon destroyed up to 150,000 acres of spotted owl habitat.
- **Soil Sterilization**—Topsoil exposed to extreme heat can become water repellant, and soil nutrients may be lost. It can take decades or even centuries for ecosystems to recover from a fire. Some fires burn so hot that they can sterilize the soil.

Many ecosystems are adapted to historical patterns of fire. These patterns, called fire regimes, include temporal attributes (e.g., frequency and seasonality), spatial attributes (e.g., size and spatial complexity), and magnitude attributes (e.g., intensity and severity), each of which have ranges of natural variability. Ecosystem stability is threatened when any of the attributes for a given fire regime diverge from its range of natural variability.

14.5 VULNERABILITY

Structures, above-ground infrastructure, critical facilities and natural environments are all vulnerable to the wildfire hazard. There is currently no validated damage function available to support wildfire mitigation planning.

Except as discussed in this section, vulnerable populations, property, infrastructure and environment are assumed to be the same as described in the section on exposure.

14.5.1 Population

All population that is exposed to wildfire risk is vulnerable to wildfire risk. The most vulnerable individuals are those who are not able to evacuate risk areas quickly, such as older populations or those with access and functional needs. Wildfires also threaten the health and safety of those fighting the fires. First responders are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke.

Smoke and air pollution from wildfire can be a severe health hazard for those living near or downwind from wildfires. This is especially true for sensitive populations, including children, the elderly and those with respiratory and cardiovascular diseases. Smoke generated by wildfire consists of visible and invisible emissions that contain particulate matter (soot, tar, water vapor, and minerals), gases (carbon monoxide, carbon dioxide, nitrogen oxides), and toxics (formaldehyde, benzene). Emissions from wildfires depend on the type of fuel, the moisture content of the fuel, the efficiency (or temperature) of combustion, and the weather. Public health impacts associated with wildfire include difficulty in breathing, odor, and reduction in visibility.

Generally, few people die in wildfires because warning time is sufficient to allow for evacuation. However, many lives are disrupted. Beyond the immediate effects of disruption to life patterns, the longer-term economic effects from loss of property can be devastating (CRESA, 2004).

14.5.2 Property

All property that is exposed to the wildfire hazard is vulnerable. Home building in and near forests increases risks from forest fires. Often, structures are built and maintained with minimal awareness of the need for protection from exterior fire sources or the need to minimize interior fires from spreading to forested lands (CRESA, 2004).

Pre-1993 Construction

Properties constructed before 1993 may be more vulnerable to wildfire because they were built prior to development codes that established more stringent requirements for fire protection. A major vulnerability issue is with subdivisions platted and developed before fire codes were adopted. Water supplies may be limited within these pre-ordinance subdivisions. Many homes on wells may also have access problems, including inadequate ingress and egress and insufficient roadway width and road grade to enable evacuation or fire suppression (CRESA, 2004). There are estimated to be 5,400 parcels in intermix areas that were developed before 1993.

Post-1993 Construction

As of 1993, all new subdivisions must have adequate access, connecting bridges, turn-around areas and driveway widths to allow for fire suppression equipment. Current Clark County code requires that development and construction be designed, located and constructed to minimize the possibility of wildland fires involving structures, as well as to reduce the possibility that structural fires will ignite a wildland fire. Code incorporates the standards included in the National Fire Protection Association's *Protection of Life and Property from Wildfire* standards (NFSP-299). These standards apply to the following (CRESA, 2004):

- Setbacks from slopes
- Defensible space
- Vehicular access
- Roofing materials
- Siding materials
- Balconies and porches

- Eaves and overhangs
- Access to water.

However, development after 1993 is not invulnerable to fire just because it meets current code. Any development in the intermix zone or in the wildland zone can be exposed to fire (CRESA, 2004).

According to recent research, most residential areas destroyed in wildfires are not ignited by advancing flames of a large crown fire, but rather from embers falling on a non-resistant roof, radiant heat igniting a curtain or pine needles, or a forgotten gas can near a home. Without these conditions, a fire can burn quickly through a development without igniting structures. This research emphasizes the importance of fireproofing and “ring of safety” approaches advocated by such programs as FireWise. Small fuel removal efforts and building material choices around the home can save an entire subdivision from destruction (CRESA, 2004).

Loss Estimates

Loss estimations for the wildfire hazard are not based on damage functions, because no such damage functions have been generated. Instead, loss estimates were developed representing 10 percent, 30 percent and 50 percent of the replacement value of exposed structures in hazard areas. This allows emergency managers to select a range of economic impact based on an estimate of the percent of damage to the general building stock. Damage in excess of 50 percent is considered to be substantial by most building codes and typically requires total reconstruction of the structure. Table 14-8 lists the loss estimates for the general building stock for assets in jurisdictions that have an exposure to the wildland and intermix risk areas.

Table 14-8. Loss Estimates for Wildfire

	Exposed Value	Estimated Loss Potential from Wildfire		
		10% Damage	30% Damage	50% Damage
Battle Ground	\$4,281,582	\$428,158	\$1,284,475	\$2,140,791
Camas	\$1,603,096,826	\$160,309,683	\$480,929,048	\$801,548,413
La Center	\$-	\$-	\$-	\$-
Ridgefield	\$-	\$-	\$-	\$-
Vancouver	\$1,324,685,165	\$132,468,517	\$397,405,550	\$662,342,583
Washougal	\$129,507,227	\$12,950,723	\$38,852,168	\$64,753,614
Woodland	\$64,803,297	\$6,480,330	\$19,440,989	\$32,401,649
Yacolt	\$306,406,962	\$30,640,696	\$91,922,089	\$153,203,481
Unincorporated	\$6,748,912,709	\$674,891,271	\$2,024,673,813	\$3,374,456,355
Total	\$8,574,315,360.00	\$857,431,537.00	\$2,572,294,609.00	\$4,287,157,682.00

Note: Values shown are accurate only for comparison among results in this plan. See Section 6.7 for a discussion of data limitations.

14.5.3 Critical Facilities and Infrastructure

Critical facilities of wood frame construction are especially vulnerable during wildfire events. Most roads and railroads would be without damage except in the worst scenarios. Power lines are the most at risk from wildfire because most poles are made of wood and susceptible to burning. Fires can create conditions that block or prevent access and can isolate residents and emergency service providers. Wildfire typically does not have a major direct impact on bridges, but it can create conditions in which bridges are obstructed. Many bridges in areas of high to moderate fire risk are important because they provide the only ingress and egress to large areas and in some cases to isolated neighborhoods. In the event of a wildfire, pipelines could provide a source of fuel and lead to a catastrophic explosion.

Currently there are four registered Tier II hazardous material containment sites in wildfire risk zones (one in the wildland area and two in the intermix area both located in unincorporated areas of the County). During a fire event, hazardous materials storage containers could rupture due to heat and act as fuel for the fire, escalating the fire to unmanageable levels. In addition they could leak into surrounding areas, saturating soils and seeping into surface waters, and have a disastrous effect on the environment.

14.5.4 Environment

Fire hazards present a considerable risk to vegetation and wildlife habitat (CRESA, 2004). The vulnerability risks are the same as those described for exposure.

14.5.5 Economic Impact

The destruction of large tracts of forest land would have immediate economic impact on the community through lost jobs, reduced taxes, and increased public support. Collateral economic and social effect could impact the County for years (CRESA, 2011). Damage to utilities (electrical lines and substations), loss of revenue from workers unable to work, and the expense incurred fighting a fire would also result in economic impacts.

14.6 FUTURE TRENDS

14.6.1 Development

The highly urbanized portions of the planning area have little or no wildfire risk exposure. Urbanization tends to alter the natural fire regime, and can create the potential for the expansion of urbanized areas into wildland areas. The expansion of the wildland urban interface can be managed with strong land use and building codes. The planning area is well equipped with these tools and this planning process has asked each planning partner to assess its capabilities with regards to the tools. Table 14-9 shows the area identified as underutilized or vacant in urban growth areas in the County that intersect identified wildfire hazard areas. As interface areas become more developed, they will likely transition to urban risk designations. Similarly, as wildland areas are developed designations may transition to intermix.

Table 14-9. Buildable Lands in Planning Area Urban Growth Areas that Intersect Wildland Risk Areas^a

Urban Growth Area ^b	Buildable Area ^c (acres)				
	Residential		Commercial	Industrial	Total
	Acres	Units			
Battle Ground	15.76	95	0	0	15.76
Camas	262.48	1,575	53.23	50.43	366.14
La Center	0	0	0	0	0
Ridgefield	0	0	0	0	0
Vancouver	880.36	7,043	95.73	81.60	1,057.69
Washougal	204.59	1,227	31.75	176.33	412.67
Woodland ^d	--	--	--	--	--
Yacolt	43.72	175	10.57	28.50	82.79
Total	1,406.91	10,115	190.28	336.86	1,935.05

- Buildable lands information in this plan is for planning purposes only. Discrepancies may exist between these estimates and official records maintained by participating jurisdictions.
- Unincorporated areas outside of urban growth areas are excluded from this assessment. Development in these areas consists largely of rural lands, open space and large residential lots. Changes in development can be assessed through
- Acreage covers only mapped parcels; it excludes many rights of way and major water features.

- d. Acreage estimates exclude the portions of the City of Woodland in Cowlitz County and thus may be underestimated.

14.6.2 Climate Change

Wildfire in western ecosystems is determined by climate variability, local topography, and human intervention. Climate change has the potential to affect multiple elements of the wildfire system: fire behavior, ignitions, fire management, and vegetation fuels. Hot dry spells create the highest fire risk. Increased temperatures may intensify wildfire danger by warming and drying out vegetation. Climate change also may increase winds that spread fires. Faster fires are harder to contain, and thus are more likely to expand into residential neighborhoods.

When climate alters fuel loads and fuel moisture, forest susceptibility to wildfires changes. Forest response to increased atmospheric carbon dioxide could contribute to more tree growth and thus more fuel for fires, although the effects of carbon dioxide on mature forests are still largely unknown. Increased high-elevation wildfires could release stores of carbon and further contribute to the buildup of greenhouse gases.

Historically, drought patterns in the West are related to large-scale climate patterns in the Pacific and Atlantic oceans. El Niño years bring drier conditions to the Pacific Northwest and more fires.

14.7 SCENARIO

With increased intermix development, a wildland fire in the Clark County foothills has the potential to cause even greater damage than the 1902 Yacolt Burn. A 21st century firestorm could burn an area approaching the size of the Yacolt Burn, and because of increased development in the area, it would destroy much more property and put more lives at risk (CRESA, 2004).

A major conflagration might begin with a wet spring, adding to the fuels that are already present on the forest floor. Flashy fuels would build throughout the spring. A dry summer with insect infestation could follow the wet spring, exacerbated by dry hot Chinook winds. The Labor Day holiday brings many hikers and campers to the area. Careless campfires or a tossed lit cigarette, or a sudden lighting storm could trigger a multitude of small isolated fires. The embers from smaller fires could be carried miles by the hot, dry winds, falling deep in the forests and intermix zones. Fires that start in flat areas would move more slowly, but wind would still push them. It is not unusual for a wildfire pushed by wind to burn the ground fuel and later climb into the crown and reverse its track. This is one of many ways that fires can escape containment, typically during periods when response capabilities are overwhelmed. As small fires eventually merge, suppression resources would be redirected from protecting natural resources to saving remote subdivisions (CRESA, 2004).

Even if the existence and spread of the fire is known, it may not be possible to respond to it adequately. The worst-case scenario in Clark County would coincide with an active fire season in the entire American west, spreading resources thin. “Hot shot” teams that are exhausted or committed to fighting conflagrations elsewhere would be unavailable to assist Clark County. Many federal assets would be responding to other fires that started earlier in the season. Local fire districts would be useful in the urban intermix areas, but they have limited wildfire capabilities and would have a difficult time responding to the ignition zones. Thus an initially manageable fire could become significant before meaningful resources are dispatched (CRESA, 2004).

To further complicate the problem, heavy rains could follow, causing flooding and landslides and releasing tons of sediment into rivers, permanently changing the floodplains of the county and damaging sensitive habitat and riparian areas. Such a fire followed by rain could release millions of cubic yards of sediment into streams for years, creating new floodplains and changing existing ones. With forests removed from the watershed, discharges could easily double. Floods that previously could be expected every 50 years might occur every couple of years. With the streambeds unable to carry this increased discharge because of increased sediment, the floodplains and

floodplain elevations would increase. The number of homes subject to flooding would increase substantially in a post wildland fire situation (CRESA, 2004).

14.8 ISSUES

The following are issues identified for the wildfire hazard:

- Residents should know the proper way to handle fire. Public education programs on fire safety, fire alarms and fire response are important. People should be encouraged to purchase fire insurance if not included in standard homeowner or renter policies and understand building codes.
- Since people start the vast majority of wildfires, wildfire prevention education and enforcement programs can significantly reduce the total number of wild land fires (CRESA, 2011).
- An effective early fire detection program and an emergency communications system are essential. The importance of immediately reporting any wildfire must be impressed upon local residents and persons using forest areas (CRESA, 2011).
- An effective warning system is essential to notify local inhabitants and persons in the area of the fire. An evacuation plan detailing primary and alternate escape routes is also important (CRESA, 2011).
- Fire-safe development planning should be done with local government planners to reduce the risk to local residents and businesses. Safety recommendations to implement could include the following (CRESA, 2011):
 - Sufficient fuel-free areas around structures
 - Fire-resistant roofing materials
 - Adequate two-way (ingress and egress) routes and turnarounds for emergency response units
 - Adequate water supplies with backup power generation equipment or other means to cost-effectively support firefighting efforts
 - Development of local ordinances to control human-caused fires (from debris burning, fireworks, campfires, etc.)
- Road criteria to ensure adequate escape routes for new sections of development in forest areas (CRESA, 2011).
- Road closures to be increased during peak fire periods to reduce the access to fire-prone areas (CRESA, 2011).
- Steps by the public to better protect lives, property, and the environment from wildfires (CRESA, 2011):
 - Maintaining defensible space around homes
 - Providing adequate access routes (two-way with turnaround) to homes for emergency equipment
 - Minimizing “fuel hazards” adjacent to homes
 - Using fire-resistant roofing materials
 - Maintaining adequate water supplies
 - Ensuring home addresses are visible to first responders.
- Some forest fires should be allowed to burn in limited areas as part of forest management.
- During peak wildfire season, if resources from Clark County are deployed to other areas of the State, the availability of firefighting resources could play a role in the severity of wildfire and the size of area effected.

15. PLANNING AREA RISK RANKING

A risk ranking was performed for the hazards of concern described in this plan. This risk ranking assesses the probability of each hazard's occurrence as well as its likely impact on the people, property, and economy of the planning area. The risk ranking methodology and results were reviewed, discussed and approved by the Steering Committee. When available, estimates of risk were generated with data from Hazus-MH or GIS analysis using methodologies promoted by FEMA. For hazards of concern with less robust datasets, qualitative assessments were used. As appropriate, results were adjusted based on local knowledge and other information not captured in the quantitative assessments. The results are used in establishing mitigation priorities.

15.1 PROBABILITY OF OCCURRENCE

The probability of occurrence of a hazard is indicated by a probability factor based on likelihood of annual occurrence:

- High—Hazard event is likely to occur within 25 years (Probability Factor = 3)
- Medium—Hazard event is likely to occur within 100 years (Probability Factor =2)
- Low—Hazard event is not likely to occur within 100 years (Probability Factor =1)
- No exposure—There is no probability of occurrence (Probability Factor = 0)

The assessment of hazard frequency is generally based on past hazard events in the area. Table 15-1 summarizes the probability assessment for each hazard of concern for this plan.

Table 15-1. Probability of Hazards

Hazard Event	Probability (high, medium, low)	Probability Factor
Dam Failure	Low	1
Drought	High	3
Earthquake ^a	High	3
Flood ^b	High	3
Landslide	High	3
Severe weather	High	3
Volcano	Low	1
Wildfire	Medium	2

a. 100-year probabilistic results are used for risk ranking

b. 1 percent annual chance flood event is used for risk ranking

15.2 IMPACT

Hazard impacts were assessed in three categories: impacts on people, impacts on property and impacts on the local economy. Numerical impact factors were assigned as follows:

- **People**—Values were assigned based on the percentage of the total *population exposed* to the hazard event. The degree of impact on individuals will vary and is not measurable, so the calculation assumes for simplicity and consistency that all people exposed to a hazard because they live in a hazard zone will be equally impacted when a hazard event occurs. It should be noted that planners can use an element of subjectivity when assigning values for impacts on people. Impact factors were assigned as follows:
 - High—30 percent or more of the population is exposed to a hazard (Impact Factor = 3)
 - Medium—15 percent to 29 percent of the population is exposed to a hazard (Impact Factor = 2)
 - Low—14 percent or less of the population is exposed to the hazard (Impact Factor = 1)
 - No impact—None of the population is exposed to a hazard (Impact Factor = 0)
- **Property**—Values were assigned based on the percentage of the total *property value exposed* to the hazard event:
 - High—25 percent or more of the total replacement value is exposed to a hazard (Impact Factor = 3)
 - Medium—10 percent to 24 percent of the total replacement value is exposed to a hazard (Impact Factor = 2)
 - Low—9 percent or less of the total replacement value is exposed to the hazard (Impact Factor = 1)
 - No impact—None of the total replacement value is exposed to a hazard (Impact Factor = 0)
- **Economy**—Values were assigned based on the percentage of the total *property value vulnerable* to the hazard event. Values represent estimates of the loss from a major event of each hazard in comparison to the total replacement value of the property exposed to the hazard. For some hazards, such as wildfire, landslide and severe weather, vulnerability was considered to be the same as exposure due to the lack of loss estimation tools specific to those hazards. Loss estimates separate from the exposure estimates were generated for the earthquake and flood hazards using Hazus-MH.
 - High—Estimated loss from the hazard is 15 percent or more of the total replacement value (Impact Factor = 3)
 - Medium—Estimated loss from the hazard is 5 percent to 14 percent of the total replacement value (Impact Factor = 2)
 - Low—Estimated loss from the hazard is 4 percent or less of the total replacement value (Impact Factor = 1)
 - No impact—No loss is estimated from the hazard (Impact Factor = 0)

The impacts of each hazard category were assigned a weighting factor to reflect the significance of the impact. These weighting factors are consistent with those typically used for measuring the benefits of hazard mitigation actions: impact on people was given a weighting factor of 3; impact on property was given a weighting factor of 2; and impact on the economy was given a weighting factor of 1.

Table 15-2, Table 15-3 and Table 15-4 summarize the impacts for each hazard.

15.3 RISK RATING AND RANKING

The risk rating for each hazard was determined by multiplying the probability factor by the sum of the weighted impact factors for people, property and economy, as summarized in Table 15-5. Based on these ratings, a priority of high, medium or low was assigned to each hazard. The hazards ranked as being of highest concern are earthquake and severe weather. Hazards ranked as being of medium concern are flood, landslide and wildfire. The hazards ranked as being of lowest concern are volcano, drought and dam failure. Table 15-6 shows the hazard risk ranking.

Table 15-2. Impact on People from Hazards

Hazard Event	Impact (high, medium, low)	Impact Factor	Multiplied by Weighting Factor (3)
Dam Failure	Low (7.6%)	1	(1x3) = 3
Drought^a	None	0	(0x3) = 0
Earthquake	High (100%)	3	(3x3) = 9
Flood	Low (1.5%)	1	(1x3) = 3
Landslide	Low (2.3%)	1	(1x3) = 3
Severe weather	High (100%)	3	(3x3) = 9
Volcano^b	Medium (100% / 0.7%)	2	(2x3) = 6
Wildfire^c	Medium (100% / 3.4%)	2	(2x3) = 6

a. All people in the planning area would be exposed to drought, but impacts on the health and safety of people would be minimal.

b. Impact from ash fall is high (100%), impacts from distal hazards are low (0.7%).

c. Estimated population in relatively high exposure areas is low (3.4%); however, impacts from air quality are high (100%).

Table 15-3. Impact on Property from Hazards

Hazard Event	Impact (high, medium, low)	Impact Factor	Multiplied by Weighting Factor (2)
Dam Failure	Medium (10.6%)	2	(2x2) = 4
Drought^a	Low	1	(1x2) = 2
Earthquake	High (100%)	3	(3x2) = 6
Flood	Low (1.8%)	1	(1x2) = 2
Landslide	Low (1.7%)	1	(1x2) = 2
Severe weather	High (100%)	3	(3x2) = 6
Volcano^b	Medium (100% / 2.6%)	2	(2x2) = 4
Wildfire^c	Low (3.0%)	1	(1x2) = 2

a. All property in the planning area would be exposed to drought, but impacts on structures would be minimal.

b. Impact from ash fall is high (100%), impacts from distal hazards are low (2.6%).

c. Based on relatively high property exposure.

Table 15-4. Impact on Economy from Hazards

Hazard Event	Impact (high, medium, low)	Impact Factor	Multiplied by Weighting Factor (1)
Dam Failure	Low (2.5%)	1	(1x1) = 1
Drought	Low (less than 0.1%)	1	(1x1) = 1
Earthquake^{a, c}	Medium (0.3%)	1	(1x1) = 1
Flood^{b, c}	Medium (0.3%)	1	(1x1) = 1
Landslide	Low (less than 1%)	1	(1x1) = 1
Severe weather^c	Medium (less than 1%)	1	(1x1) = 1
Volcano	Low (less than 1%)	1	(1x1) = 1
Wildfire	Low (less than 1%)	1	(1x1) = 1

a. Based on 100-year probabilistic results.

b. Based on 1 percent annual chance flood event.

c. Impacts were adjusted to medium due to the disruption in critical facilities and infrastructure expected from these hazards.

Table 15-5. Hazard Risk Rating

Hazard Event	Probability Factor	Sum of Weighted Impact Factors	Total (Probability x Impact)
Dam Failure	1	$(3+4+1) = 8$	$(1 \times 8) = 8$
Drought	3	$(0+2+1) = 3$	$(3 \times 3) = 9$
Earthquake	3	$(9+6+2) = 17$	$(3 \times 17) = 51$
Flood	3	$(3+2+2) = 7$	$(3 \times 7) = 21$
Landslide	3	$(3+2+1) = 6$	$(3 \times 6) = 18$
Severe weather	3	$(9+6+2) = 17$	$(3 \times 17) = 51$
Volcano	1	$(6+4+1) = 11$	$(1 \times 11) = 11$
Wildfire	2	$(6+2+1) = 9$	$(2 \times 9) = 18$

Table 15-6. Hazard Risk Ranking

Hazard Ranking	Hazard Event	Category
1	Earthquake	High
1	Severe weather	High
2	Flood	Medium
2	Landslide	Medium
2	Wildfire	Medium
3	Volcano	Low
4	Drought	Low
5	Dam failure	Low

Part 3. MITIGATION PLAN

16. PURPOSE, GOALS AND OBJECTIVES

Hazard mitigation plans must identify goals for reducing long-term vulnerabilities to identified hazards (44 CFR Section 201.6(c)(3)(i)). The Steering Committee reviewed the goals from the 2004 plan and determined that they should be reviewed and revised to reflect and align with other community goals in the planning area. Over a series of meetings the Steering Committee reviewed goals and objectives from other relevant plans and programs such as the Washington State Hazard Mitigation Plan and the Clark County Comprehensive Plan and adapted them for the hazard mitigation plan as appropriate. Hazard mitigation specific goals and objectives were also selected. These selections were revisited throughout the planning process after the completion of the risk assessment and public engagement to ensure they accurately reflected needs within the planning area. The purpose statement, goals, objectives and actions in this plan all support each other. Goals were selected to support the purpose statement. Objectives were selected that met multiple goals. Actions were prioritized based on the action meeting multiple objectives.

16.1 PURPOSE STATEMENT

A purpose statement focuses the range of goals and, therefore, objectives and actions to be considered. This statement is not a goal because it does not describe a hazard mitigation outcome, and it is broader than a hazard-specific objective. The purpose statement for the *Clark Regional Natural Hazard Mitigation Plan* is as follows:

Define natural hazard risk and, through collaboration and partnerships, establish strategies and actions for reducing the impacts of disasters in Clark County.

16.2 GOALS

The following are the mitigation goals for this plan:

- Reduce and prevent the loss of life and property.
- Protect public services and critical facilities from the impacts of natural disasters.
- Increase public awareness of vulnerability to natural hazards and educate on risk reduction strategies.
- Promote community resilience.
- Protect environmental resources and utilize natural systems to reduce natural hazard impacts.
- Develop and implement cost-effective mitigation strategies.

The effectiveness of a mitigation strategy is assessed by determining how well these goals are achieved.

16.3 OBJECTIVES

Each objective meets multiple goals, serving as a stand-alone measurement of the effectiveness of a mitigation action, rather than as a subset of a goal. The objectives also are used to help establish priorities. The objectives are as follows (numbering is provided as a point of reference, not as an indication of priority):

1. Inform the public on the risk exposure to natural hazards and ways to increase the public's capability to prepare, respond, recover and mitigate the impacts of these events.
2. Reduce the impacts of hazards on vulnerable populations.

3. Improve and maintain systems that provide warning and emergency communications.
4. Work cooperatively with stakeholders in planning for and reducing the impacts of natural hazards.
5. Incorporate risk reduction strategies in new and updated infrastructure and development plans to reduce the impacts of natural hazards.
6. Integrate natural hazard mitigation goals and objectives into other existing plans and programs within the planning area.
7. Provide incentives for development and land use techniques that reduce risks.
8. Strengthen and build redundancy into infrastructure, prioritizing areas that may be potentially isolated areas.
9. Retrofit, purchase, or relocate structures in high hazard areas, especially those known to be repetitively damaged.
10. Avoid, minimize or mitigate risks to critical facilities and infrastructure.
11. Support and enhance environmental protection and sustainability activities that may also accomplish mitigation objectives.
12. Use the best available data, science and technologies to implement mitigation strategies.

17. MITIGATION BEST PRACTICES

Catalogs of hazard mitigation best practices were developed that present a broad range of alternatives to be considered for use in the planning area, in compliance with 44 CFR (Section 201.6(c)(3)(ii)). One catalog was developed for each hazard of concern evaluated in this plan as well as a catalog for all hazards. The catalogs for each hazard are listed in Table 17-1 through Table 17-9. The catalogs present alternatives that are categorized in two ways:

- By what the alternative would do:
 - Manipulate a hazard
 - Reduce exposure to a hazard
 - Reduce vulnerability to a hazard
 - Increase the ability to respond to or be prepared for a hazard
- By who would have responsibility for implementation:
 - The general public - individuals
 - The private sector - businesses
 - Government.

Hazard mitigation actions recommended in this plan were selected from among the alternatives presented in the catalogs or inspired by a review of the catalogs. The catalogs provide a baseline of mitigation alternatives that are backed by a planning process, are consistent with the planning partners' goals and objectives, and are within the capabilities of the partners to implement. Some of these actions may not be feasible based on the selection criteria identified for this plan. The purpose of the catalog was to equip the planning partners with a list of what could be considered to reduce risk from natural hazards within the planning area. All actions identified in Volume 2 of this plan were selected based on the selection criteria described in Chapter 1 of Volume 2. Actions in the catalog that are not included for the partnership's action plan were not selected for one or more of the following reasons:

- The action is not feasible.
- The action is already being implemented.
- There is an apparently more cost-effective alternative.
- The action does not have public or political support.

Table 17-1. Catalog of Mitigation Best Practices—All Hazards

Public (Individual) Scale	Private (Business) Scale	Government Scale
Manipulate Hazard		
<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
Reduce Exposure		
<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Relocate critical facilities out of known hazard areas • Prohibit or limit public expenditures for capital improvements in known hazard areas • Acquire safe sites for public facilities (e.g., schools, police/fire stations, etc.) • Prohibit new facilities for persons with special needs/mobility concerns in hazard areas. • Prohibit animal shelters in known hazard areas
Reduce Vulnerability		
<ul style="list-style-type: none"> • Apply for permits as required and follow established building codes • Perform a vulnerability check on personal property 	<ul style="list-style-type: none"> • Establish/participate in a business-to-business mitigation mentoring program. • Perform a vulnerability check on property 	<ul style="list-style-type: none"> • Retrofit critical facilities within known hazard areas. • Organize a managed retreat from very high-risk areas. • Promote open space uses in identified high hazard areas via techniques such as: PUD's, easements, setbacks, greenways, sensitive area tracks

Public (Individual) Scale	Private (Business) Scale	Government Scale
<p>Increase Capability</p> <ul style="list-style-type: none"> • Educate yourself on risk reductions methods • Educate yourself on early warning procedures • Purchase insurance for your home and valuables • Volunteer on community mitigation projects. • Develop household mitigation plan, such as creating a retrofit savings account, communication capability with outside, 2 week self-sufficiency during an event • Prepare a family post-disaster action plan • Get to know your neighbors • Participate in perishable data capture programs 	<ul style="list-style-type: none"> • Educate your employees on the probable impacts from hazard events • Develop a Continuity of Operations Plan • Participate in perishable data capture programs 	<ul style="list-style-type: none"> • Develop an all hazards public education campaign and resource center • Promote the purchase of insurance in known hazard areas • Establish a process to coordinate with local, state and federal agencies to maintain up-to-date hazard data, maps, and assessments. • Designate high-risk zones as special assessment districts (to fund necessary hazard mitigation projects) • Incorporate a stand-alone element for hazard mitigation into the local comprehensive (land use) plan. • Develop a post-disaster reconstruction plan to facilitate decision making following a hazard event. • Involve citizens in comprehensive planning activities that identify and mitigate hazards • Adopt a post-disaster recovery ordinance based on a plan to regulate repair activity, generally depending on property location. • Adopt the International Building Code and International Residential Code • Increase the local Building Code Effectiveness Grading Schedule classification through higher building code standards and enforcement practices. • Identify a funding mechanism for a local match to Federal funds that can fund private mitigation practices. • Identify and strengthen facilities so that they can function as public shelters • Provide hazard vulnerability checklists for homeowners to conduct their own inspections • Establish a technical assistance program for residents to access data or resources for mitigation purposes • Develop mutual aid agreements with other local governments/organizations • Warehouse critical infrastructure components such as pipe, power line, and road repair material • Develop a Continuity of Government Plan • Provide technical information and guidance during permitting and development process • Maintain existing hazard databases and establish a program for collection perishable data after hazard events • Form a citizen plan implementation steering committee to monitor progress of local mitigation actions. Include a mix of representatives from neighborhoods, local businesses, and local government.

Table 17-2. Catalog of Mitigation Best Practices —Dam Failure

Public (Individual) Scale	Private (Business) Scale	Government Scale
Manipulate Hazard		
<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Remove privately owned Dams • Strengthen privately owned Dams 	<ul style="list-style-type: none"> • Remove government owned Dams • Strengthen government owned Dams
Reduce Exposure		
<ul style="list-style-type: none"> • Relocate out of Dam Failure Inundation areas. 	Replace earthen dams with hardened structures	<ul style="list-style-type: none"> • Replace earthen dams with hardened structures
Reduce Vulnerability		
<ul style="list-style-type: none"> • Elevate your home to appropriate levels • Flood-proof your home to appropriate levels 	<ul style="list-style-type: none"> • Flood proof facilities within Dam Failure Inundation areas • Continue/ensure regularly scheduled engineering assessments of privately owned dams 	<ul style="list-style-type: none"> • Adopt higher regulatory floodplain standards in mapped Dam Failure/Inundation areas. • Consider low density land uses within identified Dam Failure/Inundation areas. • Continue/ensure regularly scheduled engineering assessments • Create easements in impoundment and downstream inundation areas • Study and evaluate impacts from climate change on dam operations
Increase Capability		
<ul style="list-style-type: none"> • Learn the evacuation routes for a dam failure event • Educate yourself on early warning procedures. • Purchase flood insurance 	<ul style="list-style-type: none"> • Develop and update Emergency Action Plans • Educate employees on dam failure evacuation routes • Educate employees on early warning procedures. 	<ul style="list-style-type: none"> • Create, maintain and update scenario based Dam Failure/Inundation area maps. • Enhance Emergency Operations Plan to include a dam failure component. • Institute monthly communications checks with dam operators. Maintain up to date communications list. • Inform the public on risk reduction techniques and develop a communication plan • Adopt real-estate disclosure requirements for the re-sale of property located within Dam Inundation areas. • Establish early warning systems downstream of high hazard dams. • Update evacuation routes and educate the public on those routes • Promote the purchase of flood insurance in inundation areas

Table 17-3. Catalog of Mitigation Best Practices—Drought

Public (Individual) Scale	Private (Business) Scale	Government Scale
Manipulate Hazard		
<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Promote groundwater recharge through stormwater management • Implement cloud seeding techniques during dry season.
Reduce Exposure		
<ul style="list-style-type: none"> • Install stored water/captured water techniques, such as rain barrels or down spout gardens • Use permeable paving techniques whenever feasible 	<ul style="list-style-type: none"> • Install stored water/captured water techniques, such as rain barrels or down spout gardens • Use permeable paving techniques whenever feasible. 	<ul style="list-style-type: none"> • Identify and create ground water back up sources • Create/identify new impounded water supply points • Use permeable paving techniques whenever feasible
Reduce Vulnerability		
<ul style="list-style-type: none"> • Plant drought resistant landscapes • Reduce water system losses (e.g. fix drips) • Modify plumbing systems, i.e. water saving kits or grey water systems 	<ul style="list-style-type: none"> • Plant drought resistant landscapes • Reduce private water system losses • Identify alternate water supply sources • Plant drought-resistant crop varieties • Develop and implement grey water systems 	<ul style="list-style-type: none"> • Plant drought resistant landscapes on community owned facilities • Distribute water saving kits to community members • Implement storm water retention in regions ideally suited for groundwater recharges • Reduce water system losses through regular maintenance • Design water delivery systems to accommodate drought events
Increase Capability		
<ul style="list-style-type: none"> • Practice active water conservation 	<ul style="list-style-type: none"> • Practice active water conservation techniques • Develop a water conservation plan 	<ul style="list-style-type: none"> • Identify alternative water supplies for time of drought • Develop a drought contingency plan • Develop criteria triggers for drought related actions • Improve accuracy of water supply forecasts • Modify rate structures to influence active water conservation techniques • Consider providing incentives to property owners that utilize drought resistant landscapes in the design of their home • Develop/Implement drought education/notification systems and communication plan • Emphasize droughts relationship to other hazards in hazard awareness messaging • Increase capability to enforce water restrictions when such restrictions are in place.

Table 17-4. Catalog of Mitigation Best Practices—Earthquake

Public (Individual) Scale	Private (Business) Scale	Government Scale
Manipulate Hazard		
<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
Reduce Exposure		
<ul style="list-style-type: none"> • Locate outside of hazard area (off soft soils) 	<ul style="list-style-type: none"> • Locate or relocate mission-critical functions outside hazard area where possible 	<ul style="list-style-type: none"> • Locate critical facilities or functions outside hazard area where possible
Reduce Vulnerability		
<ul style="list-style-type: none"> • Retrofit structure (e.g. anchor house structure to foundation) • Secure household items that can cause injury or damage such as water heaters, bookcases, and other appliances • Build to higher design standards • Install window film to prevent injuries from shattered glass 	<ul style="list-style-type: none"> • Build redundancy for critical functions/facilities • Retrofit critical buildings/areas housing mission critical functions • Perform non-structural assessments and mitigation activities (e.g. anchor bookcases to the wall) • Anchor rooftop-mounted equipment (i.e., HVAC units, satellite dishes, etc.). 	<ul style="list-style-type: none"> • Harden infrastructure • Provide redundancy for critical functions • Encourage mitigation of private property • Perform non-structural assessments and mitigation activities (e.g. anchor bookcases to the wall) • Require bracing of generators, elevators, and other vital equipment in hospitals. • Review construction plans for all bridges to determine their susceptibility to collapse and retrofit problem bridges. • Use flexible piping when extending water, sewer, or natural gas service. • Install shutoff valves and emergency connector hoses where water mains cross fault lines. • Install window film to prevent injuries from shattered glass • Anchor rooftop-mounted equipment (i.e., HVAC units, satellite dishes, etc.). • Include retrofitting/replacement of critical system elements in Capital Improvements Plan (CIP) • Store emergency water supply sufficient for students and staff at school for at least one day

Public (Individual) Scale	Private (Business) Scale	Government Scale
<p>Increase Capability</p> <ul style="list-style-type: none"> • Practice "drop, cover and hold" • Participate in drills such as the Great Shakeout • Purchase earthquake insurance 	<ul style="list-style-type: none"> • Adopt higher standard for new construction -- Consider "performance based design" when building new structures • Increase capability by having cash reserves for reconstruction • Inform your employees on the possible impacts of earthquake and how to deal with them at your work facility • Participate in drills such as the Great Shakeout 	<ul style="list-style-type: none"> • Produce more accurate hazard maps (e.g. liquefaction and soils maps) • Initiate triggers guiding improvements such as: (< 50% substantial damage/improvements) • Further enhance seismic risk assessment to target high hazard buildings for mitigation opportunities (e.g. older structures, unreinforced masonry) • Develop a debris management plan • Participate in drills such as the Great Shakeout • Communicate earthquake secondary hazards to public (e.g. landslides, dam failure, fires, hazardous material spills) • Assess emergency response routes and determine back-up options in case of damage or disruption • Educate K-12, residents, developers and businesses on earthquake safety and building codes. • Require/encourage rapid damage assessment training for City staff • Develop and distribute guidelines or pass ordinances that require developers and building owners to locate lifelines, buildings, critical facilities, and hazardous materials out of areas subject to significant seismic hazards. • Support financial incentives, such as low interest loans or tax breaks, for home and business owners who seismically retrofit their structures. • Use Hazus to quantitatively estimate potential losses from an earthquake • Establish a school survey procedure and guidance document to inventory structural and non-structural hazards in and around school buildings • Use rapid visual screening to quickly inspect a building and identify disaster damage or potential seismic structural and non-structural weaknesses to prioritize retrofit efforts, inventory high-risk structures and critical facilities, or assess post-disaster risk to determine if buildings are safe to re-occupy • Develop a technical assistance information program for homeowners. • Create a seismic safety committee to provide policy recommendations, evaluate and recommend changes in seismic safety standards, and give an annual assessment of local and statewide implementation of seismic safety improvements • Develop an inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.

Table 17-5. Catalog of Mitigation Best Practices—Flood

Public (Individual) Scale	Private (Business) Scale	Government Scale
Manipulate Hazard		
<ul style="list-style-type: none"> • Clear stormwater drains and culverts 	<ul style="list-style-type: none"> • Clear stormwater drains and culverts 	<ul style="list-style-type: none"> • Develop and adopt a storm drain program • Dredge, construct levees, provide retention areas • Invest in structural flood control: levees, dams, channelization, revetments • Construct regional stormwater control facilities • Harden areas with significant erosion concerns • Promote/retain natural vegetation in areas with significant erosion concerns
Reduce Exposure		
<ul style="list-style-type: none"> • Locate outside of hazard area • Elevate utilities above base flood elevation • Institute low impact development techniques on property 	<ul style="list-style-type: none"> • Locate business critical facilities or functions outside hazard area • Institute low impact development techniques on property 	<ul style="list-style-type: none"> • Acquire or relocate identified repetitive loss properties • Adopt land development techniques such as density transfers or clustering • Institute low impact development techniques on property • Adopt sediment and erosion control regulations • Adopt zoning and erosion overlay districts • Prohibit any fill in floodplain areas • Encourage the use of porous pavement, vegetative buffers, and islands in large parking areas. • Use stream restoration to ensure adequate drainage and diversion of stormwater.

Public (Individual) Scale	Private (Business) Scale	Government Scale
Reduce Vulnerability		
<ul style="list-style-type: none"> • Retrofit structure (elevate house above base flood elevation) • Elevate items within house above base flood elevation • Build new homes above base flood elevation • Floodproof non-residential structures 	<ul style="list-style-type: none"> • Build redundancy for critical functions/ retrofit critical buildings • Provide flood-proofing measures when new critical infrastructure must be located in floodplains 	<ul style="list-style-type: none"> • Adopt appropriate regulatory standards such as cumulative substantial improvement/damage, freeboard, lower substantial damage threshold, compensatory storage • Develop and implement stormwater management regulations and master planning • Adopt "no-adverse impact" floodplain management policies that strive to not increase the flood risk on down-stream communities • Perform regular inspections/assessments of locally owned or maintained flood control infrastructure • Replace undersized culverts • Provide permanent protection for pump stations at risk of flooding • Identify/mitigate drainage issues resulting in ponding • Enhance road drainage programs or elevate/relocate roads subject to frequent flooding • Ensure permitting process is consistent with the adopted floodplain management ordinance • Develop an erosion protection program for high hazard areas • Construct open foundation systems on buildings to minimize scour • Construct deep foundations in erosion hazard areas • Establish a green infrastructure program • Use subdivision design standards to require elevation data collection during platting and to have buildable space on lots above the base flood elevation • Require tie downs of propane tanks • Require a drainage study with new development • Design a "natural runoff" or "zero discharge" policy for stormwater in subdivision design • Require and maintaining FEMA elevation certificates for all new and improved buildings located in floodplains • Extend the freeboard requirement past the mapped floodplain to include an equivalent land elevation • Include requirements in the local floodplain ordinance for homeowners to sign non-conversion agreements for areas below base flood elevation. • Offer incentives for building above the required freeboard minimum (code plus). • Inspect bridges and identify if any repairs or retrofits are needed to prevent scour • Floodproof critical facilities and infrastructure located in flood hazard areas • Require all critical facilities to meet requirements of Executive Order 11988 and be built 1 foot above the 500-year flood elevation

Public (Individual) Scale	Private (Business) Scale	Government Scale
Increase Capability <ul style="list-style-type: none"> • Comply with National Flood Insurance Program • Purchase flood insurance 		
	<ul style="list-style-type: none"> • Increase capability by having cash reserves for reconstruction • Support and implement hazard disclosure for the sale/re-sale of property in identified risk zones • Solicit "cost-sharing" through partnerships with public sector stakeholders on projects with multiple benefits 	<ul style="list-style-type: none"> • Produce more accurate flood hazard maps or identify areas for further study • Join Community Rating System (CRS) program or maintain/improve class • Provide training for staff and decision-makers in floodplain management (e.g. maintain certified floodplain managers on staff) • Create a building and elevation inventory of structures in the floodplain • Develop a Flood Task Force • Pre-stage flood response equipment before events • Integrate floodplain management policies into other planning mechanisms within the planning area • Develop framework/continue efforts for cooperation between agencies/districts in flood mitigation activities (e.g. sand and sand bag deployment) • Retain good standing in National Flood Insurance Program • Participate in information sharing with other agencies (e.g. U.S. Army Corps of Engineers, NWS) • Identify and mitigate sources of nuisance flooding • Review and update floodplain damage prevention ordinances • Identify debris collection sites • Require/encourage rapid damage assessment training for staff • Map locations of storm drains, catch basins and dry wells so that they may be located and cleared • Identify and map erosion hazard areas • Develop a tracking program for erosion hazards and their impacts on the community • Pass and enforce an ordinance that regulates dumping in streams and ditches • Develop a stormwater committee • Form a regional watershed council • Incorporate digital floodplain and topographic data into GIS systems, in conjunction with Hazus, to assess risk • Conduct NFIP community workshops to provide information and incentives for property owners to acquire flood insurance. • Increase drainage or absorption capacities with detention and retention basins, relief drains, spillways, drain widening/dredging or rerouting, logjam and debris removal, extra culverts, bridge modification, dike setbacks, flood gates and pumps, or channel redirection

Table 17-6. Catalog of Mitigation Alternatives—Landslide

Public (Individual) Scale	Private (Business) Scale	Government Scale
Manipulate Hazard		
<ul style="list-style-type: none"> • Stabilize slope (de-water, armor toe) • Reduce weight on top of slope • Minimize vegetation removal and the addition • Install rip rap boulders of geotextile fabric • Using bioengineered bank stabilization techniques. • Use a rock splash pad to direct run off and minimize the potential for erosion 	<ul style="list-style-type: none"> • Stabilize slope (de-water, armor toe) • Reduce weight on top of slope • Minimize vegetation removal and the addition of impervious surfaces • Using bioengineered bank stabilization techniques. • Use a rock splash pad to direct run off and minimize the potential for erosion 	<ul style="list-style-type: none"> • Monitor/review accumulated effects from piecemeal development on steep slopes • Implement post-fire vegetation management plans • Coordinate with resource management agencies to identify potential issues from resource extraction activities • Using bioengineered bank stabilization techniques.
Reduce Exposure		
<ul style="list-style-type: none"> • Locate structures outside of hazard area (off unstable land and away from slide-run out area) 	<ul style="list-style-type: none"> • Locate structures outside of hazard area (off unstable land and away from slide runout area) 	<ul style="list-style-type: none"> • Acquire properties located in high risk landslide areas • Adopt land use policies that prohibit the placement of habitable structures in high risk landslide areas • Adopt land use policies that limit accumulated effects in landslide risk areas
Reduce Vulnerability		
<ul style="list-style-type: none"> • Retrofit homes on steep slopes 	<ul style="list-style-type: none"> • Retrofit at-risk facilities. 	<ul style="list-style-type: none"> • Adopt higher regulatory standards for new development within unstable slope areas • Armor/retrofit critical infrastructure from the impact of landslides • Post signage in landslide hazard areas • Prohibit removal of natural vegetation from slopes • Assess vegetation in wildfire-prone areas to prevent landslides after fires (e.g., encourage plants with strong root systems).
Increase Capability		
<ul style="list-style-type: none"> • Sign up for warning systems • Learn the warning signs that indicate a landslide may occur • Educate yourself on risk reduction techniques for landslide hazards 	<ul style="list-style-type: none"> • Sign up for warning system and develop evacuation plan • Increase capability by having cash reserves for reconstruction • Educate your employees on the potential exposure to landslide hazards and your emergency response protocol 	<ul style="list-style-type: none"> • Produce landslide hazard risk maps • Enact tools to help manage development in hazard areas: better land controls, tax incentives, information, limit new impervious/pervious surfaces • Collect and compile landslide event history database • Develop plan/strategy for communicating risk to property owners/communities recently affected by wildfires • Increase regulatory authority for post-fire mitigation enforcement • Establish and communicate post-event repair responsibilities (e.g. roads that are impacted) • Conduct geological/engineering studies of potential slide areas • Notify property owners in high-risk areas • Develop a brochure describing risk and potential mitigation techniques

Table 17-7. Catalog of Mitigation Best Practices—Severe Weather

Public (Individual) Scale	Private (Business) Scale	Government Scale
Manipulate Hazard		
<ul style="list-style-type: none"> • Increase tree plantings around buildings to shade parking lots and along public rights-of-way 	<ul style="list-style-type: none"> • Increase tree plantings around buildings to shade parking lots and along public rights-of-way. 	<ul style="list-style-type: none"> • Increase tree plantings around buildings to shade parking lots and along public rights-of-way.
Reduce Exposure		
<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
Reduce Vulnerability		
<ul style="list-style-type: none"> • Insulate house • Provide redundant heat and power • Plant appropriate trees near home and power lines ("Right tree, right place" National Arbor Day Foundation Program) • Incorporate passive ventilation in the site design. • Secure loose items (i.e., patio furniture) 	<ul style="list-style-type: none"> • Relocate critical infrastructure, such as power lines, underground • Install tree wire • Install lightning protection devices and methods, such as lightning rods and grounding, on communications infrastructure and other critical facilities • Install and maintain surge protection on critical electronic equipment. • Avoid placing flag poles or antennas near buildings 	<ul style="list-style-type: none"> • Trim trees back from power lines • Designate snow routes and strengthen critical road sections and bridges • Continue/expand participation in Storm Ready programs • Continue to support/maintain/improve notification and warning systems • Support/continue/formalize shelter agreements • Ensure critical facilities have back-up power generation capabilities • Install lightning protection devices on critical facilities and communications equipment • Inspect/ensure facilities can withstand high winds • Encourage construction of guard rails where appropriate • Ensure critical facilities/shelters can easily transition to generator produced power • Stockpile response/preparedness supplies • Install and maintain surge protection on critical electronic equipment • Review building codes and structural policies to ensure they are adequate to protect older structures from wind damage • Use natural environmental features as wind buffers in site design • Incorporate inspection and management of hazardous trees into the drainage system maintenance process. • Preemptively test power line holes to determine if they are rotting • Use designed-failure mode for power line design to allow lines to fall or fail in small sections rather than as a complete system to enable faster restoration • Avoid placing flag poles or antennas near buildings • Convert traffic lights to mast arms

Public (Individual) Scale	Private (Business) Scale	Government Scale
<p>Increase Capability</p> <ul style="list-style-type: none"> • Trim or remove trees that could affect power lines • Obtain a NOAA weather radio • Obtain an emergency generator • Identify locations of emergency shelters • Participate in amateur radio groups • Sign up for reverse 911 systems/other notification options • Post address so as to be visible to first responders • Teach school children about the dangers of lightning and how to take safety precautions. 	<ul style="list-style-type: none"> • Trim or remove trees that could affect power lines • Create redundancy in critical systems • Equip facilities with a NOAA weather radio • Equip vital facilities with emergency power sources 	<ul style="list-style-type: none"> • Support/continue programs such as "Tree Watch" that proactively manage problem areas by use of selective removal of hazardous trees, tree replacement, etc. • Establish and enforce building codes that require all roofs to withstand snow loads and wind speeds • Improve communication alternatives/redundancy • Modify landscape and other ordinances to encourage appropriate planting near overhead power, cable, and phone lines • Provide NOAA weather radios to the public • Encourage coordination with amateur radio groups • Identify/ear mark funding opportunities for generator purchases • Develop evacuation/ emergency road plans and prioritize roads for response efforts • Encourage residents to sign-up for reverse 911 services or other notification services • Encourage/require residents to post addresses where they are visible to first responders • Include safety strategies for severe weather in driver education classes and materials. • Organize outreach to vulnerable populations, including establishing and promoting accessible heating centers in the community

Table 17-8. Catalog of Mitigation Best Practices—Volcano

Public (Individual) Scale	Private (Business) Scale	Government Scale
Manipulate Hazard		
<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • None
Reduce Exposure		
<ul style="list-style-type: none"> • Identify equipment/resources that may be negatively impacted by ash fall and develop plan to move indoors/protect 	<ul style="list-style-type: none"> • Identify equipment/resources that may be negatively impacted by ash fall and develop plan to move indoors/protect 	<ul style="list-style-type: none"> • Identify equipment/resources that may be negatively impacted by ash fall and develop plan to move indoors/protect
Reduce Vulnerability		
<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Build redundancy for critical facilities and functions 	<ul style="list-style-type: none"> • Retrofit older building stock to be able to support accumulated ash fall loads
Increase Capability		
<ul style="list-style-type: none"> • Sign up for early warning systems and notifications 	<ul style="list-style-type: none"> • Educate employees on impacts and emergency plans 	<ul style="list-style-type: none"> • Support detailed wind/ash fall studies • Develop post-event cleanup plan

Table 17-9. Catalog of Mitigation Best Practices—Wildfire

Public (Individual) Scale	Private (Business) Scale	Government Scale
Manipulate Hazard		
<ul style="list-style-type: none"> • Clear potential fuels on property: dry, overgrown underbrush, diseased trees 	<ul style="list-style-type: none"> • Clear potential fuels on property: dry underbrush, diseased trees 	<ul style="list-style-type: none"> • Clear fuels (dry underbrush, diseased trees) on land that can trigger and maintain wildfires • Implement "Best Management Practices" on public lands • Partner with local communities to create fire breaks
Reduce Exposure		
<ul style="list-style-type: none"> • Create and maintain defensible space around structures • Reduce exposure --Locate outside of hazard area • Mow regularly • Stay clear of hazard areas during a wildfire event 	<ul style="list-style-type: none"> • Create and maintain defensible space around structures and infrastructure • Reduce exposure -- Locate outside of hazard area 	<ul style="list-style-type: none"> • Create and maintain defensible space around structures and infrastructure • Enhance building code to include use of fire resistant materials in high hazard areas • Reduce exposure -- Locate outside of hazard area
Reduce Vulnerability		
<ul style="list-style-type: none"> • Create and maintain defensible space around structures, provide water on site. • Use fire-retardant building materials • Create defensible spaces around your home 	<ul style="list-style-type: none"> • Create and maintain defensible space around structures and infrastructure, provide water on site • Use fire-retardant building materials 	<ul style="list-style-type: none"> • Create and maintain defensible space around structures and infrastructure • Use fire-retardant building materials • Develop/implement higher regulatory standards in wildfire hazard areas • Develop/support biomass reclamation initiatives • Increase regulatory requirements/code enforcement for fire risk reduction or incentivize higher standards • Develop fire smart building code regulations • Implement road side vegetation management best practices • Conduct pre-construction building inspections that include fire prevention requirements and provide emphasis on a fire resistant structure • Develop programs to identify/install wildland fire water supply systems such as cisterns, ponds and dry hydrants • Involve fire protection agencies in determining guidelines and standards and in development and site plan review procedures • Enclose the foundations of homes and other buildings in wildfire-prone areas, rather than leaving them open and potentially exposing undersides to blown embers or other materials. • Prohibit wooden shingles/wood shake roofs on any new development in areas prone to wildfires. • Routinely inspect the functionality of fire hydrants • Use prescribed burning to reduce fuel loads that threaten public safety and property.

Public (Individual) Scale	Private (Business) Scale	Government Scale
<p>Increase Capability</p> <ul style="list-style-type: none"> • Employ "Firewise" techniques to safeguard your home • Identify alternative water supplies for fire fighting • Install/replace roofing material with non-combustible roofing materials • Ensure that all fuel-burning equipment should be vented to the outside • Install carbon monoxide monitors and alarms. 	<ul style="list-style-type: none"> • Support "Firewise" community initiatives • Create /establish stored water supplies to be utilized for fire fighting 	<ul style="list-style-type: none"> • Seek alternative water supplies in urban wildland interface areas • Become a "Firewise" community • Utilize academia to study impacts/solutions to wildfire risk • Create/implement/update wildfire protection plans • Develop evacuation/ emergency road plans and prioritize roads for response efforts • Provide public outreach to increase understanding of forest management practices • Enhance/provide redundant communication infrastructure • Require/encourage rapid damage assessment training • Pre-plan responses to wildland urban interface areas • Use zoning and/or a special wildfire overlay district to designate high-risk areas and specify the conditions for the use and development of specific areas • Develop a vegetation management plan • Work with insurance companies, utility providers, and others to include wildfire safety information in materials provided to area residents

18. MITIGATION ACTIONS AND IMPLEMENTATION

18.1 SELECTED COUNTY-WIDE MITIGATION ACTIONS

The Steering Committee determined that some actions could be implemented to provide hazard mitigation benefits county-wide. Table 18-1 lists the recommended county-wide actions and their implementation details. Table 18-2 lists the implementation and grant pursuit priorities for the recommended actions. Explanations for categorizations in these tables are in the sections that follow.

18.1.1 Timeline

Timelines for actions are defined as:

- Short-term: action can be completed in 1 to 5 years
- Long-term: action can be completed in 5 years or greater
- Ongoing: action is a continual program.

18.1.2 Benefit/Cost Review

The action plan must be prioritized according to a benefit/cost analysis of the proposed actions and their associated costs (44 CFR, Section 201.6(c)(3)(iii)). The benefits of proposed actions were weighed against estimated costs as part of the action prioritization process. The benefit/cost analysis was not of the detailed variety required by FEMA for action grant eligibility under relevant grant programs. A less formal approach was used because some actions may not be implemented for up to 10 years, and associated costs and benefits could change dramatically in that time. Therefore, a review of the apparent benefits versus the apparent cost of each action was performed. Parameters were established for assigning subjective ratings (high, medium, and low) to the costs and benefits of these actions.

Benefit ratings were defined as follows:

- High: Action will have an immediate impact on the reduction of risk exposure to life and property.
- Medium: Action will have a long-term impact on the reduction of risk exposure to life and property, or action will provide an immediate reduction in the risk exposure to property.
- Low: Long-term benefits of the action are difficult to quantify in the short term.

Cost ratings were defined as follows:

- High: Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed action.
- Medium: Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the action would have to be spread over multiple years.
- Low: Possible to fund under existing budget. Action is or can be part of an existing ongoing program.

Using this approach, actions with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial. For many of the strategies identified in this action plan, the partners may seek financial assistance under the Hazard Mitigation Grant Program or Pre-Disaster Mitigation Assistance programs, both of which require detailed benefit/cost analyses. These analyses will be performed on actions at the time of application using the FEMA benefit-cost model. For actions not seeking financial assistance from grant programs that require detailed analysis, the partners reserve the right to define “benefits” according to parameters that meet the goals and objectives of this plan.

18.1.3 Prioritization

Two prioritization categories were established for this planning process: implementation and grant pursuit.

Implementation priorities were established using the following considerations:

- **High Priority**—An action that meets multiple objectives, has benefits that exceed cost, has funding secured or is an ongoing action and meets eligibility requirements for a grant program. High priority actions can be completed in the short term (1 to 5 years). The key factors for high priority actions are that they have funding secured and can be completed in the short term.
- **Medium Priority**—An action that meets multiple objectives, that has benefits that exceed costs, and for which funding has not yet been secured, but is eligible for funding. Action can be completed in the short term, once funding is secured. Medium priority actions will become high priority actions once funding is secured. The key factors for medium priority actions are that they are eligible for funding, but do not yet have funding secured, and they can be completed within the short term.
- **Low Priority**—An action that will mitigate the risk of a hazard, that has benefits that do not exceed the costs or are difficult to quantify, for which funding has not been secured, that is not eligible for grant funding, and for which the time line for completion is long term (1 to 10 years). Low priority actions may be eligible for grant funding from other programs that have not yet been identified. Low priority actions are generally “blue-sky” or “wish-list.” actions. Financing is unknown, and they can be completed over a long term.

Grant pursuit priorities were established using the following considerations:

- **High Priority**—An action that has been identified as meeting grant eligibility requirements, assessed to have high benefits, is listed as high or medium priority, and where local funding options are unavailable or where dedicated funds could be utilized for actions that are not eligible for grant funding.
- **Medium Priority**—An action that has been identified as meeting grant eligibility requirements, assessed to have medium or low benefits, is listed as medium or low priority, and where local funding options are unavailable.
- **Low Priority**—An action that has not been identified as meeting grant eligibility requirements, or has low benefits.

Table 18-1. County-Wide Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding ^a	Timeline
CW-1 —Establish a county-wide repository of perishable data from hazard events and develop a standard form for capturing information.						
New and existing	All hazards	4, 12	CRESA	Low	Staff time	Short-term
CW-2 —Develop a county-wide recovery/resiliency plan.						
New and existing	All hazards	2, 4, 6	CRESA	High	Local, possible grant funding (UASI)	Short-term
CW-3 —Participate in the plan implementation hazard mitigation working group by sharing lessons learned and mitigation success stories and actively participating in progress reporting						
New and existing	All hazards	1, 4, 6, 12	Planning Partners/ facilitated by CRESA	Low	Staff time	Ongoing
CW-4 —Support and guide the technology for regional hazard warning systems						
New and existing	All hazards	1, 2, 3, 12	CRESA	Medium	Local, possible grant funding (FEMA, DHS, NWS, NOAA)	Ongoing
CW-5 —Ensure that a link to the hazard mitigation plan website hosted by CRESA is posted conspicuously on each planning partner website						
N/A	All hazards	1, 4	Planning Partners	Low	Staff time	Short-term
CW-6 —Support regional collaboration and consistency in hazard mitigation implementation and programs						
New and existing	All hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Clark County/CRESA	Low	Staff time	Ongoing
CW-7 —Where appropriate, support retro-fitting, relocating or acquisition from willing property owners of structures located in hazard-prone areas to protect structures from future damage, with repetitive and severe repetitive loss as a priority. Seek opportunities to leverage partnerships within the planning area in these pursuits						
Existing	All hazards	4, 5, 7, 9, 10	Planning Partners	High	HMGP, PDM, FMA, CDBG-DR	Ongoing
CW-8 —Utilize information contained within the Clark Regional Natural Hazard Mitigation Plan to support updates to other emergency management plans in effect within the planning area						
New and existing	All hazards	2, 4	CRESA	Low	Staff time	Ongoing
CW-9 —Utilize information contained within the Clark Regional Natural Hazard Mitigation Plan to support updates to other plans in effect within the planning area						
New and existing	All hazards	2, 4, 5	Planning Partners	Low	Staff time	Ongoing
CW-10 —Develop the capacity for a regional post-disaster volunteer coordination program						
N/A	All hazards	1, 2, 3, 4	CRESA	Medium	Staff time, Local funds	Long-term
CW-11 —Explore opportunities with all community stakeholders to implement, identify and fund mitigation actions						
New and existing	All hazards	1, 2, 4, 12	CRESA	Medium	Staff time, Local funds	Ongoing
CW-12 —Continue regional partnerships to improve and enhance mitigation efforts in the larger region						
New and existing	All hazards	1, 4	CRESA	Low	Staff-time	Ongoing
CW-13 —Establish guidelines to increase communication and coordination of mitigation actions across agencies whenever feasible						
New and existing	All hazards	4	CRESA	Low	Staff time	Short-term
CW-14 —Continue to work with planning partners and other stakeholders to clearly articulate and define emergency management roles and responsibilities within the County, including the implementation of identified mitigation actions.						
New and existing	All hazards	1, 4, 6	CRESA	Low	Staff time	Ongoing

a. HMGP = Hazard Mitigation Grant Program; FMA = Flood Mitigation Assistance = PDM = Pre-Disaster Mitigation Assistance; CDBG-DR = Community Development Block Grants Disaster Recovery; UASI = Urban Area Security Initiative

Table 18-2. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Action Grant-Eligible?	Can Action Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
CW-1	2	Medium	Low	Yes	No	Yes	High	Low
CW-2	3	Medium	High	No	Yes	Maybe	Medium	Medium
CW-3	4	Low	Low	Yes	No	Yes	High	Low
CW-4	4	High	Medium	Yes	Yes	Yes	High	Medium
CW-5	2	Low	Low	Yes	No	Yes	High	Low
CW-6	12	Medium	Low	Yes	No	Yes	High	Low
CW-7	5	High	High	Yes	Yes	Maybe	Medium	High
CW-8	2	Medium	Low	Yes	No	Yes	High	Low
CW-9	3	Medium	Low	Yes	No	Yes	High	Low
CW-10	4	Medium	Medium	Yes	No	Maybe	Medium	Low
CW-11	4	Medium	Medium	Yes	No	Yes	High	Low
CW-12	2	Medium	Low	Yes	No	Yes	High	Low
CW-13	1	Low	Low	Yes	No	Yes	Low	Low
CW-14	4	Medium	Low	Yes	No	Yes	High	Low

18.2 PLAN ADOPTION

A hazard mitigation plan must document that it has been formally adopted by the governing body of the jurisdiction requesting federal approval of the plan (44 CFR Section 201.6(c)(5)). For multi-jurisdictional plans, each jurisdiction requesting approval must document that it has been formally adopted. This plan will be submitted for a pre-adoption review prior to adoption to Washington State Emergency Management Division and FEMA's Community Rating System contractor, the Insurance Services Office. Once pre-adoption approval has been provided, all planning partners will formally adopt the plan. All partners understand that DMA compliance and its benefits cannot be achieved until the plan is adopted. Copies of the resolutions adopting this plan for all planning partners can be found in Appendix F of this volume.

18.3 PLAN IMPLEMENTATION AND MAINTENANCE STRATEGY

A hazard mitigation plan must present a plan maintenance process that includes the following (44 CFR Section 201.6(c)(4)):

- A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan over a 5-year cycle.
- A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate.
- A discussion on how the community will continue public participation in the plan maintenance process.

18.3.1 Plan Implementation

The effectiveness of the hazard mitigation plan depends on its implementation and the incorporation of its action items into partner jurisdictions' existing plans, policies and programs. Together, the action items in the plan provide a framework for activities that the partnership can implement over the next 5 years. The planning team

and the Steering Committee have established goals and objectives and have prioritized mitigation actions that will be implemented through existing plans, policies, and programs.

The plan will be evaluated by how successfully the implementation of identified actions have moved the planning partnership toward reaching the goals and objectives identified in this plan. This will be assessed at the next update by a review of the changes in risk that occurred over the performance period and by the degree to which mitigation goals and objectives were incorporated into existing plans, policies and programs.

CRESA will have lead responsibility for coordinating and tracking the plan implementation and maintenance strategy. Plan implementation and evaluation will be a shared responsibility among all planning partnership members and agencies identified as lead agencies in the mitigation action plans (see planning partner annexes in Volume 2 of this plan).

Integration with Other Planning Initiatives

The information on hazard, risk, vulnerability and mitigation contained in this plan update is based on the best science and technology currently available. This information can be invaluable in making decisions required through other planning efforts, such as critical areas designation, growth management planning, and capital facilities planning. All partners will use information from this updated plan as the best available science and data on natural hazards impacting Clark County. Each planning partner has identified existing linkages between the hazard mitigation plan and opportunities for linkage that can be pursued over the performance period of this plan (see planning partner annexes in Volume 2). Many of these opportunities for linkage are included as actions in planning partner annexes. As the identified plans and programs are updated and revised, the information contained in this plan will be used to inform their development. Those plans and programs where linkages already exist will incorporate the newly compiled information available in this plan at the next point of update. Examples of these planning processes and programs to be coordinated with the recommendations of the hazard mitigation plan include the following:

- Critical areas regulations
- Comprehensive plans
- Capital improvement plans and programs
- Shoreline management programs
- Stormwater management programs
- Emergency management plans and programs
- Strategic plans
- Facility acquisition plans.

As information becomes available from other planning mechanisms that can enhance this plan, that information will be incorporated via the update process.

Hazard Mitigation Plan Working Group

The hazard mitigation Steering Committee was a total volunteer body that oversaw the development of the plan and made recommendations on key elements of the plan, including the implementation and maintenance strategy. It was the Steering Committee's position that an oversight committee with representation similar to that of the Steering Committee should have an active role in the plan implementation and maintenance. Therefore, it is recommended that a hazard mitigation working group be formed to remain a viable body involved in key elements of the plan implementation and maintenance strategy. This working group should strive to include representation from stakeholders in the planning area as well as planning partners. The hazard mitigation working group will work toward fulfilling the following three responsibilities:

- Coordinating project implementation through the discussion of potential opportunities for partnership and regional coordination and the sharing of success stories and lessons learned;
- Reviewing the annual progress report; and
- Providing input and recommendations on possible enhancements to be considered at the next plan update.

Future plan updates will be overseen by a working group similar to the one that participated in this plan development process, so keeping an interim group in tact will provide a head start on future updates.

Implementation Coordination

It is anticipated that upon completion of this plan, there will be interest among the planning partnership in pursuing grant funding under FEMA hazard mitigation grant programs and other relevant programs. In order to keep planning partners informed of these opportunities, the CRESA staff person charged with coordinating the implementation of this plan will strive to:

- Coordinate with planning partners and stakeholders through scheduling hazard mitigation plan working group meetings on a quarterly basis; and
- Monitor grant funding opportunities identified in this plan and notify planning partners when such funding opportunities become available.

Planning partners will be responsible for developing proposals in pursuit of any available grants. CRESA staff will simply provide notices of funding availability to the planning partnership.

Annual Progress Report

The planning partnership will evaluate the progress on the action plan during a 12-month performance period. This review will include items such as the following:

- Summary of any hazard events that occurred during the performance period and the impact these events had on the planning area;
- Review of mitigation success stories;
- Review of continuing public involvement;
- Brief discussion about why targeted strategies were not completed;
- Reevaluation of the action plan to determine if the timeline for identified projects needs to be amended (such as changing a long-term project to a short-term project because of new funding);
- Recommendations for new projects;
- Changes in or potential for new funding options (grant opportunities);
- Impacts of changes in other planning programs or initiatives that involve hazard mitigation; and
- Identification of training needs within the partnership, such as benefit-cost analysis or E-grants.

The planning team has created a template for preparing a progress report (see Appendix G). The hazard mitigation working group and all planning partners will provide feedback to the CRESA support staff on items included in the template. CRESA staff will compile the information into a formal annual report on the progress of the plan, which will be presented to the hazard mitigation plan working group for their review and comment. This report should be used as follows:

- Posted on the CRESA website dedicated to the hazard mitigation plan;
- Provided to the local media through a press release;
- Presented to the governing bodies of planning partners to inform them of the progress of mitigation initiatives implemented during the reporting period; and

- Provided as part of the CRS annual re-certification package for those planning partners participating in CRS.

It is recommended that the annual progress report be finalized before October 1 of each year.

Plan Update

Clark County and its planning partners intend to update the hazard mitigation plan on a 5-year cycle from the date of final plan approval. This cycle may be accelerated to less than 5 years based on the following triggers:

- A federal disaster declaration that impacts the planning area;
- A hazard event that causes loss of life; or
- A comprehensive update of the Clark County Comprehensive Plan.

It will not be the intent of future updates to develop a complete new hazard mitigation plan for the planning area. The update will, at a minimum, include the following elements:

- The update process will be convened through a steering committee.
- The goals and objectives will be reviewed to evaluate the effectiveness of the plan.
- The hazard risk assessment will be reviewed and, if necessary, updated using best available information and technologies.
- The action plan will be reviewed and revised to account for any actions completed, dropped, or changed and to account for changes in the risk assessment or new policies identified under other planning mechanisms.
- The draft update will be sent to appropriate agencies and organizations for comment.
- The public will be given an opportunity to comment on the update prior to adoption.
- The governing body of each planning partner will adopt the updated plan.

18.3.2 Opportunities for Continued Public Access and Participation

The public will continue to be apprised of the plan's progress through the hazard mitigation plan working group, the hazard mitigation plan website and through the provision of copies of the annual progress reports to the media. The website will not only house the final plan, it will become the one-stop shop for information regarding the plan and plan implementation. The website will continue to provide contact information where members of the public wishing to ask questions or provide comments on the plan may do so. Upon initiation of future update processes, a new public involvement strategy will be initiated based on guidance from a new Steering Committee. This strategy will be based on the needs and capabilities of the planning partnership at the time of the update.

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Appendix A. Acronyms and Definitions

A. ACRONYMS AND DEFINITIONS

ACRONYMS

ADA—Americans with Disabilities Act
CDBG-DR—Community Development Block Grant Disaster Resilience
CFR—Code of Federal Regulations
CIP—Capital Improvement Plan or Program
CRESA—Clark Regional Emergency Services Agency
CRS—Community Rating System
CWA—Clean Water Act
DEWS—Drought Emergency Warning System
DFIRM—Digital Flood Insurance Rate Map
DHS—Department of Homeland Security
DMA—Disaster Mitigation Act
DR—Major Disaster Declaration
DSEIS—Draft Supplemental Environmental Impact Statement
DSO—Dam Safety Office
EM—Emergency Declaration
EPA—U.S. Environmental Protection Agency
ESA—Endangered Species Act
ESD—Washington State Employment Security Department
EWP—Emergency Watershed Protection Program
FCAAP—Flood Control Assistance Account Program
FEMA—Federal Emergency Management Agency
FERC—Federal Energy Regulatory Commission
FIRM—Flood Insurance Rate Map
FMA—Flood Mitigation Assistance
GIS—Geographic Information System
Hazardus-MH—Hazards, United States-Multi Hazard
HMGP—Hazard Mitigation Grant Program

HMP—Hazard Mitigation Plan
HUD—United States Department of Housing and Urban Development
HVAC—Heating, Ventilation and Air Conditioning System
LiDAR—Light Detection and Ranging
ML—Local Magnitude Scale
MMI— Modified Mercalli Intensity Scale
MRSC—Municipal Research Services Center
NASA—National Aeronautics and Space Administration
NEHRP—National Earthquake Hazards Reduction Program
NFIP—National Flood Insurance Program
NIDIS—National Integrated Drought Information System
NIMS—National Incident Management System
NOAA—National Oceanic and Atmospheric Administration
NRCS—National Resource Conservation Services
NWS—National Weather Service
PDM—Pre-Disaster Mitigation Grant Program
PGA—Peak Ground Acceleration
PP&L—Pacific Power and Light
RCW—Revised Code of Washington
SEPA—State Environmental Policy Act
SNOTEL—Snow Telemetry
SR—State Route
UASI—Urban Area Security Initiative
UGA—Urban Growth Area
USDA—United States Department of Agriculture
USGS—U.S. Geological Survey
WAC—Washington Administrative Code
WSU-Vancouver—Washington State University-Vancouver

DEFINITIONS

100-Year Flood: The term “100-year flood” can be misleading. The 100-year flood does not necessarily occur once every 100 years. Rather, it is the flood that has a 1 percent chance of being equaled or exceeded in any given year. Thus, the 100-year flood could occur more than once in a relatively short period of time. The Federal

Emergency Management Agency (FEMA) defines it as the 1 percent annual chance flood, which is now the standard definition used by most federal and state agencies and by the National Flood Insurance Program.

Acre-Foot: An acre-foot is the amount of water it takes to cover 1 acre to a depth of 1 foot. This measure is used to describe the quantity of storage in a water reservoir. An acre-foot is a unit of volume. One acre foot equals 7,758 barrels; 325,829 gallons; or 43,560 cubic feet. An average household of four will use approximately 1 acre-foot of water per year.

Asset: An asset is any man-made or natural feature that has value, including, but not limited to, people; buildings; infrastructure, such as bridges, roads, sewers, and water systems; lifelines, such as electricity and communication resources; and environmental, cultural, or recreational features such as parks, wetlands, and landmarks.

Base Flood: The flood having a 1% chance of being equaled or exceeded in any given year, also known as the “100-year” or “1% chance” flood. The base flood is a statistical concept used to ensure that all properties subject to the National Flood Insurance Program are protected to the same degree against flooding.

Basin: A basin is the area within which all surface water—whether from rainfall, snowmelt, springs, or other sources—flows to a single water body or watercourse. The boundary of a river basin is defined by natural topography, such as hills, mountains, and ridges. Basins are also referred to as “watersheds” and “drainage basins.”

Benefit: A benefit is a net project outcome and is usually defined in monetary terms. Benefits may include direct and indirect effects. For the purposes of benefit-cost analysis of proposed mitigation measures, benefits are limited to specific, measurable, risk reduction factors, including reduction in expected property losses (buildings, contents, and functions) and protection of human life.

Benefit/Cost Analysis: A benefit/cost analysis is a systematic, quantitative method of comparing projected benefits to projected costs of a project or policy. It is used as a measure of cost effectiveness.

Building: A building is defined as a structure that is walled and roofed, principally aboveground, and permanently fixed to a site. The term includes manufactured homes on permanent foundations on which the wheels and axles carry no weight.

Capability Assessment: A capability assessment provides a description and analysis of a community’s current capacity to address threats associated with hazards. The assessment includes two components: an inventory of an agency’s mission, programs, and policies, and an analysis of its capacity to carry them out. A capability assessment is an integral part of the planning process in which a community’s actions to reduce losses are identified, reviewed, and analyzed, and the framework for implementation is identified. The following capabilities were reviewed under this assessment:

- Legal and regulatory capability
- Administrative and technical capability
- Fiscal capability

Community Rating System (CRS): The CRS is a voluntary program under the NFIP that rewards participating communities (provides incentives) for exceeding the minimum requirements of the NFIP and completing activities that reduce flood hazard risk by providing flood insurance premium discounts.

Critical Area: An area defined by state or local regulations as deserving special protection because of unique natural features or its value as habitat for a wide range of species of flora and fauna. A sensitive/critical area is usually subject to more restrictive development regulations.

Critical Facility: Facilities and infrastructure that are critical to the health and welfare of the population. These become especially important after any hazard event occurs. For the purposes of this plan, critical facilities include:

- Structures or facilities that produce, use, or store highly volatile, flammable, explosive, toxic and/or water reactive materials;
- Hospitals, nursing homes, and housing likely to contain occupants who may not be sufficiently mobile to avoid death or injury during a hazard event.
- Police stations, fire stations, vehicle and equipment storage facilities, and emergency operations centers that are needed for disaster response before, during, and after hazard events, and
- Public and private utilities, facilities and infrastructure that are vital to maintaining or restoring normal services to areas damaged by hazard events.
- Government facilities.

Cubic Feet per Second: Common unit of measurement for river discharge or flow. One cubic foot is about 7.5 gallons of liquid.

Dam: Any artificial barrier or controlling mechanism that can or does impound 10 acre-feet or more of water.

Dam Failure: Dam failure refers to a partial or complete breach in a dam (or levee) that impacts its integrity. Dam failures occur for a number of reasons, such as flash flooding, inadequate spillway size, mechanical failure of valves or other equipment, freezing and thawing cycles, earthquakes, and intentional destruction.

Debris Avalanche: Volcanoes are prone to debris and mountain rock avalanches that can approach speeds of 100 mph.

Debris Flow: Dense mixtures of water-saturated debris that move down-valley; looking and behaving much like flowing concrete. They form when loose masses of unconsolidated material are saturated, become unstable, and move down slope. The source of water varies but includes rainfall, melting snow or ice, and glacial outburst floods.

Debris Slide: Debris slides consist of unconsolidated rock or soil that has moved rapidly down slope. They occur on slopes greater than 65 percent.

Disaster Mitigation Act of 2000 (DMA); The DMA is Public Law 106-390 and is the latest federal legislation enacted to encourage and promote proactive, pre-disaster planning as a condition of receiving financial assistance under the Robert T. Stafford Act. The DMA emphasizes planning for disasters before they occur. Under the DMA, a pre-disaster hazard mitigation program and new requirements for the national post-disaster hazard mitigation grant program were established.

Drainage Basin: A basin is the area within which all surface water- whether from rainfall, snowmelt, springs or other sources- flows to a single water body or watercourse. The boundary of a river basin is defined by natural topography, such as hills, mountains and ridges. Drainage basins are also referred to as **watersheds** or **basins**.

Drought: Drought is a period of time without substantial rainfall or snowfall from one year to the next. Drought can also be defined as the cumulative impacts of several dry years or a deficiency of precipitation over an extended period of time, which in turn results in water shortages for some activity, group, or environmental function. A hydrological drought is caused by deficiencies in surface and subsurface water supplies. A socioeconomic drought impacts the health, well-being, and quality of life or starts to have an adverse impact on a region. Drought is a normal, recurrent feature of climate and occurs almost everywhere.

Earthquake: An earthquake is defined as a sudden slip on a fault, volcanic or magmatic activity, and sudden stress changes in the earth that result in ground shaking and radiated seismic energy. Earthquakes can last from a

few seconds to over 5 minutes, and have been known to occur as a series of tremors over a period of several days. The actual movement of the ground in an earthquake is seldom the direct cause of injury or death. Casualties may result from falling objects and debris as shocks shake, damage, or demolish buildings and other structures.

Exposure: Exposure is defined as the number and dollar value of assets considered to be at risk during the occurrence of a specific hazard.

Extent: The extent is the size of an area affected by a hazard.

Extreme Heat Event/Heat Wave: Summertime weather that is substantially hotter and/or more humid than average for a location at that time of year. Typically a heat wave lasts two or more days.

Fire Behavior: Fire behavior refers to the physical characteristics of a fire and is a function of the interaction between the fuel characteristics (such as type of vegetation and structures that could burn), topography, and weather. Variables that affect fire behavior include the rate of spread, intensity, fuel consumption, and fire type (such as underbrush versus crown fire).

Fire Frequency: Fire frequency is the broad measure of the rate of fire occurrence in a particular area. An estimate of the areas most likely to burn is based on past fire history or fire rotation in the area, fuel conditions, weather, ignition sources (such as human or lightning), fire suppression response, and other factors.

Flash Flood: A flash flood occurs with little or no warning when water levels rise at an extremely fast rate

Flood Insurance Rate Map (FIRM): FIRMs are the official maps on which the Federal Emergency Management Agency (FEMA) has delineated the Special Flood Hazard Area.

Flood Insurance Study: A report published by the Federal Insurance and Mitigation Administration for a community in conjunction with the community's Flood Insurance rate Map. The study contains such background data as the base flood discharges and water surface elevations that were used to prepare the FIRM. In most cases, a community FIRM with detailed mapping will have a corresponding flood insurance study.

Floodplain: Any land area susceptible to being inundated by flood waters from any source. A flood insurance rate map identifies most, but not necessarily all, of a community's floodplain as the Special Flood Hazard Area.

Floodway: Floodways are areas within a floodplain that are reserved for the purpose of conveying flood discharge without increasing the base flood elevation more than 1 foot. Generally speaking, no development is allowed in floodways, as any structures located there would block the flow of floodwaters.

Floodway Fringe: Floodway fringe areas are located in the floodplain but outside of the floodway. Some development is generally allowed in these areas, with a variety of restrictions. On maps that have identified and delineated a floodway, this would be the area beyond the floodway boundary that can be subject to different regulations.

Fog: Fog refers to a cloud (or condensed water droplets) near the ground. Fog forms when air close to the ground can no longer hold all the moisture it contains. Fog occurs either when air is cooled to its dew point or the amount of moisture in the air increases. Heavy fog is particularly hazardous because it can restrict surface visibility. Severe fog incidents can close roads, cause vehicle accidents, cause airport delays, and impair the effectiveness of emergency response. Financial losses associated with transportation delays caused by fog have not been calculated in the United States but are known to be substantial.

Freeboard: Freeboard is the margin of safety added to the base flood elevation.

Frequency: For the purposes of this plan, frequency refers to how often a hazard of specific magnitude, duration, and/or extent is expected to occur on average. Statistically, a hazard with a 100-year frequency is expected to occur about once every 100 years on average and has a 1 percent chance of occurring any given year. Frequency reliability varies depending on the type of hazard considered.

Fujita Scale of Tornado Intensity: Tornado wind speeds are sometimes estimated on the basis of wind speed and damage sustained using the Fujita Scale. The scale rates the intensity or severity of tornado events using numeric values from F0 to F5 based on tornado wind speed and damage. An F0 tornado (wind speed less than 73 miles per hour (mph)) indicates minimal damage (such as broken tree limbs), and an F5 tornado (wind speeds of 261 to 318 mph) indicates severe damage.

Goal: A goal is a general guideline that explains what is to be achieved. Goals are usually broad-based, long-term, policy-type statements and represent global visions. Goals help define the benefits that a plan is trying to achieve. The success of a hazard mitigation plan is measured by the degree to which its goals have been met (that is, by the actual benefits in terms of actual hazard mitigation).

Geographic Information System (GIS): GIS is a computer software application that relates data regarding physical and other features on the earth to a database for mapping and analysis.

Hazard: A hazard is a source of potential danger or adverse condition that could harm people and/or cause property damage.

Hazard Mitigation Grant Program: Authorized under Section 202 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, the Hazard Mitigation Grant Program is administered by FEMA and provides grants to states, tribes, and local governments to implement hazard mitigation actions after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to disasters and to enable mitigation activities to be implemented as a community recovers from a disaster.

Hazards U.S. Multi-Hazard (Hazus-MH) Loss Estimation Program: Hazus-MH is a GIS-based program used to support the development of risk assessments as required under the DMA. The Hazus-MH software program assesses risk in a quantitative manner to estimate damage and losses associated with natural hazards. Hazus-MH is FEMA's nationally applicable, standardized methodology and software program and contains modules for estimating potential losses from earthquakes, floods, and wind hazards. Hazus-MH has also been used to assess vulnerability (exposure) for other hazards.

Hydraulics: Hydraulics is the branch of science or engineering that addresses fluids (especially water) in motion in rivers or canals, works and machinery for conducting or raising water, the use of water as a prime mover, and other fluid-related areas.

Hydrology: Hydrology is the analysis of waters of the earth. For example, a flood discharge estimate is developed by conducting a hydrologic study.

Intensity: For the purposes of this plan, intensity refers to the measure of the effects of a hazard.

Inventory: The assets identified in a study region comprise an inventory. Inventories include assets that could be lost when a disaster occurs and community resources are at risk. Assets include people, buildings, transportation, and other valued community resources.

Landslide: Landslides can be described as the sliding movement of masses of loosened rock and soil down a hillside or slope. Fundamentally, slope failures occur when the strength of the soils forming the slope exceeds the pressure, such as weight or saturation, acting upon them.

LiDAR: A remote sensing technology that measures distance by illuminating a target with a laser and analyzing the reflected light.

Lightning: Lightning is an electrical discharge resulting from the buildup of positive and negative charges within a thunderstorm. When the buildup becomes strong enough, lightning appears as a “bolt,” usually within or between clouds and the ground. A bolt of lightning instantaneously reaches temperatures approaching 50,000°F. The rapid heating and cooling of air near lightning causes thunder. Lightning is a major threat during thunderstorms. In the United States, 75 to 100 Americans are struck and killed by lightning each year (see <http://www.fema.gov/hazard/thunderstorms/thunder.shtm>).

Liquefaction: Liquefaction is the complete failure of soils, occurring when soils lose shear strength and flow horizontally. It is most likely to occur in fine grain sands and silts, which behave like viscous fluids when liquefaction occurs. This situation is extremely hazardous to development on the soils that liquefy, and generally results in extreme property damage and threats to life and safety.

Local Government: Any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity.

Magnitude: Magnitude is the measure of the strength of an earthquake, and is typically measured by the Richter scale. As an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value.

Mass movement: A collective term for landslides, mudflows, debris flows, sinkholes and lahars.

Mitigation: A preventive action that can be taken in advance of an event that will reduce or eliminate the risk to life or property.

Mitigation Actions: Mitigation actions are specific actions to achieve goals and objectives that minimize the effects from a disaster and reduce the loss of life and property.

Objective: For the purposes of this plan, an objective is defined as a short-term aim that, when combined with other objectives, forms a strategy or course of action to meet a goal. Unlike goals, objectives are specific and measurable.

Peak Ground Acceleration: Peak Ground Acceleration (PGA) is a measure of the highest amplitude of ground shaking that accompanies an earthquake, based on a percentage of the force of gravity.

Preparedness: Preparedness refers to actions that strengthen the capability of government, residents, and communities to respond to disasters.

Prevention: Prevention refers to building capabilities necessary to avoid, prevent or stop a threatened or actual act of terrorism.

Presidential Disaster Declaration: These declarations are typically made for events that cause more damage than state and local governments and resources can handle without federal government assistance. Generally, no specific dollar loss threshold has been established for such declarations. A Presidential Disaster Declaration puts into motion long-term federal recovery programs, some of which are matched by state programs, designed to help disaster victims, businesses, and public entities.

Probability of Occurrence: The probability of occurrence is a statistical measure or estimate of the likelihood that a hazard will occur. This probability is generally based on past hazard events in the area and a forecast of events that could occur in the future. A probability factor based on yearly values of occurrence is used to estimate probability of occurrence.

Repetitive Loss Property: Any NFIP-insured property that, since 1978 and regardless of any changes of ownership during that period, has experienced:

- Four or more paid flood losses in excess of \$1000.00; or
- Two paid flood losses in excess of \$1000.00 within any 10-year period since 1978 or
- Three or more paid losses that equal or exceed the current value of the insured property.

Recovery: A phase of emergency management where activities are intended to restore essential services and repair damages caused by the event.

Response: A phase of emergency management that is comprised of activities that are immediate actions to save lives, protect property and the environment and meet basic human needs.

Return Period (or Mean Return Period): This term refers to the average period of time in years between occurrences of a particular hazard (equal to the inverse of the annual frequency of occurrence).

Riverine: Of or produced by a river. Riverine floodplains have readily identifiable channels. Floodway maps can only be prepared for riverine floodplains.

Risk: Risk is the estimated impact that a hazard would have on people, services, facilities, and structures in a community. Risk measures the likelihood of a hazard occurring and resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low likelihood of sustaining damage above a particular threshold due to occurrence of a specific type of hazard. Risk also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

Risk Assessment: Risk assessment is the process of measuring potential loss of life, personal injury, economic injury, and property damage resulting from hazards. This process assesses the vulnerability of people, buildings, and infrastructure to hazards and focuses on (1) hazard identification; (2) impacts of hazards on physical, social, and economic assets; (3) vulnerability identification; and (4) estimates of the cost of damage or costs that could be avoided through mitigation.

Risk Ranking: This ranking serves two purposes, first to describe the probability that a hazard will occur, and second to describe the impact a hazard will have on people, property, and the economy. Risk estimates for the City are based on the methodology that the City used to prepare the risk assessment for this plan. The following equation shows the risk ranking calculation:

$$\text{Risk Ranking} = \text{Probability} + \text{Impact (people + property + economy)}$$

Robert T. Stafford Act: The Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 100-107, was signed into law on November 23, 1988. This law amended the Disaster Relief Act of 1974, Public Law 93-288. The Stafford Act is the statutory authority for most federal disaster response activities, especially as they pertain to FEMA and its programs.

Sinkhole: A collapse depression in the ground with no visible outlet. Its drainage is subterranean. It is commonly vertical-sided or funnel-shaped.

Special Flood Hazard Area: The base floodplain delineated on a Flood Insurance Rate Map. The special flood hazard area is mapped as a Zone A in riverine situations and zone V in coastal situations. The special flood hazard area may or may not encompass all of a community's flood problems

Stakeholder: Business leaders, civic groups, academia, non-profit organizations, major employers, managers of critical facilities, farmers, developers, special purpose districts, and others whose actions could impact hazard mitigation.

Stream Bank Erosion: Stream bank erosion is common along rivers, streams and drains where banks have been eroded, sloughed or undercut. However, it is important to remember that a stream is a dynamic and constantly changing system. It is natural for a stream to want to meander, so not all eroding banks are "bad" and in need of repair. Generally, stream bank erosion becomes a problem where development has limited the meandering nature of streams, where streams have been channelized, or where stream bank structures (like bridges, culverts, etc.) are located in places where they can actually cause damage to downstream areas. Stabilizing these areas can help protect watercourses from continued sedimentation, damage to adjacent land uses, control unwanted meander, and improvement of habitat for fish and wildlife.

Steep Slope: Different communities and agencies define it differently, depending on what it is being applied to, but generally a steep slope is a slope in which the percent slope equals or exceeds 25%. For this study, steep slope is defined as slopes greater than 33%.

Sustainable Hazard Mitigation: This concept includes the sound management of natural resources, local economic and social resiliency, and the recognition that hazards and mitigation must be understood in the largest possible social and economic context.

Thunderstorm: A thunderstorm is a storm with lightning and thunder produced by cumulonimbus clouds. Thunderstorms usually produce gusty winds, heavy rains, and sometimes hail. Thunderstorms are usually short in duration (seldom more than 2 hours). Heavy rains associated with thunderstorms can lead to flash flooding during the wet or dry seasons.

Tornado: A tornado is a violently rotating column of air extending between and in contact with a cloud and the surface of the earth. Tornadoes are often (but not always) visible as funnel clouds. On a local scale, tornadoes are the most intense of all atmospheric circulations, and winds can reach destructive speeds of more than 300 mph. A tornado's vortex is typically a few hundred meters in diameter, and damage paths can be up to 1 mile wide and 50 miles long.

Vulnerability: Vulnerability describes how exposed or susceptible an asset is to damage. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damage, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power. Flooding of an electric substation would affect not only the substation itself but businesses as well. Often, indirect effects can be much more widespread and damaging than direct effects.

Watershed: A watershed is an area that drains downgradient from areas of higher land to areas of lower land to the lowest point, a common drainage basin.

Wildfire: These terms refer to any uncontrolled fire occurring on undeveloped land that requires fire suppression. The potential for wildfire is influenced by three factors: the presence of fuel, topography, and air mass. Fuel can include living and dead vegetation on the ground, along the surface as brush and small trees, and in the air such as tree canopies. Topography includes both slope and elevation. Air mass includes temperature, relative humidity, wind speed and direction, cloud cover, precipitation amount, duration, and the stability of the atmosphere at the

time of the fire. Wildfires can be ignited by lightning and, most frequently, by human activity including smoking, campfires, equipment use, and arson.

Windstorm: Windstorms are generally short-duration events involving straight-line winds or gusts exceeding 50 mph. These gusts can produce winds of sufficient strength to cause property damage. Windstorms are especially dangerous in areas with significant tree stands, exposed property, poorly constructed buildings, mobile homes (manufactured housing units), major infrastructure, and aboveground utility lines. A windstorm can topple trees and power lines; cause damage to residential, commercial, critical facilities; and leave tons of debris in its wake.

Zoning Ordinance: The zoning ordinance designates allowable land use and intensities for a local jurisdiction. Zoning ordinances consist of two components: a zoning text and a zoning map.

Clark Regional Natural Hazard Mitigation Plan: Volume 1—Planning Area-Wide Elements

Appendix B. Steering Committee Ground Rules

B. STEERING COMMITTEE GROUND RULES

OVERVIEW

Members of the Steering Committee represent a cross-section of views and interests across the County. Through this inclusion of diverse interests, the Steering Committee will work to enhance the robustness of the planning effort and to build support for hazard mitigation activities across stakeholder groups. A successful planning effort will result in the adoption and approval of a Hazard Mitigation Plan (HMP) that sets the stage for reducing the adverse impacts of hazards within the County and its jurisdictions through activities and strategies embraced by both elected officials and the people of Clark County.

PURPOSE OF THE STEERING COMMITTEE

The purpose of the Steering Committee is to guide the development of the HMP. The Steering Committee will work collaboratively to encourage stakeholder coordination, develop an ongoing public involvement strategy, provide guidance and leadership on plan development, and establish a process for the successful implementation and maintenance of the plan.

CHAIRPERSON AND VICE CHAIRPERSON

John Wheeler has been selected as the chairperson and **Ken Alexander** has been selected as the vice chairperson of the Steering Committee. The role of the chairperson is to:

- lead meetings so that agendas are followed and meetings adjourn on-time;
- allow all members to be heard during discussions;
- moderate discussions between members with differing points of view; and
- be a sounding board for staff in the preparation of agendas and on how to best involve the full Committee in work plan tasks.

The role of the vice chairperson is to assume the duties of the chair when the chairperson is not able to attend a meeting or forum.

QUORUM

A quorum for the Steering Committee will be half of the committee membership plus one member (eight members). When fewer than eight members are present at a meeting, items listed on the agenda may still be reviewed and discussed; however, any committee action as to those items will be postponed until a quorum is present.

ALTERNATES

Committee members were selected for the Steering Committee based on their specific backgrounds and perspectives on matters related to hazard mitigation. Regular attendance by members is needed to understand the

issues presented, identify and reflect on various stakeholder perspectives, and reach agreements on plan recommendations. However, there may be circumstances when regular members cannot attend. To address these circumstances, alternates may be designated for each Steering Committee member. An alternate attending on behalf of a Steering Committee member shall have the same rights and responsibilities as the Steering Committee member during that meeting. Alternates will be included on all Steering Committee emails and should remain apprised of the business of the Steering Committee.

DECISION-MAKING

The Steering Committee will strive for consensus in its decision-making process. If consensus cannot be reached as to a particular item or issue, the Steering Committee's decision will be determined by a majority vote of the Committee members in attendance at the meeting and the meeting summary will reflect the number of votes in favor, opposed, and in abstention. If a vote ends in a tie, the decision will be made by the chairperson. Upon request, dissenting opinions will be included in the meetings summaries.

RECOMMENDATIONS

The Committee's recommendations will be recorded in the meeting summaries and reflected in the HMP, as appropriate. The Committee may also be asked to assist in public outreach efforts and public presentations of the HMP and its recommendations.

STAFFING

The Planning Team for this project includes personnel from Clark Regional Emergency Services Agency, along with contract consultant assistance provided by Tetra Tech, Inc. The Planning Team will schedule meetings, distribute agendas, prepare information/presentations for Committee meetings, write meeting summaries, and generally seek to facilitate the Committee's activities.

John Wheeler (360) 992-6271, will be the spokesperson for this planning effort. He will coordinate with jurisdictional public information officers as appropriate.

MEETING DATES

Meetings generally will be conducted on the third Wednesday of each month from 10:00 AM to 12:00 PM at the Clark Regional Wastewater District offices. Meetings will be open to the public and will be advertised as such.

ATTENDANCE

Participation of all Committee members in meetings is important and members should make every effort to attend each meeting. If Committee members will not be able to attend a meeting, they should provide as much advance notice as reasonably possible to the Planning Team before the meeting is conducted. If neither a Steering Committee member nor his or her alternate attends **two** consecutive meetings, the Steering Committee chairperson will reach out to the member to determine if participation will still be possible. The Steering Committee will strive to maintain the Steering Committee membership at **14** members with a representative makeup similar to the initial committee makeup.

PUBLIC INVOLVEMENT

All Steering Committee meetings will be open to the public.

Members of the public wishing to address the Steering Committee at a meeting may do so based on the following protocol:

- At the start of the meeting, after the review of the agenda, the public will be invited by the Chairperson to comment on any item on that meeting's agenda or any item relevant to the hazard mitigation plan development. For all comments and testimony, speakers are asked to limit statements to about three minutes in order to allow as many people as possible the opportunity to speak. The Steering Committee members may ask follow-up questions.
- For all comments, speakers are asked to sign-in on the public sign-in sheet and indicate that they wish to provide comment. The public sign-in sheet will request the following information for each person wishing to comment: name, address and subject being addressed. This will help ensure that speakers are accurately identified in the meeting summary and will be useful if the Steering Committee or Planning Team would like to follow-up.
- Citizens who wish to submit lengthy or detailed comments on that meeting's agenda items will submit their comments in written form at least a week in advance to allow the Committee time to consider the information provided. The chairperson may wave this requirement as he deems appropriate. Written materials on past or future agenda items may also be submitted to the Steering Committee for distribution to members either prior to or at the meeting. Written material for distribution to members may also be submitted by those unable to attend in person.
- Those wishing to make video or PowerPoint presentations should check with the Planning Team prior to the meeting (Kristen.gelino@tetrattech.com).
- All comments must have relevance to the HMP and the planning area. Relevance will be determined by the Chairperson.

A member of the public may request clarification from the Steering Committee by raising his or her hand during the normal course of the meeting; however, permission to speak will be granted at the discretion of the Chairperson.

The meeting agendas for all Steering Committee meetings will be posted on the HMP website a minimum of 72 hours prior to all scheduled meetings (<http://cresa911.org/hazmitplanproject/>).

COURTESY

Committee members should treat each other with respect, listen to each other, work cooperatively, and allow all members to voice their opinions.

STEERING COMMITTEE MEMBERSHIP

Representation	Primary Member	Alternate
Fire/EMS, planning partner	Doug Koellermeier, Vancouver Fire	Steve Eldred, Heidi Scarpelli, Vancouver Fire
Utilities, planning partner	Dan Krebs, Clark Public Utilities	Ben Feliz, Clark Public Utilities
County, planning partner	Mike Lewis, Clark County Risk Management	Jeff Swanson, Board of County Councilors – Economic Development Manager
Small cities, planning partner	Jeff Sarvis, La Center	
Schools, planning partner	Heidi Burkart, Camas School District	Scott McDaniel, Battle Ground School District
Public affairs, planning partner	Carole Bua, Vancouver Communications Manager	Loretta Callahan, Vancouver Public Works
Real Estate	Lynette Jackson, real estate agent	
Planning partner, planner	Lauren Hollenbeck, Planner	
Citizen, water/wastewater engineer, retired emergency manager (Navy), current CEM	Ken Alexander, citizen	
Building industry	Paul McGraw, Building Industry Association of Clark County	Avaly Scarpelli, Building Industry Association of Clark County
Emergency Management	John Wheeler, Clark Regional Emergency Services Agency	
Small cities, planning partner	Lee Knottnerus, City of Ridgefield	Jeff Niten, City of Ridgefield
Floodplain Management/Public Works, planning partner	Mike Soliwoda, CRS Coordinator from Clark County	Melissa Tracy, Clark County Public Works
Citizen, engineer	Joseph Gehlen	
Port, Planning Partner	Scott Ouchi, Port of Vancouver	Todd Krout, Port of Vancouver

Clark Regional Natural Hazard Mitigation Plan: Volume 1—Planning Area-Wide Elements

Appendix C. Hazard Mitigation Questionnaire and Summary of Results

C. HAZARD MITIGATION QUESTIONNAIRE AND SUMMARY OF RESULTS

SUMMARY OF QUESTIONNAIRE RESULTS

There were 837 responses to the public survey between January and April of 2016.

Geographic Representation and Residency Tenure

Survey responses were received from all participating jurisdictions and from individuals who live outside of Clark County; 96 percent of all respondents indicated that they live within Clark County.

In general, responses from the City of Ridgefield were significantly over-represented with over 20 percent of the total responses and only 1.4 percent of the estimated population. Responses from the unincorporated areas were under-represented as the estimated population is almost 50 percent of the total planning area population and accounted for only 12 percent of responses.

The majority of respondents who live in Clark County have lived in the County for 11 or more years (62 percent); 38 percent of respondents indicated that they have lived in the City for more than 20 years.

Demographics

Respondents indicated that they were 61 or older most commonly (28 percent) followed by 41 to 50 year olds (24 percent). More than half (58 percent) of respondents were female.

More than 50 percent of respondents indicated that their household income was \$75,000 per year or greater. More than 65 percent of respondents indicated that they hold college or graduate degrees.

Eighty-eight percent of respondents indicated that they own their own home.

Hazard Concern, Preparation and Mitigation

More than half of respondents indicated that they were concerned, very concerned or extremely concerned about the earthquake (77 percent) and severe weather (50 percent) hazards' impacts in Clark County; 27 percent of respondents indicated that they were extremely concerned about the earthquake hazard. Respondents were generally slightly concerned or not concerned about the drought (66 percent), flood (59 percent), landslide (55 percent), volcano (65 percent) and wildfire hazard (56 percent). In general, respondents were not concerned about the dam failure hazard with 55 percent of respondents indicating no concern. Other natural hazards of concern mentioned by respondents included sink holes, radon, falling trees, climate change, and tsunamis. Most other hazards of concern mentioned were man-made or technological hazards such as terrorism and oil train derailments.

More than half of respondents indicated that they had purchased emergency food rations/supplies (64 percent) or checked smoke detector batteries once a month or changed batteries once a year (66 percent) to prepare for natural disasters. All other preparedness related activities were selected by less than half of respondents.

96 percent of respondents indicated that they have homeowners' or renters' insurance for their properties. 6 percent of respondents indicated that they had flood insurance and 29 percent had purchased earthquake insurance. 9 percent of respondents indicated that they did not know that primary insurance may not cover damage from some natural hazards.

Respondents most commonly indicated that they would be willing to spend \$1,001 to \$4,999 on safety improvements to reduce the possible risks from disaster damage (24 percent). 12 percent indicated that they would not be willing to spend any money.

The most common reason chosen for not taking actions to reduce risk from natural hazards was that it costs too much (20 percent), while almost a quarter (24 percent) of respondents indicated that they felt well prepared.

The top three types of projects or actions that respondents indicated local, state and federal governments should take to reduce damage and disruption from natural hazard disasters were:

- Strengthen infrastructure, such as roads and water supply systems (79 percent)
- Provide better public information about risks and vulnerable areas (57 percent)
- Strengthen essential facilities such as police stations and schools (52 percent).

Information on Hazards

The top three sources where respondents indicated that they had found useful information on preparing for, responding to, and reducing risk from natural hazards were local news and other media (52 percent), nongovernmental organizations (40 percent) and social media (37 percent).

The top three types of information that respondents indicated would be useful in helping to reduce risk from natural disasters were:

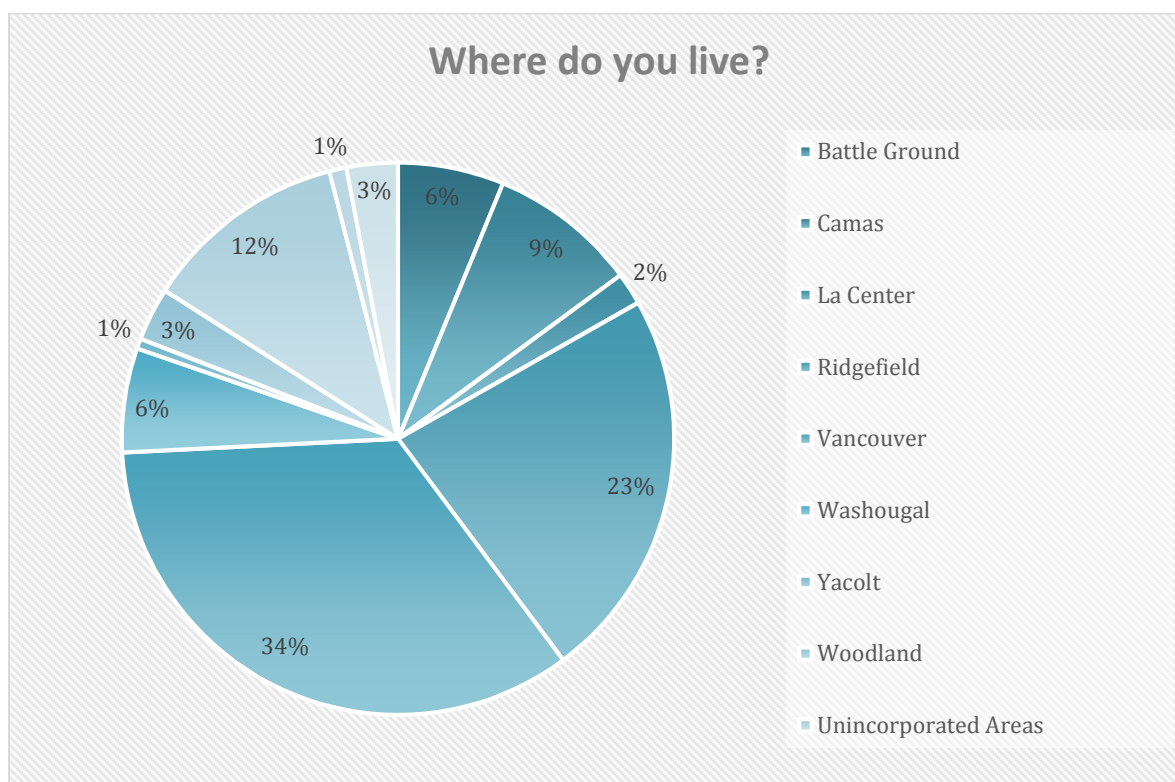
- Recommended preparedness actions residents can take (69 percent)
- Information on city and county disaster capabilities (54 percent)
- Recommended mitigation actions residents can take (53 percent).

40 percent of respondents indicated that they did not know if their home was located in a natural hazard area and 17 percent indicated that they did not live in any of the listed hazard areas. The most commonly selected hazard areas were earthquake hazard zone (42 percent), volcano hazard zone (13 percent) and wildfire risk area (10 percent). It was most common for respondents to indicate that their knowledge on their homes location in a hazard zone was determined through their own research (41 percent of total respondents).

QUESTIONS AND RESULTS

Question 1

Where do you live?			
Answer Options	Response Percent	Response Count	Estimated % of Total Population
Battle Ground	6.2%	52	4.2%
Camas	8.7%	73	4.6%
La Center	1.9%	16	0.7%
Ridgefield	23.0%	192	1.4%
Vancouver	34.4%	288	37.2%
Washougal	6.1%	51	3.3%
Yacolt	0.6%	5	1.3%
Woodland	3.1%	26	0.4%
Unincorporated Areas	12.0%	100	46.9%
I work in Clark County, but do not live in Clark County	1.0%	8	
Other (please specify)	3.0%	25	
answered question		836	
skipped question		1	



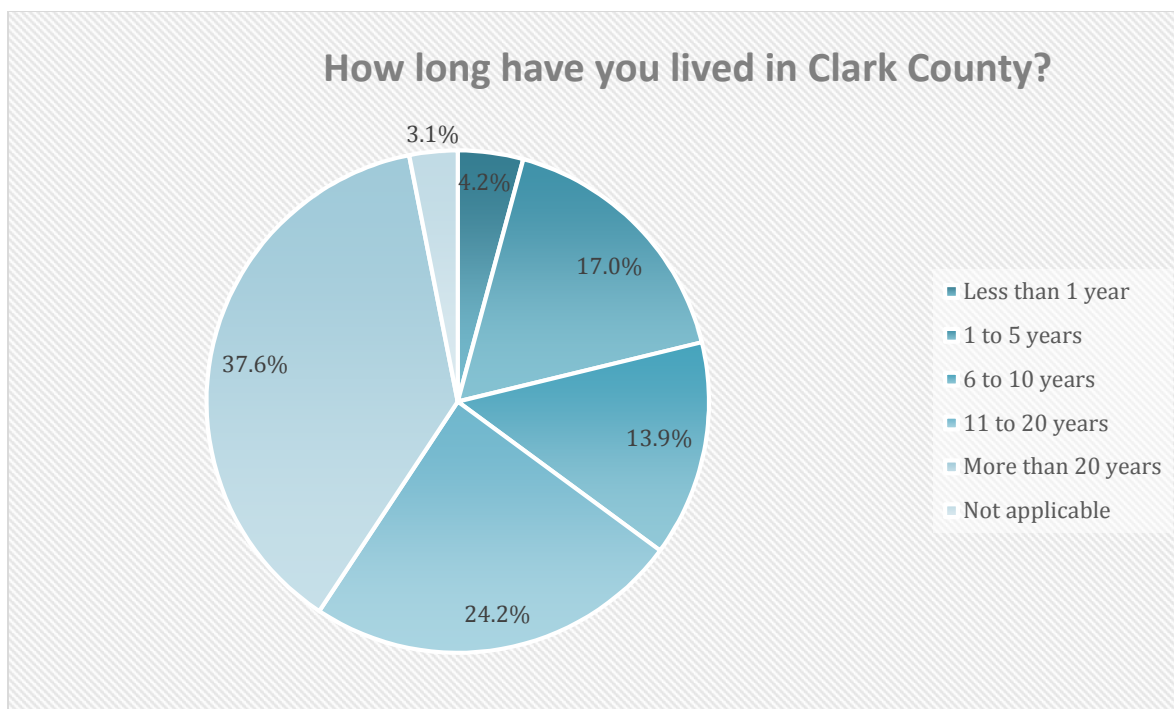
Question 2

Please provide your zip code.	
Answer Options	Response Count
	824
<i>answered question</i>	824
<i>skipped question</i>	13

ZIP Code	Number of Respondents	Percent of Total	ZIP Code	Number of Respondents	Percent of Total
89642	1	0.1%	98662	47	5.7%
91387	1	0.1%	98663	27	3.3%
97086	1	0.1%	98664	24	2.9%
98462	1	0.1%	98665	24	2.9%
98504	1	0.1%	98666	1	0.1%
98542	1	0.1%	98671	50	6.1%
98603	1	0.1%	98674	25	3.0%
98604	61	7.4%	98675	6	0.7%
98606	14	1.7%	98681	1	0.1%
98607	74	9.0%	98682	44	5.3%
98622	1	0.1%	98683	29	3.5%
98625	1	0.1%	98684	30	3.6%
98629	14	1.7%	98685	38	4.6%
98642	197	23.9%	98686	24	2.9%
98643	2	0.2%	98687	1	0.1%
98660	36	4.4%	98698	1	0.1%
98661	44	5.3%	98707	1	0.1%

Question 3

How long have you lived in Clark County?		
Answer Options	Response Percent	Response Count
Less than 1 year	4.2%	35
1 to 5 years	17.0%	141
6 to 10 years	13.9%	115
11 to 20 years	24.2%	200
More than 20 years	37.6%	311
Not applicable	3.1%	26
Comments		36
<i>answered question</i>		828
<i>skipped question</i>		9



Question 4

How concerned are you about the following hazards' potential to impact you, your neighbors, and property in Clark County?

Answer Options	Not concerned	Slightly concerned	Concerned	Very concerned	Extremely concerned	I'm not sure	Response Count
Dam Failure	421	207	68	13	19	14	742
Drought	234	268	166	38	29	2	737
Earthquake	30	134	221	160	206	1	752
Flood	184	265	179	69	37	3	737
Landslide	196	221	182	78	62	2	741
Severe Weather (Thunderstorms, Hail, Windstorms, Lightning, Winter Storms, Heat Waves, Tornadoes)	106	255	234	94	53	2	744
Volcano	213	280	162	56	33	4	748
Wildfire	186	241	182	82	47	3	741
Other	131	21	23	15	28	47	265
Please specify other hazard							102
answered question							760
skipped question							77

Question 5

Which of the following have you or household members taken to prepare for a natural disaster? Select all that apply.

Answer Options	Response Percent	Response Count
Purchase emergency food rations/supplies	64.1%	474
Participate in a disaster safety program/training (e.g. Community Emergency Response Team [CERT], American Red Cross)	24.9%	184
Develop/regularly update your family disaster plan	26.3%	194
Purchase supplemental insurance (for flood or earthquakes)	26.7%	197
Clear leaves, snow, or other debris away from storm drains	65.9%	487
Plant drought resistant landscapes	30.4%	225
Maintain long-term savings for emergencies and disasters	48.8%	361
Check smoke detector batteries once a month and change batteries once a year	65.9%	487
Maintain an area free from vegetation and combustible materials around your home	47.8%	353
Use fire-resistant landscaping (plants that do not catch fire easily)	14.5%	107
Elevate your house or utilities above the floodplain	18.9%	140
Purchase a property more resistant to hazards (e.g. buying an elevated house or verifying structural integrity before purchase)	26.1%	193
Ensure your home is bolted to its foundation	28.8%	213
Secure household items, such as bookcases, that can cause injury during an earthquake	26.4%	195
Minimize vegetation removal near steep slopes or stabilize steep slopes on property	17.2%	127
Trim trees near house and/or power lines	49.7%	367
Obtain an emergency generator	19.2%	142
Other (please specify)	9.6%	71
answered question		739
skipped question		98

Question 6

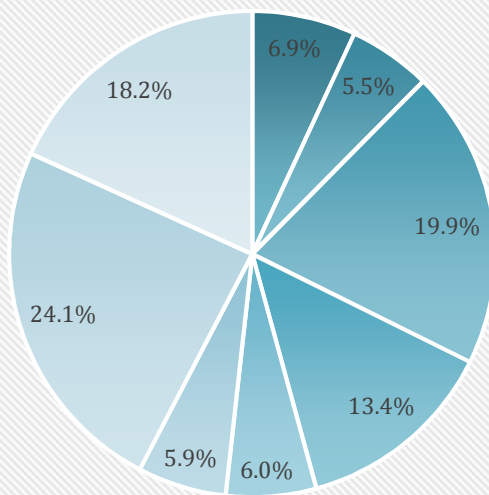
Where have you found useful information on preparing for, responding to, and reducing your risk from disasters? Select all that apply

Answer Options	Response Percent	Response Count
FEMA or other federal government websites	31.5%	218
CRESA website, blog, and social media accounts	27.4%	190
Other state or local government website	22.1%	153
Nongovernmental organizations (Red Cross or other volunteer organizations, faith-based institutions, etc.)	40.4%	280
Local news or other media (radio, TV, newspaper)	52.4%	363
Email newsletters from FEMA, CRESA, Clark County, local city, or other preparedness organizations	19.3%	134
Informational brochures or other printed materials	29.4%	204
Public meetings or community events on disaster preparedness topics	14.6%	101
Social media (Facebook, Twitter, YouTube, Pinterest)	37.2%	258
University or research institution	8.1%	56
Public library	7.2%	50
Neighbors / friend /family member	36.5%	253
Other (please specify)	12.8%	89
answered question		693
skipped question		144

Question 7**What is the primary reason for not taking actions to reduce your risk and vulnerability to natural disasters?**

Answer Options	Response Percent	Response Count
I don't know what to do	6.9%	50
I know actions to take but I don't know how to do it (technical expertise)	5.5%	40
It costs too much	19.9%	145
The odds of being impacted are too low to justify the cost or hassle	13.4%	98
I don't have time	6.0%	44
There isn't a way to stop the hazard or the damage anyway	5.9%	43
I feel I am well-prepared	24.1%	176
Other (please specify)	18.2%	133
answered question		729
skipped question		108

What is the primary reason for not taking actions to reduce your risk and vulnerability to natural disasters?



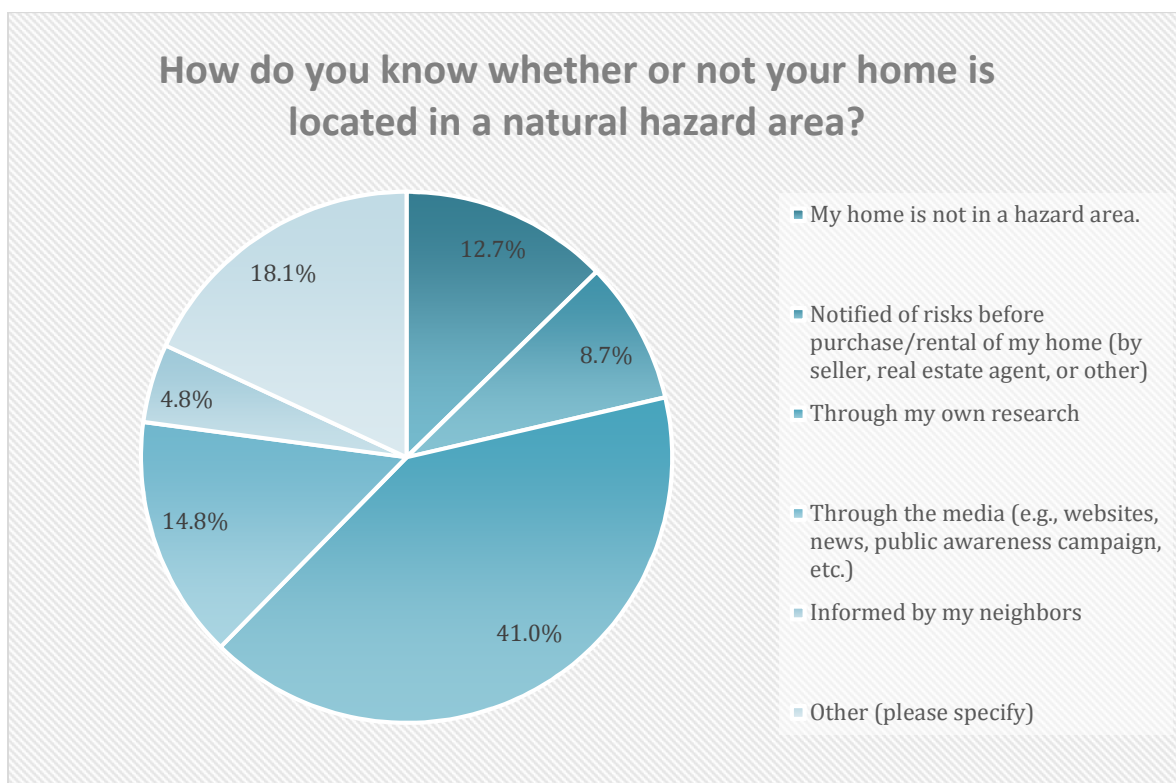
- I don't know what to do
- I know actions to take but I don't know how to do it (technical expertise)
- It costs too much
- The odds of being impacted are too low to justify the cost or hassle
- I don't have time
- There isn't a way to stop the hazard or the damage anyway
- I feel I am well-prepared
- Other (please specify)

Question 8**Is your home located in any of the following natural hazard areas? Select all that apply**

Answer Options	Response Percent	Response Count
Floodplain	6.0%	44
Earthquake hazard zone	41.7%	307
Liquefaction zone (area with liquefiable soils)	5.0%	37
Landslide hazard area	7.2%	53
Dam or reservoir inundation zone	2.4%	18
Wildfire risk area	10.3%	76
Volcano hazard zone	13.0%	96
I don't know	39.9%	294
None of the above	17.1%	126
Other (please specify)	5.8%	43
answered question		737
skipped question		100

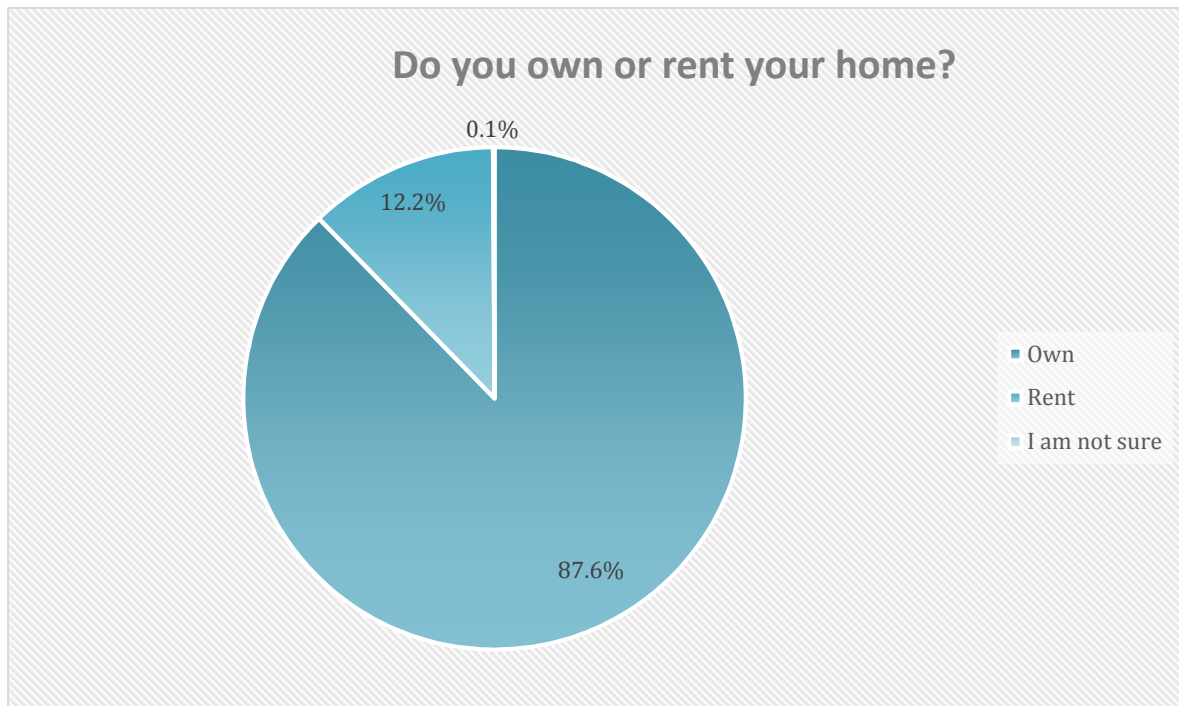
Question 9

How do you know whether or not your home is located in a natural hazard area?		
Answer Options	Response Percent	Response Count
My home is not in a hazard area.	12.7%	80
Notified of risks before purchase/rental of my home (by seller, real estate agent, or other)	8.7%	55
Through my own research	41.0%	258
Through the media (e.g., websites, news, public awareness campaign, etc.)	14.8%	93
Informed by my neighbors	4.8%	30
Other (please specify)	18.1%	114
answered question		630
skipped question		207



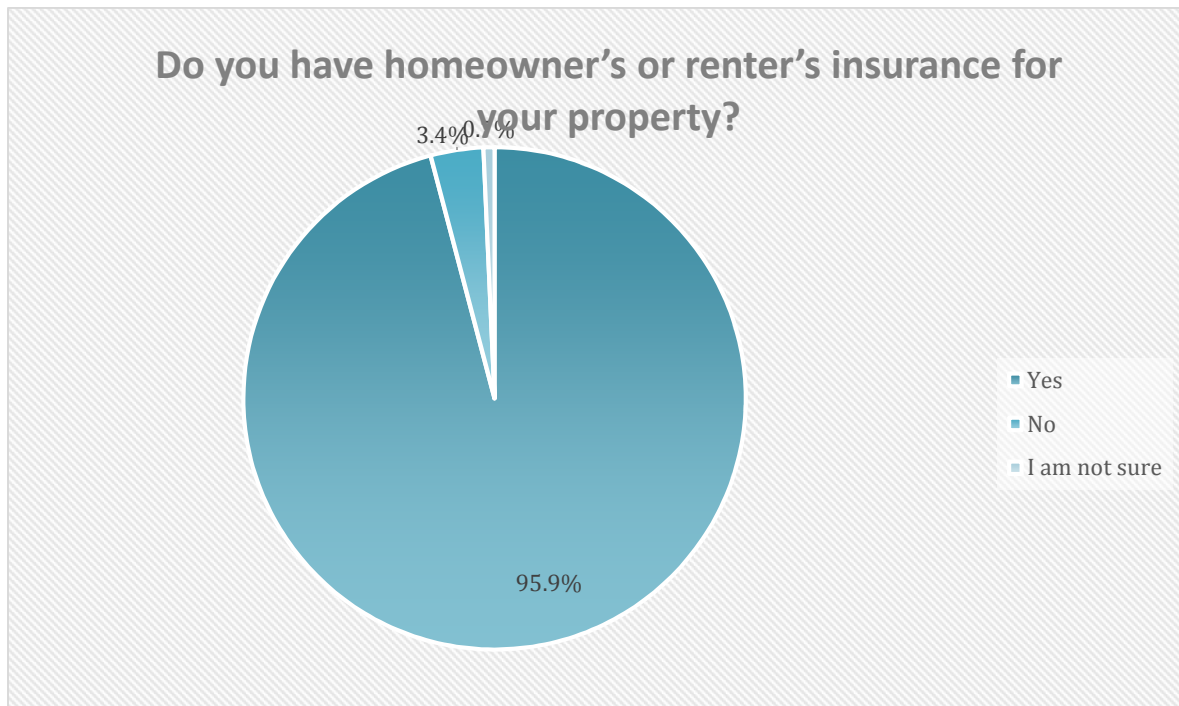
Question 10

Do you own or rent your home?		
Answer Options	Response Percent	Response Count
Own	87.6%	645
Rent	12.2%	90
I am not sure	0.1%	1
Comments		5
<i>answered question</i>		736
<i>skipped question</i>		101



Question 11

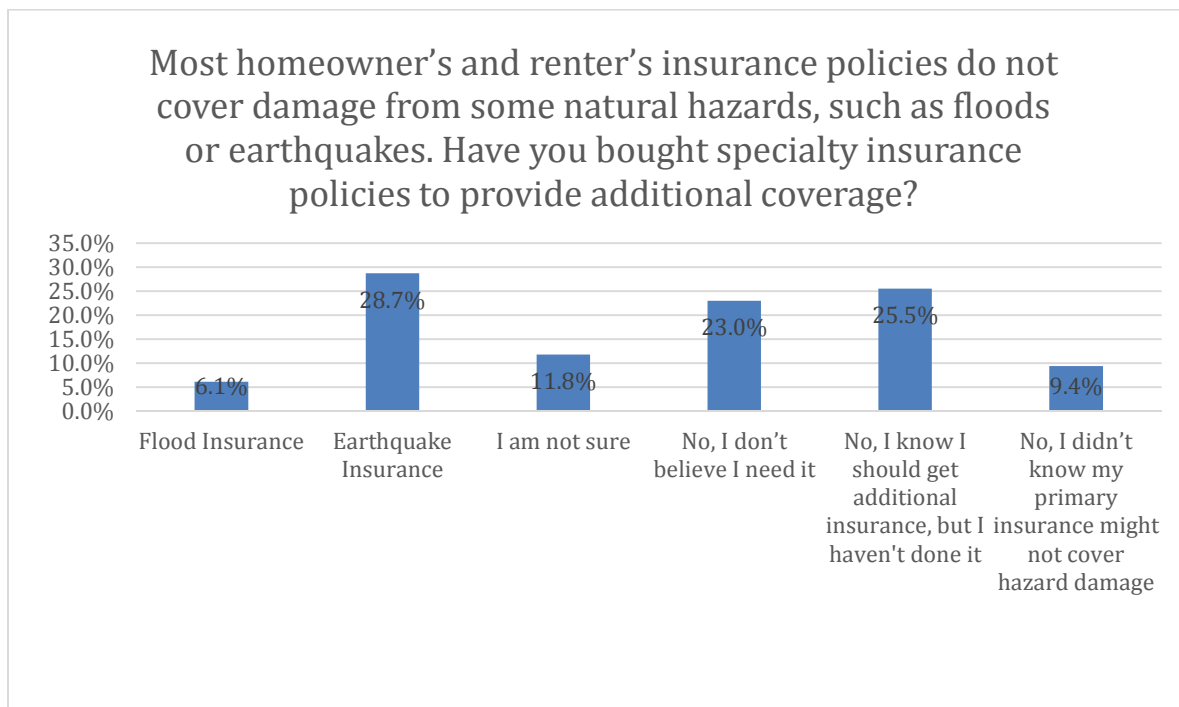
Do you have homeowner's or renter's insurance for your property?		
Answer Options	Response Percent	Response Count
Yes	95.9%	709
No	3.4%	25
I am not sure	0.7%	5
Comments		4
answered question		739
skipped question		98



Question 12

Most homeowner's and renter's insurance policies do not cover damage from some natural hazards, such as floods or earthquakes. Have you bought specialty insurance policies to provide additional coverage?

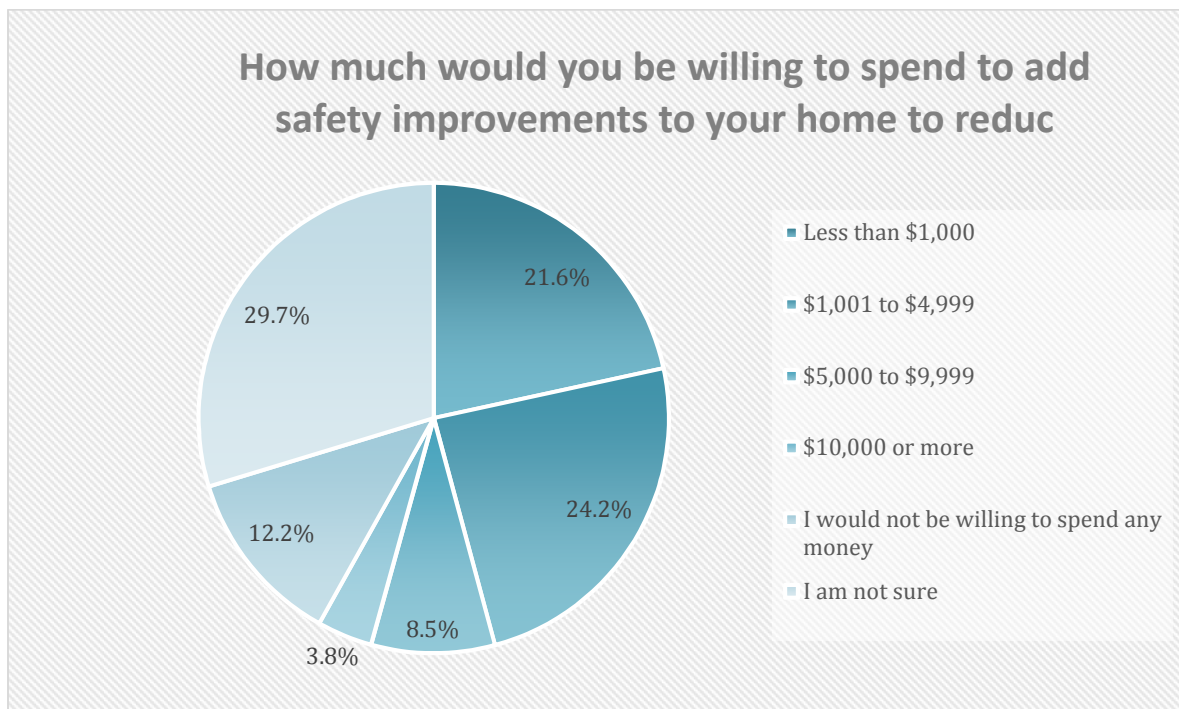
Answer Options	Response Percent	Response Count
Flood Insurance	6.1%	43
Earthquake Insurance	28.7%	202
I am not sure	11.8%	83
No, I don't believe I need it	23.0%	162
No, I know I should get additional insurance, but I haven't done it	25.5%	180
No, I didn't know my primary insurance might not cover hazard damage	9.4%	66
Comments		70
answered question		705
skipped question		132



Question 13

How much would you be willing to spend to add safety improvements to your home to reduce the possible risks from disaster damage? Examples of safety improvements include, but are not limited to, elevating your home or utilities above the flood level, performing seismic upgrades, or replacing a combustible roof with non-combustible roofing.

Answer Options	Response Percent	Response Count
Less than \$1,000	21.6%	155
\$1,001 to \$4,999	24.2%	173
\$5,000 to \$9,999	8.5%	61
\$10,000 or more	3.8%	27
I would not be willing to spend any money	12.2%	87
I am not sure	29.7%	213
Comments		67
answered question		716
skipped question		121

**Question 14**

Which of the following types of information would be most helpful to you in helping you reduce your disaster risks? Select all that apply

Answer Options	Response Percent	Response Count
Recommended preparedness actions residents can take	69.2%	487
Recommended mitigation actions residents can take	53.0%	373
Information on available grant programs for property buyouts or safety upgrades	48.0%	338
Information on county and city disaster management capabilities	53.8%	379
There is enough information available for all these topics	12.1%	85
More information is needed on hazards (list hazards below)	9.7%	68
answered question		704
skipped question		133

Question 15

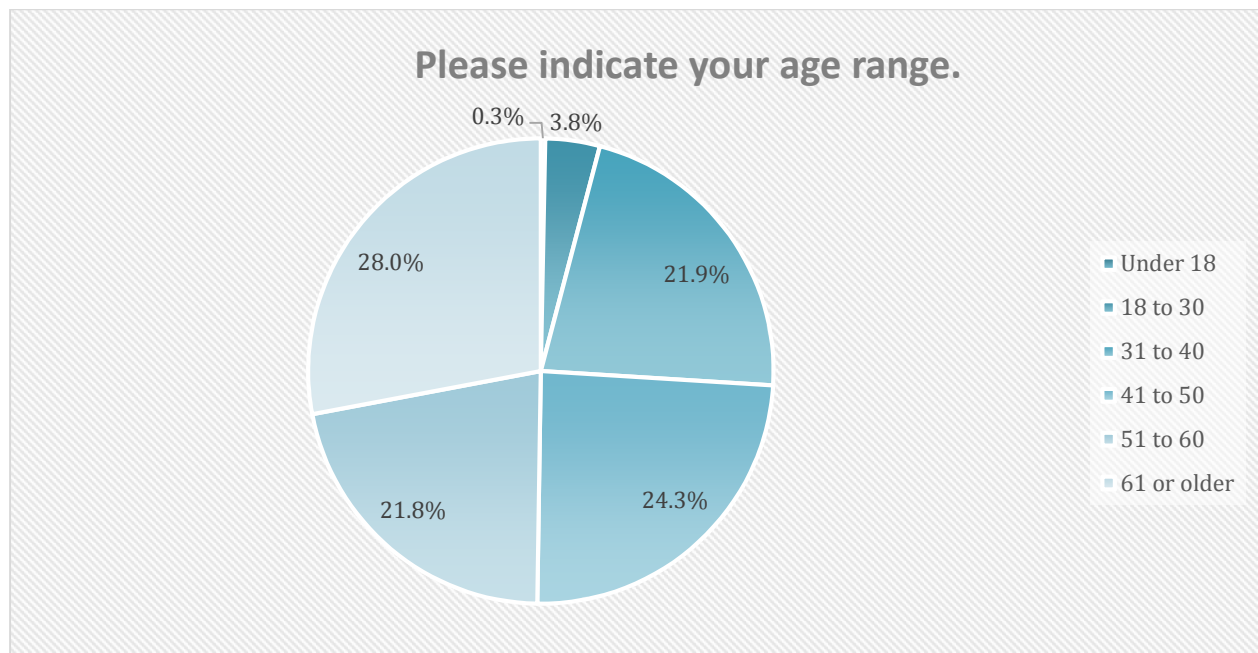
What types of projects or actions should local, state, or federal government take to reduce damage and disruption from natural disasters in Clark County? Please pick your top three priorities.

Answer Options	Response Percent	Response Count
Strengthen essential facilities such as police stations and schools	52.1%	371
Strengthen infrastructure, such as roads and water supply systems	79.4%	565
Conduct large projects such as building/ improving dams or drainage systems	19.0%	135
Strengthen laws and regulations in hazard areas such as floodplains	20.1%	143
Help owners of vulnerable property find funding for risk reduction projects	35.3%	251
Provide better public information about risk and vulnerable areas	57.0%	406
Restore the natural environment's ability to absorb the impacts from natural hazards, such as wetland restoration and rain gardens	38.6%	275
Lessen potential impacts from climate change	25.4%	181
Buy out homes/properties located in high-hazard areas or experiencing repeated damage	11.1%	79
Comments		59
answered question		712
skipped question		125

Question 16

Please indicate your age range.

Answer Options	Response Percent	Response Count
Under 18	0.3%	2
18 to 30	3.8%	27
31 to 40	21.9%	157
41 to 50	24.3%	174
51 to 60	21.8%	156
61 or older	28.0%	201
answered question		717
skipped question		120

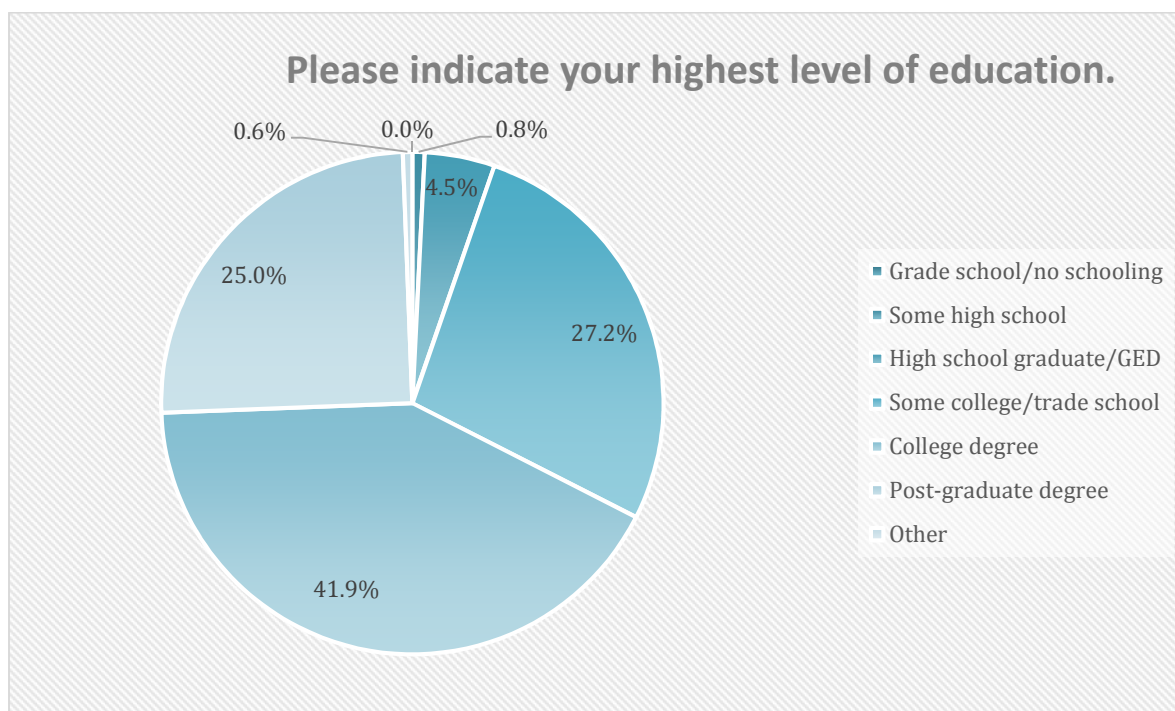


Question 17**Please indicate your gender.**

Answer Options	Response Percent	Response Count
Female	58.1%	415
Male	40.2%	287
Other/Prefer not to disclose	1.7%	12
answered question		714
skipped question		123

Question 18**Please indicate your highest level of education.**

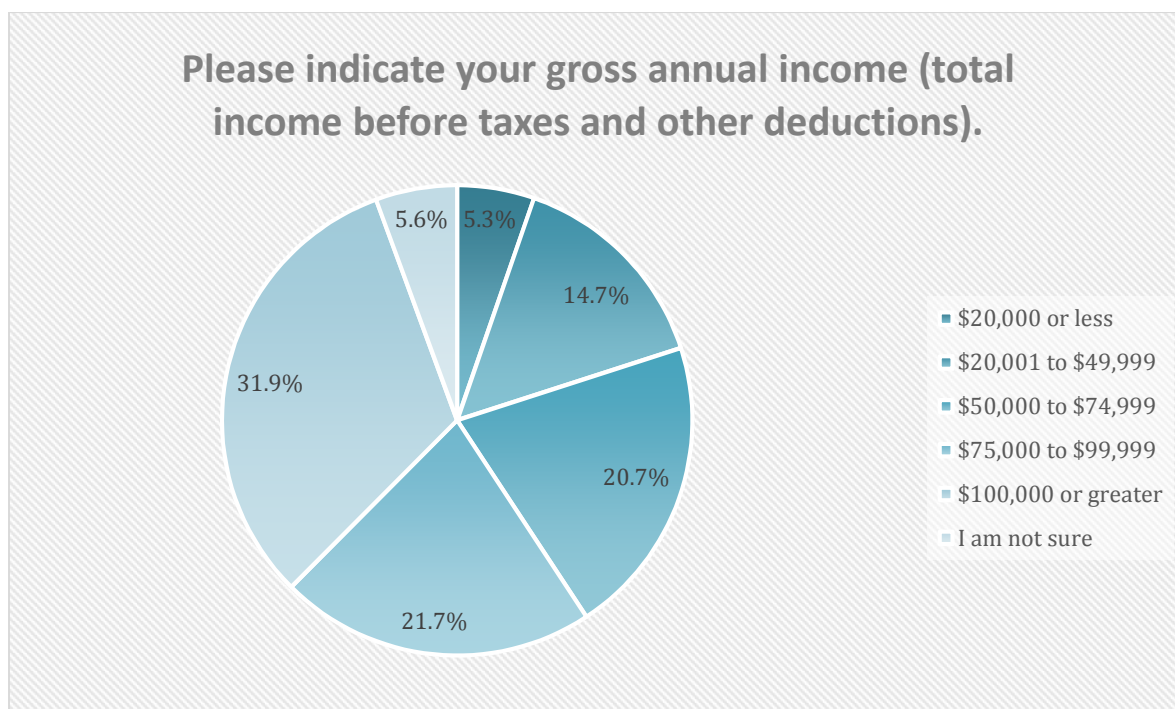
Answer Options	Response Percent	Response Count
Grade school/no schooling	0.0%	0
Some high school	0.8%	6
High school graduate/GED	4.5%	32
Some college/trade school	27.2%	195
College degree	41.9%	300
Post-graduate degree	25.0%	179
Other	0.6%	4
answered question		716
skipped question		121



Question 19

Please indicate your gross annual income (total income before taxes and other deductions).

Answer Options	Response Percent	Response Count
\$20,000 or less	5.3%	37
\$20,001 to \$49,999	14.7%	102
\$50,000 to \$74,999	20.7%	144
\$75,000 to \$99,999	21.7%	151
\$100,000 or greater	31.9%	222
I am not sure	5.6%	39
<i>answered question</i>		695
<i>skipped question</i>		142

**Question 20**

If you have additional information you would like to share about your knowledge and experiences regarding hazards in Clark County, please use the box below.

Answer Options	Response Count
	93
<i>answered question</i>	93
<i>skipped question</i>	744



Clark County, WA Hazard Mitigation Public Questionnaire

INTRODUCTION

Clark Regional Emergency Services Agency (CRESA) is working with Clark County, its cities and other participating agencies to update the Clark County Multi-Jurisdictional, Multi-Hazard Mitigation Plan (HMP).

Mitigation planning identifies steps to take before a disaster to reduce potential damages and other impacts. To implement effective mitigation, we want to find out more about your opinions, experience, and knowledge of natural hazards. The information you provide will help us identify projects and strategies that will lower the risk of injury, property damage, and other impacts in future disasters.

This anonymous survey consists of 19 questions, with an opportunity to provide additional comments at the end. It should take less than 10 minutes to complete.

For more information regarding the Clark County Hazard Mitigation Plan, please visit:
<http://cresa911.org/hazmitplanproject/>.

Thank you for your time and interest in this important process.

1. Where do you live?

- ☐ Battle Ground
- ☐ Camas
- ☐ La Center
- ☐ Ridgefield
- ☐ Vancouver
- ☐ Washougal
- ☐ Yacolt
- ☐ Woodland
- ☐ Unincorporated Areas
- ☐ I work in Clark County, but do not live in Clark County
- ☐ Other (please specify)

2. Please provide your zip code.

3. How long have you lived in Clark County?

- ☐ Less than 1 year
- ☐ 1 to 5 years
- ☐ 6 to 10 years
- ☐ 11 to 20 years
- ☐ More than 20 years
- ☐ Not applicable

Comments



Clark County, WA Hazard Mitigation Public Questionnaire

HAZARD MITIGATION ON A PERSONAL LEVEL

Hazard mitigation includes actions to reduce your total risk and vulnerability to a hazard, decreasing its ability to harm you or have a significant impact on you. These actions are typically long-term or ongoing in nature.

4. How concerned are you about the following hazards' potential to impact you, your neighbors, and property in Clark County?

	Not concerned	Slightly concerned	Concerned	Very concerned	Extremely concerned	I'm not sure
Dam Failure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drought	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Earthquake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Flood	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Landslide	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Severe Weather (Thunderstorms, Hail, Windstorms, Lightning, Winter Storms, Heat Waves, Tornadoes)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Volcano	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wildfire	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please specify other hazard

5. Which of the following have you or household members taken to prepare for a natural disaster?

Select all that apply.

- ☐ Purchase emergency food rations/supplies
- ☐ Participate in a disaster safety program/training (e.g. Community Emergency Response Team [CERT], American Red Cross)
- ☐ Develop/regularly update your family disaster plan
- ☐ Purchase supplemental insurance (for flood or earthquakes)
- ☐ Clear leaves, snow, or other debris away from storm drains
- ☐ Plant drought resistant landscapes
- ☐ Maintain long-term savings for emergencies and disasters
- ☐ Check smoke detector batteries once a month and change batteries once a year
- ☐ Maintain an area free from vegetation and combustible materials around your home
- ☐ Use fire-resistant landscaping (plants that do not catch fire easily)
- ☐ Elevate your house or utilities above the floodplain
- ☐ Purchase a property more resistant to hazards (e.g. buying an elevated house or verifying structural integrity before purchase)
- ☐ Ensure your home is bolted to its foundation
- ☐ Secure household items, such as bookcases, that can cause injury during an earthquake
- ☐ Minimize vegetation removal near steep slopes or stabilize steep slopes on property
- ☐ Trim trees near house and/or power lines
- ☐ Obtain an emergency generator
- ☐ Other (please specify)

6. Where have you found useful information on preparing for, responding to, and reducing your risk from disasters.

Select all that apply

- ☐ FEMA or other federal government websites
- ☐ CRESA website, blog, and social media accounts
- ☐ Other state or local government website
- ☐ Nongovernmental organizations (Red Cross or other volunteer organizations, faith-based institutions, etc.)
- ☐ Local news or other media (radio, TV, newspaper)
- ☐ Email newsletters from FEMA, CRESA, Clark County, local city, or other preparedness organizations
- ☐ Informational brochures or other printed materials
- ☐ Public meetings or community events on disaster preparedness topics
- ☐ Social media (Facebook, Twitter, YouTube, Pinterest)
- ☐ University or research institution
- ☐ Public library
- ☐ Neighbors / friend /family member
- ☐ Other (please specify)

7. What is the primary reason for not taking actions to reduce your risk and vulnerability to natural disasters?

- ☐ I don't know what to do
- ☐ I know actions to take but I don't know how to do it (technical expertise)
- ☐ It costs too much
- ☐ The odds of being impacted are too low to justify the cost or hassle
- ☐ I don't have time
- ☐ There isn't a way to stop the hazard or the damage anyway
- ☐ I feel I am well-prepared
- ☐ Other (please specify)



Clark County, WA Hazard Mitigation Public Questionnaire

HAZARD MITIGATION OPPORTUNITIES

8. Is your home located in any of the following natural hazard areas?

Select all that apply

- ☐ Floodplain
- ☐ Earthquake hazard zone
- ☐ Liquefaction zone (area with liquefiable soils)
- ☐ Landslide hazard area
- ☐ Dam or reservoir inundation zone
- ☐ Wildfire risk area
- ☐ Volcano hazard zone
- ☐ I don't know
- ☐ None of the above
- ☐ Other (please specify)

9. How do you know whether or not your home is located in a natural hazard area?

- ☐ My home is not in a hazard area.
- ☐ Notified of risks before purchase/rental of my home (by seller, real estate agent, or other)
- ☐ Through my own research
- ☐ Through the media (e.g., websites, news, public awareness campaign, etc.)
- ☐ Informed by my neighbors
- ☐ Other (please specify)

10. Do you own or rent your home?

- ☐ Own
- ☐ Rent
- ☐ I am not sure

Comments

11. Do you have homeowner's or renter's insurance for your property?

- ☐ Yes
- ☐ No
- ☐ I am not sure

Comments

12. Most homeowner's and renter's insurance policies do not cover damage from some natural hazards, such as floods or earthquakes.

Have you bought specialty insurance policies to provide additional coverage?

- ☐ Flood Insurance
- ☐ Earthquake Insurance
- ☐ I am not sure
- ☐ No, I don't believe I need it
- ☐ No, I know I should get additional insurance, but I haven't done it
- ☐ No, I didn't know my primary insurance might not cover hazard damage

Comments

13. How much would you be willing to spend to add safety improvements to your home to reduce the possible risks from disaster damage?

Examples of safety improvements include, but are not limited to, elevating your home or utilities above the flood level, performing seismic upgrades, or replacing a combustible roof with non-combustible roofing.

- ☐ Less than \$1,000
- ☐ \$1,001 to \$4,999
- ☐ \$5,000 to \$9,999
- ☐ \$10,000 or more
- ☐ I would not be willing to spend any money
- ☐ I am not sure

Comments



Clark County, WA Hazard Mitigation Public Questionnaire

HAZARD READINESS ON A COUNTY LEVEL

14. Which of the following types of information would be most helpful to you in helping you reduce your disaster risks?

Select all that apply

- ☐ Recommended preparedness actions residents can take
- ☐ Recommended mitigation actions residents can take
- ☐ Information on available grant programs for property buyouts or safety upgrades
- ☐ Information on county and city disaster management capabilities
- ☐ There is enough information available for all these topics
- ☐ More information is needed on hazards (list hazards below)

15. What types of projects or actions should local, state, or federal government take to reduce damage and disruption from natural disasters in Clark County?

Please pick your top three priorities.

- ☐ Strengthen essential facilities such as police stations and schools
- ☐ Strengthen infrastructure, such as roads and water supply systems
- ☐ Conduct large projects such as building/ improving dams or drainage systems
- ☐ Strengthen laws and regulations in hazard areas such as floodplains
- ☐ Help owners of vulnerable property find funding for risk reduction projects
- ☐ Provide better public information about risk and vulnerable areas
- ☐ Restore the natural environment's ability to absorb the impacts from natural hazards, such as wetland restoration and rain gardens
- ☐ Lessen potential impacts from climate change
- ☐ Buy out homes/properties located in high-hazard areas or experiencing repeated damage

Comments



Clark County, WA Hazard Mitigation Public Questionnaire

RESPONDENT DEMOGRAPHIC INFORMATION

Answers to the following questions will help us understand the responses to this survey and develop mitigation projects designed to meet the needs of Clark County residents.

THIS INFORMATION WILL BE KEPT CONFIDENTIAL.

The answers will only be used to prepare this plan and will not be provided to any other group or interest.

16. Please indicate your age range.

- ☐ Under 18
- ☐ 18 to 30
- ☐ 31 to 40
- ☐ 41 to 50
- ☐ 51 to 60
- ☐ 61 or older

17. Please indicate your gender.

- ☐ Female
- ☐ Male
- ☐ Other/Prefer not to disclose

18. Please indicate your highest level of education.

- ☐ Grade school/no schooling
- ☐ Some high school
- ☐ High school graduate/GED
- ☐ Some college/trade school
- ☐ College degree
- ☐ Post-graduate degree
- ☐ Other

19. Please indicate your gross annual income (total income before taxes and other deductions).

- ☐ \$20,000 or less
- ☐ \$20,001 to \$49,999
- ☐ \$50,000 to \$74,999
- ☐ \$75,000 to \$99,999
- ☐ \$100,000 or greater
- ☐ I am not sure

20. If you have additional information you would like to share about your knowledge and experiences regarding hazards in Clark County, please use the box below.

Clark Regional Natural Hazard Mitigation Plan: Volume 1—Planning Area-Wide Elements

Appendix D. Planning Partner Updates

December Planning Partner Update

Clark County Multi-jurisdictional, Multi-Hazard Mitigation Plan

Greetings! The planning team wanted to provide the planning partnership with an update on the hazard mitigation planning process as a few key milestones have been reached. We have held four steering committee meetings and have deployed the first of three jurisdictional annex templates. Please review the information below for more details and be sure to let us know if you have any questions, comments or concerns.

HAZARDS OF CONCERN

The following hazards of concern were confirmed by the steering committee and will be profiled in the 2016 HMP:

- Dam failure
- Drought
- Earthquake
- Flood
- Landslide
- Severe weather
- Volcano
- Wildfire.

DRAFT PURPOSE, GOALS AND OBJECTIVES

Over the past several months the steering committee has developed the following purpose, goals and objectives for the HMP. The goals were developed to support the purpose statement and the objectives were developed to support multiple goals. The steering committee will revisit these goals after reviewing the results of the risk assessment and the results of the initial public outreach, so changes may be made as we move through the process.

Purpose: Define natural hazard risk and, through collaboration and partnerships, establish strategies and actions for reducing the impacts of disasters in Clark County.

Goals:

- Reduce and prevent the loss of life and property.
- Protect public services and critical facilities from the impacts of natural disasters.
- Increase public awareness of vulnerability to natural hazards and educate on risk reduction strategies.
- Promote community resilience.
- Protect environmental resources and utilize natural systems to reduce natural hazard impacts.
- Develop and implement cost-effective mitigation strategies.

Objectives:

- Incorporate risk reduction strategies in new and updated infrastructure and development plans to reduce the impacts of natural hazards.
- Provide incentives for development and land use techniques that reduce risks. (adapted from Clark County Comprehensive Plan)
- Reduce the impacts of hazards on vulnerable populations. (2013 WA State HMP)

- Strengthen and build redundancy into infrastructure, prioritizing areas that may be potentially isolated areas. (Adapted from 2004 Clark County HMP)
- Retrofit, purchase, or relocate structures in high hazard areas, especially those known to be repetitively damaged.
- Inform the public on the risk exposure to natural hazards and ways to increase the public's capability to prepare, respond, recover and mitigate the impacts of these events.
- Improve and maintain systems that provide warning and emergency communications. (2013 WA State HMP)
- Work cooperatively with stakeholders in planning for and reducing the impacts of natural hazards.
- Integrate natural hazard mitigation goals and objectives into other existing plans and programs within the planning area.
- Avoid, minimize or mitigate risks to critical facilities and infrastructure.
- Support and enhance environmental protection and sustainability activities that may also accomplish mitigation objectives.
- Use the best available data, science and technologies to implement mitigation strategies.

PUBLIC INVOLVEMENT STRATEGY

The planning team and steering committee have been working to develop the public involvement strategy. A questionnaire designed to find out more about the public's perception of risk and support for mitigation activities is currently being developed. When the questionnaire is finalized, we will ask all of you to help advertise the web-based questionnaire so that we reach as many residents as possible. Additionally, the planning team is working to schedule two public workshops where the general public will be invited to come learn about hazard risks in the County and to share their own thoughts and perceptions.

JURISDICTIONAL ANNEXES

Phase 1: The initial completion rate for the phase 1 jurisdictional annexes was quite good, with 78 percent of planning partners submitting the annex. The planning team is following up with those jurisdictions who have not yet submitted. Submitted annexes are being reviewed and the planning team will provide comments and identify missing pieces.

Phase 2: The phase 2 templates will be distributed next week and will be added on to the phase 1 submissions. The phase 2 portion will be due at the end of January. Phase 2 mainly addresses jurisdiction capabilities.

Phase 3: The planning team would like to schedule the mandatory jurisdictional annex workshop as soon as possible. The workshop will focus on completing phase 3 of the annex. If you have not already done so, please respond to the doodle poll so that we can set a date (please respond on or by Friday, December 4th) -

<http://doodle.com/poll/gxt5u26sb69m5gn7>

Contacts

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Rob Flaner Tetra Tech

Rob.Flaner@tetrattech.com

February Planning Partner Update

Clark County Multi-jurisdictional, Multi-Hazard Mitigation Plan

Greetings! The planning team wanted to provide the planning partnership with an update on the hazard mitigation planning process. The planning partnership, steering committee and planning team are all making excellent progress on many key aspects of plan development. We have held six steering committee meetings, deployed two of three jurisdictional annex templates, scheduled our jurisdictional annex workshop, initiated our public involvement strategy, and the steering committee has reviewed a 75 percent draft of part 1, volume 1 of the plan. Please review the information below for more details and be sure to let us know if you have any questions, comments or concerns.

PUBLIC INVOLVEMENT STRATEGY

Public Survey

Thank you to all of you who have helped us advertise our public hazard mitigation survey on your website and social media pages. As of today, we have 92 responses to the survey. More than 50 percent of these respondents have indicated that they live in Battle Ground, Washougal or Woodland. Other municipalities may want to re-post, re-tweet or otherwise highlight a link to the survey. A flyer advertising the survey and some sample website and social media language was emailed out on January, 13 2016. Please contact Kristen.gelino@tetrattech.com if you would like us to resend. We intend to keep the survey open until at least the first week in March: <https://www.surveymonkey.com/r/ClarkCounty2016HMP>

Presentations and Public Meetings

Scott Johnson will be presenting about the project to two neighborhood associations in the coming weeks. The dates, times and locations are copied below. In addition, the planning team is working to finalize some public outreach events in early March and mid-April. We will send along more information on those events when the details have been finalized.

Presentation to the Neighborhood Associations Council of Clark County

February 8, 2016

Clark County Public Works Operations Center

4700 NE 78th St

7:00 to 8:30 pm

Presentation to the Vancouver Neighborhood Alliance Meeting

February 10, 2016

Fisher's Landing Fire Station

17408 SE 15th Street

7:00 pm

Project Website

The Hazard Mitigation Planning Project website has been updated with resources, hazard maps, and other information. All planning partners are encouraged to provide a link to the site on their own websites if you have not already done so: <http://cresa911.org/hazmitplanproject/>

JURISDICTIONAL ANNEXES

Phase 1: The initial completion rate for the phase 1 jurisdictional annexes was quite good, with 89 percent of planning partners submitting the annex. The planning team has been in contact with those planning partners that did not submit phase 1 and has made arrangements for its completion.

Phase 2: The phase 2 templates were distributed in mid-December and are due today, February 1st. Many jurisdictions have submitted the annexes or indicated that they will need a bit more time. If you will be unable to submit your jurisdiction's annex, please send a status update to Kristen.gelino@tetrattech.com.

Phase 3: The planning team has scheduled the mandatory jurisdictional annex workshop. Each jurisdiction is required to send at least one representative to one workshop (no need to attend both days). At the workshop, we will focus on completing phase 3 of the annex. If you have not yet RSVP'd, please take a moment to do so now: <https://www.surveymonkey.com/r/RSVPClarkCountyJurisdictionalAnnexWorkshop>

March Jurisdictional Annex Workshop Dates, Times and Location:

Thursday, March 3rd from 9am to 12pm

Friday, March 4th from 9am to 12pm

Location: Lewisville Campus, 406 NW 5th Ave, Battle Ground, WA 98604

The planning team will be sending out some information to help you prepare for this workshop in the coming weeks.

Contacts

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Rob Flaner Tetra Tech

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May Planning Partner Update

Clark County Multi-jurisdictional, Multi-Hazard Mitigation Plan

Greetings! The planning team wanted to provide the planning partnership with an update on the hazard mitigation planning process. We have now completed a significant portion of the plan development process and are getting ready to move into the plan review and adoption phase. Please review the information below for more details and be sure to let us know if you have any questions, comments or concerns.



Steering Committee

The steering committee held its final meeting of the plan development process earlier this month. The planning team would like to extend a sincere THANK YOU to our steering committee. The committee provided a lot of insightful comments and direction throughout the process. A version of the committee – a hazard mitigation working group – will begin work on plan implementation and maintenance in the fall. Anthony Vendetti (Anthony.Vendetti@clark.wa.gov) will be contacting the planning partnership and steering committee members regarding these meetings in the late summer/early fall of 2016.

Draft Document

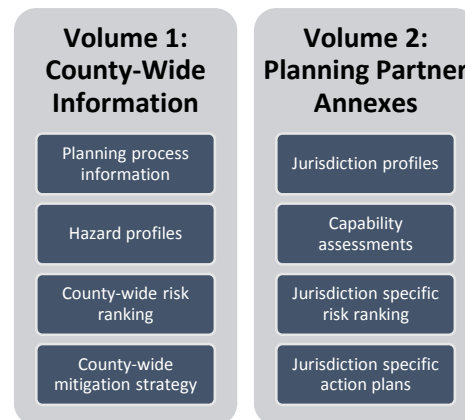
Volume 1

Over the last several months the steering committee has reviewed parts 1, 2 and 3 of Volume I of the document (county-wide elements). The planning team is working to address all comments and combine the document into one volume that the committee will review one last time before public comment (draft to be distributed to committee members on June 16th with comments due on June 23rd).

Volume 2

Volume 2 is largely comprised of the jurisdictional annexes. Thank you to those of you have turned in complete drafts of your jurisdictional annexes. We are in the process of reviewing and making comments and will have all annexes returned for any final changes by the end of the day on **June 2nd**. A few important dates follow:

- **June 6** - If you have not yet submitted a complete draft of your annex, the **absolute last day** to do so is the end of the day on Monday, June 6.
- **June 17** – Final annexes are due from all planning partners. This version of the annex will be included in the public review draft version of the plan. Additional instructions will be provided in the email that includes any final comments from the planning team (to be sent by June 2nd).



If you have any questions or concerns about these deadlines, please contact Kristen.gelino@tetrattech.com immediately.

Public Review

The public must be given a chance to review and comment on the draft plan. The planning team is making arrangements to run a 30 day public comment period (tentatively) from July 7th to August 5th. The plan will be posted to the HMP project website with instructions for providing comments. We will disseminate a press release announcing the public comment period and we will ask planning partners to use their social media accounts and websites to help us disseminate this information.

During the public comment period, we will be making a brief presentation to the Clark Regional Emergency Services Agency Administration Board, which has representatives from the small cities within Clark County, Vancouver Fire Department, local financial institutions, Clark County, regional law enforcement, Clark County Sheriff's Office, City of Vancouver, the Fire Chiefs' Association, and public EMS providers. The planning team is still working on scheduling this meeting, but it will be held during the public comment period on either July 7th or July 14th. Additional information will be provided as it becomes available. If a planning partner would like to host a meeting in their jurisdiction during the public comment period, please contact a member of the planning team to see if resources are available to help support your effort. A PowerPoint will be distributed to the planning partnership at the end of June that can be used in such public meetings and/or adapted for presentations to planning commissions or other groups as appropriate.

Agency Review and Adoption

After the public comment period, the planning team will make appropriate revisions to the document and get it ready to be submitted for agency review. First, the document will be submitted to the Washington State Emergency Management Division for their review and approval. After this approval is received, we will begin the adoption process and the plan will be forwarded to FEMA Region X for their "pre-adoption" approval. FEMA will review and issue a notice that the plan is approved pending adoption. Final approval will be granted by FEMA after proof of formal adoption of the plan has been submitted to the Region.

Please keep in mind that the timeframes outlined may be subject to change and delays may occur during the review process.



Plan Adoption

It is very important for Planning Partners to understand that the planning process for any individual jurisdiction is not complete until the jurisdiction's governing body (e.g. city council) has formally adopted the Plan, submitted this approval to FEMA and, finally, received a letter indicating final approval from FEMA. Jurisdictions should start moving through the plan adoption process as soon as the go ahead is given by the planning team (likely late September).

Adoption

Each participating jurisdiction must have its governing body formally adopt the plan via resolution or ordinance before final approval can be granted. To assist jurisdictions with this process, the planning team will provide a briefing packet, which can be given to your jurisdiction's governing body. This packet will include: a sample resolution, the executive summary and an explanatory cover letter. We will also include a copy of the presentation to be given during the public comment period, which can be adapted to each jurisdiction's individual needs. This packet will be provided as guidance. Jurisdictions are encouraged to modify the language to best suit each jurisdiction's own needs and requirements.

****Important Note—At this time, we recommend that each jurisdiction review their individual adoption processes, as they differ among jurisdictions. Some jurisdictions may need to present the plan to the planning commission. Other jurisdictions may be required to hold a public hearing. Please check-in with your jurisdiction's appropriate staff to determine the appropriate course of action. As part of this due diligence, please be sure that you consult members of your staff that work on Washington State Environmental Policy Act (SEPA) requirements. SEPA requirements for this planning process are based on jurisdictional discretion. Depending on how long it takes to move through adoption in your jurisdiction, you may wish to reserve places on board or council schedules using the guidance indicated above.****

Final Approval

As jurisdictions adopt the plan, copies of the adoption resolutions will be sent to FEMA and final approval status will be granted. Jurisdictions have one calendar year from the first issuance of final approval to adopt the plan, but the planning team recommends that each jurisdiction adopt as soon as possible after the adoption window opens.

County-Wide Actions

At the last steering committee meeting, the following county-wide actions were approved. Please review and let the planning team know if you have any questions or concerns.

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency ^a	Estimated Cost	Sources of Funding ^b	Timeline
CW-1—Establish a county-wide repository of perishable data from hazard events and develop a standard form for capturing information.						
New and existing	All hazards	4, 12	CRESA	Low	Staff time	Short-term
CW-2—Develop a county-wide recovery/resiliency plan.						
New and existing	All hazards	2, 4, 6	CRESA	High	Local, possible grant funding (UASI)	Short-term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency ^a	Estimated Cost	Sources of Funding ^b	Timeline
CW-3—Participate in the plan implementation hazard mitigation working group by sharing lessons learned and mitigation success stories and actively participating in progress reporting						
New and existing	All hazards	1, 4, 6, 12	Planning Partners/ facilitated by CRESA	Low	Staff time	On-going
CW-4—Support and guide the technology for regional hazard warning systems						
New and existing	All hazards	1, 2, 3, 12	CRESA	Medium	Local, possible grant funding (FEMA, DHS, NWS, NOAA)	On-going
CW-5—Ensure that a link to the hazard mitigation plan website hosted by CRESA is posted conspicuously on each planning partner website						
N/A	All hazards	1, 4	Planning Partners	Low	Staff time	Short-term
CW-6—Support regional collaboration and consistency in hazard mitigation implementation and programs						
New and existing	All hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Clark County/CRESA	Low	Staff time	On-going
CW-7—Where appropriate, support retro-fitting, relocating or acquisition from willing property owners of structures located in hazard-prone areas to protect structures from future damage, with repetitive and severe repetitive loss as a priority. Seek opportunities to leverage partnerships within the planning area in these pursuits						
Existing	All hazards	4, 5, 7, 9, 10	Planning Partners	High	HMGP, PDM, FMA, CBDG-DR	On-going
CW-8—Utilize information contained within the Clark County Hazard Mitigation Plan to support updates to other emergency management plans in effect within the planning area						
New and existing	All hazards	2, 4	CRESA	Low	Staff time	On-going
CW-9—Utilize information contained within the Clark County Hazard Mitigation Plan to support updates to other plans in effect within the planning area						
New and existing	All hazards	2, 4, 5	Planning Partners	Low	Staff time	On-going
CW-10—Develop the capacity for a regional post-disaster volunteer coordination program						
N/A	All hazards	1, 2, 3, 4	CRESA	Medium	Staff time, Local funds	Long-term
CW-11—Explore opportunities with all community stakeholders to implement, identify and fund mitigation actions						
New and existing	All hazards	1, 2, 4, 12	CRESA	Medium	Staff time, Local funds	On-going
CW-12—Continue regional partnerships to improve and enhance mitigation efforts in the larger region						
New and existing	All hazards	1, 4	CRESA	Low	Staff-time	On-going
CW-13—Establish guidelines to increase communication and coordination of mitigation actions across agencies whenever feasible						
New and existing	All hazards	4	CRESA	Low	Staff time	Short-term

Public Survey

If you have a link to the public hazard mitigation survey on your website, please remove it or indicate that it is closed at this time. A summary of the results of the survey will be included in the draft hazard mitigation plan.

Next Update

The planning team will send out another update before the public comment period in late June/early July. If you have any questions at this time, please contact a member of the planning team.

Contacts

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Clark Regional Natural Hazard Mitigation Plan: Volume 1—Planning Area-Wide Elements

Appendix E. Concepts and Methods Used for Hazard Mapping

E. CONCEPTS AND METHODS USED FOR HAZARD MAPPING

EARTHQUAKE

Shake Maps

A shake map is designed as a rapid response tool to portray the extent and variation of ground shaking throughout the affected region immediately following significant earthquakes. Ground motion and intensity maps are derived from peak ground motion amplitudes recorded on seismic sensors (accelerometers), with interpolation based on both estimated amplitudes where data are lacking, and site amplification corrections. Color-coded instrumental intensity maps are derived from empirical relations between peak ground motions and Modified Mercalli intensity.

Cascadia Subductions Zone Scenario

- Magnitude: 9.0
- Epicenter: N45.7329 W125.125
- Depth: 0km

Portland Hills Scenario

- Magnitude: 6.5
- Epicenter: N45.5544 W122.798
- Depth: 0km

Probabilistic Peak Ground Acceleration

Probabilistic Peak Ground Acceleration data generated by Hazus-MH 2.2. In Hazus' probabilistic analysis procedure, the ground shaking demand is characterized by spectral contour maps developed by the United States Geological Survey (USGS) as part of a 2008 update of the National Seismic Hazard Maps. USGS probabilistic seismic hazard maps are revised about every six years to reflect newly published or thoroughly reviewed earthquake science and to keep pace with regular updates of the building code. Hazus includes maps for eight probabilistic hazard levels: ranging from ground shaking with a 39% probability of being exceeded in 50 years (100 year return period) to the ground shaking with a 2% probability of being exceeded in 50 years (2500 year return period).

Soil Classification

Soil classification data provided by Washington State Department of Natural Resources, Geology and Earth Resources Division. The dataset identifies site classes for approximately 33,000 polygons derived from the geologic map of Washington. The methodology chosen for developing the site class map required the construction of a database of shear wave velocity measurements. This database was created by compiling shear wave velocity data from published and unpublished sources, and through the collection of a large number of shear wave velocity measurements from seismic refraction surveys conducted for this project. All of these sources of

data were then analyzed using the chosen methodologies to produce the statewide site class maps. The polygons were classified with site classes based on criteria described in Palmer, S. P.; Magsino, S. L.; Bilderback, E. L.; Poelstra, J. L.; Folger, D. S.; and Niggemann, R. A., 2004, Liquefaction susceptibility and site class maps of Washington State, by county: Washington Division of Geology and Earth Resources Open-file Report 2004-20, 78 sheets, with 45 p. text.

Liquefaction Susceptibility

Liquefaction data provided by the Washington State Department of Natural Resources, Division of Geology and Earth Resources. Data is based solely on surficial geology published at a scale of 1:100,000. A liquefaction susceptibility map provides an estimate of the likelihood that soil will liquefy as a result of earthquake shaking. This type of map depicts the relative susceptibility in a range that varies from very low to high. Areas underlain by bedrock or peat are mapped separately as these earth materials are not liquefiable, although peat deposits may be subject to permanent ground deformation caused by earthquake shaking.

Liquefaction is a phenomenon in which strong earthquake shaking causes a soil to rapidly lose its strength and behave like quicksand. Liquefaction typically occurs in artificial fills and in areas of loose sandy soils that are saturated with water, such as low-lying coastal areas, lakeshores, and river valleys. When soil strength is lost during liquefaction, the consequences can be catastrophic. Movement of liquefied soils can rupture pipelines, move bridge abutments and road and railway alignments, and pull apart the foundations and walls of buildings.

FLOOD

Flood hazard areas as depicted on FEMA Digital Flood Insurance Rate Maps (DFIRM)

LANDSLIDE

The landslide areas presented in this map are a combination of Clark County and Washington State Department of Natural Resources datasets. Clark County Landslide Areas data acquired from Clark County GIS Services. This dataset contains unstable slopes and landslide polygon coverage of historical, potential or active landslide areas.

Washington Department of Natural Resources Landslide Areas data provided by the Washington State Department of Natural Resources, Division of Geology and Earth Resources. This dataset contains 1:24,000 & 1:100,000-scale polygons defining the extent of mapped landslides in the state of Washington. This dataset is compiled chiefly from pre-existing landslide databases created in different divisions of the Washington State Department of Natural Resources to meet a variety of purposes.

VOLCANO

Distal Volcano Hazard Zones are Columbia River islands and areas along the Washington shore that could be affected by bank erosion and flooding induced by lahars and sediment-rich floods from Sandy and Hood Rivers during and immediately following eruptions. Volcano data provided by the Cascade Volcano Observatory.

WILDFIRE

The wildfire areas presented in this map are a combination of Clark County, City of Vancouver and Washington State Department of Natural Resources datasets. Clark County Wildfire data acquired from Clark County GIS Services. This dataset contains classifications of the Wildland Urban Interface. Intermix areas are generally defined as where elevations exceed five hundred feet, where slopes exceed twenty-five percent, forest type vegetation exists, or is outside of an organized fire protection district.

Clark Regional Natural Hazard Mitigation Plan: Volume 1—Planning Area-Wide Elements

Appendix F. Plan Adoption Resolutions from Planning Partners

F. PLAN ADOPTION RESOLUTIONS FROM PLANNING PARTNERS

To be completed as adoption resolutions are received.

Clark Regional Natural Hazard Mitigation Plan: Volume 1—Planning Area-Wide Elements

Appendix G. Progress Report Template

G. PROGRESS REPORT TEMPLATE

Clark County Hazard Mitigation Plan Update Annual Progress Report

Reporting Period: *(Insert reporting period)*

Background: Clark County and participating cities and special purpose districts in the county developed a hazard mitigation plan to reduce risk from natural hazards by identifying resources, information, and strategies for risk reduction. The federal Disaster Mitigation Act of 2000 requires state and local governments to develop hazard mitigation plans as a condition for federal disaster grant assistance. To prepare the plan, the participating partners organized resources, assessed risks from natural hazards within the county, developed planning goals and objectives, reviewed mitigation alternatives, and developed an action plan to address probable impacts from natural hazards. By completing this process, these jurisdictions maintained compliance with the Disaster Mitigation Act, achieving eligibility for mitigation grant funding opportunities afforded under the Robert T. Stafford Act. The plan can be viewed on-line at:

INSERT LINK

Summary Overview of the Plan's Progress: The performance period for the Hazard Mitigation Plan became effective on **____, 2016**, with the final approval of the plan by FEMA. The initial performance period for this plan will be 5 years, with an anticipated update to the plan to occur before **____, 2021**. As of this reporting period, the performance period for this plan is considered to be **____%** complete. The Hazard Mitigation Plan has targeted **____ hazard mitigation actions** to be pursued during the 5-year performance period. As of the reporting period, the following overall progress can be reported:

- **__** out of **__** actions (**__%**) reported ongoing action toward completion.
- **__** out of **__** actions (**__%**) were reported as being complete.
- **__** out of **__** actions (**__%**) reported no action taken.

Purpose: The purpose of this report is to provide an annual update on the implementation of the action plan identified in the *Clark Regional Natural Hazard Mitigation Plan*. The objective is to ensure that there is a continuing and responsive planning process that will keep the Hazard Mitigation Plan dynamic and responsive to the needs and capabilities of the partner jurisdictions. This report discusses the following:

- Natural hazard events that have occurred within the last year
- Changes in risk exposure within the planning area (all of Clark County and the incorporated area of the City of Woodland)
- Mitigation success stories
- Review of continuing public involvement
- Review of the action plan

- Changes in capabilities that could impact plan implementation
- Recommendations for changes/enhancement
- Relevant training needs identified within the planning partnership.

The Hazard Mitigation Work Group: The Hazard Mitigation Plan Work Group, made up of planning partners and stakeholders within the planning area, reviewed and approved this progress report at its meeting held on [REDACTED], 201[REDACTED]. It was determined through the plan’s development process that a working group would remain in service to oversee maintenance of the plan. At a minimum, the work group will provide technical review and oversight on the development of the annual progress report. It is anticipated that there will be turnover in the membership annually, which will be documented in the progress reports. For this reporting period, the work group membership is as indicated in Table 1.

Table 1. Hazard Mitigation Work Group		
Name	Title	Jurisdiction/Agency

Natural Hazard Events within the Planning Area: During the reporting period, there were [REDACTED] natural hazard events in the planning area that had a measurable impact on people or property. A summary of these events is as follows:

- _____
- _____

Changes in Risk Exposure in the Planning Area: *(Insert brief overview of any natural hazard event in the planning area that changed the probability of occurrence or ranking of risk for the hazards addressed in the hazard mitigation plan)*

Mitigation Success Stories: *(Insert brief overview of mitigation accomplishments during the reporting period)*

Continued Public Involvement: *(Insert brief overview of any continued public involvement related to hazard mitigation during the reporting period)*

Review of the Action Plan: Table 2 reviews the action plan, reporting the status of each action. Reviewers of this report should refer to the Hazard Mitigation Plan for more detailed descriptions of each action and the prioritization process.

Address the following in the “status” column of the following table:

- *Was any element of the action carried out during the reporting period?*
- *If no action was taken, why?*
- *Is the timeline for implementation for the action still appropriate?*
- *If the action was completed, does it need to be changed or removed from the action plan?*
- *Do any newly identified actions need to be added as a result in a change of capabilities or the next step in a completed action?*

Table 2. Action Plan Matrix

Action Taken? (Yes or No)	Time Line	Priority	Status	Status (X, O,✓)
Action # __ —			[description]	
Action # __ —			[description]	
Action # __ —			[description]	
Action # __ —			[description]	
Action # __ —			[description]	
Action # __ —			[description]	
Action # __ —			[description]	
Action # __ —			[description]	
Action # __ —			[description]	
Action # __ —			[description]	
Action # __ —			[description]	
Action # __ —			[description]	
Action # __ —			[description]	

Completion status legend:

✓ = Project Completed

O = Action ongoing toward completion

X = No progress at this time

Changes That May Impact Implementation of the Plan: *(Insert brief overview of any significant changes in the planning area that would have a profound impact on the implementation of the plan. Specify any changes in technical, regulatory and financial capabilities identified during the plan's development)*

Need for Training: *(Insert brief overview of any training needs identified within the planning partnership)*

Recommendations for Changes or Enhancements: Based on the review of this report by the Hazard Mitigation Work Group, the following recommendations will be noted for future updates or revisions to the plan:

- _____
- _____
- _____
- _____

Public review notice: *The contents of this report are considered to be public knowledge and have been prepared for total public disclosure. Copies of the report have been provided to the governing boards of all planning partners and to local media outlets and the report is posted on the Clark Regional Natural Hazard Mitigation Plan website. Any questions or comments regarding the contents of this report should be directed to:*

Insert Contact Info Here

Clark Regional Natural Hazard Mitigation Plan: Volume 1—Planning Area-Wide Elements

Appendix H. FEMA Review Crosswalk

H. FEMA PLAN REVIEW CROSSWALK

APPENDIX A:

LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA’s evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan’s strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: Clark County, WA	Title of Plan: Clark County Hazard Mitigation Plan (2016)	Date of Plan: August 2016
Local Point of Contact: Anthony Vendetti	Address: 710 W 13 th Street Vancouver, WA 98660-2810	
Title: Emergency Management Coordinator		
Agency: Clark Regional Emergency Services Agency (CRESA)		
Phone Number: 360-992-6271	E-Mail: Anthony.Vendetti@Clark.wa.gov	

State Reviewer:	Title:	Date:
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FEMA Reviewer:	Title:	Date:
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Date Received in FEMA Region <i>(insert #)</i>	
Plan Not Approved	
Plan Approvable Pending Adoption	
Plan Approved	

SECTION 1: REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
ELEMENT A. PLANNING PROCESS				
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Volume 1, Part 1, Chapter 3, Sections 3.1, 3.2, 3.3, 3.4 and 3.6 Volume 2, Part 2, X.1 of each Chapter (Natural Hazard Mitigation Plan Point of Contact) Volume 2, Part 2, Introduction			
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Volume 1, Part 1, Chapter 3, Section 3.4 (Coordination with Other Agencies) Volume 1, Part 1, Chapter 3, Section 3.2 (Establishment of the Planning partnership)			
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Volume 1, Part 1, Chapter 3, Section 3.5 (Public Involvement)			

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))		Volume 1, Part 1, Chapter 4, Section 4.7 (Laws, Ordinances and Programs); Chapter 6, Section 6.1 (Overall Risk Assessment Approach) and Section 6.6.2 (Data used for Spatial Analysis) References cited throughout (see References section)		
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))		Volume 1, Part 3, Chapter 18, Section 18.3.2 (Opportunities for Continued Public Access and Participation)		
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))		Volume 1, Part 3, Chapter 18, Section 18.3 (Plan Implementation and Maintenance Strategy)		
<u>ELEMENT A: REQUIRED REVISIONS</u>				
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT				

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))		<p>Volume 1, Part 1, Chapter 5 (Hazards of Concern for Risk Assessment)</p> <p>Volume 1, Part 2, Chapters 7 through 14, Sections X.1 (General Background), Sections X.2 (Hazard Profile), Sections X.4 (Exposure)</p> <p>Volume 2, Chapters 1 through 17, Sections X.7 (Hazard Risk Ranking)</p>		
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))		<p>Volume 1, Part 2, Chapters 7 through 14, Section X.2.1 (Past Events) and X.2.3 (Frequency), for Chapter 10 see 10.2.3 and 10.2.5</p> <p>Volume 1, Part 2, Chapter 15, Section 15.1 (Probability of Occurrence)</p>		
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))		<p>Volume 1, Part 2, Chapter 7 through 14, Section X.4 (Exposure) and X.5 (Vulnerability).</p> <p>Volume 2, Chapters 1 through 17, Sections X.7 (Hazard Risk Ranking)</p>		

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Volume 1, Part 2, Chapter 10, Section 10.5.5, Sub-section (Repetitive Loss) Volume 2, Chapters 1-9, Sections X.6 (Jurisdiction-Specific Vulnerabilities)			
ELEMENT B: REQUIRED REVISIONS				
ELEMENT C. MITIGATION STRATEGY				
C1. Does the plan document each jurisdiction’s existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Each municipal and special purpose district jurisdiction performed a capability assessment that looked at legal/regulatory capabilities, fiscal capabilities, administrative and technical capabilities, NFIP compliance (only municipal planning partners), classifications under various community mitigation programs, and education and outreach capabilities – see Volume 2, chapter 1 through 17, sections X.3 (capability assessment).			

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))		Volume 1, Part 2, Chapter 10, Section 10.1.3 (Federal Flood Programs), Section 10.5.5, Subsection (National Flood Insurance Program) Volume 2, Chapter 1 through 9, Section X.3, Table X-4 (National Flood Insurance Program Compliance).		
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))		Volume 1, Part 3, Chapter 16 (Purpose, goals and objectives).		
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))		Volume 1, Part 3, Chapter 17 (Mitigation Best Practices) Volume 2, Chapters 1 through 17, Table X-9 (municipalities) and Table X-7 (special purpose districts)		
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))		Volume 1, Part 3, Chapter 18 (Mitigation Actions and Implementation) Volume 2, Chapters 1 through 17, Section X-9 (for municipalities) and Table X-8 (for special purpose districts).		

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))		Volume 1, Part 1, Chapter 2, Section 1.1 (The Previous Plan); Part 3, Section 18.3.1 (Integration with other planning initiatives) Volume 2, Chapters 1 through 17, Section X.4 (Integration with other planning initiatives)		
ELEMENT C: REQUIRED REVISIONS				
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)				
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))		**Note – Document intended to be reviewed as first effort** Volume 1, Part 1, Chapter 2, Section 2.1.1 (changes in development) and Part 2, Chapters 7 through 14, sections X.6 (Future Trends)		
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))		**Note – Document intended to be reviewed as first effort** For those jurisdictions covered by prior plans see Volume 2, chapter 1 through 9, Section X.8 (Status of Previous Plan Initiatives).		

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	<p>**Note – Document intended to be reviewed as first effort**</p> <p>This plan update utilized a different prioritization scheme from original plan. Therefore, all planning partners with prior plan coverage reprioritized their actions. Volume 2, Chapters 1 through 17, Table X-9 (municipalities) and Table X-7 (special purpose districts)</p>			
<u>ELEMENT D: REQUIRED REVISIONS</u>				
ELEMENT E. PLAN ADOPTION				
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Pre-adoption review request.			
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Pre-adoption review request.			
<u>ELEMENT E: REQUIRED REVISIONS</u>				
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)				
F1.				
F2.				
<u>ELEMENT F: REQUIRED REVISIONS</u>				

SECTION 2: PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item, and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature, and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the overall plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

How does the Plan go above and beyond minimum requirements to document the planning process with respect to:

- *Involvement of stakeholders (elected officials/decision makers, plan implementers, business owners, academic institutions, utility companies, water/sanitation districts, etc.);*
- *Involvement of Planning, Emergency Management, Public Works Departments or other planning agencies (i.e., regional planning councils);*
- *Diverse methods of participation (meetings, surveys, online, etc.); and*
- *Reflective of an open and inclusive public involvement process.*

Element B: Hazard Identification and Risk Assessment

In addition to the requirements listed in the Regulation Checklist, 44 CFR 201.6 Local Mitigation Plans identifies additional elements that should be included as part of a plan's risk assessment. The plan should describe vulnerability in terms of:

- 1) *A general description of land uses and future development trends within the community so that mitigation options can be considered in future land use decisions;*
- 2) *The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; and*
- 3) *A description of potential dollar losses to vulnerable structures, and a description of the methodology used to prepare the estimate.*

How does the Plan go above and beyond minimum requirements to document the Hazard Identification and Risk Assessment with respect to:

- *Use of best available data (flood maps, HAZUS, flood studies) to describe significant hazards;*
- *Communication of risk on people, property, and infrastructure to the public (through tables, charts, maps, photos, etc.);*
- *Incorporation of techniques and methodologies to estimate dollar losses to vulnerable structures;*
- *Incorporation of Risk MAP products (i.e., depth grids, Flood Risk Report, Changes Since Last FIRM, Areas of Mitigation Interest, etc.); and*
- *Identification of any data gaps that can be filled as new data became available.*

Element C: Mitigation Strategy

How does the Plan go above and beyond minimum requirements to document the Mitigation Strategy with respect to:

- *Key problems identified in, and linkages to, the vulnerability assessment;*
- *Serving as a blueprint for reducing potential losses identified in the Hazard Identification and Risk Assessment;*
- *Plan content flow from the risk assessment (problem identification) to goal setting to mitigation action development;*
- *An understanding of mitigation principles (diversity of actions that include structural projects, preventative measures, outreach activities, property protection measures, post-disaster actions, etc);*
- *Specific mitigation actions for each participating jurisdictions that reflects their unique risks and capabilities;*
- *Integration of mitigation actions with existing local authorities, policies, programs, and resources; and*
- *Discussion of existing programs (including the NFIP), plans, and policies that could be used to implement mitigation, as well as document past projects.*

Element D: Plan Update, Evaluation, and Implementation (Plan Updates Only)

How does the Plan go above and beyond minimum requirements to document the 5-year Evaluation and Implementation measures with respect to:

- *Status of previously recommended mitigation actions;*
- *Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk;*
- *Documentation of annual reviews and committee involvement;*
- *Identification of a lead person to take ownership of, and champion the Plan;*
- *Reducing risks from natural hazards and serving as a guide for decisions makers as they commit resources to reducing the effects of natural hazards;*
- *An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment etc.);*
- *Discussion of how changing conditions and opportunities could impact community resilience in the long term; and*
- *Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience.*

B. Resources for Implementing Your Approved Plan

Ideas may be offered on moving the mitigation plan forward and continuing the relationship with key mitigation stakeholders such as the following:

- *What FEMA assistance (funding) programs are available (for example, Hazard Mitigation Assistance (HMA)) to the jurisdiction(s) to assist with implementing the mitigation actions?*
- *What other Federal programs (National Flood Insurance Program (NFIP), Community Rating System (CRS), Risk MAP, etc.) may provide assistance for mitigation activities?*
- *What publications, technical guidance or other resources are available to the jurisdiction(s) relevant to the identified mitigation actions?*
- *Are there upcoming trainings/workshops (Benefit-Cost Analysis (BCA), HMA, etc.) to assist the jurisdictions(s)?*
- *What mitigation actions can be funded by other Federal agencies (for example, U.S. Forest Service, National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA) Smart Growth, Housing and Urban Development (HUD) Sustainable Communities, etc.) and/or state and local agencies?*

SECTION 3:

MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)

INSTRUCTIONS: For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were 'Met' or 'Not Met,' and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require- ments
1	Clark County	County	Mike Lewis	1300 Franklin Street #644 / PO Box 5000 Vancouver, WA 98666	Mike.Lewis@clark.wa.gov	360-397-2025, x3	Yes	Yes	Yes	Yes	Yes	Yes
2	City of Battle Ground	City	Scott Sawyer	109 SW 1st Street, Suite 122 Battle Ground, Washington 98604	scott.sawyer@cityofbg.org	360-342-5075	Yes	Yes	Yes	Yes	Yes	Yes
3	City of Camas	City	Lauren Hollenbeck	616 NE 4th Avenue Camas, WA 98607	lhollenbeck@cityofcamas.us	360-817-1568	Yes	Yes	Yes	Yes	Yes	Yes

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Require- ments
4	City of La Center	City	Greg Thornton	305 NW Pacific Highway La Center, WA 98629	gthornton@ci.lacenter.wa.us	360-263-5123	Yes	Yes	Yes	Yes	Yes	Yes
5	City of Ridgefield	City	Lee Knottnerus	230 Pioneer Street Ridgefield, WA 98642	Lee.Knottnerus@ci.ridgefield.wa.us	(360) 887-3557	Yes	Yes	Yes	Yes	Yes	Yes
6	Town of Yacolt	Town	Cindy Marbut	PO Box 160 Yacolt, WA. 98675	cindy.marbut@townofyacolt.com	360.686.3922	Yes	Yes	Yes	Yes	Yes	Yes
7	City of Vancouver	City	Chad Eiken	PO Box 1995 Vancouver, WA 98668-1995	chad.eiken@cityofvancouver.us	360-487-7882	Yes	Yes	Yes	Yes	Yes	Yes
8	City of Washougal	City	Mitch Kneipp	1701 C Street Washougal, WA 98671	mitch.kneipp@cityofwashougal.us	360-835-8501 x604	Yes	Yes	Yes	Yes	Yes	Yes

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
9	City of Woodland	City	Dennis Ripp	PO Box 9, 300 E. Scott Ave Woodland, WA 98674	rippd@ci.woodland.wa.us	360-225-7999	Yes	Yes	Yes	Yes	Yes	Yes
10	Battle Ground Public Schools	Special Purpose District - School	Scott McDaniell	400 N Parkway Battle Ground, WA 98604	mcDaniell.scott@battlegroundps.org	360-885-5350	Yes	Yes	Yes	Yes	Yes	Yes
11	Camas School District	Special Purpose District - School	Heidi Burkart	841 NE 22nd Ave Camas, Washington 98607	heidiburkart@camas.wednet.edu	360-833-7402	Yes	Yes	Yes	Yes	Yes	Yes
12	Clark County Public Utilities District #1	Special Purpose District - Utility	Dan Krebs	PO Box 8900 Vancouver, WA 98668	dkrebs@clarkpud.com	360-992-8870	Yes	Yes	Yes	Yes	Yes	Yes
13	Clark Regional Wastewater District	Special Purpose District - Utility	Hugh Findlay	8000 NE 52nd ct. Vancouver WA 98685	hfindlay@crwwd.com	(360) 993-8845	Yes	Yes	Yes	Yes	Yes	Yes
14	C-TRAN Public Transit Benefit Area	Special Purpose District – Public Transit	Terry Lohnes	2425 NE 65th Ave. Vancouver, WA 98668-2529	terryl@c-tran.org	360-906-7343	Yes	Yes	Yes	Yes	Yes	Yes

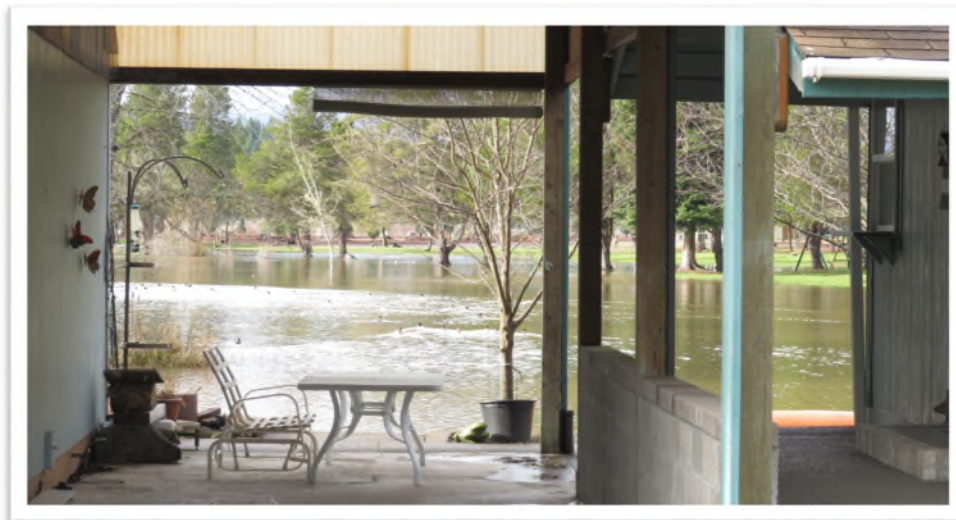
MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/borough/ township/ village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N)					
							A. Planning Process	B. Hazard Identification & Risk Assessment	C. Mitigation Strategy	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
15	Clark Fire Protection District #3	Special Purpose District - Fire	Sean Smith	17718 NE 159 ST Brush Prairie, WA 98606	sean@fire3.org	360-892-2331	Yes	Yes	Yes	Yes	Yes	Yes
16	Port of Vancouver, USA	Special Purpose District - Port	Scott Ouchi	3103 NW Lower River Rd Vancouver, WA 98660	souchi@portvanusa.com	360-816-9847	Yes	Yes	Yes	Yes	Yes	Yes
17	Ridgefield School District	Special Purpose District - School	Chris Griffith	2724 South Hillhurst Road Ridgefield, WA 98642	chris.griffith@ridgefieldsd.org	360-619-1304	Yes	Yes	Yes	Yes	Yes	Yes



Clark Regional Emergency Services Agency

Clark Regional Natural Hazard Mitigation Plan Volume 2—Planning Partner Annexes

Agency Review Draft



Clark Regional Natural Hazard Mitigation Plan: Volume 2—Planning Partner Annexes

September 2016 - Agency Review Draft

PREPARED FOR

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INTRODUCTION

BACKGROUND

The Federal Emergency Management Agency (FEMA) encourages multi-jurisdictional planning for hazard mitigation. All participating jurisdictions must meet the requirements of Chapter 44 of the Code of Federal Regulations (44 CFR):

“Multi-jurisdictional plans (e.g. watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan.” (Section 201.6.a(4))

For the *Clark Regional Natural Hazard Mitigation Plan*, a Planning Partnership was formed to leverage resources and to meet requirements of the federal Disaster Mitigation Act (DMA) for as many eligible local governments in Clark County as possible. The DMA defines a local government as follows:

“Any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity.”

There are two types of planning partners that participated in this process, with distinct needs and capabilities:

- Incorporated municipalities (seven cities, one town and the County)
- Special purpose districts.

Each participating planning partner has prepared a jurisdiction-specific annex to this plan. These annexes, as well as information on the process by which they were created, are contained in this volume.

THE PLANNING PARTNERSHIP

Initial Solicitation and Letters of Intent

The planning team solicited the participation of the County, incorporated cities and towns and all County-recognized special purpose districts at the outset of this project. A kickoff meeting was held on July 9, 2015 at Clark College in Vancouver to identify potential stakeholders and planning partners for this process. The purpose of the meeting was to introduce the planning process to jurisdictions in the County that could have a stake in the outcome of the planning effort. All eligible local governments within the planning area were invited to attend. The goals of the meeting were as follows:

- Provide an overview of the Disaster Mitigation Act.
- Introduce the Planning Team for the project.
- Outline the Clark County plan update work plan.

- Describe the benefits of multi-jurisdictional planning.
- Outline planning partner expectations.
- Solicit planning partners.
- Solicit volunteers or recommendations for steering committee members.

All interested local governments were provided with a list of planning partner expectations developed by the planning team and were informed of the obligations required for participation. Local governments wishing to join the planning effort were asked to provide the planning team with a “notice of intent to participate” that agreed to the planning partner expectations (see Appendix A) and designated a point of contact for their jurisdiction. In all, formal commitment was received from 18 planning partners by the planning team, and the Clark Regional Planning Partnership was formed.

Planning Partner Expectations

Groups Involved in The Planning Process

One of the goals of the multi-jurisdictional approach to natural hazard mitigation planning is to efficiently achieve compliance with the Disaster Mitigation Act (DMA) for all participating members in the planning effort. Several groups were involved in this process at different levels:

- **Planning Team**—The Tetra Tech team and Clark Regional Emergency Services Agency (CRESA) staff responsible for the facilitation of the planning process and the development of the plan document.
- **Steering Committee**—Representative members from the planning partnership that serve as the oversight body. They are responsible for many of the planning milestones and decisions prescribed for this process to help reduce the burden of time required by each planning partner.
- **Planning Partners**—Jurisdictions or special purpose districts that are developing an annex to the regional plan.
- **Planning Stakeholders**—The individuals, groups, businesses, academia, etc., from which the planning team gains information to support the various elements of the plan. This group may also be referred to as coordinating stakeholders.

Definition of Participation

DMA requires that planners identify at the start what the participation requirements are for involved jurisdictions and special districts. Any agency may submit an annex to the plan, so long as they meet these participation requirements. To achieve compliance for *all* planning partners, the plan must clearly document how each planning partner that is seeking linkage to the plan participated in the plan’s development. For this planning process, planning partners met the following participation requirements:

- **Complete administrative tasks.** Participation in this plan included the following administrative tasks:
 - **Complete a letter of intent.** Provide a “Letter of Intent to participate” or a Resolution to participate to the planning team (see exhibit A).
 - **Designate points of contact.** Designate a primary and secondary point of contact. These designees will be listed as the hazard mitigation points of contact for your jurisdiction in the plan.
 - **Approve the steering committee.** The steering committee was approved via an email vote.
- **Participate, as able, in additional opportunities.** Attendance or participation in the following opportunities was also recorded. These records were used to document participation for each planning partner. No thresholds were established as minimum levels of participation for these events. However, each planning partner was expected to attempt to attend all possible meetings and events:

- Attend steering committee meetings.
- Attend or host public meetings or open houses.
- Participate in and advertise the public review and comment period prior to adoption.
- **Support the steering committee.** This planning process used a steering committee that was responsible for many of the planning milestones and helped reduce the time required by each planning partner. This committee was representative of the whole body. It met periodically throughout the process and provided direction and guidance to the planning team. Steering committee meetings were not mandatory meetings for all planning partners. However, all planning partners were encouraged to remain engaged with this process and attend meetings from time to time.
- **Support the public involvement strategy.** The planning team requested support from the partnership during the implementation of the public involvement strategy developed by the steering committee. Support was in the form of providing venues for public meetings, attending these meetings as meeting participants, providing technical support, providing access to mailing lists, providing existing public information materials, etc.
- **Participate in the critical facility update.** All planning partner were asked to update their facilities list used in the risk assessment. If the list was not updated, Hazus default data was utilized. Updating this list provided a much more detailed analysis.
- **Complete the jurisdictional annex template.** Each planning partner completed a jurisdictional annex template. Templates and instructions to aid in their completion were provided to all committed planning partners in a phased approach to extend the level of effort over a series of months. Key components of the annex completion effort were as follows:
 - **Attend the mandatory workshop.** There was one mandatory workshop that all planning partners were required to attend. This workshop covered the completion of the annex template, which is the basis for each partner's jurisdictional chapter in the plan. Failure to have a representative at this workshop could disqualify a planning partner from participation in the plan. After participation in the mandatory template workshop, each partner was asked to complete a template according to a specified timeline. Technical assistance in the completion of these templates was available from the planning team.
 - **Perform a capability assessment.** All planning partners conducted a capability assessment. This required a review of existing documents (plans, studies and ordinances) as well as technical and financial capabilities pertinent to each jurisdiction that can support hazard mitigation.
 - **Review the risk assessment.** Each partner was asked to review the risk assessment and identify hazards and vulnerabilities specific to its jurisdiction. The planning team provided jurisdiction-specific mapping and technical consultation to aid in this task, but the determination of risk and vulnerability was up to each partner (through a facilitated process during the mandatory workshop).
 - **Review county-wide mitigation recommendations.** Each partner was asked to review and determine if the mitigation recommendations chosen in the base plan meet the needs of its jurisdiction.
 - **Develop a mitigation action plan.** All planning partners developed an action plan that identifies each project, who will oversee the task, how it will be financed and when it is estimated to occur. Projects within each jurisdiction consistent with the base plan recommendations were identified and prioritized, and reviewed to determine their benefits vs. costs.
- **Adopt the plan.** The natural hazard mitigation plan must be formally adopted by each jurisdiction. Once this plan is completed, and FEMA approval has been received for each partner, maintaining that eligibility will be dependent upon each partner implementing the plan implementation-maintenance protocol identified in the plan.

Estimated Time Commitment

The time commitment to meet the participation requirements for a planning partner not participating on the steering committee was 36 to 46 hours over a 12-month period. Most of this time was devoted to completing the jurisdictional annex template.

Linkage Procedures

Eligible local jurisdictions that did not participate in development of this plan update may comply with DMA requirements by linking to this plan following the procedures outlined in Appendix B.

ANNEX-PREPARATION PROCESS

Templates

Templates were created to help the planning partners prepare their jurisdiction-specific annexes. Since special purpose districts operate differently from incorporated municipalities, separate templates were created for the two types of jurisdictions. The templates were created so that all criteria of Section 201.6 of 44 CFR would be met, based on the partners' capabilities and mode of operation. Templates available for the planning partners' use were specific as to whether the partner is a municipality or a special purpose district and whether the annex is an update to a previous natural hazard mitigation plan or a first-time hazard plan. Each partner was asked to participate in a technical assistance workshop during which key elements of the template were completed by a designated point of contact for each partner and a member of the planning team. The templates were set up to lead each partner through a series of steps that would generate the DMA-required elements that are specific for each partner. The templates and their instructions can be found in Appendix C to this volume of the Natural Hazard Mitigation Plan.

Workshop

Workshops were held for planning partners to learn about the templates and the overall planning process. Topics included the following:

- Review of Background Information
 - Clark County 2004 Hazard Mitigation Plan
 - DMA
 - Review of the work plan
- The templates
- Risk ranking
- Developing your action plan
- Cost/benefit review and prioritization.

Two sessions were held in early March 2016. The sessions provided technical assistance and an overview of the template completion process. Attendance at this workshop was mandatory under the planning partner expectations agreed to by the planning partnership. There was 100-percent attendance of the partnership at these sessions.

In the risk-ranking exercise, each planning partner was asked to rank each risk specifically for its jurisdiction, based on the impact on its population or facilities. Cities were asked to base this ranking on probability of occurrence and the potential impact on people, property and the economy. Special purpose districts were asked to base this ranking on probability of occurrence and the potential impact on their constituency, their vital facilities and the facilities' functionality after an event. The methodology followed that used for the countywide risk

ranking presented in Volume 1. A principal objective of this exercise was to familiarize the partnership with how to use the risk assessment as a tool to support other planning and hazard mitigation processes. Tools utilized during these sessions included the following:

- The purpose, goals, and objectives developed by the steering committee
- Catalog of mitigation best practices
- Information on federal funding for mitigation projects
- Historical event and loss information
- The risk assessment results developed for this plan
- A working list of identified issues or problem areas
- The results of the public hazard mitigation survey
- Hazard maps for all hazards of concern
- Previously identified mitigation actions for jurisdictions who had participated in the 2004 plan.

Prioritization

44 CFR requires actions identified in the action plan to be prioritized (Section 201.c.3.iii). The planning team and steering committee developed a methodology for prioritizing the action plans that meets the needs of the partnership and the requirements of 44 CFR. The actions were prioritized according to the following criteria:

Implementation priorities were established using the following considerations:

- **High Priority**—An action that meets multiple objectives, has benefits that exceed cost, has funding secured or is an ongoing action and meets eligibility requirements for a grant program. High priority actions can be completed in the short term (1 to 5 years). The key factors for high priority actions are that they have funding secured and can be completed in the short term.
- **Medium Priority**—An action that meets multiple objectives, that has benefits that exceed costs, and for which funding has not yet been secured, but is eligible for funding. Action can be completed in the short term, once funding is secured. Medium priority actions will become high priority actions once funding is secured. The key factors for medium priority actions are that they are eligible for funding, but do not yet have funding secured, and they can be completed within the short term.
- **Low Priority**—An action that will mitigate the risk of a hazard, that has benefits that do not exceed the costs or are difficult to quantify, for which funding has not been secured, that is not eligible for grant funding, and for which the time line for completion is long term (1 to 10 years). Low priority actions may be eligible for grant funding from other programs that have not yet been identified. Low priority actions are generally “blue-sky” or “wish-list.” actions. Financing is unknown, and they can be completed over a long term.

Grant pursuit priorities were established using the following considerations:

- **High Priority**—An action that has been identified as meeting grant eligibility requirements, assessed to have high benefits, is listed as high or medium priority, and where local funding options are unavailable or where dedicated funds could be utilized for actions that are not eligible for grant funding.
- **Medium Priority**—An action that has been identified as meeting grant eligibility requirements, assessed to have medium or low benefits, is listed as medium or low priority, and where local funding options are unavailable.
- **Low Priority**—An action that has not been identified as meeting grant eligibility requirements, or has low benefits.

Benefit/Cost Review

44 CFR requires the prioritization of the action plan to emphasize a benefit/cost analysis of the proposed actions. Because some actions may not be implemented for up to 10 years, benefit/cost analysis was qualitative and not of the detail required by FEMA for project grant eligibility under relevant grant programs. A review of the apparent benefits versus the apparent cost of each project was performed. Parameters were established for assigning subjective ratings (high, medium, and low) to costs and benefits as follows:

Benefit ratings were defined as follows:

- **High**—Action will have an immediate impact on the reduction of risk exposure to life and property.
- **Medium**—Action will have a long-term impact on the reduction of risk exposure to life and property, or action will provide an immediate reduction in the risk exposure to property.
- **Low**—Long-term benefits of the action are difficult to quantify in the short term.

Cost ratings were defined as follows:

- **High**—Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed action.
- **Medium**—Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the action would have to be spread over multiple years.
- **Low**—Possible to fund under existing budget. Action is or can be part of an existing ongoing program.

Using this approach, actions with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial. For many of the strategies identified in this action plan, the partners may seek financial assistance under the Hazard Mitigation Grant Program (HMGP) or Pre-Disaster Mitigation (PDM) Program, both of which require detailed benefit/cost analyses. These analyses will be performed on actions at the time of application using the FEMA benefit-cost model. For actions not seeking financial assistance from grant programs that require detailed analysis, the partners reserve the right to define “benefits” according to parameters that meet the goals and objectives of this plan.

Analysis of Mitigation Initiatives

Each planning partner reviewed its recommended initiatives to classify each initiative based on the hazard it addresses and the type of mitigation it involves. Mitigation types used for this categorization are as follows:

- **Prevention**—Government, administrative or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
- **Property Protection**—Modification of buildings or structures to protect them from a hazard or removal of structures from a hazard area. Includes acquisition, elevation, relocation, structural retrofit, storm shutters, and shatter-resistant glass.
- **Public Education and Awareness**—Actions to inform citizens and elected officials about hazards and ways to mitigate them. Includes outreach projects, real estate disclosure, hazard information centers, and school-age and adult education.
- **Natural Resource Protection**—Actions that minimize hazard loss and preserve or restore the functions of natural systems. Includes sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

- **Emergency Services**—Actions that protect people and property during and immediately after a hazard event. Includes warning systems, emergency response services, and the protection of essential facilities.
- **Structural Projects**—Actions that involve the construction of structures to reduce the impact of a hazard. Includes dams, setback levees, floodwalls, retaining walls, and safe rooms.

Hazard Maps

Maps for each participating city or town are provided in the individual annex for that city this volume. Maps showing the location of participating special purpose districts by district type are included in Appendix D. These maps will be updated periodically as changes to the partnership occur, either through linkage or by a partner dropping out due to a failure to participate.

COMPATIBILITY WITH PREVIOUSLY APPROVED PLANS

Of the 18 committed planning partners, eight were covered by the 2004 plan approved by FEMA. Given the expansion of the planning partnership, the substantial difference in the facilitated process for plan development and the length of time the plan was expired, reviewers should consider this as a new plan with a new process and a new direction. The chapters of this plan describing the plan update process and the tools and techniques that were utilized address these topics as if they were being completed for the first time. When relevant, the update discusses correlations with the initial plan, especially when data or information is being carried over to this update. Best efforts were made to establish a status for all previously identified actions, however, the status of some of these actions remain unknown.

FINAL COVERAGE UNDER THE PLAN

Of the 18 committed planning partners, 17 fully met the participation requirements specified by the Planning Team. The planning partner who was unable to complete the process indicated that the decision to leave the partnership resulted from severe understaffing. If desired, that planning partner can follow the linkage procedure described in Appendix B of this volume to rejoin the partnership at a later date. Table 1 lists the jurisdictions that submitted letters of intent and their ultimate status in this plan.

Table 1. Planning Partner Status

	Letter of Intent Date	Attended Workshop?	Completed Template?	Covered by This Plan?
Municipalities				
Clark County	8/6/2015	Yes	Yes	Yes
City of Battle Ground	7/10/2015	Yes	Yes	Yes
City of Camas	7/31/2012	Yes	Yes	Yes
City of La Center	7/13/2015	Yes	Yes	Yes
City of Ridgefield	8/11/2016	Yes	Yes	Yes
City of Vancouver	8/6/2015	Yes	Yes	Yes
City of Washougal	8/6/2015	Yes	Yes	Yes
City of Woodland	8/5/2015	Yes	Yes	Yes
Town of Yacolt	8/4/2015	Yes	Yes	Yes
Special Purpose Districts				
Battle Ground Public Schools	7/27/2015	Yes	Yes	Yes
Camas School District	7/21/2016	Yes	Yes	Yes
Clark County Public Utilities District #1	7/15/2015	Yes	Yes	Yes
Clark Regional Wastewater District	7/15/2015	Yes	Yes	Yes
C-TRAN Public Transit Benefit Ares	7/21/2015	Yes	Yes	Yes
Clark Fire Protection District #3	8/1/2015	Yes	Yes	Yes
Green Mountain School District ^a	8/5/2016	Yes	No	No
Port of Vancouver USA	9/16/2015	Yes	Yes	Yes
Ridgefield School District	7/10/2016	Yes	Yes	Yes

a. Due to a reduction in available resources, the planning partner was unable to complete the planning process.

ACRONYMS AND ABBREVIATIONS

The following terms are used in the planning partner annexes:

- BCEGS—Building Code Effectiveness Grading Schedule
- CDBG-DR—Community Development Block Grant Disaster Resilience
- CEMP—Comprehensive Emergency Management Plan
- CERT—Citizens Emergency Response Training
- CFR—Code of Federal Regulations
- CRESA—Clark Regional Emergency Services Agency
- CRS—Community Rating System
- DMA—Disaster Mitigation Act
- EPA—U.S. Environmental Protection Agency
- FEMA—Federal Emergency Management Agency
- FMA—Flood Mitigation Assistance
- GIS—Geographic Information System
- GMA—Growth Management Act
- Hazus-MH—Hazards, United States-Multi Hazard
- HMGP—Hazard Mitigation Grant Program
- IBC—International Building Code
- IRC—International Residential Code
- NEHRP—National Earthquake Hazards Reduction Program

- NFIP—National Flood Insurance Program
- NHMP—Natural Hazard Mitigation Plan
- NWS—National Weather Service
- PDM—Pre-Disaster Mitigation Grant Program
- RCW—Revised Code of Washington
- UASI—Urban Area Security Initiative
- USGS—U.S. Geological Survey
- WUI—Wildland Urban Interface

1. CLARK COUNTY

1.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Mike Lewis
Emergency Response/COOP Coordinator
1300 Franklin Street #644 / PO Box 5000
Vancouver, WA 98666
Telephone: 360-397-2025, x3
e-mail Address: Mike.lewis@clark.wa.gov

Alternate Point of Contact

Melissa Tracy
Planning Technician II
1300 Franklin Street 402 / PO Box 9810
Vancouver, WA 98666
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e-mail Address:
Melissa.tracy@clark.wa.gov

1.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- Date of Incorporation—1849
- Current Population—451,820 (County), 214,585 (unincorporated Clark County) as of April 2015 (2015 Office of Finance estimates).
- Population Growth—Based on data tracked by the Office of Finance, Clark County has experienced an increasing rate of growth over the past 5 years. The overall population has increased 5.86 percent since 2010. Significantly, Clark County experienced a 10 percent rate of growth in the last year, ranking it third in rate of growth among counties in Washington State.
- Location and Description—Clark County is located in the southern part of Washington State. Clark County is the state's seventh smallest county, encompassing an area of 656 square miles. The county is bordered by the Columbia River and State of Oregon to the south and west, the Lewis River drainage system, including Lake Merwin and Yale Lake as well as Cowlitz County to the north and Skamania County to the east. Clark County is the home of Washington State University's Vancouver campus. The Port of Vancouver, a deep draft port is located in the southwestern corner of the county. Interstates 5 and 205 and State Route 14 are the major highways within the county.
- Brief History—Clark County began as the Vancouver District in 1844. In 1845 the name was changed to Vancouver County. On September 3, 1849 the Oregon Territorial Legislation changed the name to Clark County in honor of explorer William Clark. Originally covering the area north of the Columbia River, east to the Rockies and south of Alaska, the County was divided and subdivided until reaching its present size in 1880. Clark County has a long and storied cultural, economic, industrial, and military history. From Fort Vancouver and Vancouver Barracks to WWI and WWII, the county has a rich history in many areas such as logging, lumber mills, railroad, aviation, and shipbuilding. In 1989, Washington State University Vancouver was established, conducting virtual classrooms until 1996 when the campus located in the Salmon Creek area opened. The County has a mix of rural and urban areas and has become a regional hub for transportation and commerce.

- **Climate**—Clark County’s weather is typical of the central valley in the Pacific Northwest, with the strong influences of the Pacific Ocean and Cascade Mountain Range producing mild summers and cool wet winters. The average annual rainfall is 42 inches, but varies quite a bit, ranging from 38 inches on the west side to 80 inches in Yacolt. Mountainous areas in northeastern Clark County can receive over 120 inches of annual rainfall. Seventy percent of the county’s rainfall occurs between November and March. The average annual snowfall ranges from 7 inches on the western side to several feet in the mountains, although snow does not occur every year. The average year-round temperature is 50°F. The average high in July is 80°F and average low in January is 34°F. Prevailing winds over most of the county are from the northwest in the summer and southeast in the winter.
- **Governing Body Format**—Clark County is governed under the Home Rule Charter, which took effect in January 2015. It includes a five-member council, one of which is the elected chair, and a county manager. Other elected officials include the Assessor, Auditor, Clerk, District Court, Prosecuting Attorney, Sheriff, Superior Court and Treasurer. Under the direction of the County Manager are eight external departments: Board of Equalization, Community Planning, Community Development, Community Services, Public Health, Public Works, Public Information and Outreach, Environmental Services, and six internal departments: General Services, Human Resources, Budget, Information Technology, GIS and Medical Examiner. The County has over 35 boards, commissions, committees and advisory groups, which report to the Council. The Board of County Councilors assumes responsibility for the adoption of this plan; the County Manager will oversee its implementation.
- **Development Trends**—Anticipated development levels for Clark County are moderate to high, consisting of residential and commercial development. The majority of recent development has included development of areas within the existing urban growth boundaries as urban infrastructure capacity is extended and increased to support development activity. Residential development has consisted primarily of single family homes and some multi-family developments. Clark County is currently in cycle to update its growth management plan effective June 30, 2016. The prior plan update was in 2007. Plan policies for the 2016 update continue to be developed, and some fluctuations are expected as the county charter form of government passed by voters in 2014 comes into full effect in January 2016.

1.3 CAPABILITY ASSESSMENT

An assessment of legal and regulatory capabilities is presented in Table 1-1. An assessment of fiscal capabilities is presented in Table 1-2. An assessment of administrative and technical capabilities is presented in Table 1-3. Information on National Flood Insurance Program (NFIP) compliance is presented in Table 1-4. Classifications under various community mitigation programs are presented in Table 1-5. An assessment of education and outreach capabilities is presented in Table 1-6.

In addition to the capabilities listed below, it should be noted that Clark County is a member of the Discovery Clean Water Alliance, which was legally formed on January 4, 2013 under the Joint Municipal Utility Services Act (RCW 39.106). The Alliance serves four Member agencies – the City of Battle Ground, Clark County, Clark Regional Wastewater District and the City of Ridgefield. The Alliance Members jointly own and jointly manage regional wastewater assets under Alliance ownership. The Alliance seeks to optimize the long-term framework for delivery of regional wastewater transmission and treatment services to the urban growth areas in the central portion of Clark County, Washington.

Table 1-1. Legal and Regulatory Capability

	Local Authority	Other Jurisdiction Authority	State Mandated
Building Code <i>Comment: Clark County Code Title 14- Buildings and Structures & Title 15- Fire Prevention- adopted July 2013</i>	Yes	No	Yes
Zoning Code <i>Comment: Clark County Code Title 40- Clark County, Washington Unified Development Code Consolidates all development related codes into one document</i>	Yes	No	Yes
Subdivisions <i>Comment: Clark County Code Chapter 40.540 – Boundary Line Adjustments and Land Divisions Section 40.540.040 - Subdivisions</i>	Yes	No	Yes
Stormwater Management <i>Comment: Clark County Code Chapter 40.386 – Stormwater and Erosion Control Clark County Stormwater Management Plan (4 March 2015)</i>	Yes	No	Yes
Post-Disaster Recovery <i>Comment: N/A</i>	No	No	No
Real Estate Disclosure <i>Comment: N/A</i>	No	No	No
Growth Management <i>Comment: Clark County Comprehensive Plan –Adopted September 2007(latest amendment December 2012) Update due June 30, 2016</i>	Yes	No	Yes
Site Plan Review <i>Comment: Clark County Code Chapter 40.520 – Permits and Reviews Section 40.520.040 – Site Plan Review All new commercial and residential projects require Building and Fire review of the site plan for County requirements.</i>	Yes	No	Yes
Environmental Protection <i>Comment: Critical Areas Ordinances (CAO)—Clark County Code Subtitle 40.4- Critical Areas and Shorelines</i>	Yes	No	Yes
Flood Damage Prevention <i>Comment: Critical Areas Ordinances (CAO)—Clark County Code Chapter 40.420 – Flood Hazard Areas- Adopted July 2012</i>	Yes	No	Yes
Emergency Management <i>Comment: Clark County Code Chapter 2.48A – Emergency Management *Clark Regional Emergency Services Agency Interlocal Cooperation Agreement *Washington State Emergency Management Division</i>	Yes	Yes	Yes
Climate Change <i>Comment: N/A</i>	No	No	No
Other <i>Comment: N/A</i>	No	No	No
General or Comprehensive Plan <i>Is the plan equipped to provide linkage to this mitigation plan? Yes, direct linkage to the Natural Hazard Mitigation Plan has been included in the current update to the Clark County Comprehensive Plan, Environmental Chapter, Other Hazard Mitigation Programs Section. Comment: Clark County Comprehensive Plan –Adopted September 2007 (latest amendment December 2012); Update due June 30, 2016</i>	Yes	No	Yes
Capital Improvement Plan <i>Comment: Clark County Comprehensive Plan –Appendix E- Capital Facilities Plan What types of capital facilities does the plan address? Water, sewer, stormwater, schools, parks and recreation facilities, law enforcement and fire protection. How often is the plan updated? As needed every 8-10 years - part of the Comp Plan cycle</i>	Yes	No	Yes

	Local Authority	Other Jurisdiction Authority	State Mandated
Floodplain or Watershed Plan <i>Comment: Clark County Code Chapter 40.420 – Flood Hazard Areas</i> <i>Clark County Code Chapter 40.410- Critical Aquifer Recharge Areas</i> <i>* Lower Columbia Fish Recovery Board & Washington State Department of Ecology</i>	Yes	Yes*	No
Stormwater Plan <i>Comment: Clark County Code Chapter 40.386- Stormwater and Erosion Control</i> <i>Clark County Stormwater Management Plan (4 March 2015)</i>	Yes	No	Yes
Habitat Conservation Plan <i>Comment: Clark County Code Chapter 40.440- Habitat Conservation</i> <i>Clark County Code Chapter 40.450- Wetland Protection</i>	Yes	No	No
Economic Development Plan <i>Comment: Clark County Code Chapter 40.230- Commercial, Business, Mixed Use and Industrial Districts</i> <i>Clark County Economic Development Plan – September 2011 (update due 2016)</i> <i>Clark County Comprehensive Plan – Chapter 9 -Adopted September 2007(latest amendment December 2012)</i> <i>Update due June 30, 2016</i> <i>* Columbia River Economic Development Council</i>	Yes	Yes*	Yes (dependent on funding)
Shoreline Management Plan <i>Comment: Clark County Code Chapter 40.460 – Shoreline Master Program – last update 2012</i> <i>Clark County Comprehensive Plan- Chapter 13</i>	Yes	No	Yes
Community Wildfire Protection Plan <i>Comment: Clark County Code Chapter 15.13- Wildland Urban Interface/Intermix Ordinance</i> <i>Clark County Forest Stewardship Plan – Camp Bonneville – November 2011- Appendix E- Wildfire Suppression Plan</i>	Yes	No	No
Forest Management Plan <i>Comment: Clark County Forest Stewardship Plan – Camp Bonneville – November 2011</i>	Yes	No	No
Climate Action Plan <i>Comment: N/A</i>	No	No	No
Other <i>Comment: Regional Disaster Debris Management Plan (DRAFT) March 31, 2011 *Note- a working group involving Clark County and other Municipal Partners is currently meeting monthly to work on an update to this plan based on recommendations during a contractor review in 2014 through the Regional Disaster Preparedness Organization.</i>	Yes	Yes	No
Comprehensive Emergency Management Plan <i>Comment: Clark Regional Comprehensive Emergency Management Plan – December 2013</i>	Yes	No	Yes
Threat & Hazard Identification & Risk Assessment <i>Comment: Clark County Hazards Identification Vulnerability Analysis- 2011</i> <i>*Clark Regional Emergency Services Agency</i> <i>*Regional Disaster Preparedness Organization and Portland Urban Area Security Initiative (UASI)</i>	Yes	Yes*	No
Post-Disaster Recovery Plan <i>Comment: N/A</i>	No	No	No
Continuity of Operations Plan <i>Comment: Clark County Code Section 2.48A.050- Continuity of Government</i> <i>*COOP efforts underway in Treasurers Office, Public Health, Public Works and Elections</i>	Yes*	No	No
Public Health Plan <i>Comment: Clark County Code Title 24- Public Health</i> <i>Clark County Public Health Strategic Plan 2015-2016</i> <i>Region IV Public Health Emergency Response Plan – December 2013</i>	Yes	No	No

Table 1-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	No
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	Yes
Withhold Public Expenditures in Hazard-Prone Areas	Yes
State-Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes
Other Legacy Lands Program	Yes

Table 1-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Clark County Dept. of Community Development – Land Use Clark County Dept. of Public Works / Clark County Public Health Dept.
Engineers or professionals trained in building or infrastructure construction practices	Yes	Clark County Dept. of Community Development- Building Safety: Inspectors Plans Examiners Administrative Staff Clark County Dept. of Community Development- Fire Marshal's Office: Deputy Fire Marshal's Administrative Staff Clark County Public Works Dept. Project Managers Construction Engineering
Planners or engineers with an understanding of natural hazards	Yes	Clark County Public Works Dept.
Staff with training in benefit/cost analysis	Yes	Clark County Budget Office Clark County Auditor's Office Clark County risk Management
Surveyors	Yes	Clark County Public Works Dept.
Staff capable of making substantial damage estimates	Yes	<u>Buildings</u> – Clark County Dept. of Community Development <u>Bridges/Infrastructure/Soils</u> – Clark County Public Works Dept. – Also has GEO-Tech Contractors on immediate contract
Personnel skilled or trained in GIS applications	Yes	Clark County GIS Department Includes: GIS Manager – 1 GIS Coordinator/Project Mgr. – 3 GIS Coordinator/ GIS DBA – 1 GIS Analysts – 6 (1) Hazus/EOC trained GIS Technicians – 5 Land Records Technicians - 4

Staff/Personnel Resources	Available?	Department/Agency/Position
Scientist familiar with natural hazards in local area	Yes	Clark County Public Works Dept. : Cleanwater Access to CVO, NWS and other organizations
Emergency manager	Yes	Clark Regional Emergency Services Agency (CRESA) – Emergency Management Division Manager
Grant writers	Yes	Multiple depending on subject

Table 1-4. National Flood Insurance Program Compliance

Criteria	Response
When did the community enter the NFIP?	08/02/82
When did the Flood Insurance Rate maps become effective?	09/5/2012
What local department is responsible for floodplain management?	Clark County Public Works Dept.
Who is your floodplain administrator? (department/position) • Is this a primary or auxiliary role?	Clark County Public Works – Engineering Division Manager Auxiliary
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date of adoption of your flood damage prevention ordinance? • Does your floodplain management program meet or exceed minimum requirements? • If so, in what ways?	July 15, 2012 Exceed Exceeds due to higher regulatory standards and participation in the Community Rating System. The County has adopted higher regulatory standards than the NFIP requirements. These include <ul style="list-style-type: none"> • New residential, commercial and industrial construction, as well as substantial improvements shall have the lowest floor (including basement) elevated at least one foot above based flood elevation. • No net loss of conveyance or storage capacity for all channels during 100-year flood event. • Adoption of both the IRC and IBC. • All manufactured homes to be placed or substantially improved within a special flood hazard area shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is at least one (1) foot above the base elevation.
When was the most recent Community Assistance Visit or Community Assistance Contact?	September 24, 2008
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? • If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction? • If no, please state why.	Yes

Criteria	Response
Does your floodplain management staff need any assistance or training to support its floodplain management program? • If so, what type of assistance/training is needed?	Yes E072 – Hazus – MH for Flood E0194- Advanced Floodplain Management Concepts E0272- Managing the Floodplain Post-Disaster E0273- Managing Floodplain through NFIP E0278- NFIP / Community Rating System E0282- Advanced Floodplain Concepts II CFM Certification training program if available.
Does your jurisdiction participate in the Community Rating System (CRS)? • If so, is your jurisdiction seeking to improve its CRS Classification? • If not, is your jurisdiction interested in joining the CRS program?	Yes Yes the County would like to improve its CRS rating to 4 Already participate in CRS
How many Flood Insurance policies are in force in your jurisdiction?^a • What is the insurance in force? ^a • What is the premium in force? ^a	647 \$185,016,900 \$422,554
How many total loss claims have been filed in your jurisdiction?^a • How many claims were closed without payment/are still open? ^a • What were the total payments for losses? ^a	103 2 \$1,666,659.68

a. According to FEMA records as of 11/30/15.

Table 1-5. Community Classifications

	Participating?	Classification	Date Classified
Community Rating System	Yes	5	October 2015
Building Code Effectiveness Grading Schedule	Yes	3	November 2015
Public Protection	Yes	Varies by Fire District	Varies – Information available at each Fire District
Storm Ready	No	N/A	N/A
Firewise	No	N/A	N/A

Table 1-6. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes – The Director of the Public Information & Outreach Department (PIO).
Do you have personnel skilled or trained in website development?	Yes – PIO has a Graphic Designer Information Technology Dept. – Web design team
Do you have hazard mitigation information available on your website? • If yes, please briefly describe.	No- not at this time, will have at least a link to information in the future when this project is complete N/A
Do you utilize social media for hazard mitigation education and outreach? • If yes, please briefly describe.	Yes- Just started with this project Currently- Facebook, Twitter Future- Possibly YouTube
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, please briefly specify.	Yes <u>Development & Engineering Advisory Board</u> —Works with Public Works and community development to review policy and code changes <u>Planning Commission</u> —Advises the Board of County Councilors on matters related to physical development in unincorporated areas. <u>Stakeholder Advisory Committee</u> —High level guidance for update of codes and design governing stormwater management. <u>Technical Committee</u> —Advise on technical aspect of stormwater design and codes. <u>Board of Health</u> —Exercises final authority over all matters pertaining to preservation of life and health of the people of Clark County
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, please briefly describe.	Yes Internal—Employee FYI weekly newsletter, monthly safety committee meetings External- News releases, Clark-Vancouver Television (CVTV), Clark County Neighborhood Associations, various County mailings (i.e. The Public Works annual newsletter to the special flood hazard area. Clark County Fire Marshal Spring Wildfire Campaign
Do you have any established warning systems for hazard events? • If yes, please briefly describe.	Yes <u>Internal</u> to County Government: Emergency Notification System (ENS) – desktop application. <u>External</u> : Clark Regional Emergency Services Agency (CRESA) – Public Alerts system (wireless, VOIP, emails)

1.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into local planning mechanisms.

1.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the hazard mitigation plan:

- Currently – No plans or programs have been DIRECTLY integrated with the 2004 Hazard Mitigation Plan.
- A direct linkage enabling future integration, was inserted into the DRAFT update to the County Comprehensive Plan and is pending approval with the other updates to the plan, June 30, 2016.
- Title 40- Clark County Washington, Unified Development Code addresses many aspects of integration in its various sections, including Shoreline Master Program, Land Use, Development, Permitting and specific Hazard Areas. However, Title 40 needs a thorough review specifically looking at integration with this plan. That action is captured in 1.4.2

1.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- **County Department Engagement**—Engage all County Departments and make them aware of the contents of the Natural Hazard Mitigation Plan and the associated risk assessment. Upon plan approval, the point of contact for the plan will meet with the directors of each county department and seek their support in using the risk assessment and identifying opportunities for integration in plans, projects and programs for which they are responsible.
- **Clark County Comprehensive Plan**—Look for opportunities to integrate goals and use the risk assessment info to in multiple chapters of the Comp Plan including the Land use, Environmental, Parks, Recreation and Open Space. Consider developing a new Mitigation Chapter in the Comp Plan. As integration opportunities are identified they will be accomplished during the Comp Plan annual update process.
- **Public Works Emergency Response Plans/SOP/Ops Manual**—Integrate goals where applicable and use the risk assessment information to inform the planning efforts in Public Works. These plans are due for revision so integration timing is good. Seek opportunities to implement mitigation actions in Public Works projects as feasible.
- **Regional Disaster Debris Management Plan**—Integrate goals where applicable. Use the risk assessment information and debris estimates from the Mitigation Plan in the planning process.
- **Clark County Stormwater Management Plan**—Integrate goals where applicable. Use the risk assessment information to inform planning processes. Engage with Stormwater staff and look for opportunities to include mitigation considerations and action during Stormwater construction projects.
- **Applicable sections of Clark County Code. Some examples are Titles 12, 13, 14, 15 and 40**—Work with responsible department directors and managers to integrate the goals from the Mitigation Plan into applicable sections of the Clark County Code. Assist them in working with leadership to gain approval and updates to the code. Use the risk assessment information to inform the planning and updates. Title 12 – Streets and Roads, Title 13- Public Works, Title 14- Buildings and Structures, Title 15- Fire Prevention, Title 40 Clark County Unified Development Code.
- **Clark Regional Comprehensive Emergency Management Plan and annexes (CEMP)**—As one of the planning partners, support the integration of goals into the planning updates to the CEMP and its annexes. Where possible support mitigation actions that relate to this plan including those of other partners. Use the risk assessment information to inform planning, exercises and plan updates.

1.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 1-7 lists notable past occurrences of natural hazards within the jurisdiction.

Table 1-7. Natural Hazard Events

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment ^a
Severe storm, flooding, tornado	4253	12/1/2015	\$712,833
Severe storm, tornado	N/A	3/21/2013	\$10,162
Severe storm, high wind	N/A	12/16/2012	\$103,110
Flood	N/A	6/1/2011	\$1,262,934
Flood	N/A	5/26/2011	\$315,733
Severe winter storm-Snow	1825	12/12/2008	\$611,898
Tornado	N/A	1/10/2008	\$577,262
Severe winter storm, landslides, mudslides	1682	12/14/2006	N/A
Severe storms, flooding, landslides and mudslides	1671	11/02/2006	N/A
Severe storm, high wind	N/A	2/10/2006	\$234,857
Earthquake	1361	2/28/2001	N/A
Tornado	N/A	5/11/2000	\$13,747
Severe winter storm – ice storm	N/A	1/14/1998	\$181,546
Tornado	N/A	5/31/1997	\$14,749
Severe winter storms, land & mudslides, flooding	1159	12/26/1996	\$377,208
Severe storm- high wind & flooding	1100	1/26/1996	N/A
Severe storms- high wind & flooding	1079	11/29/1995	\$862,992
Flood	N/A	11/23/1990	\$7,875,187
Tornado	N/A	6/29/1989	\$954
Severe winter storm- high wind & snow	N/A	2/1/1989	\$244,764
Flood	N/A	11/23/1986	\$900,000
Tornado	N/A	10/13/1984	\$11,392
Severe storm – high wind	N/A	12/24/1983	\$2,971,084
Severe storm- high wind	N/A	11/24/1983	\$108,039
Severe storm- high wind	N/A	11/14/1981	\$333,891
Volcanic eruption- Mt St Helens	623	5/21/1980	N/A
Severe winter storm- snow	N/A	1/8/1980	\$359,126
Severe storm- high wind	N/A	2/12/1979	\$9,590,677
Severe storms- flood & mudslides	545	12/10/1977	N/A
Flood	N/A	12/2/1975	\$169,242,207
Severe storm- high wind	N/A	1/8/1973	\$666,486
Tornado	N/A	4/5/1972	\$28,317,703
Severe storm- flooding & landslides	N/A	2/27/1972	\$235,981
Flood	N/A	1/20/1972	\$353,971
Severe storm- heavy rain & snow- flooding	185	12/29/1964	\$979,057
Flood	146	3/2/1963	N/A
Severe storm- wind & rain	137	10/20/1962	\$103,143
Flood	70	3/6/1957	N/A
Flood	50	2/25/1956	N/A

a. Note the Preliminary Damage Estimates are from SHELUDS and may not be exact/accurate. N/A indicates-unknown.

1.6 JURISDICTION-SPECIFIC VULNERABILITIES

Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: 5
- Number of FEMA-identified Severe-Repetitive-Loss Properties: Unknown
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: 0

Other noted vulnerabilities include:

- No standardized method or system for capturing and retaining perishable data during and after significant events.
- Public Works has knowledge of common localized urban shallow flooding areas and landslides areas throughout the County which affect transportation routes and may help identify areas of isolation. The information needs to be collected, reviewed, verified and mapped in GIS, then shared with our partners.
- Detailed seismic and other natural disaster assessments were not completed on County facilities.
- County Essential Functions have not been identified and prioritized.
- No back-up power is currently available at the vast majority of County Government facilities. At the few that have back-up power the capacity is inadequate and only powers life safety systems like emergency lighting and fire suppression systems.
- Lack of alternate and back-up communications at County Facilities.
- Lack of integration of disaster, response and recovery planning efforts, internally and externally. No common references and resources used in plan development. General lack of awareness of other planning efforts.
- Many critical county and non-county facilities are located in liquefaction areas. Information available on our liquefaction areas is limited, more detailed study is needed.
- Lack of access to Dam Failure mapping information makes it extremely hard to identify areas for public information and outreach.
- The cascading effects from a very strong earthquake on Cascadia or Portland Hills are not well known.
- The Regional Debris Management Plan was never finalized and lacks important information such as pre-identified debris collection sites.

1.7 HAZARD RISK RANKING

Table 1-8 presents the ranking of the hazards of concern.

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Severe Weather	48	High
2	Earthquake	32	High
3	Flood	21	High
4	Landslide	18	Medium
5	Wildfire	12	Medium
6	Dam Failure	6	Low
7	Volcano	4	Low
8	Drought	3	Low

1.8 STATUS OF PREVIOUS PLAN INITIATIVES

Table 1-9 summarizes the initiatives that were recommended in the previous version of the hazard mitigation plan and their implementation status at the time this update was prepared. It should be noted, that the actions identified in the following table were developed in 2004. Due to the significant amount of time and staff turnover that has occurred since their identification, the status of some actions may be unknown. Additionally, many of the action items identified were to be led by CRESA or other non-City agencies. For ease of annual progress reporting, these actions have generally been removed from the City's action plan or rephrased to be within the capabilities of the City. This will allow for a fresh start consistent with the comprehensive update to the natural hazard mitigation plan conducted during the 2016 planning process.

Table 1-9 Status of Previous Plan Initiatives

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Support voluntary structural retrofitting of older homes on vulnerable soils. <i>Comment: Carry Over (Modified)—This was a Clark Regional Emergency Services Agency (CRESA) specific action item, however Clark County will carry it over. See Action # CC-10 in updated Action Plan.</i>		X	
Require the retrofitting of older, vulnerable or critical structures located on NEHRP 'E' and 'F' soils. <i>Comment: Completed- Clark County Community Development Department instituted a trigger for existing structures that anytime improvements or modification greater than 50% of the value of the home are being done, the structure must be brought into compliance with current seismic codes, regardless of NEHRP soil type.</i>	X		
Encourage non-structural retrofitting throughout the County. <i>Comment: Carry Over (Modified)—This was a Clark Regional Emergency Services Agency (CRESA) specific action item, however Clark County will carry it over. See Action # CC-11 in updated Action Plan.</i>		X	
Join the CRS program <i>Comment: Completed / Carry Over (Modified)—Clark County joined the CRS program in October 2004 and was classified in October 2015. See Action # CC-9 in updated Action Plan.</i>	X		
Floodproof Salmon Creek pump station. <i>Comment: Completed – A 100 year flood wall was designed and constructed at the Salmon Creek 36th Ave Pump Station. Project was completed in November 2006.</i>	X		
Encourage elevation of homes in the Trails Mobile Home Park <i>Comment: Removed; no longer feasible- Have not been able to locate the "Trails Mobile Home Park" in Clark County.</i>			X
Support the retrofit of at-risk homes and subdivisions <i>Comment: Completed- Clark County Community Development Department (Fire Marshal) developed a trigger for existing structures that anytime improvements or modification greater than 50% of the value of the home are being done, and the structure is within the Wildland Urban Interface (WUI), the structure must be brought into compliance with current standards and codes. Information and resources provided during Public Outreach events throughout the County.</i>	X		
Retrofit hazardous material containment areas. <i>Comment: Carry Over (Modified)—No Clark County Code was written or approved to enforce this Action Item. See Action # CC-12 in updated Action Plan.</i>		X	
Encourage non-structural retrofitting of hazardous materials containment <i>Comment: Carry Over (Modified) – See Action # CC-13 in updated Action Plan.</i>		X	
Develop a position within Clark County government for a Mitigation Outreach Coordinator <i>Comment: Removed; No longer feasible – There is a Mitigation Coordinator at Clark Regional Emergency Services Agency (CRESA). Clark County will support our partner by providing information and resources as requested.</i>			X

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Develop public information packets ready to deploy following a disaster event <i>Comment: Removed; no longer feasible- This was a Clark Regional Emergency Services Agency (CRESA) specific action item. Clark County will support our partner by providing information and resources as requested.</i>			X
Ensure that residents understand the benefits of defensible space to minimize and reduce the impacts of fires. <i>Comment: Carry Over (Modified) – See Action# CC-14 in updated Action Plan.</i>		X	
Ensure severe weather warning system and public education for tornadoes in place. <i>Comment: Removed; no longer feasible- this was a Clark Regional Emergency Services Agency (CRESA) specific action item. Clark County will support our partner by providing information and resources as requested.</i>			X
Expand the public awareness program about hazard materials <i>Comment: Removed; no longer feasible- this was a Clark Regional Emergency Services Agency (CRESA) and Local Emergency Planning Committee specific action item. CRESA also heads the Committee which has responsibility for this action item. Clark County will support our partner by providing information and resources as requested.</i>			X
Cultivate an awareness program for landslide hazards <i>Comment: Removed; no longer feasible- this was a Clark Regional Emergency Services Agency (CRESA) specific action item. Clark County will support our partner by providing information and resources as requested.</i>			X
Develop an automated method to notify the public of events during a disaster. <i>Comment: Removed; no longer feasible- this was a Clark Regional Emergency Services Agency (CRESA) specific action item. Clark County will support our partner by providing information and resources as requested.</i>			X
Expand weather radio systems to include all of Clark County <i>Comment: Removed; no longer feasible- this was a Clark Regional Emergency Services Agency (CRESA) specific action item. Clark County will support our partner by providing information and resources as requested.</i>			X
Provide fast, accurate spatial incident information for emergency services response. <i>Comment: Removed; no longer feasible- CAMEO and other software are for First Responders. Clark County has no Hazmat First Responders. Clark Regional Emergency Services Agency (CRESA) specific action item...</i>			X
Conduct pre-earthquake assessments for critical and essential facilities and develop a risk-reduction strategy <i>Comment: Carry Over (Modified) – See Actions # CC-22 & CC-23 in updated Action Plan.</i>		X	
Determine critical government functions and establish redundancy for these functions. <i>Comment: Carry Over (Modified) – See Action # CC-21 in updated Action Plan.</i>		X	
Target development and preparedness efforts of Tier II hazardous material facilities <i>Comment: Removed; no longer feasible- Clark County continues to support preparedness efforts and cooperation with Tier II facilities by our involvement on the Local Emergency Planning Commission. However most of the regulatory capability rests with the State, especially concerning existing facilities. Clark County has the ability to be involved in the review process for new facilities and actively participates when the County has an interest.</i>			X
Strengthen the Port of Vancouver bulkhead supporting the chemical storage tank. <i>Comment: Removed; no longer feasible- this is a Port of Vancouver specific action item and falls within City of Vancouver.</i>			X
Take advantage of leases to build resiliency for port businesses <i>Comment: Removed; no longer feasible- this is a Port of Vancouver specific action item and falls within City of Vancouver.</i>			X
Encourage partnerships among agencies to promote uniformity among no-burn policies in forest lands <i>Comment: Complete (Ongoing)—The Clark County Fire Marshall collaborates and partners with Federal, State and Local Fire Agencies throughout the year, to promote uniformity among no-burn policies not just in forest lands, but the entire County, during regularly scheduled meetings and based on circumstances, whenever necessary outside regular meetings.</i>	X		

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Develop a contingency/Business resumption organization <i>Comment: Removed; no longer feasible - this was a Clark Regional Services Agency (CRESA) specific action item.</i>			X
Provide opportunities for strategic relations between emergency managers and social service providers. <i>Comment: Removed; no longer feasible- this was a Clark Regional Services Agency (CRESA) specific action item.</i>			X
Support the use of GIS management tools such as spatial decision support systems <i>Comment: Completed (Ongoing)—Clark County GIS management tools are used throughout the County for planning, development, code enforcement, risk identification and much more on a daily basis.</i>	X		
Require the construction of earthquake-resilient structures <i>Comment: Completed - Clark County Code requires new construction to meet the most current standards and seismic codes and is enforced by the Building Officials in the Community Development Department during permitting and plan review.</i>	X		
Develop integrated County stormwater basin-wide plans <i>Comment: Complete (Ongoing)—The Clark County Stormwater Plan was completed in 2009 and is updated annually in the first quarter of the year. Last update was March 2016. Plan includes maintenance, repair, etc.</i>	X		
Map shallow flooding areas <i>Comment: Carry Over (Modified) –LIDAR mapping completed in 2002 was input into GIS. Shallow flood areas still need to be mapped. See Action # CC-16 in updated Action Plan.</i>		X	
Promote development off of the floodplain <i>Comment: Completed - Clark County promotes development off the floodplain through required reviews (Clark County Code) conducted by the Departments of Community Development (Land Use), Public Works (Floodplain) and Environmental Services (Shoreline & Wetland) for proposed developments.</i>	X		
Consider adoption of a zero-rise floodway <i>Comment: Removed; no longer feasible – Action considered no longer feasible at this time due to lack of political support. Clark County Code currently enforces a 1 foot rise floodway.</i>			X
Expand the County Clean Water Program <i>Comment: Completed Clark County Environmental Services expanded the program to include an integrated Stormwater Basin plan and retrofitting and property purchase through the Legacy Lands Program.</i>	X		
Develop a method of assessing and documenting landslide hazard areas. <i>Comment: Completed- Clark County code defines landslide hazard areas and requirements for development including a geologic hazard area study by a State of Washington registered geotechnical engineer using the “best available engineering and geologic practice.” The geotechnical information and plan requirements are defined in Clark County Code and triggers for review by multiple departments are in place.</i>	X		
Support the use of LIDAR mapping technology to refine landslide hazard maps <i>Comment: Completed- The latest LIDAR information is currently used in the Slope Layer and Developers Package of Clark County GIS, and is linked to code requirement in Clark County Unified Development Code.</i>	X		
Ensure state certification of licensing for professionals performing geotechnical evaluations <i>Comment: Completed- Clark County Code 40.430 Geologic Hazard Areas, requires that persons performing geotechnical evaluations be certified and licensed in Washington State.</i>	X		
Institute Low Impact Development Practices <i>Comment: Completed- A Low Impact Development section was included in the Stormwater Manual which was adopted in 2015. As part of our NPDES permit, the State Department of Ecology mandates we use LID where applicable. The LID section in the Stormwater manual guides the Counties compliance with the NPDES and the use of LID.</i>	X		

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Initiate a vegetation management program <i>Comment: Removed; no longer feasible- Clark County Development Code has a vegetation management component with requirements in the Geologic Hazard Areas Section (40.430). Education and outreach is mostly to developers or those doing improvements. Efforts to develop a formal education program with WSU Vancouver and Special Districts have not gained traction and are no longer feasible at this time. NOTE—Clark County Vegetation Management section under the Environmental Services Departments sole focus is on the control of noxious weeds within the County.</i>			X
Ensure emergency vehicle access to all residents to allow effective response and recovery from disaster events. <i>Comment: Removed; no longer feasible- Clark County Code requires this for new construction only and there is not the political support to increase it to older construction. Clark County Public Works identified bridges insufficient to carry emergency vehicle and improvements were done. Homeowners in effected areas have been notified by the County.</i>			X
Develop priority routes throughout the county and improve these routes to a higher standard. <i>Comment: Removed; no longer feasible- Some priority routes have been identified, such as snow routes, however not enough specific information on the effects of various hazards, such as flood areas, liquefaction areas, etc. has been used to make identification of primary routes outside the major roadways. This action item is replaced in the new plan. See Action# CC-19 in updated Action Plan.</i>			X
Ensure that electricity is available to populations requiring priority for electricity. <i>Comment: Removed; no longer feasible- this was a Clark Public Utilities specific action item.</i>			X
Ensure appropriate equipment is available during events. <i>Comment: Completed- Clark County Public Works operates numerous equipment shed throughout the County and has the ability to surge more equipment to any shed if needed. Other staging areas would be identified on an as needed basis per the Incident Command System and cooperation with our local and regional partners.</i>	X		
Condition development in isolated interface zones on adequate fire suppression capability and redundant access. <i>Comment: Removed; no longer feasible- Clark County requires new developments in the Wildland Urban Interface to meet current Fire Code. Clark County Government has no fire first responders and no ability to compel the Fire Districts to increase capabilities allowing more development. Lack of political support to complete.</i>			X

1.9 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 1-10 lists the actions that make up the Clark County hazard mitigation action plan. Table 1-11 identifies the priority for each action. Table 1-12 summarizes the mitigation actions by hazard of concern and the six mitigation types.

1.10 FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

The following information was identified as having the potential to increase the understanding of risk and vulnerability in Clark County:

- Detailed study of the cascading effects resulting from a large or very large earthquake on the Cascadia or Portland Hills fault.
- Detailed information on building stock construction types in the planning area.
- As science improves, better understanding and future mapping of landslide runout areas/zones.

Table 1-10. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency ^a	Estimated Cost	Sources of Funding	Timeline
CC-1—Where appropriate, support retro-fitting, relocation or acquisition from willing property owners of structures located in hazard prone areas to protect structures from future damage, with repetitive and severe repetitive loss as a priority. Seek opportunities to leverage partnerships within the planning area in these pursuits.						
Existing	All Hazards	4, 5, 7, 9, 10	Public Works-Construction & Design* / Community Development- Building Safety	High	HMGP, PDM, FMA, CDBG-DR	Short-term
CC-2—Integrate the natural hazard mitigation plan into other plans, programs, ordinances, codes and databases that dictate land use decisions, unified development, comprehensive planning, critical areas ordinances, stormwater etc. within the community. Ensure managers and planners within responsible departments are aware of the natural hazard mitigation plan, the information contained within it, and its potential for integration. Do so through direct engagement, training and education.						
New and Existing	All Hazards	2, 4	Community Planning* / Community Development/ Public Works/ Public Health / Risk Management- Emergency Response Coordinator(*engagement & education)	Low	Staff Time, General Funds	On-going
CC-3—Develop and implement a program to capture perishable data during and after significant events (e.g. high water marks, preliminary damage estimates, damage photos) to support our partners and future mitigation efforts including the update, implementation and maintenance of the natural hazard mitigation plan. Support the establishment of a county-wide repository for capturing this information.						
Existing	All Hazards	1, 2, 4, 12	Risk Management- Emergency Response Coordinator* / Public Works- OPS	Low	Staff Time, General Funds	Short-term
CC-4—Support the County-wide initiatives identified in Volume I of the natural hazard mitigation plan.						
New and Existing	All Hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Risk Management- Emergency Response Coordinator* / All County Departments (as needed)	Low	Staff Time, General Funds	Short-term
CC-5—Actively participate in the plan maintenance protocols outlined in Volume I of the natural hazard mitigation plan. Share lessons learned and mitigation success stories and actively participate in progress reporting.						
New and Existing	All Hazards	1, 4	Risk Management- Emergency Response Coordinator	Low	Staff Time, General Funds	Short-term
CC-6—Continue to maintain good standing and compliance under the National Flood Insurance Program (NFIP). This will be accomplished through the implementation of floodplain management programs that will, at a minimum, meet the requirements of the NFIP:						
<ul style="list-style-type: none"> Enforcement of the flood damage prevention ordinance. Participate in floodplain identification and mapping updates. Provide public assistance/information on floodplain requirements and impacts. 						
New and Existing	Flood	1, 4, 5, 9	Public Works-Construction & Design	Low	Staff Time, General Funds	On-going

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency ^a	Estimated Cost	Sources of Funding	Timeline
CC-7— Work with building officials to identify ways to improve our jurisdiction's BCEGS classification.						
New	Earthquake, Flood, Landslide, Severe Weather, Volcano, Wildfire	5, 6, 7, 10, 12	Community Development- Building Safety	Low	Staff Time, General Funds	Short-term
CC-8—In cooperation with our participating jurisdictional partners, finalize the Regional Disaster Debris Management Plan by incorporating changes that were recommended during the 2014 review of the draft plan. Identify, assess and document debris collection sites. Ensure the plan meets at least the minimum requirements for future review and approval.						
Existing	All Hazards	1, 2, 4, 6	Public Works- Emergency Management* / Public Health - Solid Waste / Risk Management- Emergency Response Coordinator	Medium	Staff Time, General Funds, Interns, EMPG	Short-term
CC-9— Maintain the County CRS classification and where appropriate take steps to improve our CRS classification.						
New and Existing	Flood, Dam Failure	1, 6, 7, 9, 10, 11, 12	Public Works- Construction & Design	Low	Staff Time, General Funds	Short-term
CC-10—Establish a program to encourage voluntary structural retro-fitting of older homes on vulnerable soils by providing information and resources during scheduled public outreach events and when requested.						
Existing	Earthquake	1, 2, 8, 9	Community Development- Building Safety	Low	Staff Time, General Funds	Short-term
CC-11—Establish a program to encourage voluntary non-structural and structural retro-fitting throughout the County by providing information and resources during scheduled public outreach events and when requested.						
Existing	Earthquake	1, 2, 5, 9, 10,	Community Development- Building Safety	Low	Staff Time, General Funds	Short-term
CC-12—Establish a program to encourage structural retro-fitting of hazardous materials containment during Clark County Fire Marshal operational permit inspections.						
Existing	Earthquake, Flood, Severe Weather, Dam Failure	1, 4, 6, 8, 9, 10, 11	Community Development- Fire Marshal*	Low	Staff Time, General Funds	Short-term
CC-13— Establish a program to encourage non-structural retro-fitting of hazardous materials containment during Clark County Fire Marshal annual facilities visits.						
Existing	Earthquake	1, 4, 6, 8, 9, 10	Community Development- Fire Marshal*	Low	Staff Time, General Funds	Short-term
CC-14—Establish a program to encourage and assist residents in understanding the benefits of defensible space to minimize and reduce the impacts of fires during public outreach opportunities and the Spring Wildfire Campaign.						
New and Existing	Wildfire	1, 2, 4, 6, 10	Community Development- Fire Marshal*	Low	Staff Time, General Funds	Short-term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency ^a	Estimated Cost	Sources of Funding	Timeline
CC-15— Develop a program within the Community Development Department (Building Safety) to review the unincorporated area critical facilities list from the natural hazard mitigation plan, prioritize the list, and conduct outreach and education to owners concerning pre-disaster assessments.						
Existing	Severe Weather, Earthquake, Flood, Landslide, Wildfire, Wildfire	1, 2, 8, 9, 10	Community Development- Building Safety*/ Fire Marshal	Medium	Staff Time, General Funds	Short-term
CC-16—Develop a standard hazards planning map in GIS using the best available information. Include layers for each of the hazards identified in the natural hazard mitigation plan. In addition, create a map layer of the known shallow flood areas based on information from Public Works, and other layers including liquefaction and critical facilities and transportation infrastructure. Once complete, integrate this mapping into planning. New layers should be added as a need is identified. Share within the County Government and with our planning partners.						
New and Existing	All Hazards	4, 6, 12	Clark County GIS Department* / Risk Management- Emergency Response Coordinator / Public Works/ Community Development / Public Health / CRESA	Low	Staff Time, General Funds	Short-term
CC-17—Establish a hazard mitigation webpage on the Clark County internet website with links to pertinent hazard mitigation topics and information from County Departments (I.E. retro-fit information, defensible space, etc.) to support public outreach and education as well as other action items. Include a link to the natural hazard mitigation plan and information on CRESA's website.						
New and Existing	All Hazards	1, 4, 6	Public Information & Outreach* / Risk- Emergency Response Coordinator / Community Planning / Community Development / Public Works / Public Health	Low	Staff Time, General Funds	Short-term
CC-18—Expand our participation in the Great Washington SHAKEOUT drill throughout the County Government. Exercise the ENS system during the drill. Conduct de-briefings and collect lessons learned and improve our procedures to enhance earthquake preparedness and employee safety. Encourage the public to participate as well, using social media, website, and other public outreach methods.						
Existing	Earthquake	1, 3, 10	Risk Management- Emergency Response Coordinator */ All Departments	Low	Staff Time, General Funds	On-going
CC-19—Add a hazard mitigation information section to the annual newsletter mailing to the special flood hazard area. Include hazard information and resources as part of our public outreach.						
New and Existing	Flood, Severe Weather	1, 6	Public Works- PIO* / Risk Management- Emergency Response Coordinator	Low	Staff Time, General Funds	Short-term
CC-20— Where feasible, continue to encourage and support efforts to re-open/improve access roads into the County forest for fire suppression and fuel breaks.						
New and Existing	Wildfire	4, 10, 11	Public Works - Forestry	High	PDM	Short-term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency ^a	Estimated Cost	Sources of Funding	Timeline
CC-21—Develop a County Continuity Of Operations Plan (COOP). Initial priority is to identify and prioritize County essential functions and critical facilities based on function during an event.						
Existing	All Hazards	2, 3, 4, 10	Risk Management- COOP Coordinator* / County Manager & Directors of all County Departments	Medium	Staff Time, General Funds , EMPG	Short-term
CC-22—Conduct pre-disaster assessments (seismic, flood, severe weather, back-up power, etc.) on County critical facilities based on information determined in Action #CC-21.						
Existing	Severe Weather, Earthquake, Flood, Landslide, Wildfire	2, 3, 4, 8, 10	County Risk Manager* / Risk Management- COOP Coordinator / Community Development- Building Safety / Public Works- Engineering / General Services- Facilities Management	Medium	Staff Time, General Funds	Short-term
CC-23- Based on information from Action #CC-22, identify and prioritize County critical facilities to target for retro-fit and back-up power, or most likely to require an alternate site during a major event or disaster.						
Existing	All Hazards	3, 6, 8, 10	Risk Management- COOP Coordinator*/ General Services- Facilities Management	Low	Staff Time, General Funds	Short-term
CC 24—Based on the information gathered in Actions #CC-22 & CC-23, procure and install alternate/back-up power generators and/or emergency generator quick connect hook-ups in County critical facilities as funding becomes available. Install and maintain surge protection on critical electronic equipment.						
Existing	All Hazards	3, 6, 8, 10	General Services- Facilities Management* / Information Technology / Risk Management- COOP Coordinator /	High	HMGP, PDM	Long-term

a. * denotes lead agency

Table 1-11. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
CC-1	5	High	High	Yes	Yes	No	Medium	High
CC-2	2	Medium	Low	Yes	No	Yes	High	Low
CC-3	4	Low	Low	Yes	No	Yes	High	Low
CC-4	12	Low	Low	Yes	No	Yes	High	Low
CC-5	2	Low	Low	Yes	No	Yes	High	Low
CC-6	4	Medium	Low	Yes	No	Yes	High	Low
CC-7	5	Medium	Low	Yes	No	Yes	High	Low
CC-8	4	Medium	Medium	Yes	Yes	No	Medium	High
CC-9	7	Medium	Low	Yes	No	Yes	High	Low
CC-10	4	Medium	Low	Yes	No	Yes	High	Low
CC-11	5	Medium	Low	Yes	No	Yes	High	Low
CC-12	7	Medium	Low	Yes	No	Yes	High	Low
CC-13	6	Medium	Low	Yes	No	Yes	High	Low
CC-14	5	Medium	Low	Yes	No	Yes	High	Low
CC-15	5	Medium	Medium	Yes	No	No	Medium	Low
CC-16	3	Low	Low	Yes	No	Yes	High	Low
CC-17	3	Low	Low	Yes	No	Yes	High	Low
CC-18	3	Medium	Low	Yes	No	Yes	High	Low
CC-19	2	Low	Low	Yes	No	Yes	High	Low
CC-20	3	High	High	Yes	Yes	No	Medium	High
CC-21	4	Medium	Medium	Yes	Yes	No	Medium	High
CC-22	5	Medium	Medium	Yes	No	No	Medium	Low
CC-23	4	Low	Low	Yes	No	Yes	High	Low
CC-24	4	Medium	High	No	Yes	No	Low	Medium

a. See the introduction to this volume for explanation of priorities.

Table 1-12. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	CC-2, CC-3, CC-4, CC-5, CC-6, CC-8, CC-9, CC-16	CC-1, CC-6, CC-9, CC-12	CC-4, CC-6, CC-9, CC-12, CC-16, CC-17	CC-9	CC-8, CC-9, CC-16, CC-21, CC-23, CC-24	CC-9, CC-12
Drought	CC-2, CC-3, CC-4, CC-5	CC-1	CC-4, CC-17		CC-21, CC-24	
Earthquake	CC-2, CC-3, CC-4, CC-5, CC-7, CC-8, CC-18	CC-1, CC-7, CC-10, CC-11, CC-12, CC-13	CC-4, CC-10, CC-11, CC-12, CC-13, CC-15, CC-16, CC-17, CC-18, CC-22, CC-23		CC-8, CC-15, CC-16, CC-18, CC-21, CC-22, CC-23, CC-24	CC-12
Flood	CC-2, CC-3, CC-4, CC-5, CC-6, CC-7, CC-8, CC-9, CC-16	CC-1, CC-6, CC-7, CC-9, CC-12	CC-4, CC-6, CC-9, CC-12, CC-15, CC-16, CC-17, CC-19, CC-22, CC-23	CC-9	CC-8, CC-15, CC-16, CC-21, CC-22, CC-23, CC-24	CC-9, CC-12
Landslide	CC-2, CC-3, CC-4, CC-5, CC-7, CC-8, CC-16	CC-1, CC-7	CC-4, CC-15, CC-16, CC-17, CC-22, CC-23		CC-8, CC-15, CC-16, CC-21, CC-22, CC-23, CC-24	
Severe Weather	CC-2, CC-3, CC-4, CC-5, CC-7, CC-8	CC-1, CC-7, CC-12	CC-4, CC-12, CC-15, CC-16, CC-17, CC-19, CC-22, CC-23		CC-8, CC-15, CC-16, CC-21, CC-22, CC-23, CC-24	CC-12
Volcano	CC-2, CC-3, CC-4, CC-5, CC-7, CC-8	CC-1, CC-7	CC-4, CC-16, CC-17		CC-8, CC-21, CC-24	
Wildfire	CC-2, CC-3, CC-4, CC-5, CC-7, CC-14, CC-20	CC-1, CC-7	CC-4, CC-14, CC-15, CC-16, CC-17, CC-22, CC-23	CC-20	CC-8, CC-15, CC-16, CC-21, CC-22, CC-23, CC-24	

a. See the introduction to this volume for explanation of mitigation types.

2. CITY OF BATTLE GROUND

2.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Scott P. Sawyer, P.E., Public Works Director
109 SW 1st Street, Suite 122
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Alternate Point of Contact

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Battle Ground, Washington 98604
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2.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- **Date of Incorporation**—June 18, 1951
- **Current Population**—19,250 as of April 1, 2015 (Washington State Office of Financial Management)
- **Population Growth**—The population of Battle Ground slowly grew from the 1950s through 1980s. Like many other cities within the county, Battle Ground experienced a large increase in population from the late 1990s through the 2000s. Since 2007, the City has experienced a period of rather slow growth. Upcoming growth projections anticipate an increase in population to 39,309 persons estimated in 2035.
- **Location and Description**—Battle Ground is located in the heart of Clark County, Washington, just six miles from Interstate 5. The community lies between the Pacific Ocean and the Cascade Mountains, providing citizens and visitors with scenic and pristine landscapes.
- **Brief History**—On the May 26, 1951, a special election was held to determine whether or not a corporation to be known as the Town of Battle Ground should be established. Voters approved the incorporation of the new town and at the same time elected its first city council and its first mayor, Mr. P.L. Rasmussen. Washington State recognized the incorporation of the Town of Battle Ground, population 742, on June 18, 1951. Eventually, the Town of Battle Ground became the City of Battle Ground and the population has grown to nearly 20,000.
- **Climate**—The City is sheltered by the Cascade Mountains to the east and the Coast Range to the west. The climate is generally mild, with average temperatures ranging from 42 degrees in winter to 76 degrees during the summer months. Battle Ground is at an altitude of 280 feet above sea level. The average annual precipitation is 69.06 inches.
- **Governing Body Format**—The citizens of Battle Ground voted to adopt the Council-Manager form of government in 1997. Under this form of government, the City Council is responsible for the legislative function of the city such as establishing policy, passing local ordinances, approving budget appropriations, and developing an overall vision. The Council appoints a professional City Manager to implement its policies, serve as advisor, and oversee administrative operations. The City Manager assumes responsibility for the adoption of this plan; the Public Works Director will oversee its implementation.

- **Development Trends**—Population and corresponding new development within the Urban Growth Area for the City of Battle Ground have grown significantly since 1995 resulting in the City annexing approximately 682 acres. The majority of this land has been designated for residential use, though some of this land has been designated for industrial and business park use. The City of Battle Ground's Comprehensive Plan will guide development in the City. The plan provides broad guidance on development practices within the City to address the concerns reflected in the Growth Management Act. The plan is intended to reflect expected growth for a 20-year period.

2.3 CAPABILITY ASSESSMENT

An assessment of legal and regulatory capabilities is presented in Table 2-1. An assessment of fiscal capabilities is presented in Table 2-2. An assessment of administrative and technical capabilities is presented in Table 2-3. Information on National Flood Insurance Program (NFIP) compliance is presented in Table 2-4. Classifications under various community mitigation programs are presented in Table 2-5. An assessment of education and outreach capabilities is presented in Table 2-6.

Table 2-1. Legal and Regulatory Capability

	Local Authority	Other Jurisdiction Authority	State Mandated
Building Code <i>Comment: BGMC 15.104 Ord 95-769</i>	Yes	No	Yes
Zoning Code <i>Comment: BGMC 17.101 Ord 95-769</i>	Yes	No	Yes
Subdivisions <i>Comment: BGMC 16.115 Ord 99-008</i>	Yes	No	Yes
Stormwater Management <i>Comment: BGMC 18.250 Ord 96-802</i>	Yes	No	Yes
Post-Disaster Recovery <i>Comment: None</i>	No	No	No
Real Estate Disclosure <i>Comment: None</i>	No	No	No
Growth Management <i>Comment BGMC 17.101.020 Ord 95-769</i>	Yes	No	Yes
Site Plan Review <i>Comment: BGMC 17.143 Ord 95-769</i>	Yes	No	No
Environmental Protection <i>Comment: BGMC 18.100 Ord 00-015</i>	Yes	No	Yes
Flood Damage Prevention <i>Comment BGMC 18.310 Ord 04-025</i>	Yes	No	Yes
Emergency Management <i>Comment: BGMC 2.74 Ord 06-03</i>	Yes	No	Yes
Climate Change <i>Comment: None</i>	No	No	No
Other <i>Comment: None</i>	No	No	No

	Local Authority	Other Jurisdiction Authority	State Mandated
General or Comprehensive Plan <i>Is the plan equipped to provide linkage to this mitigation plan? No</i> <i>Comment: BGMC 17.101.040 Ord 95-769 1995</i>	Yes	No	Yes
Capital Improvement Plan <i>Comment: Water, Sewer, Stormwater, Transportation. Updated every 4 years.</i>	Yes	No	Yes
Floodplain or Watershed Plan <i>Comment: BGMC 18.310 Ord 04-025</i>	Yes	No	No
Stormwater Plan <i>Comment: BGMC 18.250.110 Ord 96-802 1996 – Dept. of Ecology</i>	Yes	Yes	Yes
Habitat Conservation Plan <i>Comment BGMC 18.280 Ord 04-025</i>	Yes	No	No
Economic Development Plan <i>Comment: Old Towne Economic Development Plan (date unknown)</i>	Yes	No	Yes (depending on funding)
Shoreline Management Plan <i>Comment: BGMC 18.320 Ord 15-04</i>	Yes	No	Yes
Community Wildfire Protection Plan <i>Comment: None</i>	No	No	No
Forest Management Plan <i>Comment: None</i>	No	No	No
Climate Action Plan <i>Comment: None</i>	No	No	No
Other <i>Comment: None</i>	No	No	No
Comprehensive Emergency Management Plan <i>Comment: BGMC 2.74 Ord 06-03</i>	Yes	Yes	Yes
Threat & Hazard Identification & Risk Assessment <i>Comment: None</i>	No	No	No
Post-Disaster Recovery Plan <i>Comment: None</i>	No	No	No
Continuity of Operations Plan <i>Comment: None</i>	No	No	No
Public Health Plan <i>Comment: None – Plan administered by the Clark County Public Health Dept.</i>	No	Yes	No

Table 2-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes – Utility Taxes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
Withhold Public Expenditures in Hazard-Prone Areas	Yes
State-Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes
Other	No

Table 2-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Planning Department/ City of BG/Senior Planner
Engineers or professionals trained in building or infrastructure construction practices	Yes	Public Works Department / City of BG / City Engineer
Planners or engineers with an understanding of natural hazards	Yes	Public Works Department / City of BG / City Engineer
Staff with training in benefit/cost analysis	Yes	Public Works Department / City of BG / City Engineer
Surveyors	No	
Staff capable of making substantial damage estimates	Yes	Public Works Department / City of BG / City Engineer
Personnel skilled or trained in GIS applications	Yes	Public Works Department / City of BG / Engineering & Planning personnel
Scientist familiar with natural hazards in local area	No	
Emergency manager	No	The City considers CRESA has our emergency management provider
Grant writers	Yes	Public Works Department / City of BG / Engineering personnel

Table 2-4. National Flood Insurance Program Compliance

Criteria	Response
When did the community enter the NFIP?	04/15/81
When did the Flood Insurance Rate maps become effective?	09/05/2012
What local department is responsible for floodplain management?	Community Development
Who is your floodplain administrator? (department/position)	Community Development/ Director
• Is this a primary or auxiliary role?	Primary
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date of adoption of your flood damage prevention ordinance?	2004
• Does your floodplain management program meet or exceed minimum requirements?	Meet
• If so, in what ways?	
When was the most recent Community Assistance Visit or Community Assistance Contact?	Unknown
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed?	No
• If so, please state what they are.	
Do your flood hazard maps adequately address the flood risk within your jurisdiction?	Yes
• If no, please state why.	
Does your floodplain management staff need any assistance or training to support its floodplain management program?	No
• If so, what type of assistance/training is needed?	
Does your jurisdiction participate in the Community Rating System (CRS)?	No
• If so, is your jurisdiction seeking to improve its CRS Classification?	
• If not, is your jurisdiction interested in joining the CRS program?	No
How many Flood Insurance policies are in force in your jurisdiction? ^a	21
• What is the insurance in force? ^a	\$4,548,000
• What is the premium in force? ^a	\$11,259
How many total loss claims have been filed in your jurisdiction? ^a	3
• How many claims were closed without payment/are still open? ^a	1
• What were the total payments for losses? ^a	\$3,265.40

a. According to FEMA records as of 11/30/2015.

Table 2-5. Community Classifications

	Participating?	Classification	Date Classified
Community Rating System	No	N/A	N/A
Building Code Effectiveness Grading Schedule	No	N/A	N/A
Public Protection	No	N/A	N/A
Storm Ready	No	N/A	N/A
Firewise	No	N/A	N/A

Table 2-6. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes – We have a dedicated Public Information Officer.
Do you have personnel skilled or trained in website development?	No
Do you have hazard mitigation information available on your website?	No
• If yes, please briefly describe.	N/A
Do you utilize social media for hazard mitigation education and outreach?	Yes
• If yes, please briefly describe.	City Website, Facebook
Do you have any citizen boards or commissions that address issues related to hazard mitigation?	No
• If yes, please briefly specify.	
Do you have any other programs already in place that could be used to communicate hazard-related information?	No
• If yes, please briefly describe.	
Do you have any established warning systems for hazard events?	No
• If yes, please briefly describe.	

2.3.1 Discovery Clean Water Alliance

The City of Battle Ground is a member of the Discovery Clean Water Alliance, which was legally formed on January 4, 2013. The Alliance serves four Member agencies – the City of Battle Ground, Clark County, Clark Regional Wastewater District and the City of Ridgefield. The Members jointly own and jointly manage regional wastewater assets under Alliance ownership through an interlocal framework established under the Joint Municipal Utility Services Act (RCW 39.106). The Alliance seeks to optimize the long-term framework for delivery of regional wastewater transmission and treatment services to the urban growth areas in the central portion of Clark County, Washington.

2.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into local planning mechanisms.

2.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- Battle Ground Municipal Code 18.310 stipulates that the purpose of the chapter is to promote the public health, safety and general welfare, and to minimize public and private losses due to flood conditions in specific areas by methods and provisions designed for by restricting or prohibiting uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities. This flood damage prevention ordinance regulates areas in the special flood hazard areas designated by FEMA. This data forms the basis of the flood risk assessment for the natural hazard mitigation plan.
- Battle Ground Municipal Code 18.320 stipulates the shoreline master program (SMP) is to implement the goals, policies, regulations, and procedures set forth by the Shoreline Management Act of 1971, as amended, and all applicable provisions contained in the Washington Administrative Code. All goals currently in place are consistent with Washington Administrative Code.

- Battle Ground Municipal Code 18.260 stipulates that the director, to the extent practical, shall review development for compliance with critical area regulations (with the triggering development application). Where there are no triggering applications, determination of the type of application shall be based upon the criteria in BGMC [17.200.035](#). Determinations of compliance with this title shall be appealable along with the decision on the underlying permit application through BGMC [17.200.140](#). (Ord. 04-025 § 3 (part), 2004).

1.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- Further development and involvement with Clark County, City of Ridgefield, and Clark Regional Wastewater District in the Discover Clean Water Alliance.
- Further development and involvement with Clark County and the City of Vancouver in the ongoing development of the Disaster Debris Response Plan.
- Further development of the City of Battle Ground Comprehensive Plan including the addition of the Natural Hazard Mitigation Plan by reference.

2.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 2-7 lists all past occurrences of natural hazards within the jurisdiction.

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Tornado	DR-4253	December 10, 2015	\$23,970
Severe Winter Storm and Record and Near Record Snow	DR-1825	December 12, 2008	Unknown
Severe Winter Storm, Landslides, and Mudslides	DR-1682	December 14, 2006	Unknown
Earthquake	DR1361	February 28, 2001	Unknown
Tornado	N/A	May 11, 2000	\$11,392
Storms, High Winds, Floods	DR1079	November 7, 1995	Unknown
Lightning	N/A	July 13, 1993	\$819
Volcanic Eruption, Mt. St. Helens	DR-623	May 21, 1980	Unknown
Tornado	N/A	October 1951	Unknown

2.6 JURISDICTION-SPECIFIC VULNERABILITIES

Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: 0
- Number of FEMA-identified Severe-Repetitive-Loss Properties: 0
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: 0

Other noted vulnerabilities include:

- The City's main water line which replenishes the city's water storage reservoirs crosses in the vicinity of potential landslide territory.

- The Battle Ground City Hall currently does not have a backup generator and provides the main internet and servers to the Police Station.
- Water Wells 1, 2, 4, 5, and 6 do not have backup generators.
- The Battle Ground Community Center would likely serve as a public shelter after a major event does not have a backup generator.

2.7 HAZARD RISK RANKING

Table 2-8 presents the ranking of the hazards of concern.

Table 2-8. Hazard Risk Ranking			
Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Earthquake	32	Medium
2	Severe Weather	18	Medium
3	Flood	6	Low
3	Landslide	6	Low
4	Volcano	3	Low
5	Wildfire	2	Low
6	Drought	1	Low
7	Dam Failure	0	None

2.8 STATUS OF PREVIOUS PLAN INITIATIVES

Table 2-9 summarizes the initiatives that were recommended in the previous version of the natural hazard mitigation plan and their implementation status at the time this update was prepared. It should be noted, that the actions identified in the following table were developed in 2004. Due to the significant amount of time and staff turnover that has occurred since their identification, the status of some actions may be unknown. Additionally, many of the action items identified were to be led by CRESA or other non-City agencies. For ease of annual progress reporting, these actions have generally been removed from the City's action plan or rephrased to be within the capabilities of the City. This will allow for a fresh start consistent with the comprehensive update to the natural hazard mitigation plan conducted during the 2016 planning process.

Table 2-9 Status of Previous Plan Initiatives			
Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Encourage non-structural retrofitting throughout the County. <i>Comment: Worked to be completed by CRESA – Unknown if this has been completed. No status Update. See BG-1</i>		X	
Join the CRS program <i>Comment: The decision was made not to join the CRS program due to lack of Public support.</i>			X
Support the retrofit of at-risk homes in subdivisions <i>Comment: Continue to support the retrofitting of at-risk homes. No status update. See BG-2</i>		X	
Retrofit hazardous material containment areas. <i>Comment: Continue to support the ongoing retrofitting of hazardous material containment. No status update. See BG-3</i>		X	
Encourage non-structural retrofitting of hazardous materials containment <i>Comment: Continue to support – No status update. BG-4.</i>		X	

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Ensure that the public is informed of the necessity of maintaining a 3 day supply of food and water <i>Comment: CRESA has done a great job getting the word out.</i>	X		
Develop public information packets ready to deploy following a disaster event <i>Comment: No status update known. See BG-5</i>		X	
Ensure that residents understand the benefits of defensible space to minimize and reduce the impacts of fires. <i>Comment: CRESA and other media outlets have done a great job getting the word out.</i>	X		
Ensure severe weather warning system and public education for tornadoes in place. <i>Comment: CRESA has done a good job getting the word out.</i>	X		
Expand the public awareness program about hazard materials <i>Comment: CRESA and the Fire Marshal have done a great job getting the word out.</i>	X		
Cultivate an awareness program for landslide hazards <i>Comment: CRESA and Clark County have done a good job of this.</i>	X		
Develop an automated method to notify the public of events during a disaster. <i>Comment: A reverse 911 system has been implemented.</i>	X		
Expand weather radio systems to include all of Clark County <i>Comment: CRESA was listed as lead agency and does not currently have this capability.</i>			X
Conduct pre-earthquake assessments for critical and essential facilities and develop a risk-reduction strategy <i>Comment: Status update unknown. See BG-7</i>		X	
Determine critical government functions and establish redundancy for these functions. <i>Comment: Status update unknown. See BG-8.</i>		X	
Develop preparedness efforts of Tier II hazardous material facilities <i>Comment: Status update unknown. BG-9</i>		X	
Encourage partnerships among agencies to promote uniformity among no-burn policies in forest lands <i>Comment: Municipal codes are in place which prohibits outdoor burning within city limits – Ordinance 01-017 2003</i>	X		
Develop a contingency/Business resumption organization <i>Comment: Status update unknown. See BG-10</i>		X	
Provide opportunities for strategic relations between emergency managers and social service providers <i>Comment: CRESA lead agency- Currently participating on the Region IV Homeland Security Technical Committee</i>	X		
Require the construction of earthquake-resilient structures <i>Comment: The City adopted BGMC 18.300.090 Ordinance 04-025 2004</i>	X		
Develop integrated County stormwater basin-wide plans <i>Comment: Work is ongoing. BG-11</i>		X	
Promote development off of the floodplain <i>Comment: Adoption of BGMC 18.310.030 prevents and/or regulates the development in floodplains</i>	X		
Consider adoption of a zero-rise floodway <i>Comment: Adoption of BGMC 18.310 prevents and/or regulates the increase of flood waters.</i>	X		
Expand the County Clean Water Program <i>Comment: Work is underway and ongoing with each NPDES permit issued by the Washington Department of Ecology</i>	X		

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Develop a method of assessing and documenting landslide hazard areas. <i>Comment: The county has completed this work and is included in their GIS.</i>	X		
Support the use of LIDAR mapping technology to refine landslide hazard maps <i>Comment: The City supports the use of LIDAR for mapping technology to refine landslide hazards.</i>	X		
Ensure state certification of licensing for professionals performing geotechnical evaluations <i>Comment: City code requires (BGM 12.116.060) stipulates the requirement of a licensed professional.</i>	X		
Institute Low Impact Development Practices <i>Comment: Included in BGM 18.250.170 Ord 09-16 2010</i>	X		
Initiate a vegetation management program <i>Comment: Included in BGM 18.257 Ord 05-018 2005</i>	X		
Ensure emergency vehicle access to all residents to allow effective response and recovery from disaster events <i>Comment: Ongoing. See BG-12</i>		X	
Develop priority routes throughout the county and improve these routes to a higher standard. <i>Comment: Status update unknown. See BG-13</i>		X	
Ensure that electricity is available to populations requiring priority for electricity. <i>Comment: This work is completed by Clark Public Utilities on a regular basis</i>	X		
Ensure appropriate equipment is available during events. <i>Comment: Ongoing. See BG-14</i>		X	

2.9 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 2-10 lists the actions that make up the City of Battle Ground hazard mitigation action plan. Table 2-11 identifies the priority for each action. Table 2-12 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 2-10. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
BG-1—Encourage non-structural retrofitting throughout the City.						
Existing	Earthquakes	1, 2, 4, 7	CRESA – Lead Agency / Battle Ground Support Agency	Low	Owner's Expense/BG Staff time to assist in distributing information created by CRESA	On-going
BG-2—Support the retrofit of at-risk homes in subdivisions						
Existing	Wildland Fires	2, 4, 7, 9	Fire Marshall Lead Agency/ BG Community Development Support Agency	Medium	Owner's Expense/BG Staff time to assist in distributing information created by the Fire Marshall's Office	On-going

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
BG-3—Encourage facility owners to retrofit hazardous material containment areas						
Existing	Earthquake	4, 7, 9, 12	Fire Marshall Lead Agency/ BG Community Development Support Agency	High	Owner's Expense, SBA Loans, DHS/FEMA Grant/ BG Staff time to assist in distributing information created by the Fire Marshall's Office	Long-Term
BG-4—Encourage non-structural retrofitting of hazardous materials containment						
Existing	Earthquake	1, 2, 4, 7	Fire Marshall & CRESA Lead Agencies/ BG Community Development Support Agency	Low	Owner's Expense/ BG Staff time to assist in distributing information created by the Fire Marshall's Office and/or CRESA	Ongoing
BG-5—Assist CRESA as needed in the dissemination of recovery-related information after an event.						
Existing	All Hazards	1, 2, 3, 4	CRESA – Lead Agency / Battle Ground Support	Medium	BG Staff time to assist in distributing information created by CRESA	Short-Term
BG-6—Conduct pre-earthquake assessments for critical and essential facilities and develop a risk-reduction strategy						
Existing	Earthquake	6, 10, 12	BG Public Works/BG Building Dept.	Low	BG Staff Time / Operating Budget	Short-Term
BG-7—Determine critical government functions and establish redundancy for these functions						
Existing	All Hazards	6, 12	BG Risk Management / CRESA Support	Low	BG & CRESA Staff Time / Operating Budget	Short-Term
BG-8—Encourage the development of preparedness efforts of Tier II hazardous material facilities within Battle Ground.						
Existing	Earthquakes	1, 4, 5, 7	Fire Marshall Lead Agency / BG Community Development Support Agency	Low	BG Staff Time/ Owner's Expense	Long-Term
BG-9—Support the development of a contingency/Business resumption organization						
Existing	All Hazards	1, 4, 6, 10	CRESA Lead Agency / BG Chamber of Commerce Support Agency / BG Support Agency	Medium	CRESA Staff Time / BG Staff Time	Long-Term
BG-10—Continue to support the development and maintenance of integrated County stormwater basin-wide plans						
Existing	Floods	4, 6, 11	Clark County Clean Water Services Lead Agency /BG Public Works Support Agency	Low	Clark County Staff Time / BG Staff Time / Operating Budget	Ongoing
BG-11—Ensure emergency vehicle access to all residents to allow effective response and recovery from disaster events						
Existing	All Hazards	2, 4	Public Works Lead Agency	Medium	BG Staff Time / Operating Budget	Ongoing
BG-12—Support the continued development of priority routes throughout the county and improve these routes to a higher standard						

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Existing	All Hazards	4	Clark County Public Works Lead Agency / BG Public Works support Agency / WSDOT Support Agency	High	Clark County Staff Time / BG Staff Time	Ongoing
BG-13—Ensure appropriate equipment is available during events						
Existing	All Hazards	4, 10	BG Public Works	Low	Operating Budgets	Ongoing
BG-14—Retrofit Well 1 & 2 to enable a back-up generator to operate the pumps when the power is not available						
New	Earthquakes, Severe Storms	8	BG Public Works	Low	Staff Time / Operating Budget / FEMA Grant	Ongoing
BG-15—Install a back-up generator at city hall to enable operations when the power is not available						
New	Earthquakes, Severe Storms	8	BG Public Works	High	FEMA Grant	Medium-Term
BG-16—Where appropriate, support retro-fitting, purchase or relocation of structures located in high hazard areas and prioritize those structures that have experienced repetitive losses.						
Existing	All Hazards	4, 5, 7, 9, 10	BG Community Development	High	HMGP, PDM, FMA, CDBG-DR	Short-term
BG-17—Continue to maintain good standing and compliance under the National Flood Insurance Program (NFIP). This will be accomplished through the implementation of floodplain management programs that will, at a minimum, meet the requirements of the NFIP:						
<ul style="list-style-type: none"> • Enforcement of the flood damage prevention ordinance • Participate in floodplain identification and mapping updates • Provide public assistance/information on floodplain requirements and impacts. 						
New and Existing	Flood	1, 4, 5, 9	BG Community Development	Low	BG Staff Time / General Fund	Ongoing
BG-18—Integrate the natural hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions within the community.						
New and Existing	All Hazards	2, 4	BG Community Development	Low	BG Staff Time / General Funds	Ongoing

Table 2-11. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
BG-1	4	Medium	Low	Yes	No	Yes	Medium	Low
BG-2	4	Medium	Medium	Yes	No	No	High	Low
BG-3	4	Medium	High	No	Yes	No	Low	Medium

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
BG-4	4	Low	Low	Yes	No	Yes	Medium	Low
BG-5	4	Medium	Medium	Yes	No	No	Low	Low
BG-6	3	Medium	Low	Yes	No	Yes	Medium	Low
BG-7	2	High	Low	Yes	No	Yes	Medium	Low
BG-8	4	Low	Low	Yes	No	No	Low	Low
BG-9	4	Low	Medium	No	No	No	Low	Low
BG-10	4	Low	Medium	No	No	No	Low	Low
BG-11	2	High	Medium	Yes	No	Yes	High	Low
BG-12	1	High	Low	Yes	No	Yes	Medium	Low
BG-13	2	Medium	Low	Yes	No	Yes	Medium	Low
BG-14	1	Medium	Low	Yes	Yes	Yes	High	Medium
BG-15	1	High	High	Yes	Yes	No	Medium	High
BG-16	5	High	High	Yes	Yes	No	Medium	High
BG-17	4	Medium	Low	Yes	No	Yes	High	Low
BG-18	2	Medium	Low	Yes	No	Yes	High	Low

a. See the introduction to this volume for explanation of priorities.

Table 2-12. Analysis of Mitigation Actions

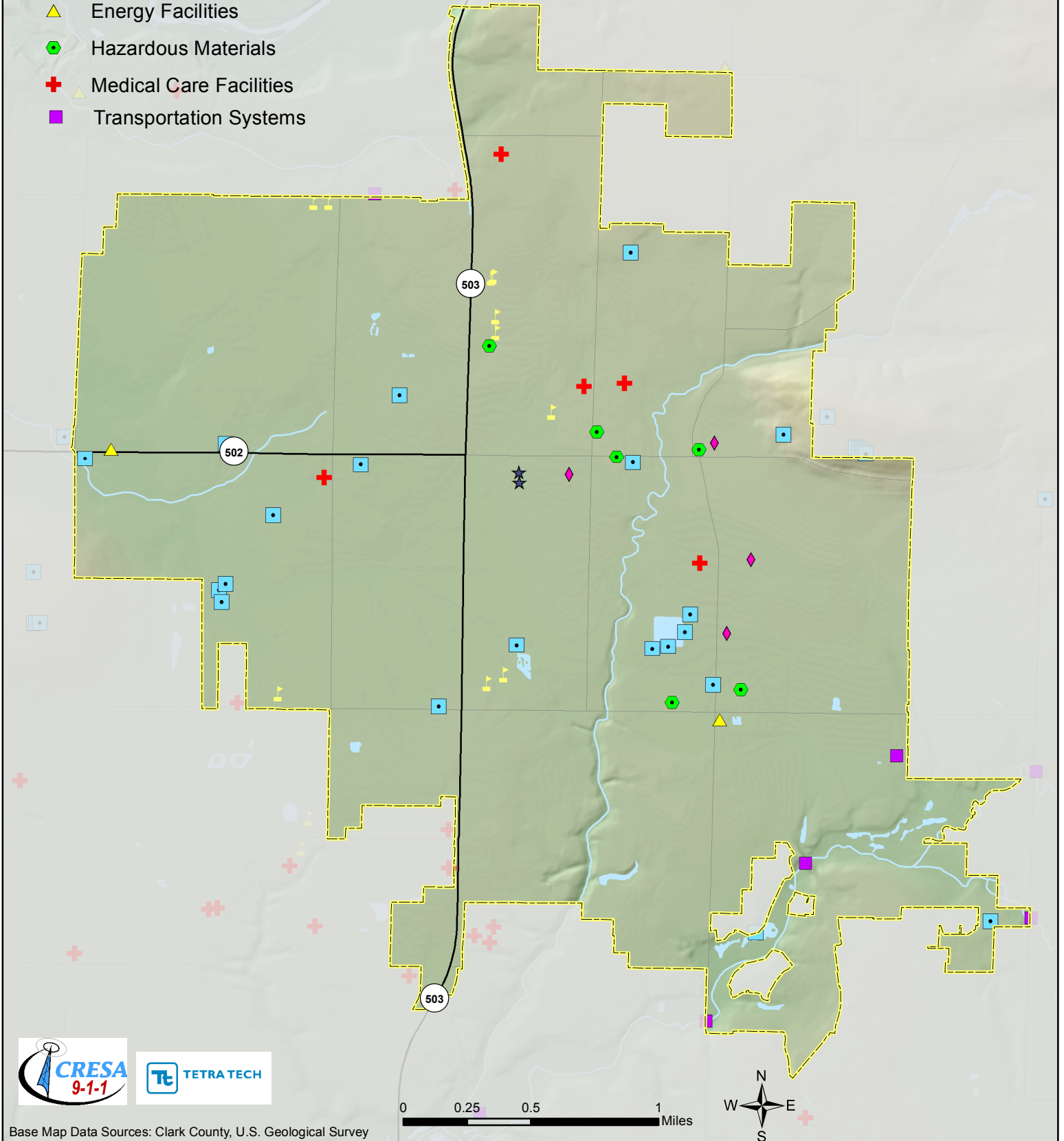
Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	BG-7, BG-9, BG-17, BG-18	BG-16, BG-17	BG-5, BG-17		BG-11, BG-12, BG-13	
Drought	BG-7, BG-9, BG-18	BG-16	BG-5		BG-11, BG-12, BG-13	
Earthquake	BG-1, BG-3, BG-4, BG-6, BG-7, BG-8, BG-9, BG-18	BG-1, BG-3, BG-16	BG-1, BG-4, BG-5, BG-8	BG-8	BG-3, BG-7, BG-11, BG-12, BG-13, BG-14, BG-15	
Flood	BG-7, BG-9, BG-17, BG-18	BG-16, BG-17	BG-5, BG-17	BG-10	BG-11, BG-12, BG-13	
Landslide	BG-7, BG-9, BG-18	BG-16	BG-5		BG-11, BG-12, BG-13	
Severe Weather	BG-7, BG-9, BG-18	BG-16	BG-5		BG-7, BG-11, BG-12, BG-13, BG-14, BG-15	
Volcano	BG-7, BG-9, BG-18	BG-16	BG-5		BG-11, BG-12, BG-13	
Wildfire	BG-7, BG-2, BG-9, BG-18	BG-2, BG-16	BG-2, BG-5		BG-11, BG-12, BG-13	

a. See the introduction to this volume for explanation of mitigation types.

City of Battle Ground

Critical Facilities and Infrastructure

- * Communication Facilities
- ◆ Dams
- ★ Emergency Services
- ▲ Energy Facilities
- Hazardous Materials
- ✚ Medical Care Facilities
- Transportation Systems
- ▲ Schools
- Water and Sanitation Systems
- ◆ Other Facilities



Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

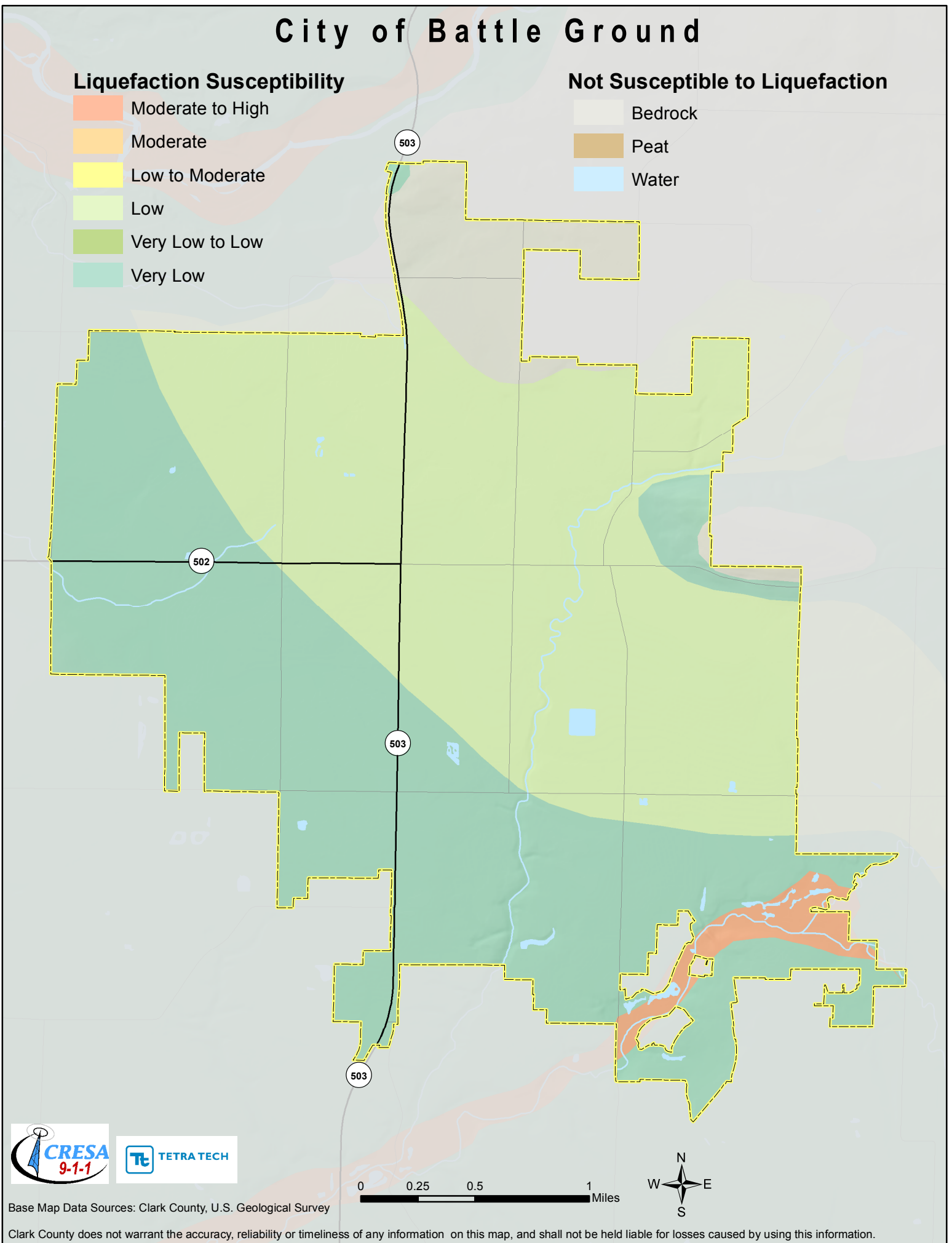
City of Battle Ground

Liquefaction Susceptibility

- Moderate to High
- Moderate
- Low to Moderate
- Low
- Very Low to Low
- Very Low

Not Susceptible to Liquefaction

- Bedrock
- Peat
- Water





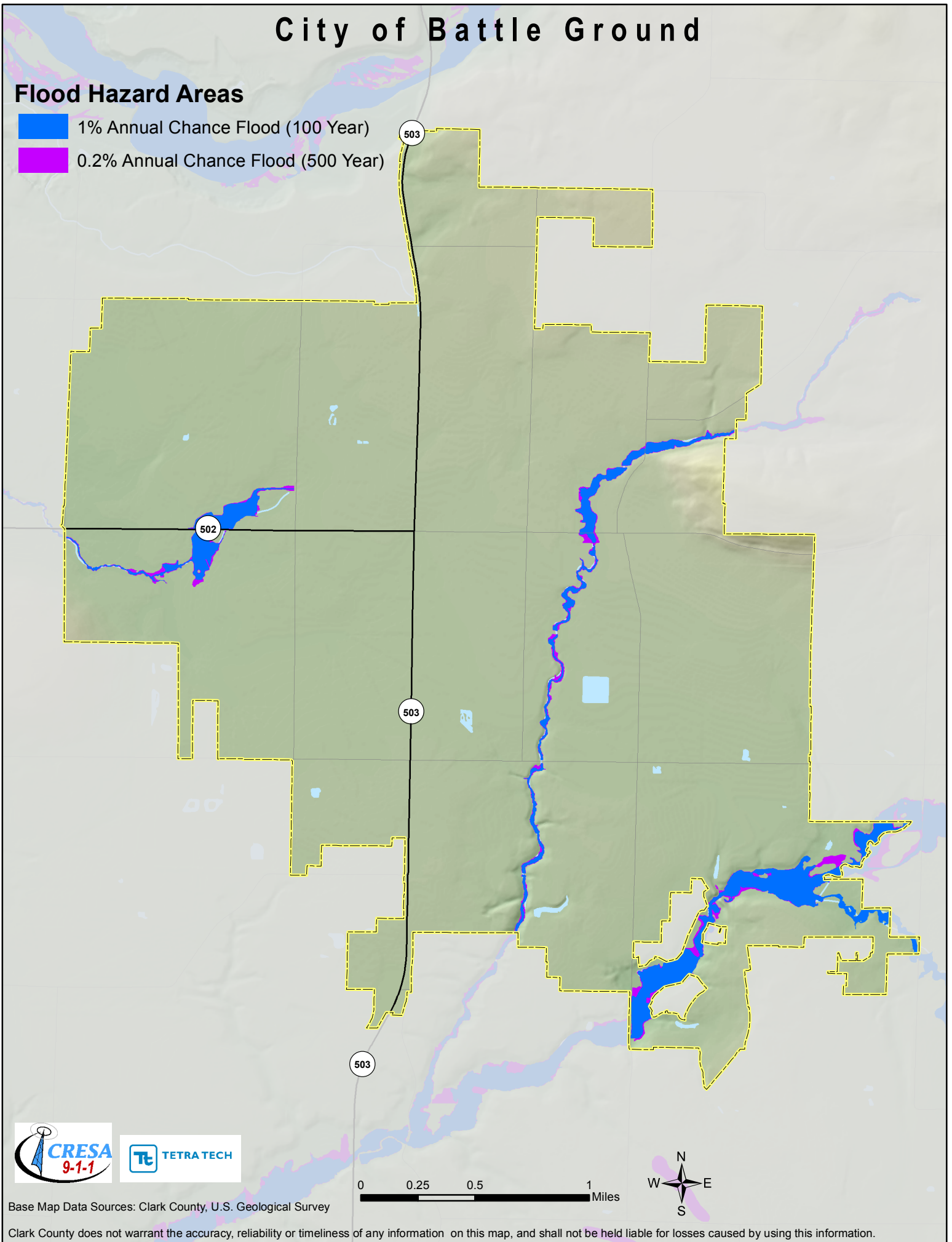
Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

City of Battle Ground

Flood Hazard Areas

-  1% Annual Chance Flood (100 Year)
-  0.2% Annual Chance Flood (500 Year)



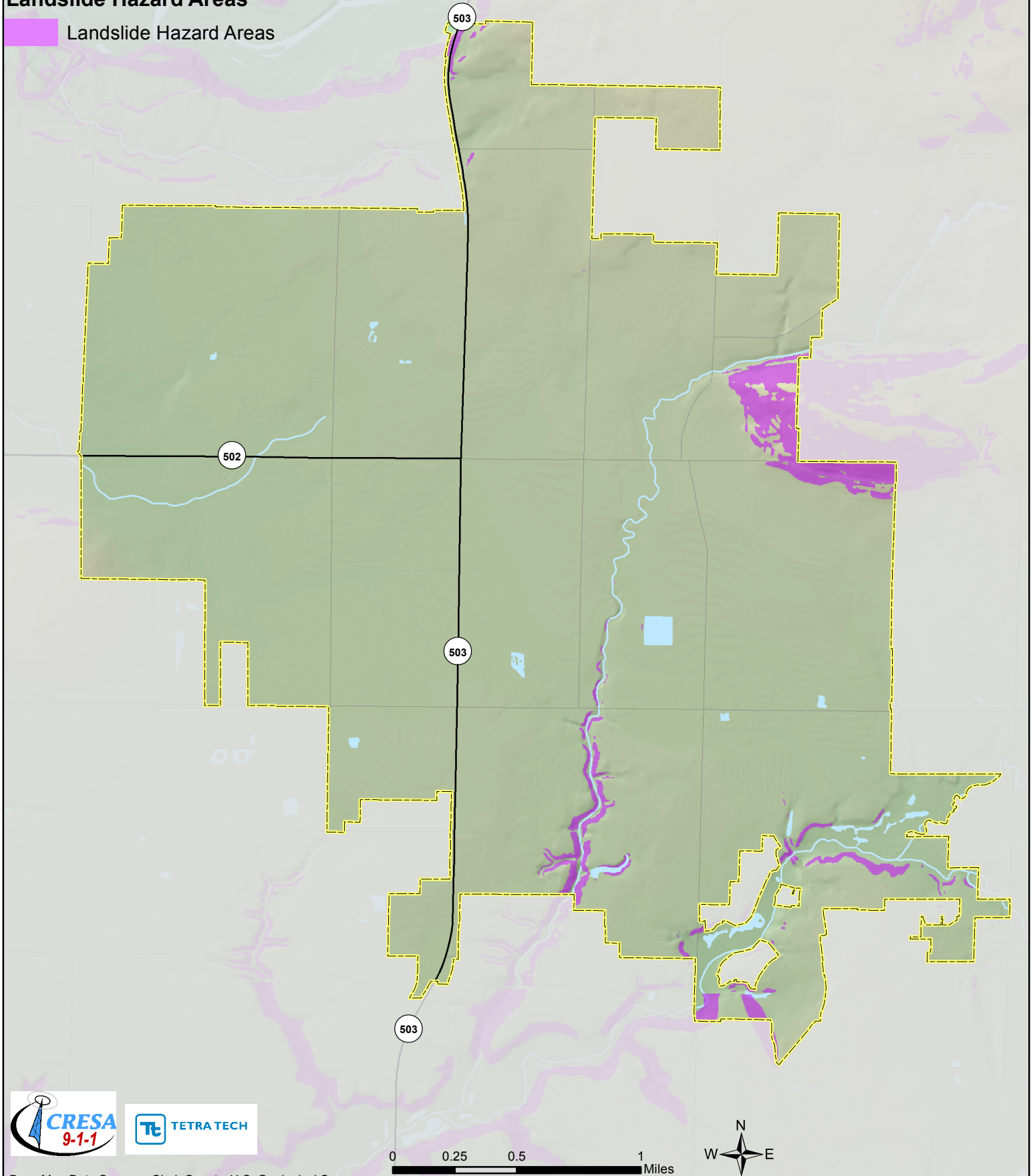
Base Map Data Sources: Clark County, U.S. Geological Survey

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City of Battle Ground

Landslide Hazard Areas

Landslide Hazard Areas



Base Map Data Sources: Clark County, U.S. Geological Survey

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3. CITY OF CAMAS

3.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Lauren Hollenbeck, Senior Planner
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Camas, WA 98607
Telephone: 360-817-1568
e-mail Address: lhollenbeck@cityofcamas.us

Alternate Point of Contact

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616 NE 4th Avenue
Camas, WA 98607
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3.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- Date of Incorporation—1906
- Current Population—21,210 as of April 1, 2015 (2015 Office of Financial Management estimates)
- Population Growth—Based on data tracked by the Office of Financial Management, Camas has experienced a fairly steady growth rate. The overall population has increased approximately 15 percent from 19,355 in 2010 to 22,843 in 2015, an average 3.5 percent per year increase during this time frame.
- Location and Description—The City of Camas is located in Clark County, Washington, west of the Columbia River gorge and approximately 20 miles north of Portland, Oregon. The City is bordered by the Columbia River to the south, the City of Washougal and Woodburn Hill to the east, Lacamas Lake and Lacamas Lake Park to the north, and Grass Valley and the City of Vancouver to the west. It sits north of Highway 14 across the Columbia River from the City of Gresham, Oregon. Camas' downtown and older parts of the City are fairly flat, almost at the same level of the Columbia River, and surrounded by steep slopes.
- Brief History—In the late 1800's, hundreds of Native Americans camped along the Columbia River. The name for the City of Camas comes from the lily-like camas plant, an important part of the Native American diet in the Northwest, and widely found in this area. The first settlers arrived to Camas in the mid 1800's. In 1883, the LaCamas Colony Company of Portland selected this area for their new paper mill, the largest paper mill west of the Rocky Mountains. Mr. Henry L. Pittock, the owner of the Oregonian newspaper needed plenty of water to power paper-making machines for his newspaper and found it in the nearby lakes. Camas was incorporated in 1906 and by 1928 the paper mill was owned and operated by the Crown-Zellerbach Corporation. Today, Crown-Zellerbach is known as Georgia Pacific. From the 1990s through today, Camas experienced significant growth in residential development and in the technology and manufacturing industries due to land annexations.
- Climate—Camas' climate is influenced by the Coast and Cascade mountain ranges. Prevailing winds are from the northeast from April through September, and from the east-southeast for the rest of the year. Occasional high easterly winds occur year-round through the Columbia Gorge. Annual average precipitation is 51 inches. The month of December generally receives the most precipitation, with an

average of 6.5 inches, and July receives the least, with a half-inch. The average mid-winter temperature is 40 degrees, the summer average is 65 degrees, and the annual average temperature is 53 degrees.

- **Governing Body Format**—Camas uses the “Mayor-Council” form of government which consists of an elected mayor, who serves as the city’s chief administrative officer, and a council, which serves as the municipality’s legislative body. Additionally, the City has a professional City Administrator to assist the Mayor with administrative and polity related duties. The City consists of nine departments: City Administration, Community Development, Fire, Finance, IT, Library, Parks & Recreation, Police and Public Works. The City has 10 committees, commissions and task forces, which report to the City Council. The City Council assumes responsibility for the adoption of this plan; the City Administrator will oversee its implementation.
- **Development Trends**—Anticipated development levels for Camas are high, consisting primarily of residential development. In 2015, Camas approved the Green Mountain Planned Residential Development Mixed Use Master Plan to include 1,300-1,400 residential units and commercial uses, the largest mixed use development in the city’s recent history. There has also been a focus on affordable housing and a push for more accessory dwelling units, secondary “mother-in-law” units, on properties. Camas adopted its comprehensive plan in 2004, which provides policies and recommendations to direct public and private decisions affecting future growth and development. City actions, such as those relating to growth, land use, transportation, public facilities and services, parks, and open space must be consistent with the plan.

3.3 CAPABILITY ASSESSMENT

An assessment of legal and regulatory capabilities is presented in Table 3-1. An assessment of fiscal capabilities is presented in Table 3-2. An assessment of administrative and technical capabilities is presented in Table 3-3. Information on National Flood Insurance Program (NFIP) compliance is presented in Table 3-4. Classifications under various community mitigation programs are presented in Table 3-5. An assessment of education and outreach capabilities is presented in Table 3-6.

Table 3-1. Legal and Regulatory Capability

	Local Authority	Other Jurisdiction Authority	State Mandated
Building Code <i>Comment: Camas Municipal Code (CMC) Chapter 15.04.010; adopts the most current State Building Code as amended.</i>	Yes	No	Yes
Zoning Code <i>Comment: CMC Title 18 Zoning: Ord. 2515 § 1 (Exh. A (part)), 2008; Ord. 2443 § 3 (Exh. A (part)), 2006</i>	Yes	No	Yes
Subdivisions <i>Comment: CMC Chapter 17.11 Subdivisions; Ord. 2483, 2007</i>	Yes	No	Yes
Stormwater Management <i>Comment: CMC Chapter 14.02 Stormwater Control: Ord. 2582, § I, 2-1-2010- adopts the 2005 Ecology Stormwater Manual and Camas Stormwater Design Standards Manual Res. 1193 adopted July 2010.</i>	Yes	Yes	Yes
Post-Disaster Recovery <i>Comment: None at this time.</i>	No	No	No
Real Estate Disclosure <i>Comment: WA State Disclosure Law- RCW 64.06</i>	No	Yes	Yes
Growth Management <i>Comment: The City is in compliance and good standing with the Washington Growth Management Act of 1990 with its land-use policies identified in its comprehensive plan (March 2004 update) and municipal code.</i>	Yes	No	Yes
Site Plan Review <i>Comment: CMC Chapter 18.18 Site Plan Review: Ord. 2515 § 1(Exh. A (part)), 2008, Ord. 2481 § 1 (Exh. A (part)), 2007, Ord. 2443 § 3 (Exh. A (part)), 2006</i>	Yes	No	No
Environmental Protection <i>Comment: CMC Chapter 16.51 Critical Areas: Ord. 2517 § 1(Exh. A (part)), 2007; CMC Chapter 18.31 Sensitive Areas and Open Space: Ord. 2515 § 1(Exh. A (part)), 2008; Shoreline Master Program adopted 2012</i>	Yes	No	Yes
Flood Damage Prevention <i>Comment: CMC Chapter 16.57 Frequently Flooded Areas: Ord. 2517 § 1(Exh. A (part)), 2008, Ord. 2647 § I (Exh. A) 5-21-2012,</i>	Yes	Yes	Yes
Emergency Management <i>Comment: 2016 Draft Comprehensive Emergency Management Plan</i>	Yes	No	Yes
Climate Change <i>Comment: None at this time.</i>	No	No	No
Other <i>Comment: None at this time.</i>	No	No	No
General or Comprehensive Plan <i>Is the plan equipped to provide linkage to this mitigation plan? No</i> <i>Comment: March 2004 City of Camas Comprehensive Plan; 2035 City of Camas Comprehensive Plan is anticipated for adoption before the end of 2016.</i>	Yes	No	Yes
Capital Improvement Plan <i>What types of capital facilities does the plan address? Roads, water and sewer</i> <i>How often is the plan updated? 6 year CIP, reviewed and updated annually.</i> <i>Comment:</i>	Yes	No	Yes
Floodplain or Watershed Plan <i>Comment: None at this time.</i>	No	No	No
Stormwater Plan <i>Comment: Comprehensive Stormwater Drainage Plan April 2013</i>	Yes	No	No

	Local Authority	Other Jurisdiction Authority	State Mandated
Habitat Conservation Plan <i>Comment: None at this time.</i>	No	No	No
Economic Development Plan <i>Comment: Camas-Washougal Economic Development Association</i>	Yes	Yes	Yes – dependent on funding
Shoreline Management Plan <i>Comment: Ord. 2643 and Res. 1250, Sept. 12, 2012 and Ord. 15-007</i>	Yes	No	Yes
Community Wildfire Protection Plan <i>Comment: None at this time.</i>	No	No	No
Forest Management Plan <i>Comment: None at this time.</i>	No	No	No
Climate Action Plan <i>Comment: None at this time.</i>	No	No	No
Other <i>Comment: None at this time.</i>	No	No	No
Comprehensive Emergency Management Plan <i>Comment: Adopted/approved 2006, currently being revised.</i>	Yes	No	Yes
Threat & Hazard Identification & Risk Assessment <i>Comment: None at this time.</i>	No	No	No
Post-Disaster Recovery Plan <i>Comment: None at this time.</i>	No	No	No
Continuity of Operations Plan <i>Comment: None at this time.</i>	No	No	No
Public Health Plan <i>Comment: Region IV Public Health Emergency Response Plan Dec. 2013</i>	No	Yes	No

Table 3-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes (water, sewer, stormwater)
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
Withhold Public Expenditures in Hazard-Prone Areas	No
State-Sponsored Grant Programs	No
Development Impact Fees for Homebuyers or Developers	Yes
Other	No

Table 3-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Community Department – 1 Community Development Director, 1 Planning Manager, 2 Senior Planners, 1 Project Manager
Engineers or professionals trained in building or infrastructure construction practices	Yes	Community Development- 1 Building Official, 2 Building Inspectors. Utilities Department (21 water/sewer/storm water employees).
Planners or engineers with an understanding of natural hazards	Yes	Community Development- 1 Senior Planner; Engineering- 1 Engineer; could contract with others for expertise in this field
Staff with training in benefit/cost analysis	Yes and No	Community Development- 1 Senior Planner (could use a refresher course)
Surveyors	No	No licensed surveyors on City staff.
Staff capable of making substantial damage estimates	Yes	Community Development- 1 Building Official, 1 Senior Planner
Personnel skilled or trained in GIS applications	Yes and No	Community Development- Senior Planners, City can and has requested GIS assistance from Clark County GIS staff.
Scientist familiar with natural hazards in local area	Yes	No scientist or biologist on staff. The City has contracted for this level of expertise in the past.
Emergency manager	Yes	Fire Department- Fire Chief
Grant writers	Yes	City staff writes grants.

Table 3-4. National Flood Insurance Program Compliance

Criteria	Response
When did the community enter the NFIP?	02/18/81
When did the Flood Insurance Rate maps become effective?	09/05/2012
What local department is responsible for floodplain management?	Community Development
Who is your floodplain administrator? (department/position)	Community Development/Senior Planner
• Is this a primary or auxiliary role?	N/A
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date of adoption of your flood damage prevention ordinance?	5-21-2012
• Does your floodplain management program meet or exceed minimum requirements?	Meets
• If so, in what ways?	N/A
When was the most recent Community Assistance Visit or Community Assistance Contact?	Unknown
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed?	No
• If so, please state what they are.	N/A
Do your flood hazard maps adequately address the flood risk within your jurisdiction?	Yes
• If no, please state why.	N/A
Does your floodplain management staff need any assistance or training to support its floodplain management program?	Not at this time.
• If so, what type of assistance/training is needed?	
Does your jurisdiction participate in the Community Rating System (CRS)?	No
• If so, is your jurisdiction seeking to improve its CRS Classification?	
• If not, is your jurisdiction interested in joining the CRS program?	No

Criteria	Response
How many Flood Insurance policies are in force in your jurisdiction? ^a	65
• What is the insurance in force? ^a	\$18,405,500
• What is the premium in force? ^a	\$33,992
How many total loss claims have been filed in your jurisdiction? ^a	5
• How many claims were closed without payment/are still open? ^a	2
• What were the total payments for losses? ^a	\$13,710.27

a. According to FEMA records as of 11/30/15.

Table 3-5. Community Classifications

	Participating?	Classification	Date Classified
Community Rating System	No	N/A	N/A
Building Code Effectiveness Grading Schedule	Yes	2	2001
Public Protection	No	N/A	N/A
Storm Ready	No	N/A	N/A
Firewise	No	N/A	N/A

Table 3-6. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes, City Clerk
Do you have personnel skilled or trained in website development?	Yes. IT department.
Do you have hazard mitigation information available on your website?	No
• If yes, please briefly describe.	N/A
Do you utilize social media for hazard mitigation education and outreach?	No
• If yes, please briefly describe.	N/A
Do you have any citizen boards or commissions that address issues related to hazard mitigation?	No
• If yes, please briefly specify.	N/A
Do you have any other programs already in place that could be used to communicate hazard-related information?	Yes
• If yes, please briefly describe.	city website, water bill news media
Do you have any established warning systems for hazard events?	No
• If yes, please briefly describe.	N/A

3.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into local planning mechanisms.

3.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- The Comprehensive Plan- The Plan addresses Critical Areas including Frequently Flooded Areas and Geologically Hazardous Areas.
- Stormwater Design Manual- geotechnical analysis report is required for stormwater detention facilities located within 200 feet top of a Landslide Hazard area.
- Critical Areas Ordinance (CAO)—The first goal of the Camas CAO is to protect members of the public and public resources and facilities from injury, loss of life, or property damage due to landslides and steep slope failures, erosion, seismic events, or flooding.
- Shoreline Master Program (SMP)—The goal for flood hazards in the SMP is to promote public health, safety, and general welfare, and minimize public and private losses due to flood conditions in specific areas.

3.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- Comprehensive Plan- The Hazard Mitigation plan could be adopted by reference
- Stormwater Drainage Plan- some of the identified capital improvements could be included as hazard mitigation initiatives in the Hazard Mitigation action plan.
- Capital Improvement Plan- some of the hazard mitigation initiatives could be incorporated from the Capital Improvement Plan.

3.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 3-7 lists all past occurrences of natural hazards within the jurisdiction.

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Severe Storm(s)	4253	2/2/16	Approx. 1 mill.
Severe Storm(s)	1825	3/2/2009	N/A
Severe Storm(s)	1682	2/14/2007	N/A
Severe Storm(s)	1671	12/12/2006	N/A
Earthquake	1361	3/1/2001	N/A
Severe Storm(s)	1159	3/1/2001	N/A
Flood	1100	2/9/1996	N/A
Severe Storm(s)	1079	1/3/1996	N/A
Volcano	623	5/21/1980	N/A
Flood	545	12/10/1977	N/A
Flood	185	12/29/1964	N/A
Flood	146	3/2/1963	N/A
Severe Storm(s)	137	10/20/1962	N/A
Flood	70	3/6/1957	N/A
Flood	50	2/25/1956	N/A

3.6 JURISDICTION-SPECIFIC VULNERABILITIES

Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: 0

- Number of FEMA-identified Severe-Repetitive-Loss Properties: 0
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: 0

Other noted vulnerabilities include:

- Aging water and sewer lines are vulnerable to the earthquake hazard.
- Aging city hall building. Constructed before seismic codes were in place- susceptible to earthquake damage.
- Public Works Operations Center building- constructed prior to seismic codes in place and thus vulnerable to the earthquake hazard.
- Dam at Lacamas lake- could be impacted to flooding or earthquake.
- Potential chemical spill from the paper mill
- High pressure natural gas line could be vulnerable to the earthquake hazard.
- High tension power lines may be vulnerable severe storms (i.e. wind and ice).
- Homes along the Washougal River may be susceptible to flooding.

3.7 HAZARD RISK RANKING

Table 3-8 presents the ranking of the hazards of concern.

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Earthquake	51	High
2	Severe Weather	51	High
3	Landslide	36	Medium
4	Flood	21	Medium
5	Wildfire	18	Medium
6	Dam Failure	11	Low
6	Volcano	11	Low
7	Drought	9	Low

3.8 STATUS OF PREVIOUS PLAN INITIATIVES

Table 3-9 summarizes the initiatives that were recommended in the previous version of the natural hazard mitigation plan and their implementation status at the time this update was prepared. It should be noted, that the actions identified in the following table were developed in 2004. Due to the significant amount of time and staff turnover that has occurred since their identification, the status of some actions may be unknown. Additionally, many of the action items identified were to be led by CRESA or other non-City agencies. For ease of annual progress reporting, these actions have generally been removed from the City's action plan or rephrased to be within the capabilities of the City. This will allow for a fresh start consistent with the comprehensive update to the natural hazard mitigation plan conducted during the 2016 planning process.

3.9 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 3-10 lists the actions that make up the City of Camas hazard mitigation action plan. Table 3-11 identifies the priority for each action. Table 3-12 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 3-9 Status of Previous Plan Initiatives

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Support voluntary structural retrofitting of older homes on vulnerable soils. <i>Comment: Provide educational materials (Action carried over as Action #CM-10 in update action plan)</i>		X	
Require the retrofitting of older, vulnerable or critical structures located on NEHRP 'E' and 'F' soils. <i>Comment: City of Camas does not have NEHRP 'E' or 'F' soils, therefore this action has been removed.</i>			X
Encourage non-structural retrofitting throughout the County. <i>Comment: Provide educational materials supplied or approved by CRESA (Action carried over as Action #CM-12 in updated action plan).</i>		X	
Join the CRS program <i>Comment: The City of Camas is not joining the CRS program at this time, therefore this action has been removed.</i>			X
Support the retrofit of at-risk homes in subdivisions <i>Comment: (Action carried over as Action #CM-13 in updated action plan)</i>		X	
Encourage non-structural retrofitting of hazardous materials containment <i>Comment: (Action carried over as Action #CM-12 in updated action plan)</i>		X	
Ensure that the public is informed of the necessity of maintaining a 3 day supply of food and water <i>Comment: Provide educational material for disaster preparedness supplied by CRESA. Will add a "Preparing for Emergency" to our website. (Action carried over as Action #CM-14 in updated action plan)</i>		X	
Develop public information packets ready to deploy following a disaster event <i>Comment: (This was a CRESA specific action item. City of Camas will support out partner by providing information and resources as requested.)</i>			X
Ensure that residents understand the benefits of defensible space to minimize and reduce the impacts of fires. <i>Comment: add this information to the city website. (Action carried over as Action #CM-16 in updated action plan)</i>		X	
Ensure severe weather warning system and public education for tornadoes in place. <i>Comment: (This was a CRESA specific action item. City of Camas will support our partner by providing information and resources as requested.)</i>			X
Expand the public awareness program about hazard materials <i>Comment: (This was a CRESA and Local Emergency Planning Committee specific action item. CRESA also leads the Committee which has responsibility for this action item. City of Camas will support our partner by providing information and resources as requested.)</i>			X
Cultivate an awareness program for landslide hazards <i>Comment: (This was a CRESA specific action item. City of Camas will support our partner by providing information and resources as requested.)</i>			X
Develop an automated method to notify the public of events during a disaster. <i>Comment: Possible develop a reverse 911. (Action carried over as Action #CM-20 in updated action plan)</i>		X	
Expand weather radio systems to include all of Clark County <i>Comment: (This was a CRESA specific action item. City of Camas will support our partner by providing information and resources as requested.)</i>			X
Provide fast, accurate spatial incident information for emergency services response. <i>Comment: (CAMEO and other software are for First Responders. Clark County has no Hazmat First Responders. This was a CRESA specific action item.)</i>			X
Conduct pre-earthquake assessments for critical and essential facilities and develop a risk-reduction strategy <i>Comment: Work with CRESA on pre-earthquake assessments and risk reduction strategies (Action carried over as Action #CM-23 in updated action plan)</i>		X	

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Determine critical government functions and establish redundancy for these functions.		X	
<i>Comment: Coordinate with Public Works, Fire and Police (Action carried over as Action #CM-24 in updated action plan)</i>			
Target development and preparedness efforts of Tier II hazardous material facilities	X		
<i>Comment: Through fire inspections and plans reviews, these facilities are in compliance.</i>			
Encourage partnerships among agencies to promote uniformity among no-burn policies in forest lands	X		
<i>Comment: No open burning is permitted.</i>			
Develop a contingency/Business resumption organization			X
<i>Comment: (This was a CRESA specific action item).</i>			
Provide opportunities for strategic relations between emergency managers and social service providers.			X
<i>Comment: (This was a CRESA specific action item).</i>			
Require the construction of earthquake-resilient structures	X	X	
<i>Comment: This work is implemented through the adoption of the International Building Codes. (Ongoing action, implements annually by Building Department).</i>			
Develop integrated County stormwater basin-wide plans	X	X	
<i>Comment: (The Clark County Stormwater Plan was completed in 2009 & updated annually in the first quarter of the year. Plan includes maintenance, repair, etc. LID principles are currently being considered for inclusion in the local development codes. Action carried over as Action #CM-27 in updated action plan).</i>			
Promote development off of the floodplain	X		
<i>Comment: This action has been completed through the adoption of Camas Municipal Code (CMC) 18.09.060 Density Transfer and CMC Chapter 18.23 Planned Residential Development</i>			
Consider adoption of a zero-rise floodway	X		
<i>Comment: This action has been completed through the adoption of CMC Section 16.57.020.E.1 Development in Floodways.</i>			
Expand the County Clean Water Program	X		
<i>Comment: Clark County Environmental Services expanded the program to include an integrated stormwater basin plan & retrofitting & property purchase via Legacy Lands Program.</i>			
Develop a method of assessing and documenting landslide hazard areas.	X		
<i>Comment: City code defines landslide hazard areas and requirements for development including a geologic hazard area study by a State of Washington registered geotechnical engineer using the "best available engineering and geologic practice." The geotechnical information and plan requirements are defined in Camas Code."</i>			
Support the use of LIDAR mapping technology to refine landslide hazard maps	X		
<i>Comment: The latest LIDAR information is currently used in the slope layer and developers package of Clark Co. GIS.</i>			
Ensure state certification of licensing for professionals performing geotechnical evaluations	X		
<i>Comment: This action is completed through the adoption of CMC 16.59.060(A) Critical area report requirements for geologically hazardous areas.</i>			
Institute Low Impact Development Practices		X	
<i>Comment: LID principles are currently being considered for inclusion in the local development codes. (Action carried over as Action #CM-30 in updated action plan)</i>			
Initiate a vegetation management program	X		
<i>Comment: This action is completed through the adoption of CMC 16.59.070(A)(5)—Hazard and environmental mitigation plans for erosion and landslide hazard areas shall include a vegetation management and/or replanting plan.</i>			

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Ensure emergency vehicle access to all residents to allow effective response and recovery from disaster events. <i>Comment: All residences can be reached through fire access roads.</i>	X		
Develop priority routes throughout the county and improve these routes to a higher standard. <i>Comment: This action has been completed.</i>	X		
Ensure that electricity is available to populations requiring priority for electricity. <i>Comment: Nursing home, schools, police and fire stations have back-up generators.</i>	X		

Table 3-10. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CM-1—Where appropriate, support retro-fitting, purchase or relocation of structures located in high hazard areas and prioritize those structures that have experienced repetitive losses.						
Existing	All Hazards	4, 5, 7, 9, 10	Planning	High	HMGP, PDM, FMA, CDBG-DR	Short-term
CM-2—Integrate the natural hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions within the community.						
New and Existing	All Hazards	2, 4	Planning	Low	Staff Time, General Funds	On-going
CM-3—Develop and implement a program to capture perishable data after significant events (e.g. high water marks, preliminary damage estimates, damage photos) to support future mitigation efforts including the implementation and maintenance of the natural hazard mitigation plan.						
Existing	All Hazards	1, 2, 4, 12	Fire/Emergency Management and Building Department	Medium	Staff Time, General Funds	Short-term
CM-4—Support the County-wide hazard mitigation initiatives identified in Volume I of the natural hazard mitigation plan.						
New and Existing	All Hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Lead Contact Department for Plan	Low	Staff Time, General Funds	Short-term
CM-5—Actively participate in the plan maintenance protocols outlined in Volume I of the natural hazard mitigation plan.						
New and Existing	All Hazards	1, 4	Lead Contact Department for Plan	Low	Staff Time, General Funds	Short-term
CM-6—Continue to maintain good standing and compliance under the National Flood Insurance Program (NFIP). This will be accomplished through the implementation of floodplain management programs that will, at a minimum, meet the requirements of the NFIP:						
<ul style="list-style-type: none"> Enforcement of the flood damage prevention ordinance Participate in floodplain identification and mapping updates Provide public assistance/information on floodplain requirements and impacts 						
New and Existing	Flood	1, 4, 5, 9	Community Development and Public Works	Low	Staff Time, General Funds	On-going

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CM-7—Work with building officials to identify ways to improve the jurisdiction's BCEGS classification.						
New	Earthquake, Flood, Landslide, Severe Weather, Volcano, Wildfire	5, 6, 7, 10, 12	Building and Development Services	Low	Staff Time, General Funds	Short-term
CM-8- Develop a post-disaster recovery plan and a debris management plan.						
Existing	All Hazards	1, 2, 4, 9	Fire/Emergency Management and Public Works	Medium	EMPG	On-going
CM-9—Participate in programs such as Firewise, StormReady and the Great Shakeout.						
New and Existing	Dam Failure, Flood, Severe Weather, Wildfire	1, 7	Fire/Emergency Management and Public Works	Low	Staff Time, General Funds	
CM-10—Support voluntary structural retrofitting of older homes on vulnerable soils.						
Existing	Earthquake	1, 2, 7, 9	Building	Low	Property Owner, FEMA Hazard Mitigation Grant Funding	On-going
CM-11—Ensure critical facilities have back-up power generation facilities.						
New	All Hazards	2, 5, 8, 9, 10	Public Works	High	FEMA Hazard Mitigation Grant Programs	Long-term
CM-12—Encourage non-structural retrofitting for critical facilities, schools, hospitals and businesses by anchoring, base isolating, relocating vulnerable nonstructural building elements such as hazardous materials containment.						
New and Existing	Earthquake	1, 2, 5, 9, 10	Building	Low	Property owner, Staff Time, General Funds, FEMA funding	On-going
CM-13—Support the retrofit of at-risk homes to wildland fire.						
New and Existing	Wildfire	2, 4, 5, 7, 9, 12	Fire and Building	Medium	Property owner, FEMA Hazard Mitigation Grant Programs	On-going
CM-14—Work with CRESA to ensure that the public is informed of the necessity of maintaining self-sufficient supplies for 10-14 days.						
Existing	All Hazards	1, 2, 3, 4	Fire/Emergency Management	Low	Staff Time, General Funds	On-going
CM-15— Ensure that residents understand the benefits of defensible space to minimize and reduce the impacts of fires.						
New	Wildfire	1, 2, 5, 11	Fire	Low	Staff Time, General Funds	On-going
CM-16—Develop an automated method to notify the public of events during a disaster.						
New	All Hazards	1, 2, 3, 4, 12	Fire/Emergency Management	Medium	FEMA funds	Short-term
CM-17—Conduct pre-earthquake assessments for critical and essential facilities and develop a risk-reduction strategy.						
New	Earthquake	1, 5, 9, 10, 12	Building and Public Works	Medium	Staff time, General Funds, FEMA Hazard Mitigation Grant Programs	Long-term
CM-18—Determine critical government functions and establish redundancy for these functions.						
New	Earthquake	4, 6, 8, 10	Public Works, Police, Fire	Medium	Staff Time, General Funds	Long-term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CM-19—Develop integrated County stormwater basin-wide plans						
New	Flood, Severe Weather	1, 5, 9, 10, 11, 12	Public Works	Medium	FEMA Hazard Mitigation Funding	Long-term
CM-20—Institute Low Impact Development Practices						
New	Flood, Severe Weather	1, 5, 6, 7, 11, 12	Public Works, Community Development	Low	Staff Time, General Funds	On-going
CM-21—Continue and/or enhance where feasible, the city's ongoing drainage system maintenance program to reduce or minimize the impact from stormwater flooding within the City.						
New and Existing	Flood and Severe Weather	2, 5, 10, 11, 12	Public Works	Low	Stormwater Utility, CIP	On-going
CM-22—Address stormwater flooding problems due to lack of drainage conveyance systems at the following locations:						
<ul style="list-style-type: none"> • intersection of NW Julia Street and NW 26th Avenue • along NW Maryland Street • southern end of NW Iris Court, north of Columbia Summit Drive • along NW 10th Ave at NW Ivy Drive and NW Drake Street 						
New and Existing	Flood and Severe Weather	2, 5, 10, 11, 12	Public Works	Medium	CIP, FEMA Hazard Mitigation Grant Programs	Long-term
CM-23—Identify and mitigate drainage issues resulting in nuisance flooding such as replacing undersized culverts where needed.						
New and Existing	Flood and Severe Weather	1, 2, 5, 11, 12	Public Works	Low	Staff Time, General Funds	On-going
CM-24—Monitor/review accumulated effects from piecemeal development on steep slopes.						
New	Landslide	11, 12	Community Development	Low	Staff Time, General Funds	On-going
CM-25—Identify a funding mechanism for a local match to Federal funds that can fund private mitigation practices.						
New	All Hazards	1	Community Development	Low	Staff Time, General Funds	Short-term
CM-26—Develop a drought contingency plan.						
New	Drought	1, 2, 3, 4, 5, 6, 11	Public Works	Medium	Staff Time, General Funds, FEMA Hazard Mitigation Grant Programs	Short-term
CM-27—Update the City's Emergency Plan notebook.						
Existing	All Hazards	1, 3, 12	Fire/Emergency Management	Low	Staff Time, General Funds	On-going
CM-28—Partner with the Cascade Volcano Observatory in public education and awareness campaigns.						
Existing	Volcano	1, 2, 3, 4	Fire/Emergency Management	Low	Staff Time, General Funds	On-going
CM-29—Use zoning and/or special wildfire overlay district to designate high-risk areas and specify the conditions for the use and development of specific areas.						
New	Wildfire	1, 2, 4, 5, 7, 11	Fire	Low	Staff Time, General Funds	Short-term
CM-30—Seek out partnerships for the use of a boat during a flood disaster.						
New	Flood	2, 5	Fire/Emergency Management	Low	Staff Time, General Funds	Short-term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CM-31—Develop an inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage.						
New	Earthquake	1, 5, 9, 10	Building/Public Works	Low	Staff Time, General Funds	Short-term

Table 3-11. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
CM-1	5	High	High	Yes	Yes	No	Medium	High
CM-2	2	Medium	Low	Yes	No	Yes	High	Low
CM-3	4	Low	Medium	No	No	Maybe	Low	Low
CM-4	12	Low	Low	Yes	No	Yes	High	Low
CM-5	2	Low	Low	Yes	No	Yes	High	Low
CM-6	4	Medium	Low	Yes	No	Yes	High	Low
CM-7	5	Medium	Low	Yes	No	Yes	High	Low
CM-8	4	Medium	Medium	Yes	Yes	No	Medium	High
CM-9	2	Medium	Low	Yes	No	Yes	High	Low
CM-10	4	High	Low	Yes	Yes	No	Medium	High
CM-11	5	High	High	Yes	Yes	Yes	Medium	High
CM-12	5	High	Low	Yes	Yes	No	Medium	High
CM-13	6	High	Medium	Yes	Yes	No	Medium	High
CM-14	4	Medium	Low	Yes	No	Yes	Medium	Low
CM-15	4	Medium	Low	Yes	No	Yes	Medium	Low
CM-16	5	Medium	Medium	Yes	No	Yes	Medium	Low
CM-17	5	Medium	Medium	Yes	Maybe	No	Medium	Medium
CM-18	4	High	Medium	Yes	No	Yes	Medium	Low
CM-19	6	High	Medium	Yes	Yes	No	High	High
CM-20	6	Medium	Low	Yes	Maybe	Yes	Medium	Low
CM-21	5	Medium	Low	Yes	No	Yes	Medium	Low
CM-22	5	High	Medium	Yes	No	No	High	High
CM-23	5	Medium	Low	Yes	No	Yes	Medium	Low
CM-24	2	Low	Low	Yes	No	Yes	Low	Low
CM-25	1	Medium	Low	Yes	No	Yes	Medium	Low
CM-26	7	Medium	Medium	Yes	Yes	Yes	Medium	Medium
CM-27	3	Medium	Low	Yes	No	Yes	Medium	Low
CM-28	4	Medium	Low	Yes	No	Yes	Medium	Low
CM-29	6	Medium	Low	Yes	No	Yes	Medium	Low
CM-30	2	Medium	Low	Yes	No	Yes	Medium	Low
CM-31	4	Medium	Low	Yes	No	Yes	Medium	Low

a. See the introduction to this volume for explanation of priorities.











Table 3-12. Analysis of Mitigation Actions

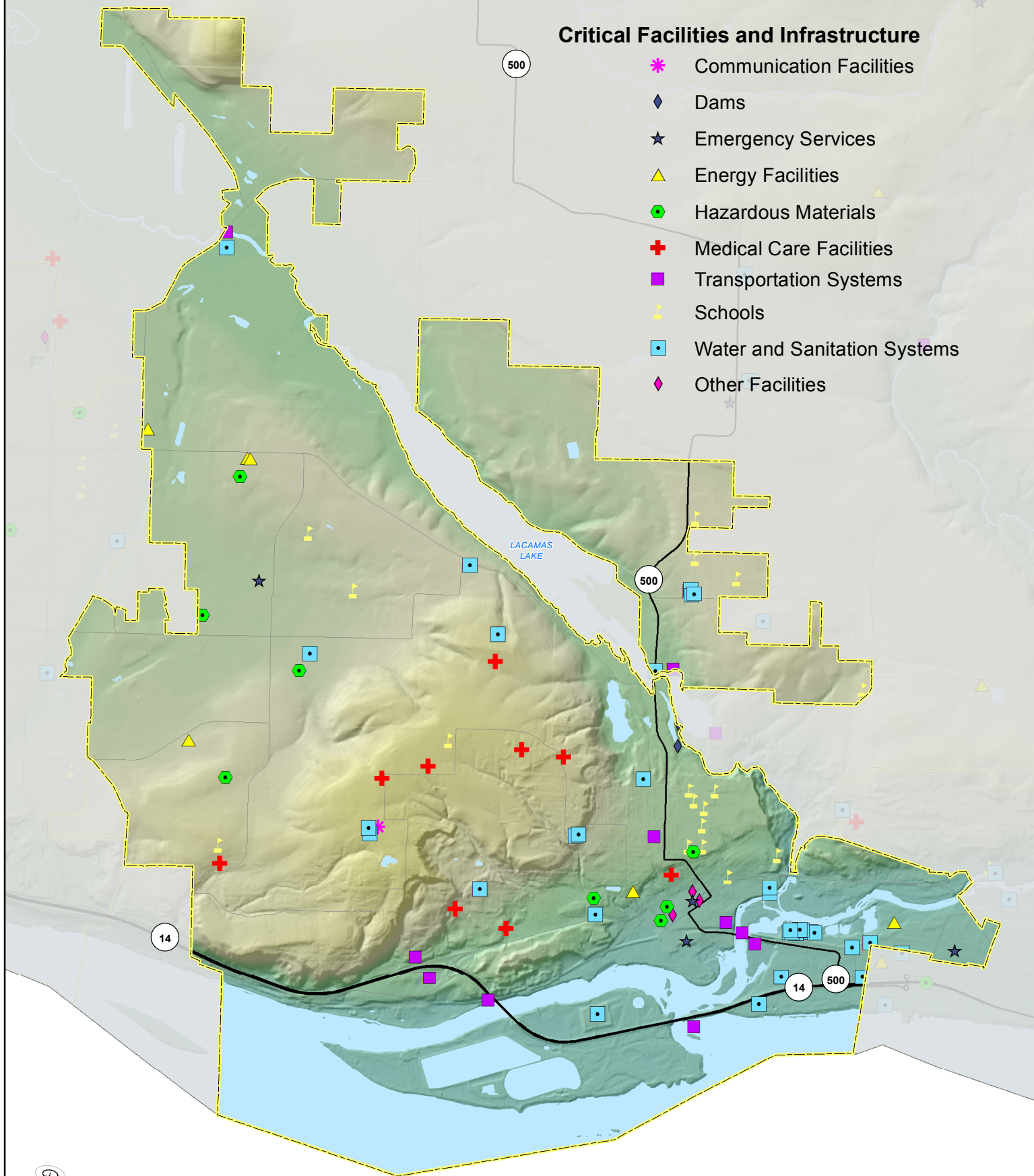
Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	CM-2, CM-3, CM-4, CM-5, CM-6, CM-8, CM-25, CM-27	CM-1, CM-6	CM-4, CM-6, CM-14, CM-16		CM-8, CM-11	
Drought	CM-2, CM-3, CM-4, CM-5, CM-8, CM-25, CM-26, CM-27	CM-1, CM-26	CM-4, CM-14, CM-16, CM-26	CM-26	CM-8, CM-11	
Earthquake	CM-2, CM-3, CM-4, CM-5, CM-7, CM-8, CM-17, CM-25, CM-27, CM-31	CM-1, CM-7, CM-10, CM-11, CM-12, CM-17, CM-31	CM-4, CM-14, CM-16		CM-8, CM-11, CM-18	CM-17, CM-31
Flood	CM-2, CM-3, CM-4, CM-5, CM-6, CM-7, CM-8, CM-19, CM-21, CM-23, CM-25, CM-27	CM-1, CM-6, CM-7	CM-4, CM-6, CM-14, CM-16	CM-9, CM-19, CM-20, CM-21	CM-8, CM-11	CM-22
Landslide	CM-2, CM-3, CM-4, CM-5, CM-7, CM-8, CM-24, CM-25, CM-27	CM-1, CM-7	CM-4, CM-14, CM-16		CM-8, CM-11	
Severe weather	CM-2, CM-3, CM-4, CM-5, CM-7, CM-8, CM-19, CM-21, CM-23, CM-25, CM-27	CM-1, CM-7, CM-9	CM-4, CM-14, CM-16	CM-19, CM-20, CM-21	CM-8, CM-11	CM-22
Volcano	CM-2, CM-3, CM-4, CM-5, CM-7, CM-8, CM-25, CM-27	CM-1, CM-7	CM-4, CM-14, CM-16, CM-28		CM-8, CM-9, CM-11	
Wildfire	CM-2, CM-3, CM-4, CM-5, CM-7, CM-15, CM-25, CM-27	CM-1, CM-7, CM-9, CM-13, CM-15	CM-4, CM-9, CM-14, CM-15, CM-20	CM-15	CM-9, CM-11	

a. See the introduction to this volume for explanation of mitigation types.

City of Camas

Critical Facilities and Infrastructure

-  Communication Facilities
-  Dams
-  Emergency Services
-  Energy Facilities
-  Hazardous Materials
-  Medical Care Facilities
-  Transportation Systems
-  Schools
-  Water and Sanitation Systems
-  Other Facilities



Base Map Data Sources: Clark County, U.S. Geological Survey

0 0.25 0.5 1 Miles



Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

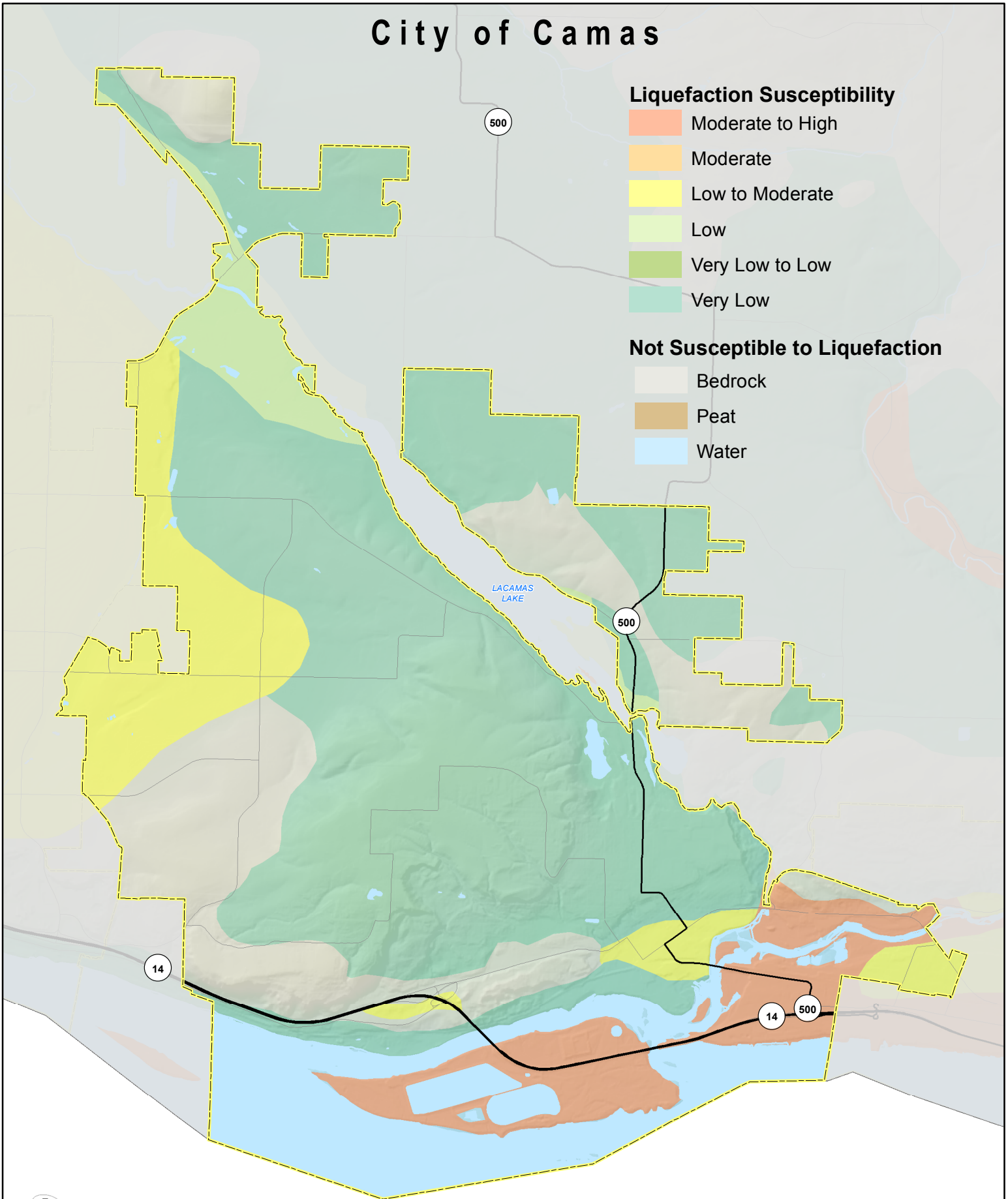
City of Camas

Liquefaction Susceptibility

- Moderate to High
- Moderate
- Low to Moderate
- Low
- Very Low to Low
- Very Low

Not Susceptible to Liquefaction

- Bedrock
- Peat
- Water



Base Map Data Sources: Clark County, U.S. Geological Survey

0 0.25 0.5 1 Miles

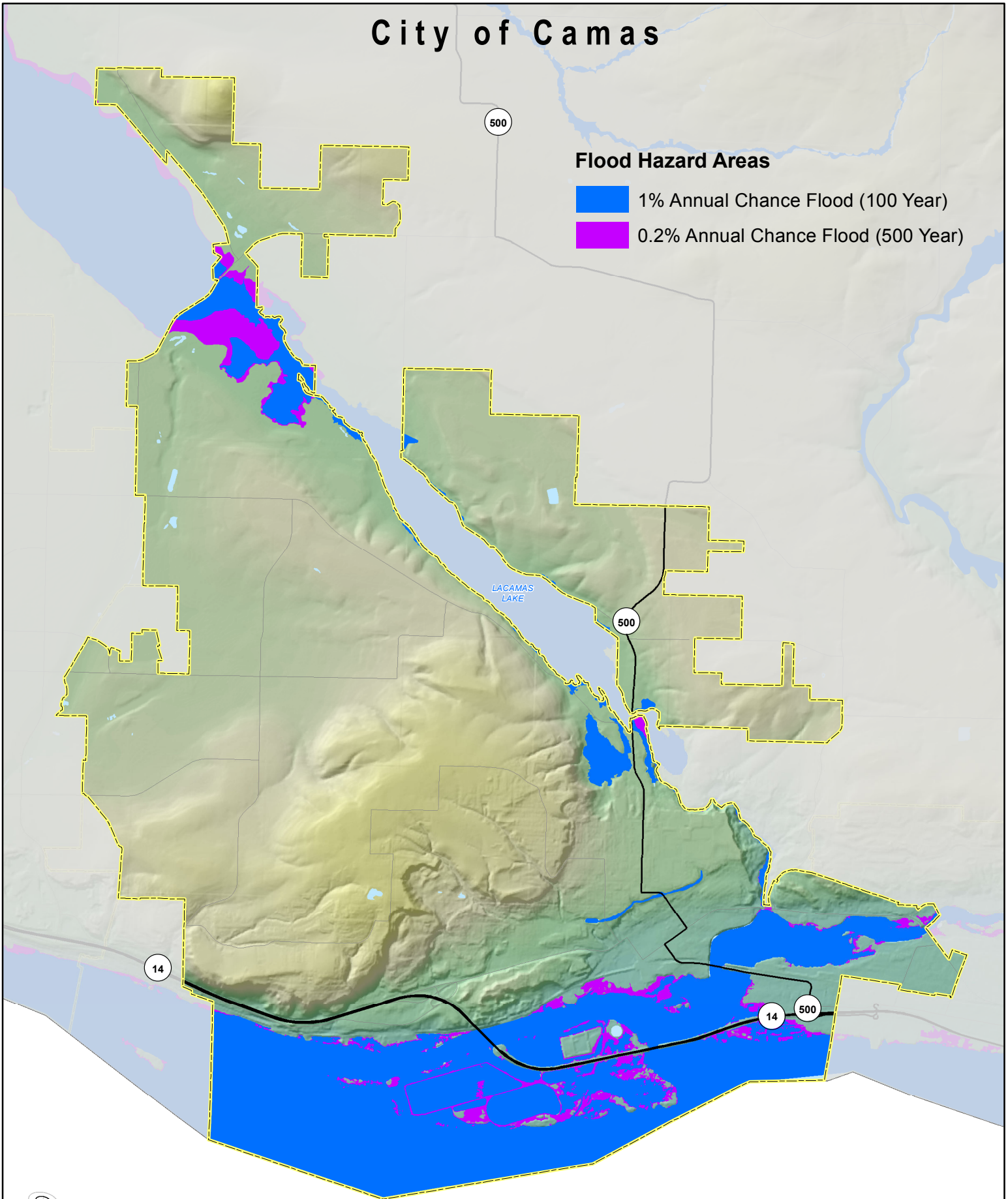


Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

City of Camas

Flood Hazard Areas

- 1% Annual Chance Flood (100 Year)
- 0.2% Annual Chance Flood (500 Year)



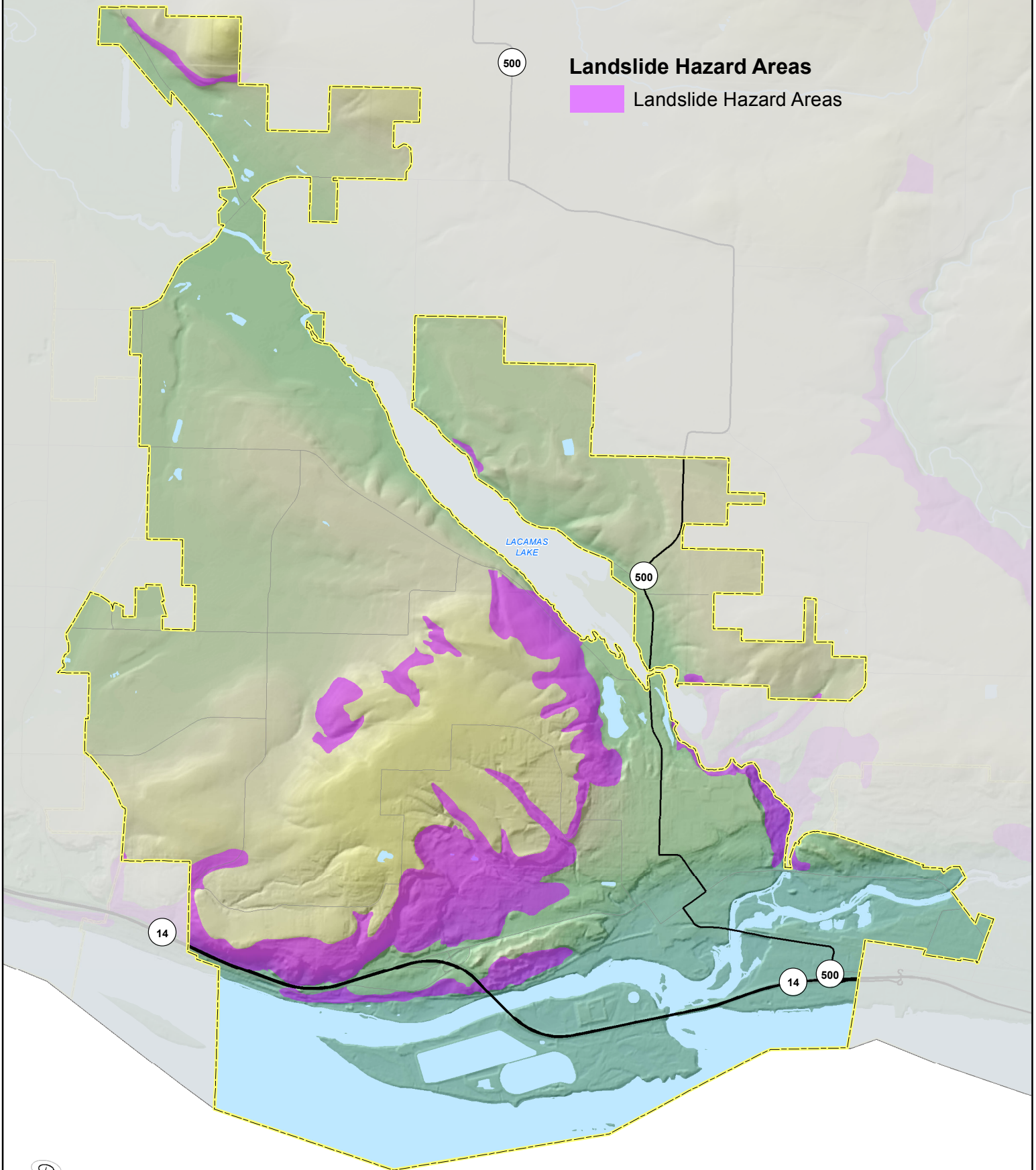
Base Map Data Sources: Clark County, U.S. Geological Survey

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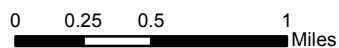


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City of Camas




Base Map Data Sources: Clark County, U.S. Geological Survey

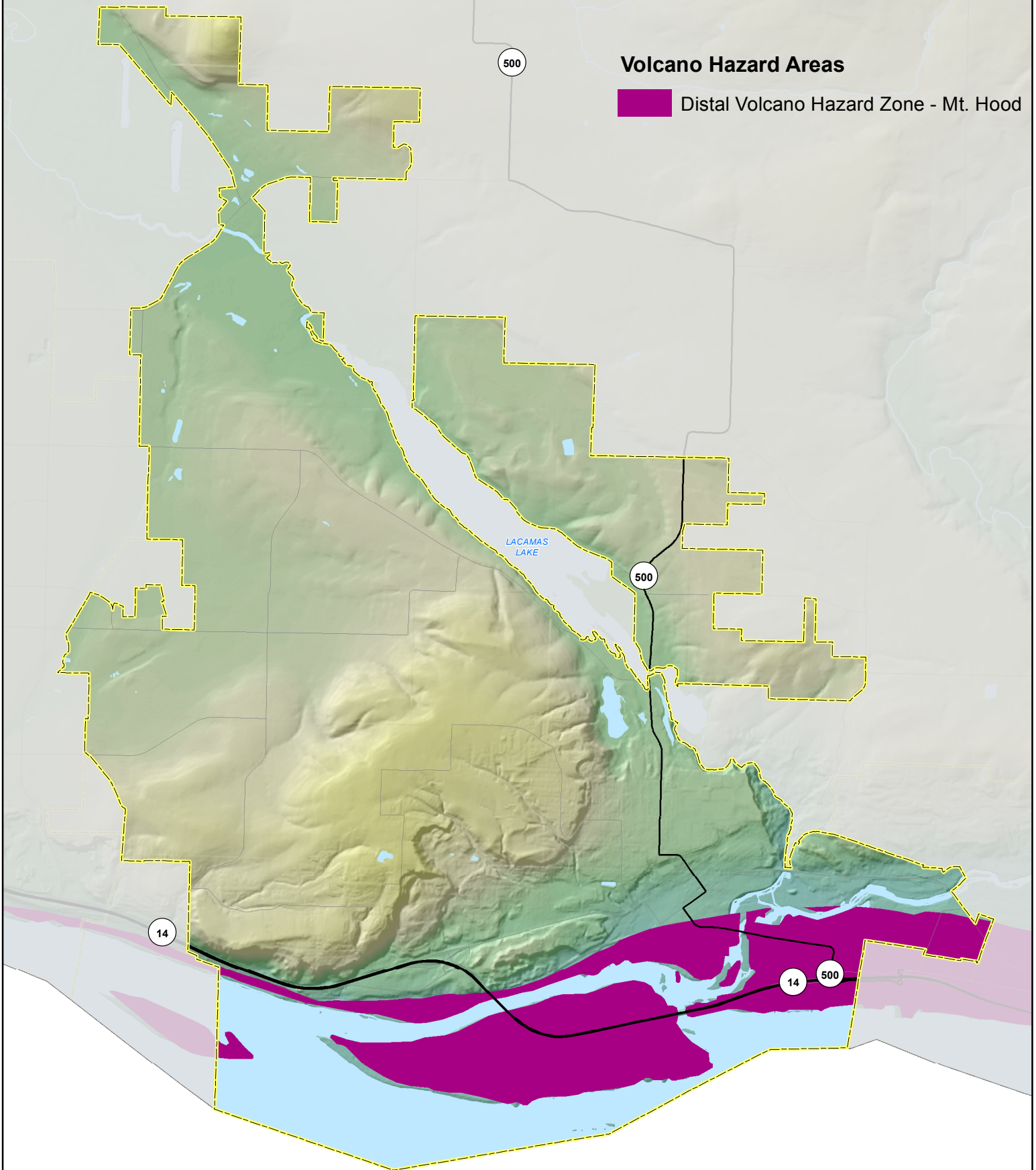


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City of Camas

Volcano Hazard Areas

 Distal Volcano Hazard Zone - Mt. Hood



Base Map Data Sources: Clark County, U.S. Geological Survey

0 0.25 0.5 1 Miles

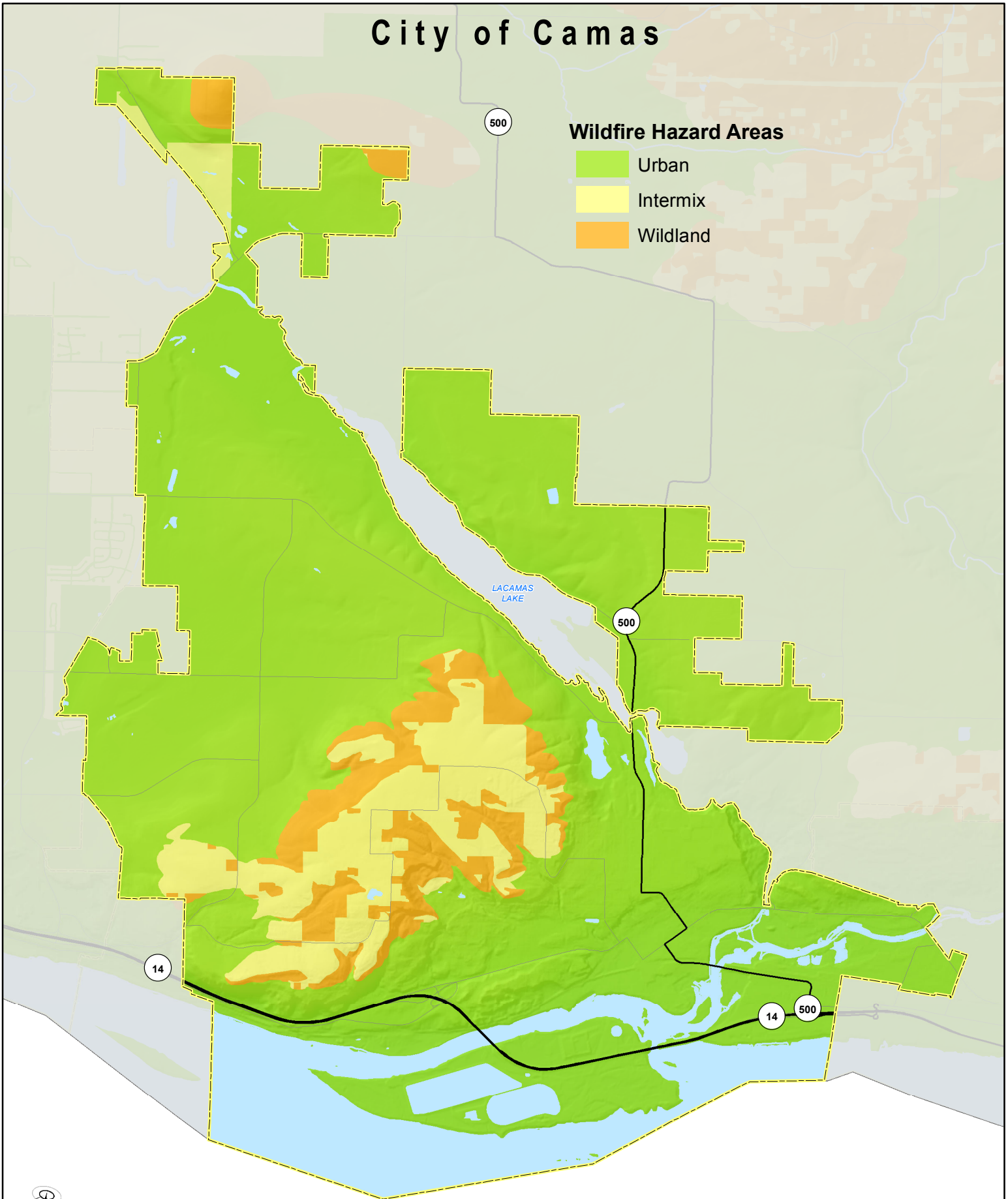


Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

City of Camas

Wildfire Hazard Areas

- Urban
- Intermix
- Wildland



Base Map Data Sources: Clark County, U.S. Geological Survey

0 0.25 0.5 1 Miles



Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

4. CITY OF LA CENTER

4.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Greg Thornton, Mayor
305 NW Pacific Highway
La Center, WA 98629
Telephone: 360-263-5123
e-mail Address: gthornton@ci.lacenter.wa.us

Alternate Point of Contact

Jeff Sarvis, Public Works Director
305 NW Pacific Highway
La Center, WA 98629
Telephone: 360-263-7661
e-mail Address: jsarvis@ci.lacenter.wa.us

4.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- Date of Incorporation—1909
- Current Population—3,100 as of April, 1, 2015 (Office of Financial Management Projections)
- Population Growth—The City of La Center’s growth rate suffered during the recession. Since 2010 La Center added approximately 300 new residents. From 1994 through 2015 the city’s population increased four-fold. Between 2004 and 2014 the Washington Office of Financial Management reported that La Center witnessed annual growth rates as low as 1% and as high as 10%. The average growth rate over the 10 year period was 4.3%. Under the current growth projections, by 2036 La Center will have a total of 7,914.
- Location and Description—The City of La Center is a small, but growing community in southwest Washington located approximately 16 miles north of the Vancouver/Portland metropolitan area and approximately two miles east of Interstate 5. Although La Center is only 20 minutes from the employment centers, attractions, and services of the major metropolitan area, it enjoys the feel of a small-town community. NOPE
- Brief History— On December 7, 1875, John H. Timmen donated land to plat the original site of the town, which would eventually be known as La Center. Early settlers called the area “Timmen’s Landing” in reference to his boat landing along the East Fork of the Lewis River. The direct access to the river promoted our rich history of steamboats, sternwheelers, logging, mills and apples and prune agriculture. Thirty four years later on August 23, 1909, Clark County Commissioners recognized the Town of La Center as a municipality.
- Climate— La Center’s weather is typical of the Pacific Northwest. We have wet but mild springs averaging 63 degrees. Summers are typically low in humidity and average 80 degrees. Fall typically averages 75 degrees. Winters are generally mild with a few days of snow with an average temperature of 48 degrees. Despite the Northwest’s reputation of raining for nine months out of the year, the annual average precipitation is only 45.7 inches.
- Governing Body Format— The City of La Center is a strong Mayor form of government with a five-member City Council. There are three main departments within the City structure; administrative/finance,

police and public works. The administrative branch assumes responsibility for the adoption of this plan; the public works department will oversee its implementation.

- **Development Trends**— Like many communities, La Center’s growth was stalled during the recession. Although major growth was stalled due to the economic down turn, the City continued planning for the future. In 2010 the City annexed 583 acres of land leading to the corridor of commerce (Interstate 5) for employment lands. In addition over 350 single family residential lots are in various stages of development. The City is development friendly with standards established to shape the community for generations to come. The Cowlitz casino project is expected to be complete by mid-2017. A new interchange at La Center Road and Interstate 5 along with the addition of new water, sewer and stormwater facilities will increase opportunities for Industrial and Commercial growth in La Center. Various mixes of housing types are being planned within the city to accommodate normal growth as well as the addition of 800 – 1200 new jobs being created at the I-5 junction.

4.3 CAPABILITY ASSESSMENT

An assessment of legal and regulatory capabilities is presented in Table 4-1. An assessment of fiscal capabilities is presented in Table 4-2. An assessment of administrative and technical capabilities is presented in Table 4-3. Information on National Flood Insurance Program (NFIP) compliance is presented in Table 4-4. Classifications under various community mitigation programs are presented in Table 4-5. An assessment of education and outreach capabilities is presented in Table 4-6.

Table 4-1. Legal and Regulatory Capability

	Local Authority	Other Jurisdiction Authority	State Mandated
Building Code <i>Comment: Title 15: La Center Building Code and Specialty Code; last amended by Ord. 2013-05</i>	Yes	No	Yes
Zoning Code <i>Comment: Title 18: Development Code: Division 2. Zoning; Last amended 2015</i>	Yes	No	Yes
Subdivisions <i>Comment: Title 18: Division 3; Section 18.210: Subdivision Provisions; Last amended 2010</i>	Yes	No	Yes
Stormwater Management <i>Comment: Title 18: Division 4; Chapter 18.320: Stormwater and Erosion Control; Last amended 2010</i>	Yes	No	Yes
Post-Disaster Recovery <i>Comment: N/A</i>	No	No	No
Real Estate Disclosure <i>Comment: N/A</i>	No	No	No
Growth Management <i>Comment: Title 18: Division 2: Chapter 18.120 Plan Amendments and Zone Changes; Last amended 2007</i>	Yes	Yes	Yes
Site Plan Review <i>Comment: Title 18: Division 3; Section 18.215: Site Plan Review; Last amended 2010</i>	Yes	No	Yes
Environmental Protection <i>Comment: Title 18: Division 4; Chapter 18.310: Environmental Policy; Last amended 2006</i>	Yes	No	Yes
Flood Damage Prevention <i>Comment: Frequently Flooded Areas addressed in Title 18: Division 4: Chapter 18.300: Critical Areas; Last amended 2012</i>	Yes	No	Yes
Emergency Management <i>Comment: La Center is covered by the Emergency Operations Plan for Clark County prepared by CRESA in 2013.</i>	Yes	Yes	Yes

	Local Authority	Other Jurisdiction Authority	State Mandated
Climate Change <i>Comment: N/A</i>	No	No	No
Other <i>Comment: N/A</i>	No	No	No
General or Comprehensive Plan <i>Is the plan equipped to provide linkage to this mitigation plan? No</i> <i>Comment: La Center Comprehensive Plan 2016-2035; Adopted 23 March, 2016; Ordinance #2016 – 01</i>	Yes	Yes	Yes
Capital Improvement Plan <i>What types of capital facilities does the plan address? Transportation</i> <i>How often is the plan updated? Updated every 5-7 years</i> <i>Comment: Update to be approved 2016</i>	Yes	No	Yes
Floodplain or Watershed Plan <i>Comment: N/A</i>	No	No	No
Stormwater Plan <i>Comment: No Capital Improvement Plan for Stormwater</i>	No	No	Yes
Habitat Conservation Plan <i>Comment: N/A</i>	No	No	Yes
Economic Development Plan <i>Comment: element of the Comprehensive Plan</i>	Yes	No	Yes (dependent on funding)
Shoreline Management Plan <i>Comment: element of the Comprehensive Plan</i>	Yes	No	Yes
Community Wildfire Protection Plan <i>Comment: N/A</i>	No	No	No
Forest Management Plan <i>Comment: N/A</i>	No	No	No
Climate Action Plan <i>Comment: N/A</i>	No	No	No
Other <i>Comment: N/A</i>	No	No	No
Comprehensive Emergency Management Plan <i>Comment: Regional Comprehensive Emergency Management Plan; 2013; CRESA</i>	Yes	Yes	Yes
Threat & Hazard Identification & Risk Assessment <i>Comment: N/A</i>	No	No	No
Post-Disaster Recovery Plan <i>Comment: N/A</i>	No	No	No
Continuity of Operations Plan <i>Comment: N/A</i>	No	No	No
Public Health Plan <i>Comment: N/A</i>	No	No	No

Table 4-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	No
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes, Sewer
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
Withhold Public Expenditures in Hazard-Prone Areas	No
State-Sponsored Grant Programs	No
Development Impact Fees for Homebuyers or Developers	Yes
Other	REET, Grants

Table 4-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Public Works, City Engineer
Engineers or professionals trained in building or infrastructure construction practices	Yes	Public Works, Building Official
Planners or engineers with an understanding of natural hazards	Yes	Public Works, City Planner
Staff with training in benefit/cost analysis	Yes	Public Works, Director
Surveyors	Yes	Professional Consultant(s)
Staff capable of making substantial damage estimates	Yes	Public Works , City Engineer
Personnel skilled or trained in GIS applications	Yes	Public Works , City Engineer, City Planner, Tech.
Scientist familiar with natural hazards in local area	Yes	Professional Consultant(s)
Emergency manager	Yes	CRESA/City Supported
Grant writers	Yes	Public Works, Planning, City Engineer, Planner Tech., Professional Consultant(s)

Table 4-4. National Flood Insurance Program Compliance

Criteria	Response
When did the community enter the NFIP?	N/A
When did the Flood Insurance Rate maps become effective?	09/05/2012
What local department is responsible for floodplain management?	Public Works Planning
Who is your floodplain administrator? (department/position)	Public Works, City Building Official
• Is this a primary or auxiliary role?	Auxiliary
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date of adoption of your flood damage prevention ordinance?	2012
• Does your floodplain management program meet or exceed minimum requirements?	La Center Floodplain Management Program is not currently recognized by FEMA
• If so, in what ways?	
When was the most recent Community Assistance Visit or Community Assistance Contact?	Unknown
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed?	Yes
• If so, please state what they are.	La Center is currently suspended from the NFIP
Do your flood hazard maps adequately address the flood risk within your jurisdiction?	Unknown
• If no, please state why.	Insert appropriate information
Does your floodplain management staff need any assistance or training to support its floodplain management program?	No
• If so, what type of assistance/training is needed?	
Does your jurisdiction participate in the Community Rating System (CRS)?	No
• If so, is your jurisdiction seeking to improve its CRS Classification?	N/A
• If not, is your jurisdiction interested in joining the CRS program?	No
How many Flood Insurance policies are in force in your jurisdiction? ^a	0
• What is the insurance in force? ^a	\$0
• What is the premium in force? ^a	\$0
How many total loss claims have been filed in your jurisdiction? ^a	Unknown
• How many claims were closed without payment/are still open? ^a	Unknown
• What were the total payments for losses? ^a	Unknown

a. According to FEMA records as of 11/30/2015

Table 4-5. Community Classifications

	Participating?	Classification	Date Classified
Community Rating System	No	N/A	N/A
Building Code Effectiveness Grading Schedule	Unsure	Unsure	Unsure
Public Protection	Unsure	Unsure	Unsure
Storm Ready	No	N/A	N/A
Firewise	No	N/A	N/A

Table 4-6. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	No
Do you have personnel skilled or trained in website development?	Yes, Public Works Adm.
Do you have hazard mitigation information available on your website? • If yes, please briefly describe.	Yes 2016 Update/Survey
Do you utilize social media for hazard mitigation education and outreach? • If yes, please briefly describe.	No
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, please briefly specify.	No
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, please briefly describe.	Yes Monthly Utility Bill Inserts
Do you have any established warning systems for hazard events? • If yes, please briefly describe.	No

4.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into local planning mechanisms.

4.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- Critical Areas—Implements possible mitigation for construction, re-construction or building activity within critical areas and buffers. Regulates development to higher standards for many of the hazards of concern addressed in this mitigation plan.
- Standards for Construction—Implements mitigation for construction impacts, restrict or implement conditions for storm, water, sanitary sewer and road construction. Regulates development to higher standards where appropriate given geologic or other hazards.

4.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- Comprehensive Plan – Implements city-wide policies related to zoning, geologic hazards and slopes. The results of the risk assessment and possible mitigation recommendations will be integrated as appropriate.
- Shorelines Program — Implements restrictions or mitigation on construction, re-construction or building activity within hazard areas or flood plains. During the next update, the mitigation plan could be integrated.

4.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 4-7 lists all past occurrences of natural hazards within the jurisdiction.

Table 4-7. Natural Hazard Events

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Severe Winter Storm, Straight Line Winds, Flooding, Landslides, Mudslides and a Tornado	4253	12/1/2015	Unknown
Severe Winter Storm And Record And Near Record Snow	1825	12/12/2008	Unknown
Severe Winter Storm, Landslides, And Mudslides	1682	12/14/2006	Unknown
Severe Storms, Flooding, Landslides, And Mudslides	1671	11/2/2006	Unknown
Earthquake	1361	2/28/2001	Unknown
Severe Winter Storms, Land & Mudslides, Flooding	1159	12/26/1996	Unknown
High Winds, Severe Storms And Flooding	1100	1/26/1996	Unknown
Severe Storms, High Wind, And Flooding	1079	11/7/1995	Unknown
Volcanic Eruption, Mt. St. Helens	623	5/21/1980	Unknown
Severe Storms, Mudslides, & Flooding	545	12/10/1977	Unknown
Heavy Rains & Flooding	185	12/29/1964	Unknown
Severe Storms	137	10/20/1962	Unknown

4.6 JURISDICTION-SPECIFIC VULNERABILITIES

Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: 0
- Number of FEMA-identified Severe-Repetitive-Loss Properties: 0
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: 0

Other noted vulnerabilities include:

- Isolation, only one bridge leading in and out of the community.
- Vulnerable creek crossing (Breeze Creek) between emergency services, public works operations and schools.

4.7 HAZARD RISK RANKING

Table 4-8 presents the ranking of the hazards of concern.

Table 4-8. Hazard Risk Ranking

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Severe weather	33	High
2	Earthquake	32	High
3	Flood	18	Medium
3	Landslide	18	Medium
4	Dam failure	8	Low
5	Drought	1	Low
5	Volcano	1	Low
5	Wildfire	1	Low

4.8 STATUS OF PREVIOUS PLAN INITIATIVES

Table 4-9 summarizes the initiatives that were recommended in the previous version of the natural hazard mitigation plan and their implementation status at the time this update was prepared. It should be noted, that the actions identified in the following table were developed in 2004. Due to the significant amount of time and staff turnover that has occurred since their identification, the status of some actions may be unknown. Additionally, many of the action items identified were to be led by CRESA or other non-City agencies. For ease of annual progress reporting, these actions have generally been removed from the City's action plan or rephrased to be within the capabilities of the City. This will allow for a fresh start consistent with the comprehensive update to the natural hazard mitigation plan conducted during the 2016 planning process.

Table 4-9 Status of Previous Plan Initiatives

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Encourage non-structural retrofitting throughout the County		x	
<i>Comment: Focus within City jurisdiction, carry over as action item LC-1</i>			
Join the CRS program			x
<i>Comment: Become compliant with NFIP</i>			
Encourage non-structural retrofitting of hazardous materials containment.		x	
<i>Comment: Continue annual inspections and retro as feasible, carry over as action item LC-2</i>			
Ensure that the public is informed of the necessity of maintaining a 3 day supply of food and water		x	
<i>Comment: On-Going preparedness messaging, carry over as action items LC-3</i>			
Develop public information packets ready to deploy following a disaster event		x	
<i>Comment: Carry over as action item LC-4</i>			
Ensure severe weather warning system and public education for tornadoes in place.			x
<i>Comment: The intent of this action is unclear. Tornado warning and public education is addressed by other actions.</i>			
Expand the public awareness program about hazard materials		x	
<i>Comment: Carry over as action item LC-5</i>			
Cultivate an awareness program for landslide hazards		x	
<i>Comment: Carry over as action item LC-6</i>			
Develop an automated method to notify the public of events during a disaster.	x		
<i>Comment: County Wide Notification System in Place</i>			
Expand weather radio systems to include all of Clark County	x		
<i>Comment: La Center area covered</i>			
Conduct pre-earthquake assessments for critical and essential facilities and develop a risk-reduction strategy		x	
<i>Comment: Carry over as action item LC-7</i>			
Determine critical government functions and establish redundancy for these functions.		x	
<i>Comment: Carry over as action item LC-8</i>			
Target development and preparedness efforts of Tier II hazardous material facilities			x
<i>Comment: No tier II sites known within City boundaries</i>			
Provide opportunities for strategic relations between emergency managers and social service providers.			x
<i>Comment: More of a County wide action item</i>			

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Develop a contingency/Business resumption organization <i>Comment: This is not within the capabilities of the City at this time.</i>			x
Require the construction of earthquake-resilient structures <i>Comment: Comply with current building code, LC-11</i>	x	x	
Develop integrated County stormwater basin-wide plans <i>Comment: County directive</i>			x
Promote development off of the floodplain <i>Comment: Currently one structure within City boundaries in flood plain, LC-12</i>		x	
Consider adoption of a zero-rise floodway <i>Comment: Comply with NFIP before considering higher regulatory standards LC-13</i>		x	
Expand the County Clean Water Program <i>Comment: County Directive</i>			x
Support the use of LIDAR mapping technology to refine landslide hazard maps <i>Comment: Tied in with assessment of landslide areas as described above LC-14</i>			x
Ensure state certification of licensing for professionals performing geotechnical evaluations to a higher standard. <i>Comment: Only licensed geo-engineers used</i>	x		
Institute Low Impact Development Practices <i>Comment: Updated with comprehensive plans LC-15</i>		x	
Initiate a vegetation management program <i>Comment: Continue to refine and develop LC-16</i>		x	
Ensure emergency vehicle access to all residents to allow effective response and recovery from disaster events. <i>Comment: Carry over as an action item LC-18</i>		x	
Develop priority routes throughout the county and improve these routes <i>Comment: Carry over as action item LC-18</i>		x	
Ensure that electricity is available to populations requiring priority for electricity. <i>Comment: Clark County Public Utility responsibility</i>			x
Ensure appropriate equipment is available during events. <i>Comment: Carry over as action item LC-18</i>		x	

4.9 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 4-10 lists the actions that make up the City of La Center hazard mitigation action plan. Table 4-11 identifies the priority for each action. Table 4-12 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 4-10. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
LC-1—Seek to establish and maintain, where appropriate, the support of retro-fitting, purchase or relocation of structures located in high hazard areas and prioritize those structures that have experienced repetitive losses.						
Existing	All Hazards	1, 2, 4, 5, 8, 9, 10, 12	Planning	High	City, Owners, HMGP, PDM, FMA	Ongoing
LC-2—Seek to integrate and maintain the natural hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions with the community.						
Existing	All hazards	1, 2, 4, 5, 8, 9, 10, 12	City	Low	Staff Time	Ongoing
LC-3—Ensure that the public is informed of the necessity of maintaining food and water for an appropriate number of days.						
Existing	All Hazards	1, 2	CRESA/City Supported	Low	General Fund/Staff Time	Ongoing
LC-4—Assist CRESA as needed in the dissemination of recovery-related information after an event.						
Existing	All Hazards	1, 2	CRESA/City Supported	Low	General Fund/Staff Time	Ongoing
LC-5—Expand the public awareness program about hazard materials						
Existing	Earthquake, Flood, Landslide	1, 2	CRESA/City Supported	Low	General Fund/Staff Time	Ongoing
LC-6—Cultivate an awareness program for landslide hazards						
Existing	Landslide	1, 2	CRESA/City Supported	Low	General Fund/Staff Time	Ongoing
LC-7—Conduct pre-earthquake assessments for critical and essential facilities and develop a risk-reduction strategy						
Existing	Earthquake	4, 5, 8, 9, 10	City Building Dept.	Medium	General Fund/Staff Time	Ongoing
LC-8—Determine critical government functions and establish redundancy for these functions.						
Existing	All Hazards	8, 10	CRESA/City Supported	Medium	General Fund/Staff Time	Short-term 1-3 Years
LC-9—Seek compliance with the National Flood Insurance Program (NFIP) and once achieved maintain good standing and compliance under the NFIP. This will be accomplished through the implementation of floodplain management programs that will, at a minimum, meet the requirements of the NFIP.						
<ul style="list-style-type: none"> • Enforcement • Participate in floodplain identification and mapping updates • Provide public assistance/information on the floodplain requirements and impacts. 						
New and Existing	Flood	5, 6, 7, 11, 12	Planning Dept.	Low	General Fund/Staff Time	Short-term 0-1 Year
LC-10—Continue to require the construction of earthquake-resilient structures						
Existing	All Hazards	10	CRESA/City Supported/Chamber of Commerce	Medium	General Fund/Staff Time	Short-term 0-5 Years
LC-11—Promote development off of the floodplain						
New	Earthquake	10	City Building Department	Low	General Fund/Staff Time	Short-term 0-1 Year
LC-12—Consider adoption of a zero-rise floodway						
New	Flood	10, 11, 12	City Building Department	Medium	General Fund/Staff Time	Short-term 0-5 Years
LC-13—Continue to support methods of assessing and documenting landslide hazard areas.						
New and Existing	Flood	10, 11, 12	City Building Department	Low	General Fund/Staff Time	Short-term 0-1 Year
LC-14—Support the use of LIDAR mapping technology and other emerging technologies to refine landslide hazard maps						
New and Existing	Landslide	1, 2, 4, 5, 6, 7, 8, 10, 12	City Building Department	Medium	General Fund, Grant, Staff Time	Short-term 0-5 Years

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
LC-15—Continue to institute and update as necessary Low Impact Development practices						
New and Existing	Landslide	1, 2, 4, 5, 6, 7, 8, 10, 12	City Building Department	Medium	General Fund, Grant, Staff Time	Short-term
LC-16—Initiate a vegetation management program						
New and Existing	Earthquake, Flood, Landslide	2, 4, 5, 6, 7, 10, 11, 12	City Building Department	Low	General Fund, Staff Time	Short-term 0-1 Year
LC-17—Ensure emergency vehicle access to all residents to allow effective response and recovery from disaster events.						
New and Existing	Wildfire	1, 11, 12	City Public Works Department	Low	General Fund, Staff Time	Short-term 0-1 Year

Table 4-11. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
LC-1	9	High	Low	Yes	Yes	Yes	High	Medium
LC-2	8	High	Low	Yes	Yes	Yes	High	Medium
LC-3	2	Medium	Medium	Yes	No	Yes	Medium	Low
LC-4	2	High	Low	Yes	No	Yes	High	Low
LC-5	2	Low	Low	Yes	No	Yes	Medium	Low
LC-6	2	High	Low	Yes	No	Yes	High	Low
LC-7	5	High	High	Yes	No	No	Low	Low
LC-8	2	High	Low	Yes	No	Yes	High	Low
LC-9	5	High	Low	Yes	No	Yes	High	Low
LC-10	1	High	High	Yes	No	No	Medium	Low
LC-12	3	Low	Low	Yes	No	Yes	High	Low
LC-13	3	High	Low	Yes	No	Yes	High	Low
LC-14	9	High	Medium	Yes	No	No	Medium	Low
LC-15	9	High	Low	Yes	No	Yes	High	Low
LC-16	8	High	Low	Yes	No	Yes	Medium	Low
LC-17	3	Medium	Low	Yes	No	Yes	Medium	Low
LC-18	10	High	High	Yes	Yes	No	Low	High

a. See the introduction to this volume for explanation of priorities.

Table 4-12. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	LC-1, LC-2, LC-8	LC-1, LC-5	LC-3, LC-4, LC-5		LC-8, LC-17	
Drought	LC-1, LC-2, LC-8	LC-1	LC-3, LC-4		LC-8, LC-17	

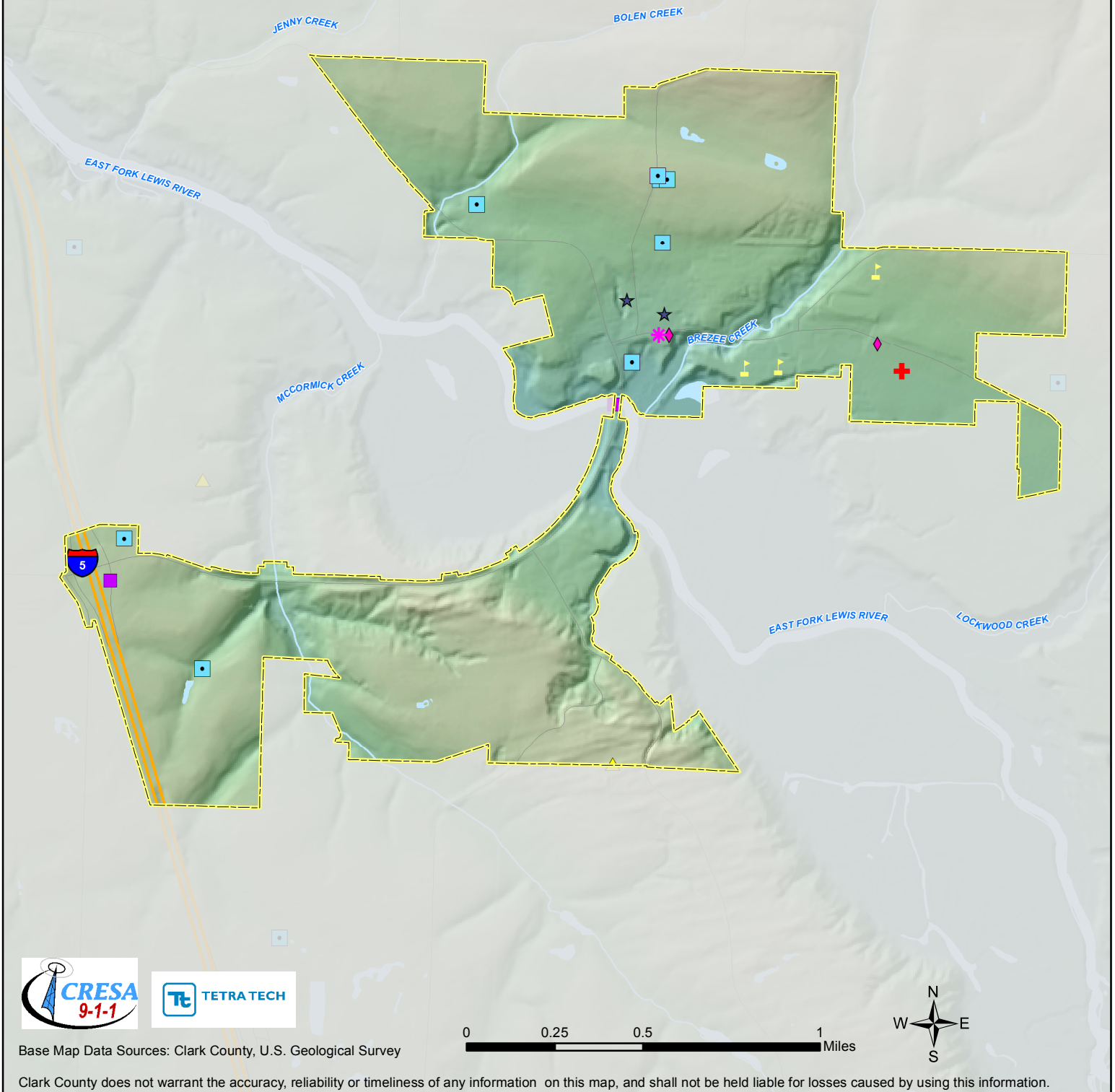
Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Earthquake	LC-1, LC-2, LC-8, LC-10, LC-15	LC-1, LC-5, LC-7	LC-3, LC-4, LC-7		LC-8, LC 17	
Flood	LC-2, LC-8, LC-9, LC-11, LC-12, LC-15	LC-1, LC-9, LC-11	LC-3, LC-4, LC-5, LC-9		LC-8, LC-17	LC-17
Landslide	LC-2, LC-8, LC-13, LC-14	LC-1	LC-4, LC-5, LC-6, LC-14		LC-17	LC-17
Severe Weather	LC-1, LC-2, LC-8	LC-1, LC-5	LC-3, LC-4		LC-8	
Volcano	LC-1, LC-2, LC 8	LC-1	LC-3, LC-4		LC-8	
Wildfire	LC-2, LC-16, LC-8	LC-1	LC-3, LC-4		LC-8	

a. See the introduction to this volume for explanation of mitigation types.

City of La Center

Critical Facilities and Infrastructure

- | | | | |
|---|--------------------------|---|------------------------------|
| ✱ | Communication Facilities | + | Medical Care Facilities |
| ◆ | Dams | ■ | Transportation Systems |
| ★ | Emergency Services | ▲ | Schools |
| ▲ | Energy Facilities | ■ | Water and Sanitation Systems |
| ● | Hazardous Materials | ◆ | Other Facilities |



Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

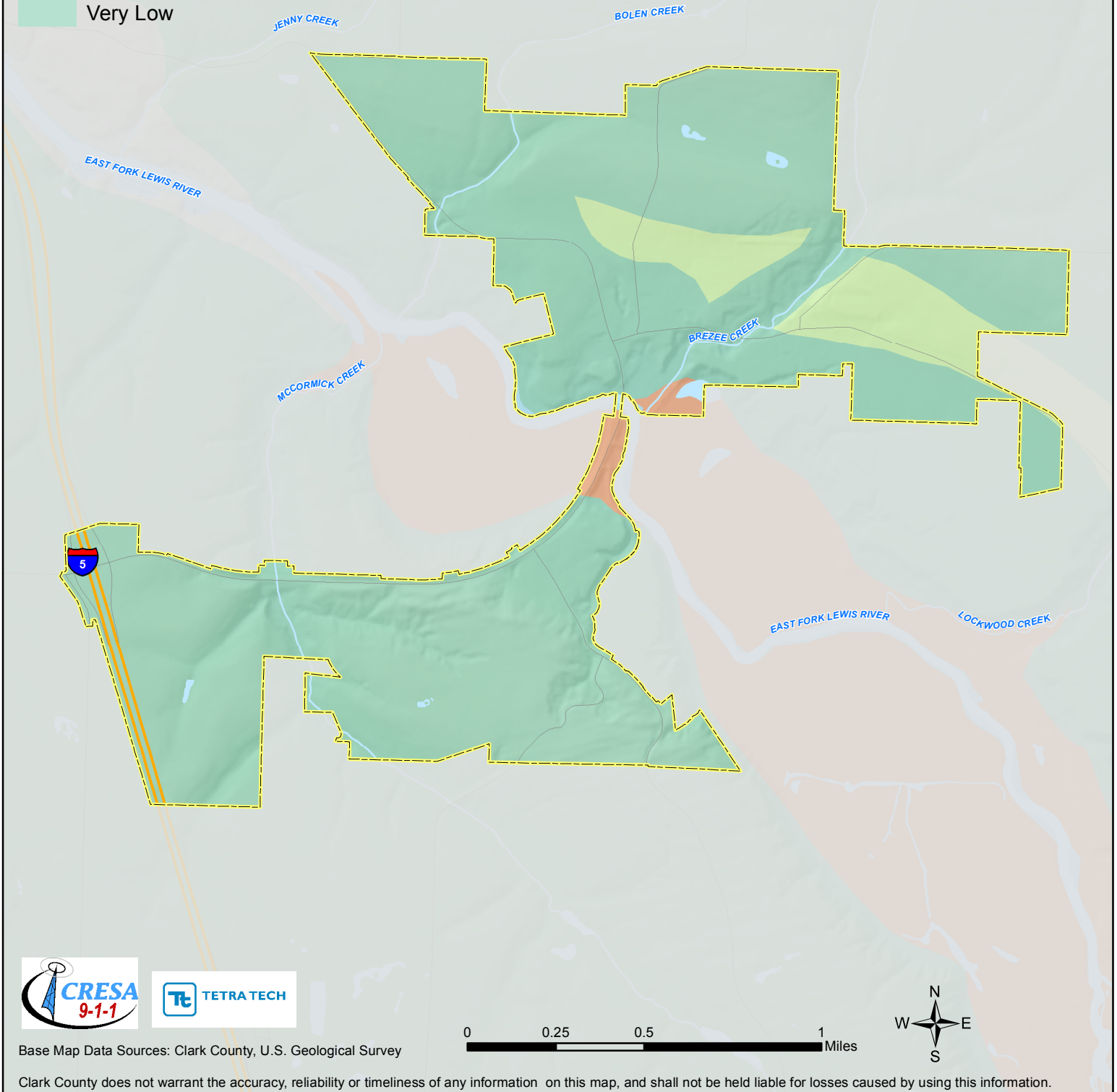
City of La Center

Liquefaction Susceptibility

- Moderate to High
- Moderate
- Low to Moderate
- Low
- Very Low to Low
- Very Low

Not Susceptible to Liquefaction

- Bedrock
- Peat
- Water



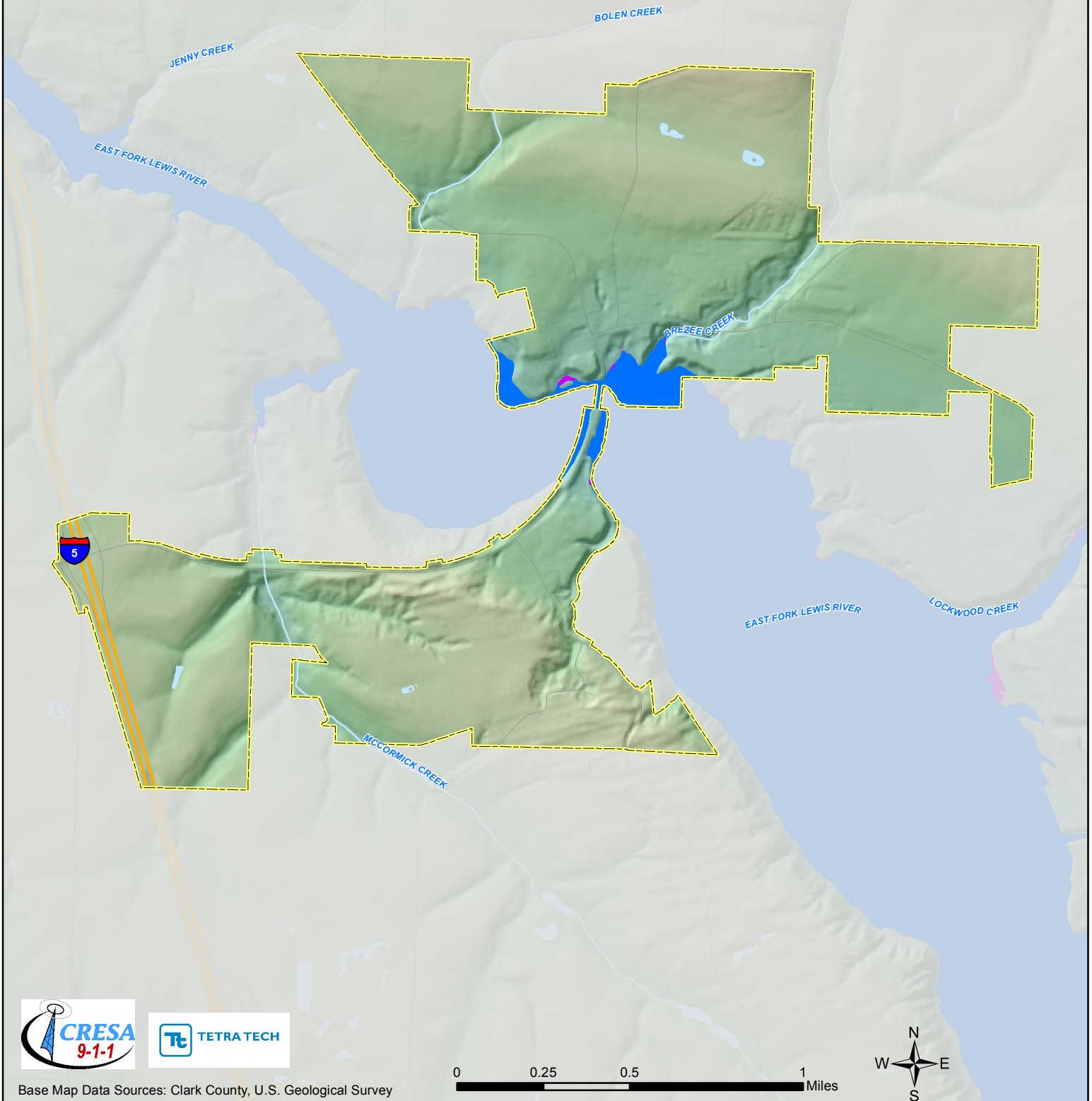
Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

City of La Center

Flood Hazard Areas

- 1% Annual Chance Flood (100 Year)
- 0.2% Annual Chance Flood (500 Year)




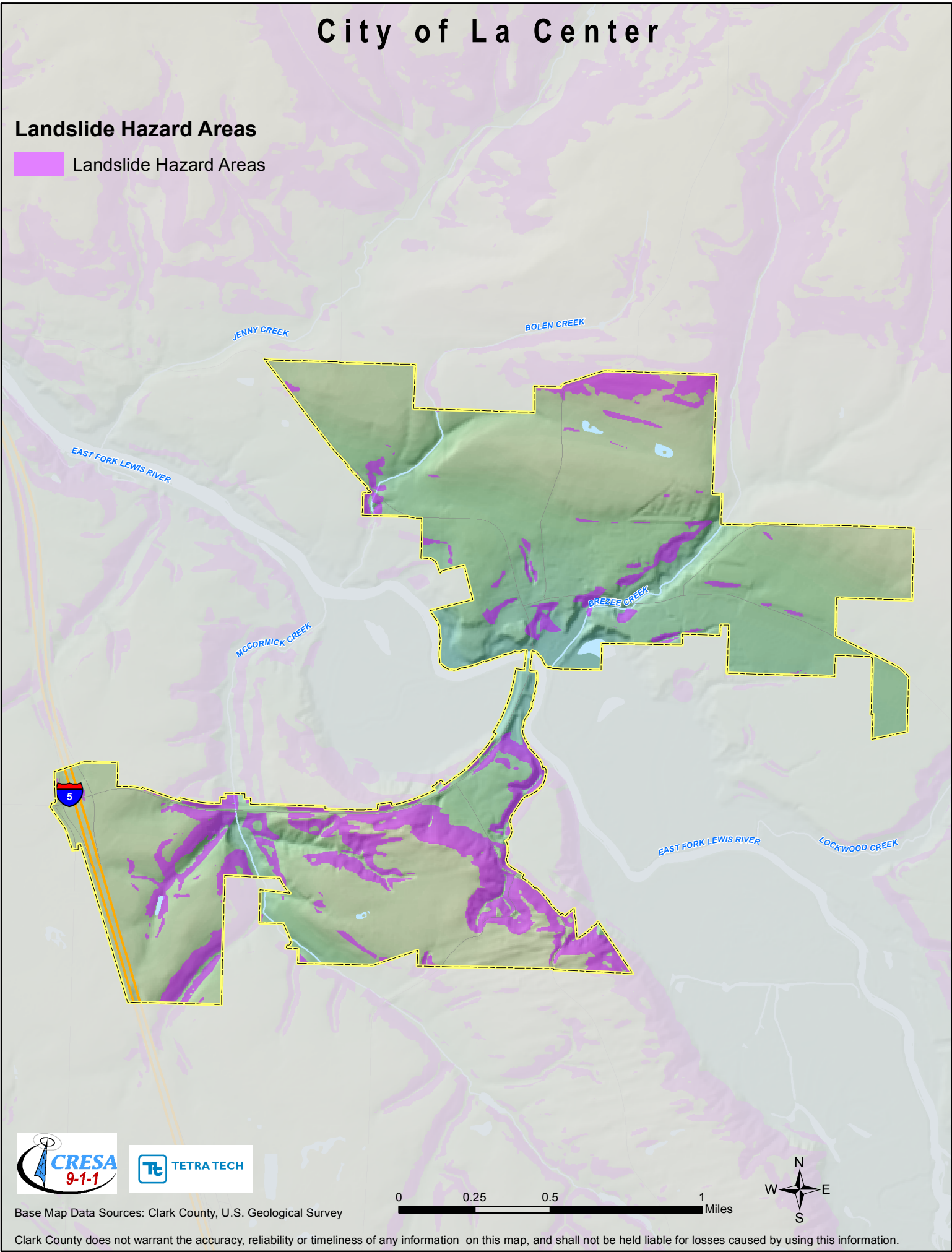
Base Map Data Sources: Clark County, U.S. Geological Survey

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City of La Center

Landslide Hazard Areas

 Landslide Hazard Areas



Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

5. CITY OF RIDGEFIELD

5.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Lee Knottnerus, Admin Services Dir/City Clerk
230 Pioneer Street
Ridgefield, WA 98642
Telephone: (360) 887-3557
e-mail: Lee.Knottnerus@ci.ridgefield.wa.us

Alternate Point of Contact

Jeff Niten, Community Development
Director
301 N 3rd Ave Ridgefield, WA 98642
Telephone: (360) 887-3908
e-mail: Jeff.Niten@ci.ridgefield.wa.us

5.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- **Date of Incorporation**— Founded in 1865 and Incorporated in 1909.
- **Current Population**— According to the US Census Bureau, the population for 2014 was 6,123.
- **Population Growth**— Based on data gathered from the US Census Bureau, Ridgefield has experienced steady growth for more than 10 years. With a population of 2,259 in 2004, the City has nearly tripled in size. In recent years, Ridgefield has been one of the top five fastest growing communities in Washington. Since 2010, the population has increased approximately 18.1% and is anticipated to grow from its current 6,123 to over 24,000 people by 2024.
- **Location and Description**— Ridgefield is located 10 miles north of Vancouver, Washington and 20 miles north of Portland, Oregon on the I-5 Discovery Corridor with easy access to metropolitan amenities yet enough distance to maintain a small-town atmosphere. According to the United States Census Bureau, the city has a total area of 7.18 square miles (18.60 km²), of which, 7.08 square miles is land and 0.10 square miles is water. The City is bordered by Clark County.

The city is a pastoral, rolling-hills countryside and slopes up a gentle incline from the riverbank of Lake River to elevated highlands on the east. The Ridgefield National Wildlife Refuge Complex lies between the downtown area and the Columbia River three miles to the west. The area is marked with numerous fields bordered by canyons, with ridges along them overlooking the canyons in places. The canyons have been and continue to be carved from the land primarily by water erosion.

State Route 501, also known as Pioneer Street, acts as the primary transportation corridor connecting downtown and the I-5 Junction. Land uses along this corridor reflect the spectrum of development types with a combination of industrial, residential and commercial development. Main Avenue and Hillhurst Road are north-south connectors that are near or traverse downtown. These areas reflect over 100 years of settlement, with a mix of old historic residential structures interspersed with modern subdivisions and a diverse array of historic buildings in the downtown area.

- **Brief History**— Ridgefield's origins can be traced back more than 1,000 years to early Native American settlements that prospered in the area near Lake River now designated as the Ridgefield National Wildlife

Refuge. The Lewis and Clark Expedition visited the area twice and the City of Ridgefield grew up on the banks of the River. This navigable water starts in Vancouver Lake and flows north into the Columbia River. After the Civil War, the area grew rapidly through the second half of the nineteenth century.

The railroad arrived in 1903 and in 1916, the steamship City of Ridgefield was launched. Served by both river and rail, Ridgefield was seen as a ‘transfer center to inland towns.’ In 1920, Ridgefield was known for its immensely fertile agricultural lands producing potatoes, prunes, and livestock. The area also enjoyed a rich manufacturing base, including a large lumber mill, a shingle mill, a creamery, a cheese factory and a boat building business. The Pacific Wood Treating Company opened in 1963, providing the city with several hundred jobs until it filed for bankruptcy and closed its doors in 1993.

The completion of Interstate 5 in the 1960s made Ridgefield more accessible which led to growth in the industrial and shipping sectors. The creation of the Ridgefield National Wildlife Refuge in 1965 drew an increasing numbers of tourists. Beginning in 2000, the population of Ridgefield exploded and a growing number of companies have chosen the location for a variety of reasons, including land availability, proximity to Portland, ocean/air/rail freight facilities, good schools, and livable communities.

- **Climate**— Ridgefield enjoys a mild climate, thanks to its proximity to the Pacific Ocean to the west and the Cascade mountains to the east. The warmest month of the year is August with an average maximum temperature of 82 degrees. The coldest month of the year is January with an average minimum temperature of 34 degrees. Temperature variations between night and day tend to be moderate during summer with a difference of about 27 degrees Fahrenheit, and fairly limited during winter with an average difference of 15 degrees Fahrenheit.

The annual average precipitation in Ridgefield is 45.70 inches. Winter months tend to be wetter than summer months. The wettest month of the year is December with an average rainfall of 7.08 inches. On average, there are 145 sunny days per year in Ridgefield.

- **Governing Body Format**— Ridgefield’s original incorporation called for a strong-mayor form of government with a volunteer mayor. In 1999 the voters approved a ballot measure that changed city government to the council-manager form, in which the elected council hires a city manager and appoints a volunteer mayor from its own ranks. Ridgefield is classified as a “non-charter code city” under state law. The City Council assumes responsibility for the adoption of this plan; the City Manager will oversee its implementation.
- **Development Trends**—While housing in Ridgefield has developed less densely than some other Clark County cities to date, future growth is anticipated to alter that pattern. To accommodate this growth and shape a quality future, Ridgefield is developing a strong, shared vision. The City is focusing planning efforts on community priorities, including detailed plans for downtown design, multi-modal transportation, downtown and waterfront integration (in 2015 the Washington legislature approved funding for a railroad overpass that will connect the downtown and waterfront areas), and development of an outdoor recreation complex. Additional planning efforts target environmental resource protection.

The cornerstone of the city’s long-range planning efforts is the Comprehensive Plan. The plan details policies for land use, housing, economic development, capital facilities, environmental resources, and more, supported by capital facilities plans for public utilities including water, sanitary sewer, transportation, and parks. The City of Ridgefield is in the process of updating its Comprehensive Plan, with anticipated completion in June, 2016, to plan for the next 20 years of development. The community vision identified in the current plan emphasizes:

- A regional employment center for Clark County and Southwest Washington rather than a bedroom community, with opportunities for family-wage jobs.

- Quality neighborhoods, including maintaining existing neighborhoods, and creating new neighborhoods that incorporate pedestrian elements, access to schools and parks, and high quality design.
- Protection of critical environment resource areas to ensure the city’s natural amenities remain central to the community identity, aesthetics, and environmental well-being.
- Careful management of growth to ensure orderly, cost effective provision of public facilities and utilities as the city continues to grow.

5.3 CAPABILITY ASSESSMENT

An assessment of legal and regulatory capabilities is presented in Table 5-1. An assessment of fiscal capabilities is presented in Table 5-2. An assessment of administrative and technical capabilities is presented in Table 5-3. Information on National Flood Insurance Program (NFIP) compliance is presented in Table 5-4. Classifications under various community mitigation programs are presented in Table 5-5. An assessment of education and outreach capabilities is presented in Table 5-6.

In addition to the capabilities listed below, the City of Ridgefield is a member of the Discovery Clean Water Alliance, which was legally formed on January 4, 2013 under the Joint Municipal Utility Services Act (RCW 39.106). The Alliance serves four Member agencies – the City of Battle Ground, Clark County, Clark Regional Wastewater District and the City of Ridgefield. The Alliance Members jointly own and jointly manage regional wastewater assets under Alliance ownership. The Alliance seeks to optimize the long-term framework for delivery of regional wastewater transmission and treatment services to the urban growth areas in the central portion of Clark County, Washington.

Table 5-1. Legal and Regulatory Capability

	Local Authority	Other Jurisdiction Authority	State Mandated
Building Code	Yes	Yes	Yes
<i>Comment: Ridgefield Municipal Code (RMC), Title 14, Buildings and Construction (Construction Administrative Code) Adopted pursuant to RCW 19.27.031 and State Building Code Council of the State of Washington 14.030.010 states “All building and building-related codes as currently adopted or as may be adopted in future enactments by the state of Washington pursuant to RCW 19.27.031, together with all amendments that may be adopted by the State Building Code Council of the state of Washington are hereby adopted as the building codes for the city of Ridgefield.” The provisions of the code apply to the administration of the technical and nontechnical codes – International Building Code, International Residential Code, International Existing Building Code, International Fuel Gas Code, International Mechanical Code, Uniform Plumbing Code, International Property Maintenance Code, Uniform Housing Code, International Fire Code, International Energy Conservation Code, ADA Standards for Accessible Design, National Green Building Standard.</i>			
Zoning Code	Yes	No	Yes
<i>Comment: RMC 18.200 – Establishment of Zoning Districts and Maps</i>			
Subdivisions	Yes	No	Yes
<i>Comment: RMC 18.620 – Procedure for Subdivisions</i>			
Stormwater Management	Yes	No	Yes
<i>Comment: RMC 13.75 – Stormwater Utility</i>			
Post-Disaster Recovery	No	No	No
<i>Comment: N/A</i>			
Real Estate Disclosure	No	No	No
<i>Comment: N/A</i>			

	Local Authority	Other Jurisdiction Authority	State Mandated
Growth Management <i>Comment: RMC Title 18 – Ridgefield Development Code (1995) adopted pursuant to RCW 36.70A.120</i>	Yes	Yes	Yes
Site Plan Review <i>Comment: RMC 18.500- Site Plan Review</i>	Yes	No	No
Environmental Protection <i>Comment: RMC 18.810 – Environmental Standards pursuant to SEPA, RCW 43.21C.120, WAC 197-904, 197-11</i>	Yes	Yes	Yes
Flood Damage Prevention <i>Comment: RMC 18.750- Flood Control, 2007</i>	Yes	No	Yes
Emergency Management <i>Comment: RMC 2.44- Emergency Management, 2005, pursuant to RCW 38.52; Article 11, Section 11 of the Washington State Constitution</i>	Yes	Yes	Yes
Climate Change <i>Comment: N/A</i>	No	No	No
Other <i>Comment:</i>	No	No	No
General or Comprehensive Plan <i>Is the plan equipped to provide linkage to this mitigation plan? Yes</i> <i>Comment: Ridgefield Urban Area Comprehensive Plan (2016-2035); approved 2/25/2016</i>	Yes	No	Yes
Capital Improvement Plan <i>What types of capital facilities does the plan address? General Facilities, Water, Sewer, Stormwater, Parks, Transportation, Schools</i> <i>How often is the plan updated? Annually</i> <i>Comment: Capital Facilities Plan, incorporated by reference into the Comprehensive Plan</i>	Yes	No	Yes
Floodplain or Watershed Plan <i>Comment: N/A</i>	No	No	No
Stormwater Plan <i>Comment: Capital Facilities Plan, incorporated by reference into the Comprehensive Plan</i>	Yes	No	Yes
Habitat Conservation Plan <i>Comment:</i>	No	No	No
Economic Development Plan <i>Comment: An element of the comprehensive plan</i>	Yes	No	Yes (dependent on funding)
Shoreline Management Plan <i>Comment: Shoreline Management Program, 11/15/2012</i>	Yes	No	Yes
Community Wildfire Protection Plan <i>Comment: N/A</i>	No	No	No
Forest Management Plan <i>Comment: N/A</i>	No	No	No
Climate Action Plan <i>Comment: N/A</i>	No	No	No
Other <i>Comment: N/A</i>	No	No	No

	Local Authority	Other Jurisdiction Authority	State Mandated
Comprehensive Emergency Management Plan <i>Comment: Emergency Management Plan (update in progress); CRESA</i>	Yes	Yes	Yes
Threat & Hazard Identification & Risk Assessment <i>Comment: Anticipate completion in 2017</i>	In Progress	No	No
Post-Disaster Recovery Plan <i>Comment: N/A</i>	No	No	No
Continuity of Operations Plan <i>Comment: N/A</i>	No	No	No
Public Health Plan <i>Comment: N/A</i>	No	No	No

Table 5-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding – Revenue bonds are used to finance construction or improvements in facilities of enterprise systems operated by the City in accordance with the Capital Improvement Program and are generally payable from the enterprise. Revenue bonds are not subject to the City's statutory debt limitation and voter approval is not required.	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service – Ridgefield only provides water service, and has the authority to establish user fees and development charges for water connections	Yes
Incur Debt through General Obligation Bonds – Assessment bonds are considered in place of general obligation bonds where possible to assure the greatest degree of public equity. Limited Tax General Obligation Bonds can be issued with the approval of the City Council under specific circumstances. Unlimited General Obligation Bonds are payable from excess tax levies and subject to voter approval by 60% of the voters.	Yes
Incur Debt through Special Tax Bonds	No
Incur Debt through Private Activity Bonds	No
Withhold Public Expenditures in Hazard-Prone Areas	No
State-Sponsored Grant Programs - Department of Ecology, Department of Commerce	Yes
Development Impact Fees for Homebuyers or Developers - RMC 18.070 - The city has authorized the use of impact fees for allowable public purposes by adoption of the RUACP and CFP. The CFP identifies each of the city's major capital facilities and services; establishes levels of service (LOS) standards for each capital facility; and identifies specific capital facilities construction or enhancement projects for which impact fees may be used.	Yes
Other – Public Works Trust Fund Loans, the Local Option Capital Asset Lending Program	No

Table 5-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Public Works Director Community Development Director Planning Consultants
Engineers or professionals trained in building or infrastructure construction practices	Yes for Infrastructure	Building Official Public Works Director
Planners or engineers with an understanding of natural hazards	Yes	Community Development Director Public Works Director Planning Consultants
Staff with training in benefit/cost analysis	Yes	Community Development Director Public Works Director
Surveyors	No	
Staff capable of making substantial damage estimates	Yes	Building Official
Personnel skilled or trained in GIS applications	No	
Scientist familiar with natural hazards in local area	No	
Emergency manager	Yes	Police Chief; CRESA
Grant writers	No	

Table 5-4. National Flood Insurance Program Compliance

Criteria	Response
When did the community enter the NFIP?	05/19/81
When did the Flood Insurance Rate maps become effective?	09/15/2012
What local department is responsible for floodplain management?	Community Development
Who is your floodplain administrator? (department/position)	Community Development Director
• Is this a primary or auxiliary role?	Auxiliary
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date of adoption of your flood damage prevention ordinance?	2007
• Does your floodplain management program meet or exceed minimum requirements?	Meet
• If so, in what ways?	
When was the most recent Community Assistance Visit or Community Assistance Contact?	Unknown
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed?	No
• If so, please state what they are.	
Do your flood hazard maps adequately address the flood risk within your jurisdiction?	Yes
• If no, please state why.	
Does your floodplain management staff need any assistance or training to support its floodplain management program?	Yes
• If so, what type of assistance/training is needed?	Update regulations
Does your jurisdiction participate in the Community Rating System (CRS)?	No
• If so, is your jurisdiction seeking to improve its CRS Classification?	
• If not, is your jurisdiction interested in joining the CRS program?	No
How many Flood Insurance policies are in force in your jurisdiction? ^a	1
• What is the insurance in force? ^a	\$350,000
• What is the premium in force? ^a	\$412

Criteria	Response
How many total loss claims have been filed in your jurisdiction? ^a	0
• How many claims were closed without payment/are still open? ^a	0
• What were the total payments for losses? ^a	\$0

a. According to FEMA records as of 11/30/2015

Table 5-5. Community Classifications

	Participating?	Classification	Date Classified
Community Rating System	No	N/A	N/A
Building Code Effectiveness Grading Schedule	Unknown	Unknown	Unknown
Public Protection	Unknown	Unknown	Unknown
Storm Ready	No	N/A	N/A
Firewise	No	N/A	N/A

Table 5-6. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	No
Do you have personnel skilled or trained in website development?	No
Do you have hazard mitigation information available on your website?	No, updates in progress
• If yes, please briefly describe.	
Do you utilize social media for hazard mitigation education and outreach?	Yes
• If yes, please briefly describe.	Facebook, Twitter– articles & notices
Do you have any citizen boards or commissions that address issues related to hazard mitigation?	Planning Commission
• If yes, please briefly specify.	
Do you have any other programs already in place that could be used to communicate hazard-related information?	Yes
• If yes, please briefly describe.	Website, Next Door
Do you have any established warning systems for hazard events?	No
• If yes, please briefly describe.	

5.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into local planning mechanisms.

5.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- Mitigation assessments are included in the Ridgefield Development Code, the Construction Administrative Code, land use plans and site plan review. Goals and risk assessments are also included in the process for review/adoption of the Urban Area Comprehensive Plan and the Capital Improvement Plan.

5.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- Integrate plan goals with community objectives
- Create a stand-alone resiliency plan as an appendix to the Comprehensive Plan. Incorporate the Shoreline Management Program into the Comprehensive Plan

5.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 5-7 lists all past occurrences of natural hazards within the jurisdiction.

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Severe Rain, Landslide	N/A	2016	Unknown
Severe Rain, Landslide	N/A	2012	Unknown
Earthquake	1361	2001	Unknown
Severe Winter Storm	1159	1997	Unknown
Severe Storm, Flooding	N/A	11/1995	10 houseboats damaged
Volcanic Eruption	623	5/21/1980	Unknown
Tornado	N/A	8/26/1953	Unknown

5.6 JURISDICTION-SPECIFIC VULNERABILITIES

Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: 0
- Number of FEMA-identified Severe-Repetitive-Loss Properties: 0
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: 0

Other noted vulnerabilities include:

- An urban drainage issue downtown that results in localized flooding every time it rains – This issue is being addressed through the recently adopted Stormwater Management Comprehensive Plan.
- All neighborhoods and the downtown area have the potential to have ingress and egress cut off as the result of a hazard event, such as a flood or earthquake, on Pioneer Street.
- Substantial number of buildings in downtown area are unreinforced masonry.
- Port of Ridgefield, 348 residential, 3 commercial, and 2 industrial structures on D, E or F soils.
- The Port of Ridgefield, 97 residential and 5 commercial lots developed in the floodplain.
- 224 landslide susceptible parcels, including Union Ridge Elementary School and Ridgefield High School.
- Existing buildings, the floodplain and the location of the downtown area cannot be modified. However, the City can create an education and awareness program for residents who live in these areas regarding the vulnerabilities, possibility of insurance coverage, retrofitting, etc.

5.7 HAZARD RISK RANKING

Table 5-8 presents the ranking of the hazards of concern.

Table 5-8. Hazard Risk Ranking

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Earthquake	39	High
1	Severe Weather	39	High
2	Flood	21	Medium
3	Landslide	18	Medium
4	Wildfire	8	Low
5	Dam Failure	7	Low
6	Drought	2	Low
6	Volcano	2	Low

5.8 STATUS OF PREVIOUS PLAN INITIATIVES

Table 5-9 summarizes the initiatives that were recommended in the previous version of the natural hazard mitigation plan and their implementation status at the time this update was prepared. It should be noted, that the actions identified in the following table were developed in 2004. Due to the significant amount of time and staff turnover that has occurred since their identification, the status of some actions may be unknown. Additionally, many of the action items identified were to be led by CRESA or other non-City agencies. For ease of annual progress reporting, these actions have generally been removed from the City's action plan or rephrased to be within the capabilities of the City. This will allow for a fresh start consistent with the comprehensive update to the natural hazard mitigation plan conducted during the 2016 planning process.

Table 5-9 Status of Previous Plan Initiatives

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Encourage non-structural retrofitting throughout the County			X
<i>Comment: This is a County project, not City.</i>			
Join the CRS program			X
<i>Comment: Only 1 flood insurance policy in force, effort required exceeds the benefit.</i>			
Encourage non-structural retrofitting of hazardous materials containment		X	
<i>Comment: Incorporated into RF-1</i>			
Ensure that the public is informed of the necessity of maintaining a 3 day supply of food and water	X		
<i>Comment: This action is led by CRESA. Ridgefield will support public outreach efforts as resources allow.</i>			
Develop public information packets ready to deploy following a disaster event		X	
<i>Comment: RF-8</i>			
Ensure severe weather warning system and public education for tornadoes in place.			X
<i>Comment: This was a Clark Regional Emergency Services Agency (CRESA) specific action item.</i>			
Expand the public awareness program about hazard materials		X	
<i>Comment: This action is led by CRESA. Ridgefield will support public outreach efforts as resources allow.</i>			
Cultivate an awareness program for landslide hazards		X	
<i>Comment: This action is led by CRESA. Ridgefield will support public outreach efforts as resources allow.</i>			
Develop an automated method to notify the public of events during a disaster.	X		
<i>Comment: County provides an automated method.</i>			
Expand weather radio systems to include all of Clark County			X
<i>Comment: This was a Clark Regional Emergency Services Agency (CRESA) specific action item.</i>			

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Conduct pre-earthquake and flood assessments for critical and essential facilities and develop a risk-reduction strategy, e.g., relocate and/or retrofit facilities <i>Comment: RF-12</i>		X	
Determine critical government functions and establish redundancy for these functions. <i>Comment: RF-13</i>		X	
Target development and preparedness efforts of Tier II hazardous material facilities <i>Comment: RF-13</i>		X	
Develop a contingency/Business resumption organization <i>Comment: RF-8</i>		X	
Provide opportunities for strategic relations between emergency managers and social service providers. <i>Comment: Ongoing; this action is led by Clark Regional Services Agency</i>	X		
Require the construction of earthquake-resilient structures <i>Comment: 2012-2015 state building code</i>	X		
Develop integrated County stormwater basin-wide plans <i>Comment: This action would be led by the County, not the City of Ridgefield. Not feasible.</i>			X
Promote development off of the floodplain <i>Comment: RF-11</i>		X	
Consider adoption of a zero-rise floodway <i>Comment: RF-11</i>		X	
Expand the County Clean Water Program <i>Comment: This is a County program, not Ridgefield.</i>			X
Develop a method of assessing and documenting landslide hazard areas. <i>Comment: Landslide hazard areas have been identified are regulated by the Critical Areas Ordinance.</i>	X		
Support the use of LIDAR mapping technology to refine landslide hazard maps <i>Comment: RF-11</i>		X	
Ensure state certification of licensing for professionals performing geotechnical evaluations <i>Comment: Ongoing; Codified in the City's Development Code, Title 18</i>	X		
Institute Low Impact Development Practices <i>Comment: Ongoing; Codified in the City's Development Code, Title 18</i>	X		
Initiate a vegetation management program <i>Comment: RF-15</i>		X	
Ensure emergency vehicle access to all residents to allow effective response and recovery from disaster events <i>Comment: RF-8</i>		X	
Develop priority routes throughout the county and improve these routes to a higher standard. <i>Comment: This is a County project, not City.</i>			X
Ensure that electricity is available to populations requiring priority for electricity. <i>Comment: This is a Clark Public Utilities District Action, not City.</i>	X		
Ensure appropriate equipment is available during events. <i>Comment: Addressed in Comprehensive Emergency Management Plan.</i>	X		

5.9 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 5-10 lists the actions that make up the City of Ridgefield hazard mitigation action plan. Table 5-11 identifies the priority for each action. Table 5-12 summarizes the mitigation actions by hazard of concern and the six mitigation types.

5.10 FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

- Climate Change – Water levels at the waterfront/Port property
- Citywide Resiliency Study – critical and hazardous infrastructure

Table 5-10. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
RF-1 –Where appropriate, support retro-fitting, purchase or relocation of structures located in high hazard areas and prioritize those structures that have experienced repetitive losses; encourage non-structural retrofitting of hazardous materials containment.						
Existing	All Hazards	4, 5, 7, 9, 10	Planning	High	HMGP, PDS, FMA, CDBG-DR	Short-term
RF-2 – Integrate the natural hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions within the community.						
New and Existing	All Hazards	2, 4	Planning	Low	Staff time, General Fund	On-going
RF-3 – Develop and implement a program to capture perishable data after significant events (e.g., high water marks, preliminary damage estimates, damage photos) to support future mitigation efforts including the implementation and maintenance of the natural hazard mitigation plan.						
Existing	All Hazards	1, 2, 4, 12	Emergency Management	Medium	Staff time, General Funds	Short-term
RF-4 – Support the County-wide initiatives identified in Volume 1 of the natural hazard mitigation plan.						
New and existing	All Hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Community Development Dept.	Low	Staff Time, General Funds	Short-term
RF-5 – Actively participate in the plan maintenance protocols outlined in Volume 1 of the natural hazard mitigation plan.						
New and Existing	All Hazards	1, 4	Community Development Dept.	Low	Staff Time, General Funds	Short-term
RF-6 – Continue to maintain good standing and compliance under the National Flood Insurance Program (NFIP). This will be accomplished through the implementation of floodplain management programs that will, at a minimum, meet the requirements of the NFIP:						
<ul style="list-style-type: none"> • Enforcement of the flood damage prevention ordinance. • Participate in floodplain identification and mapping updates. • Provide public assistance/information on floodplain requirements and impacts. • Improve stormwater management; improve stormwater drainage system capacity. 						
New and Existing	Flood	1, 4, 5, 9	Public Works	Low	Staff Time, General Funds	On-going

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
RF-7 – Work with building officials to identify ways to participate in the BCEGS classification program.						
New	Earthquake, Flood, Landslide, Severe Weather, Volcano, Wildfire	5, 6, 7, 10, 12	Community Development Department	Low	Staff Time, General Funds	Short-Term
RF-8 – Support mitigation measures that enhance other phases of emergency management such as the development of a post-disaster recovery plan and a debris management plan; the development of public information packets to deploy following a disaster event; ensure emergency vehicle access to all residents to allow effective response and recovery; develop a contingency/business resumption organization.						
Existing	All Hazards	1, 2, 4, 9	Emergency Management	Medium	EMPG	Long-Term
RF-9 – Participate or encourage participation in programs such as Firewise, StormReady.						
New and Existing	Dam Failure, Flood, Severe Weather, Wildfire	1, 7	Emergency Management and Public Works	Low	Staff Time, General Funds	Short-Term
RF-10 – Conduct a citywide resiliency study – critical and hazardous infrastructure.						
New and Existing	Earthquake, Severe Weather	1, 4, 5, 9	Public Works	Medium	Staff Time, Grants may be available	
RF-11 – Continue to pursue best available data and use this data to inform policies and regulations. This would include projects such as mapping and assessing vulnerability to erosion; stabilize erosion hazard areas, manage development in erosion hazard areas; Promoting development off of the floodplain, consider adoption of a zero-rise floodway, Support the use of LIDAR mapping technology to refine landslide hazard maps.						
New and Existing	Flood, Landslide, Severe Weather	1, 4, 5, 9	Public Works	Medium	Staff Time, Grants may be available	Long-term
RF-12 – Conduct pre-earthquake and flood assessments for critical and essential facilities and develop a risk reduction strategy, e.g., relocate and/or retrofit facilities.						
New and Existing	Earthquake, Flood, Severe Weather	5, 8, 9, 10, 12	Public Works	Medium	Staff Time, General Funds	Short Term
RF-13 – Determine critical government functions and establish redundancy for those functions.						
New and Existing	All Hazards	6, 10	Administration	Low	Staff Time General Funds	Ongoing
RF-14 – Target development and preparedness efforts of Tier II hazardous material facilities.						
New and Existing	Earthquake, Flood, Severe Weather	4, 10, 11	Public Works	Low	Staff Time General Funds	Short Term
RF-15– Initiate a vegetation management program.						
New and Existing	Wildfire, Flood, Landslide	4, 5, 11	Public Works	Low	Staff Time	Short Term

Table 5-11. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
RF-1	5	High	High	Yes	Yes	No	Medium	High
RF-2	2	Medium	Low	Yes	No	Yes	High	Low
RF-3	4	Low	Medium	Yes	No	Maybe	Low	Low
RF-4	12	Low	Low	Yes	No	Yes	High	Low
RF-5	2	Low	Low	Yes	No	Yes	High	Low
RF-6	4	Medium	Low	Yes	No	Yes	High	Low
RF-7	5	Medium	Low	Yes	No	Yes	High	Low
RF-8	4	Medium	Medium	Yes	Yes	No	Medium	High
RF-9	2	Medium	Low	Yes	No	Yes	High	Low
RF-10	4	High	High	Yes	Maybe	No	Medium	High
RF-11	4	High	Medium	Yes	Maybe	Partial	High	Medium
RF-12	5	Medium	Medium	Yes	No	Not for 2017	Medium	Low
RF-13	2	High	Low	Yes	No	Yes	High	Low
RF-14	3	High	Low	Yes	No	Yes	High	Low
RF-15	3	High	Low	Yes	No	Yes	High	Low

a. See the introduction to this volume for explanation of priorities.

Table 5-12. Analysis of Mitigation Actions

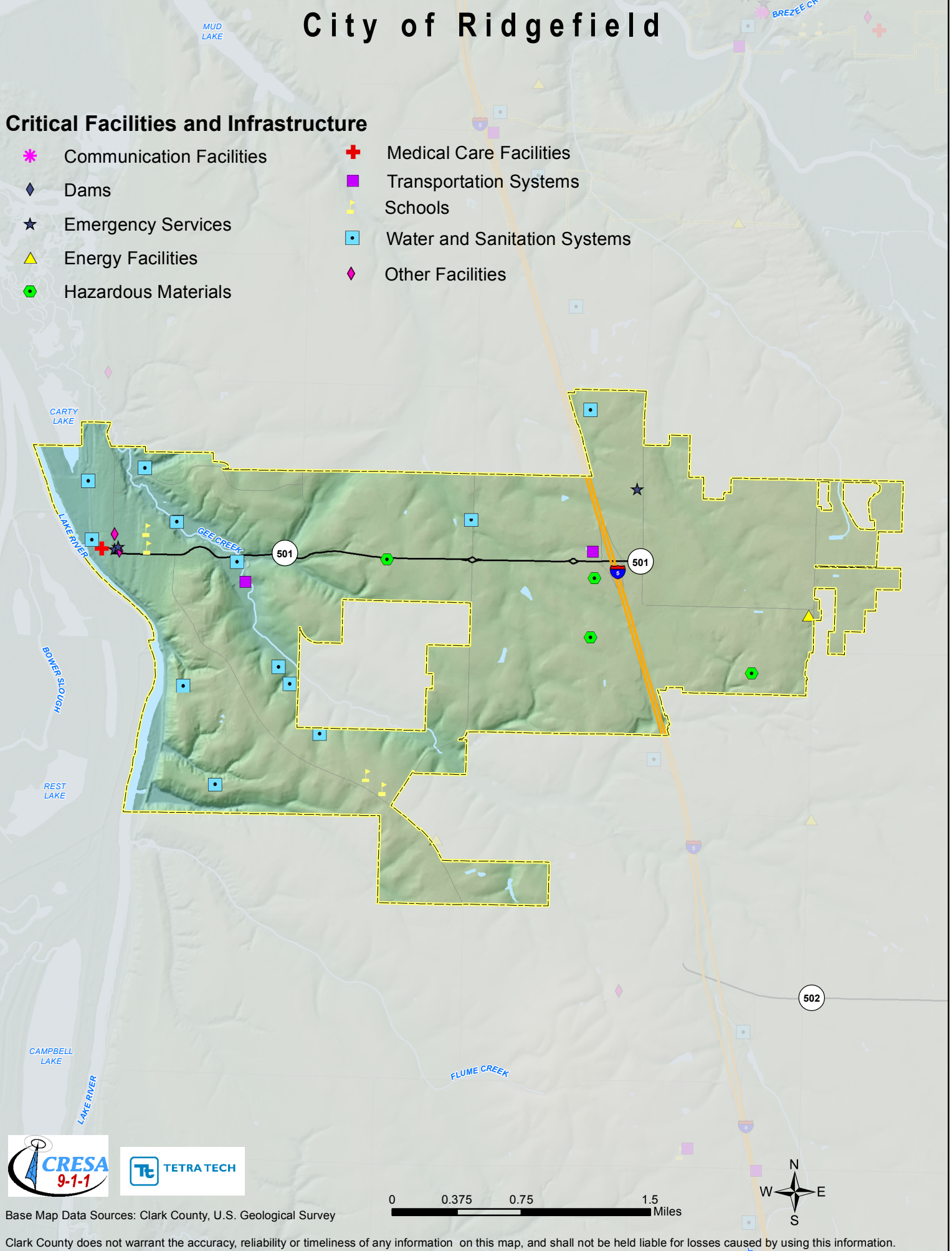
Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	RF-1, RF-3, RF-4, RF-5, RF-6, RF-8,	RF-1, RF-6, RF-11	RF-4, RF-6, RF-8		RF-8	
Drought	RF-2, RF-3, RF-4, RF-5, RF-8,	RF-1	RF-4, RF-8		RF-8	
Earthquake	RF-2, RF-3, RF-4, RF-5, RF-7, RF-8, RF-10, RF-11, RF-12, RF-13	RF-1, RF-7, RF-12	RF-4, RF-8	RF-10	RF-8	RF-12
Flood	RF-2, RF-3, RF-4, RF-5, RF-6, RF-7, RF-8, RF-11, RF-12, RF-13, RF-15	RF-1, RF-6, RF-7, RF-10, RF-11, RF-12, RF-15	RF-4, RF-6, RF-8	RF-9, RF-14	RF-8	RF-12
Landslide	RF-2, RF-3, RF-4, RF-5, RF-7, RF-8, RF-11, RF-12, RF-14, RF-15	RF-1, RF-7, RF-11, RF-15	RF-4, RF-8	RF-10, RF-11, RF-14	RF-8	
Severe Weather	RF-2, RF-3, RF-4, RF-5, RF-7, RF-8, RF-11, RF-12, RF-13	RF-1, RF-7, RF-9, RF-11, RF-12, RF-15	RF-4, RF-8	RF-9, RF-10, RF-11	RF-8, RF-9	RF-12
Volcano	RF-2, RF-3, RF-4, RF-5, RF-7, RF-8,	RF-1, RF-7	RF-4, RF-8		RF-8	
Wildfire	RF-2, RF-3, RF-4, RF-5, RF-7, RF-14, RF-15	RF-1, RF-7, RF-9	RF-4, RF-8, RF-9	RF-9, RF-14		RF-15

a. See the introduction to this volume for explanation of mitigation types.

City of Ridgefield

Critical Facilities and Infrastructure

- ✳ Communication Facilities
- ◆ Dams
- ★ Emergency Services
- ▲ Energy Facilities
- Hazardous Materials
- ✚ Medical Care Facilities
- Transportation Systems
- ▲ Schools
- Water and Sanitation Systems
- ◆ Other Facilities



Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

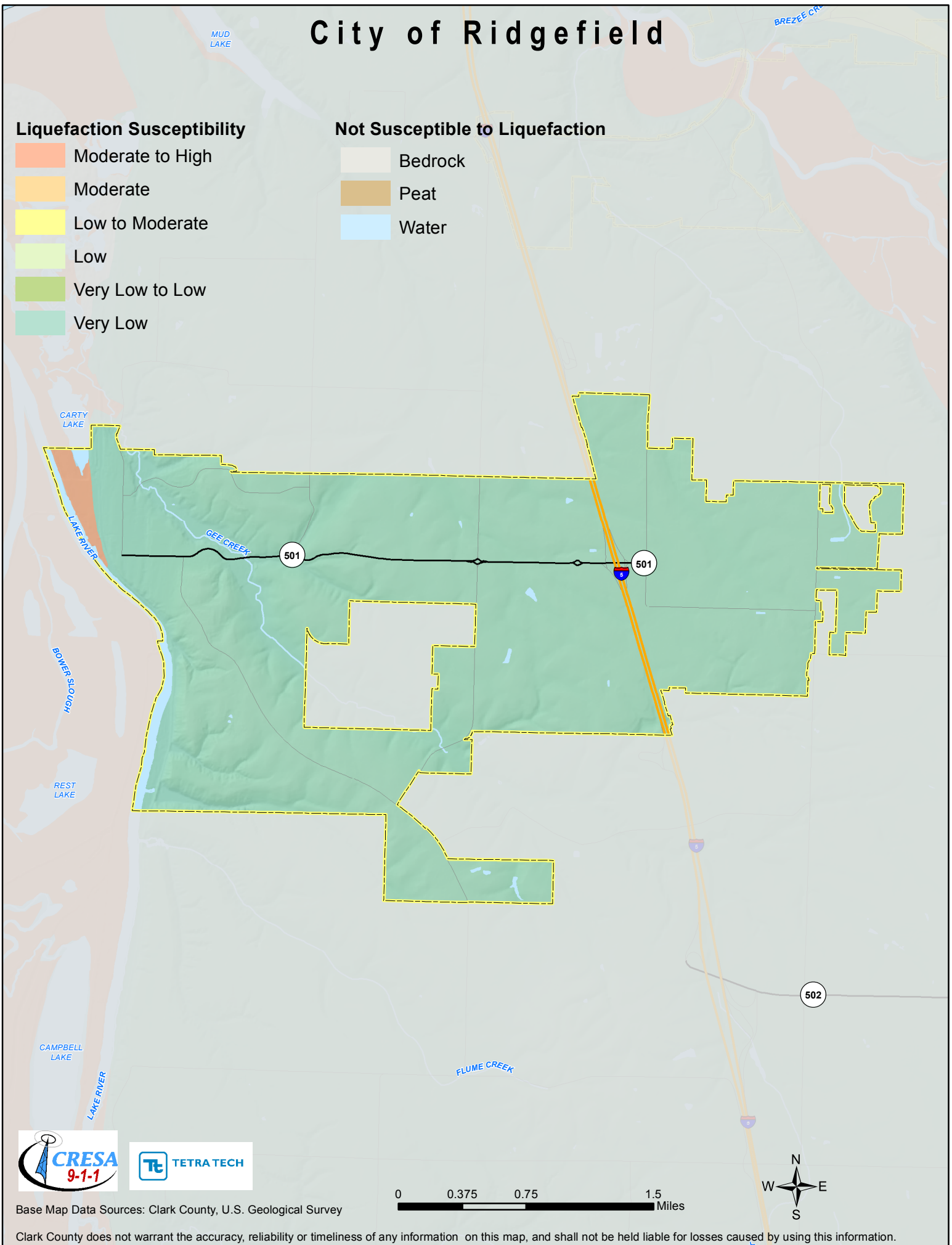
City of Ridgefield

Liquefaction Susceptibility

- Moderate to High
- Moderate
- Low to Moderate
- Low
- Very Low to Low
- Very Low

Not Susceptible to Liquefaction

- Bedrock
- Peat
- Water



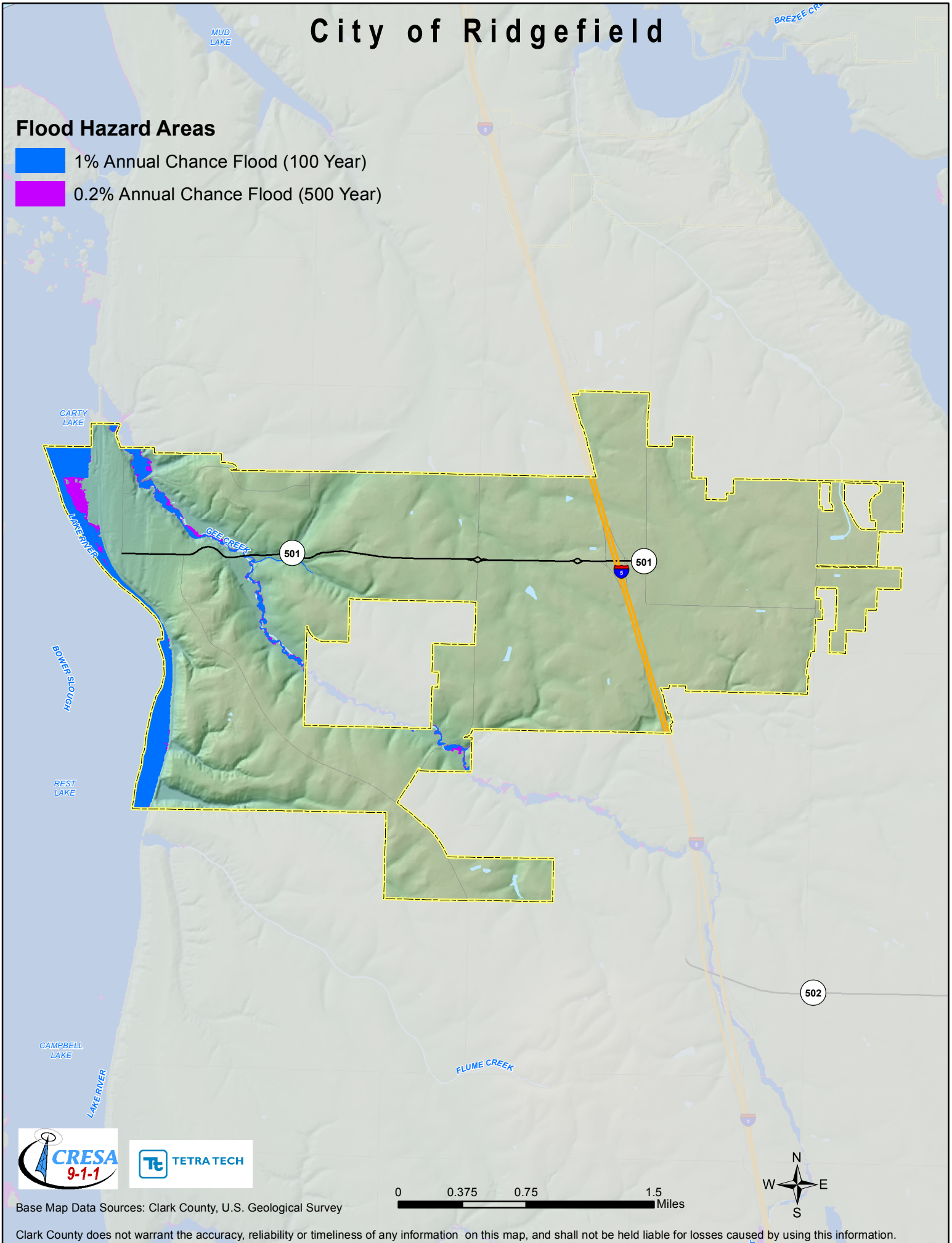
Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

City of Ridgefield

Flood Hazard Areas

- 1% Annual Chance Flood (100 Year)
- 0.2% Annual Chance Flood (500 Year)




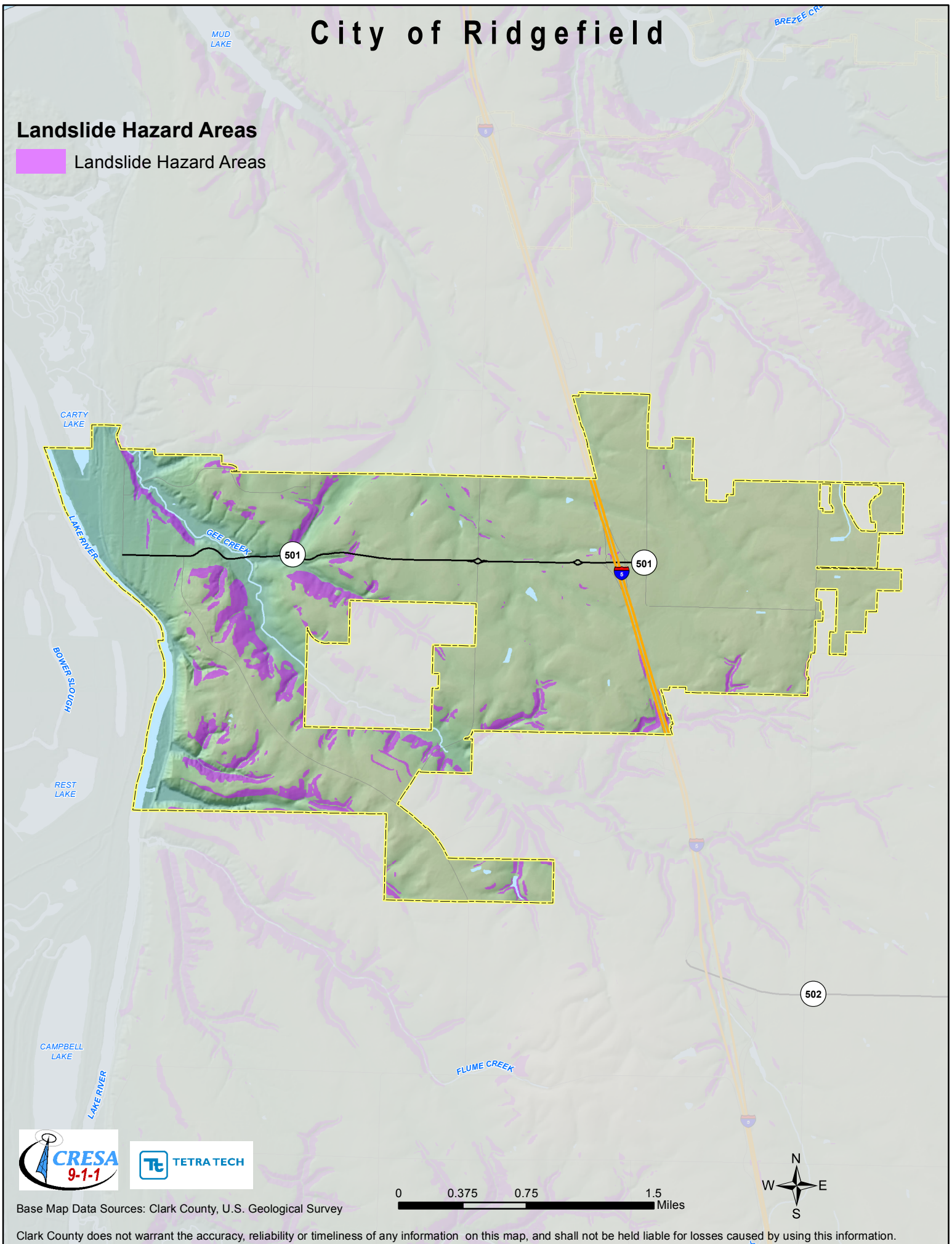
Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

City of Ridgefield

Landslide Hazard Areas

 Landslide Hazard Areas



Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

6. TOWN OF YACOLT

6.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Cindy Marbut, Clerk Treasurer
PO Box 160
Yacolt, WA. 98675
360.686.3922
e-mail:
cindy.marbut@townofyacolt.com

Alternate Point of Contact

Pete Roberts, Public Works Director
PO Box 160
Yacolt, WA. 98675
360.686.3922
e-mail: pete.roberts@townofyacolt.com

6.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- Date of Incorporation—1908
- Current Population—1,685 as of 2014 according to the US Census estimates.
- Population Growth—Since 1998 there has been a 20% population growth to date, the Town will complete a full census in 2018.
- Location and Description—The small town of Yacolt is nestled in the foothills of the Cascade Mountains in the shadow of Mt. St. Helens. It is on the Scenic Route in North Clark County. Yacolt boasts country living with easy access to the luxuries of the city. Both Vancouver and Portland, Oregon are just a short drive away. Yacolt schools are in the Battle Ground School District and it is home to North Clark Little League. The local library is Fort Vancouver Regional Library. Yacolt is located in the 18th Legislative District in Clark County.
- Brief History—Yacolt was originally named Garner, named for the family who homesteaded 160 acres in 1887. The post office was officially established in 1895 with two locations, one named Garner and the other named Yacolt. Over time, the Yacolt name won out. Yacolt translates to “valley of the demons” or “haunted place.” It was named for a Native American legend about several children camping in Yacolt, many years ago, who wandered away from camp never to be seen again. It was believed that evil spirits had taken them. In September 1902, Yacolt experienced the largest fire in the state history. The fire is now infamously known as the Yacolt Burn. At the time of the fires, the town consisted of 15 buildings and was almost completely destroyed by the fire. The fire’s origin is still unknown; however, there was speculation that it was an accident resulting from local loggers working. The fire burned over 370 square miles and resulted in 38 fatalities. Despite this massive disaster, Yacolt was officially incorporated on July 31, 1908. In 2008, the town celebrated its 100th anniversary.
- Climate—Seasonal weather includes temperatures in the summer of near 80 and lows of 51, winter ranges from high 47 to lows of 33. The average rain fall in summer is 1.6 inches, and 6.4 inches in the winter.
- Governing Body Format—Mayor-Council Forum is made up of 5 Council Members who are elected and assumes responsibility for the adoption of this plan; the Mayor and Administration will oversee its

implementation. The council members are responsible for budget creation and general governance of the Town. The Mayor is responsible for overseeing the budget expenditures and administration.

- **Development Trends**—The Town of Yacolt continues to research the development of a sewer system, there is very little development opportunities due to the lack of such a system. A small housing development is planned for early 2016. Future plans include some beautification centrally to help entice potential business and industry to the area.

6.3 CAPABILITY ASSESSMENT

An assessment of legal and regulatory capabilities is presented in Table 6-1. An assessment of fiscal capabilities is presented in Table 6-2. An assessment of administrative and technical capabilities is presented in Table 6-3. Information on National Flood Insurance Program (NFIP) compliance is presented in Table 6-4. Classifications under various community mitigation programs are presented in Table 6-5. An assessment of education and outreach capabilities is presented in Table 6-6.

Table 6-1. Legal and Regulatory Capability

	Local Authority	Other Jurisdiction Authority	State Mandated
Building Code <i>Comment: Yacolt adopted revised international building codes 2012 edition by Ordinance #527- #530 in February 2015.</i>	Yes	No	Yes
Zoning Code <i>Comment: Current Zoning is regulated by Ordinance 371 which was adopted on February 3, 1997 There have been several amendments to this ordinance and it is projected to be re-written in 2017.</i>	Yes	No	Yes
Subdivisions <i>Comment: Zoning Ordinance # 371 and International Revised Building Codes as adopted by Ordinance # 527 regulate subdivisions</i>	Yes	No	Yes
Stormwater Management <i>Comment: Stormwater Protection Management Plan was adopted in June of 1999 by Ordinance # 385</i>	Yes	No	Yes
Post-Disaster Recovery <i>Comment: N/A</i>	No	No	No
Real Estate Disclosure <i>Comment: N/A</i>	No	No	No
Growth Management <i>Comment: Yacolt adopted the Growth Management Plan on August 19, 2013 by Resolution # 497</i>	Yes	Yes	Yes
Site Plan Review <i>Comment All Site Plan reviews are completed by the Town of Yacolt building inspector and engineer of record at the time of submittal and regulated by Ordinance # 371 adopted in 1997 and the revised building codes 2012 edition as adopted by Ordinance # 527</i>	Yes	No	No
Environmental Protection <i>Comment: Ordinance # 440 was adopted for the protection of public health, safety, welfare, resource land and critical land areas, on April 17, 2006</i>	Yes	No	Yes
Flood Damage Prevention <i>Comment: Ordinance # 502 was adopted on August 6, 2012 establishing Region X flood plain damage prevention</i>	Yes	No	Yes
Emergency Management <i>Comment: The Town of Yacolt currently has Interlocal agreements or MOU's for emergency services with the following local jurisdictions Clark County Fire District 13, Cowlitz Fire and Rescue, Clark County Sheriff's Office, CRESA, GETS, GEM, M RSC and Southwest Regional Transportation.</i>	Yes	Yes	Yes
Climate Change <i>Comment: N/A</i>	No	No	No

	Local Authority	Other Jurisdiction Authority	State Mandated
Other <i>Comment: N/A</i>	N/A	N/A	N/A
General or Comprehensive Plan <i>Is the plan equipped to provide linkage to this mitigation plan?</i> <i>Comment: Sections 2, 3 and 5 of Yacolt Comprehensive Plan</i>	Yes	No	Yes
Capital Improvement Plan <i>Yacolt's Capital Improvement plan addresses the following Capital Facilities: Stormwater, Streets, Utilities, Parks/Open spaces, Schools, Law Enforcement, and Electrical to name a few. This plan was updated and adopted in 2013 and will updated again in 2020.</i> <i>How often is the plan updated? Every 7 years</i> <i>Comment:</i>	Yes	No	Yes
Floodplain or Watershed Plan <i>Comment: N/A</i>	No	No	No
Stormwater Plan <i>Comment: Ordinance # 385 Stormwater Facility Maintenance</i>	Yes	No	No
Habitat Conservation Plan <i>Comment: N/A</i>	No	No	No
Economic Development Plan <i>Comment: N/A</i>	No	No	Yes – dependent on funding
Shoreline Management Plan <i>Comment: N/A</i>	No	No	No
Community Wildfire Protection Plan <i>Comment: N/A</i>	No	No	No
Forest Management Plan <i>Comment: N/A</i>	No	No	No
Climate Action Plan <i>Comment N/A</i>	No	No	No
Other <i>Comment: N/A</i>	N/A	N/A	N/A
Comprehensive Emergency Management Plan <i>Comment: Yacolt adopted Resolution # 316 a Model for Regional Emergency Management Work plan and Intergovernmental Agreement for Regional Emergency Management in 1997. That plan is currently under review and is being updated for adoption by the end of 2016.</i>	No	Yes	Yes
Threat & Hazard Identification & Risk Assessment <i>Comment: Yacolt adopted Resolution # 510 in 2014 to be insured by Association of WA. Cities Risk Management Service Agency.</i>	Yes	No	No
Post-Disaster Recovery Plan <i>Comment: N/A</i>	No	No	No
Continuity of Operations Plan <i>Comment: N/A</i>	No	No	No
Public Health Plan <i>Comment: N/A</i>	No	No	No

Table 6-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
General Operating Funds	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	No
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
Withhold Public Expenditures in Hazard-Prone Areas	Unknown
State-Sponsored Grant Programs (TIB and Dept. of Ecology)	Yes
Development Impact Fees for Homebuyers or Developers - Park Impact Fee, Transportation Impact Fee, Stormwater fee	Yes
Other	No

Table 6-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Contract Support
Engineers or professionals trained in building or infrastructure construction practices	Yes	Contract Support
Planners or engineers with an understanding of natural hazards	Yes	Contract Support
Staff with training in benefit/cost analysis	Yes	Contract Support
Surveyors	Yes	Contract Support
Staff capable of making substantial damage estimates	No	
Personnel skilled or trained in GIS applications	No	
Scientist familiar with natural hazards in local area	No	
Emergency manager	Yes	All Departments
Grant writers	Yes	Administration

Table 6-4. National Flood Insurance Program Compliance

Criteria	Response
When did the community enter the NFIP?	1995
When did the Flood Insurance Rate maps become effective?	8/16/2012
What local department is responsible for floodplain management?	Public Works Director
Who is your floodplain administrator? (department/position)	Public Works Director
• Is this a primary or auxiliary role?	Auxiliary
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date of adoption of your flood damage prevention ordinance?	8/10/2012
• Does your floodplain management program meet or exceed minimum requirements?	Exceed
• If so, in what ways?	Region X 100 year flood plain Maps base flood elevations even though our designation does not require
When was the most recent Community Assistance Visit or Community Assistance Contact?	Unknown
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed?	No
• If so, please state what they are.	No
Do your flood hazard maps adequately address the flood risk within your jurisdiction?	Yes
• If no, please state why.	
Does your floodplain management staff need any assistance or training to support its floodplain management program?	Yes
• If so, what type of assistance/training is needed?	Subdivision Training
Does your jurisdiction participate in the Community Rating System (CRS)?	No
• If so, is your jurisdiction seeking to improve its CRS Classification?	No
• If not, is your jurisdiction interested in joining the CRS program?	No
How many Flood Insurance policies are in force in your jurisdiction? ^a	6
• What is the insurance in force? ^a	\$799,300
• What is the premium in force? ^a	\$5,888
How many total loss claims have been filed in your jurisdiction? ^a	0
• How many claims were closed without payment/are still open? ^a	0
• What were the total payments for losses? ^a	\$0

a. According to FEMA records as of 11/30/2015

Table 6-5. Community Classifications

	Participating?	Classification	Date Classified
Community Rating System	No	N/A	Date
Building Code Effectiveness Grading Schedule	No	N/A	Date
Public Protection	No	N/A	Date
Storm Ready	No	N/A	Date
Fire wise	No	N/A	Date

Table 6-6. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes, Mayor
Do you have personnel skilled or trained in website development?	Yes, Clerk Treasurer
Do you have hazard mitigation information available on your website? • If yes, please briefly describe.	No
Do you utilize social media for hazard mitigation education and outreach? • If yes, please briefly describe.	No
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, please briefly specify.	No
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, please briefly describe.	No
Do you have any established warning systems for hazard events? • If yes, please briefly describe.	No

6.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into local planning mechanisms.

6.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- Ordinance 440 Critical Area , it provides setbacks for structures from flood plains
- We have adopted all of the international building codes of Washington including geographical hazards and seismic activity.

6.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- Comprehensive Plan—Add future capital facilities funding for wildfire and include by reference.
- Zoning Ordinance 371 updated to be inclusive of all future emergency plans
- Ordinance #443 Emergency Management Plan, in order to be prepared for emergency
- Capital Improvement Plan – Review and add future improvements to support all areas of hazard plan.

6.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 6-7 lists all past occurrences of natural hazards within the jurisdiction.

Table 6-7. Natural Hazard Events

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Severe Storm	N/A	4/21/2016	unknown
Severe Storm	1825	12/12/2008	unknown
Severe Storm	1682	12/14/2006	unknown
Severe Storm	1671	12/02/2006	unknown
Severe Storm	N/A	6/27/2001	unknown
Earthquake	1361	2/28/2001	unknown
Severe Storm	1159	12/26/1996	unknown
Severe Storm	1079	11/7/1996	unknown
Flood	1100	1/26/1996	unknown
Flood	N/A	8/22/1989	unknown
Volcano	623	5/21/1980	unknown
Flood	545	12/10/1977	unknown
Flood	185	12/29/1964	unknown

6.6 JURISDICTION-SPECIFIC VULNERABILITIES

Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: 0
- Number of FEMA-identified Severe-Repetitive-Loss Properties: 0
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: 0

Other noted vulnerabilities include:

- Wildfire residential and commercial lots as developed are vulnerable including necessary services: Yacolt Town Hall, North County Fire District 13, and Yacolt Primary School.

6.7 HAZARD RISK RANKING

Table 6-8 presents the ranking of the hazards of concern.

Table 6-8. Hazard Risk Ranking

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Severe weather	48	High
2	Wildfire	36	High
3	Earthquake	32	High
4	Landslide	27	Medium
5	Flood	18	Medium
6	Drought	1	Low
6	Volcano	1	Low
7	Dam failure	0	None

6.8 STATUS OF PREVIOUS PLAN INITIATIVES

Because of the significant amount of time that has passed since the development of the original natural hazard mitigation plan, the status of previously identified actions are unknown. Many actions were to be implemented by

other agencies, such as CRESA, and were not within the capabilities of the Town of Yacolt. The previously identified actions were reviewed as part of the plan development process to determine if any should be carried over to the 2016 natural hazard mitigation plan. Actions that were deemed appropriate and within the capabilities of the Town of Yacolt are included in the following tables. This will allow for a fresh start consistent with the comprehensive update to the natural hazard mitigation plan conducted during the 2016 planning process.

6.9 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 6-9 lists the actions that make up the Town of Yacolt hazard mitigation action plan. Table 6-10 identifies the priority for each action. Table 6-11 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 6-9. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
YA-1—Conduct pre-earthquake assessments for critical and essential facilities and develop a risk reduction strategy.						
Existing	Earthquake	4, 10, 12	Public Works	Medium	Staff time, general fund, HMGP and PDM for implementation	Short term
YA-2—Develop a system for public awareness on a semiannual basis for emergency preparedness using meetings, social media and automation and other electronic methods.						
New and Existing	All Hazards	1, 2, 3, 5, 6, 10, 12	Town Staff, CRESA,	High	Staff time, general fund	Long term
YA-3—Collectively work with local agencies to encourage partnerships to advise the public of no burn policies as preventative measures.						
New and Existing	Wildfire	1, 2, 4, 9, 12	Fire District 13, Town Staff, Fire Marshall	Medium	General funds, staff time	Long term
YA-4—Identify and participate in opportunities for strategic relations between emergency management and social service providers						
N/A	All hazards	2, 5, 6, 9, 10	CRESA, Red Cross, Town Staff	Low	Operating Budget	Short term
YA-5—Work collectively with local, state and federal agencies to update crucial planning and development plans for the long term by incorporating the recommendations of risk assessment in the natural hazard mitigation plan as part of planning and development.						
New and Existing	All Hazards	1, 4, 5, 6, 12	Public Works, Community Development, Clark County, Dept. of Ecology,	High	Operating Budget	Long Term
YA -6—Develop a business resumption model or Continuity of Operations Plan						
New and Existing	All Hazards	3, 4, 5, 10	Town Staff (lead), Local Business Owners, CRESA, Community Development	Medium	Operating Budget, Possibly UASI	Short Term
YA-7—Develop priority routes in and out of town ensuring access for emergency vehicles and all residents for effective response and recovery from disaster events.						
New and Existing	All Hazards	4, 5, 6, 9, 11	Fire District 13, Fire Marshall, Clark County, Yacolt Public Works	High	Operating Budget, State and federal agencies, Possibly FP&S grants	Short term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
YA-8—Promote development off of the floodplain, supporting the use of mapping technology and ensuring all professionals are state certified and licensed in geographical elevations						
New and Existing	Landslides, Floods, Severe weather	1, 5, 6, 7, 9, 10, 12	Community Development, GIS, Planning and Development, Public Works	Medium	Operating Budget	
YA-9—Promote Clean Water Programs and develop storm water basin plans						
Existing	Flood, Severe Weather	1, 2, 5, 6, 7, 8, 9, 12	Public Works, Community Development, Planning	Medium	Operating Budget, state and federal resources, Possibly EPA Grants	Short term
YA-10—Where appropriate, support retro-fitting, relocation or acquisition from willing property owners of structures located in hazard prone areas to protect structures from future damage, with repetitive and severe repetitive loss as a priority.						
Existing	All Hazards	4, 5, 7, 9, 10	Community Development, Planning	High	HMGP, PDM, FMA, CDBG-DR	Long-term
YA-11—Integrate the natural hazard mitigation plan into other plans, programs, ordinances, codes and databases that dictate land use decisions, unified development, comprehensive planning, critical areas ordinances, stormwater etc. within the community.						
New and Existing	All Hazards	2, 4	Community Development, Planning, Public Works	Low	Staff Time, General Funds	On-going
YA-12—Continue to maintain good standing and compliance under the National Flood Insurance Program (NFIP). This will be accomplished through the implementation of floodplain management programs that will, at a minimum, meet the requirements of NFIP:						
<ul style="list-style-type: none"> Enforcement of the flood damage prevention ordinance. Participate in floodplain identification and mapping updates. Provide public assistance/information on floodplain requirements and impacts. 						
New and Existing	Flood	1, 4, 5, 9	Public Works	Low	Staff Time, General Funds	On-going

Table 6-10. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/ Budgets?	Implementation Priority ^a	Grant Priority ^a
YA-1	3	High	Medium	Yes	No	No	Medium	High
YA-2	12	High	High	Yes	Yes	Maybe	Medium	High
YA-3	5	High	Medium	Yes	Yes	Yes	High	High
YA-4	5	High	Low	Yes	Yes	Yes	High	low
YA-5	5	High	High	Yes	Yes	No	Medium	High
YA-6	4	High	High	Yes	Maybe	No	Medium	High
YA-7	5	High	High	Yes	Yes	No	Medium	High
YA-8	7	Medium	Medium	Yes	Yes	No	Medium	High
YA-9	8	Medium	High	Yes	Maybe	Yes	Medium	High
YA-10	5	High	High	Yes	Yes	No	Medium	High
YA-11	2	Medium	Low	Yes	No	Yes	High	Low
YA-12	Medium	Low	Yes	No	Yes	High	Low	Medium

a. See the introduction to this volume for explanation of priorities.

Table 6-11. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	YA-11, 12	YA-10, 12	YA- 2, 4, 5, 12		YA-2, 7	
Drought	YA-2, 3, 5, 11	YA-10	YA-2, 3, 4	YA-4, 5		
Earthquake	YA-11	YA-10	YA-2,		YA-2	
Flood	YA-2, 4, 8, 11, 12	YA-10, 12	YA-2, 4, 5, 12		YA-2, 4, 5, 7	
Landslide	YA-2, 4, 5, 11	YA-5, 10	YA-2, 4, 5	YA-8	YA-2, 4, 5, 7	
Severe Weather	YA-11	YA-10	YA-2, 4, 5, 7		YA-2, 4, 5, 7	
Volcano	YA-1, 2, 4, 11	YA-4, 5, 10	YA-2, 4	YA-5	YA-2, 4, 5	YA-1, 5
Wildfire	YA-2, 3, 4, 5, 6, 7, 8, 11	YA-1, 3, 5, 6, 8, 10	YA-2, 3, 4	YA-1, 2, 3	YA-2, 3, 5, 7,	YA-1, 2, 4, 5, 8

a. See the introduction to this volume for explanation of mitigation types.

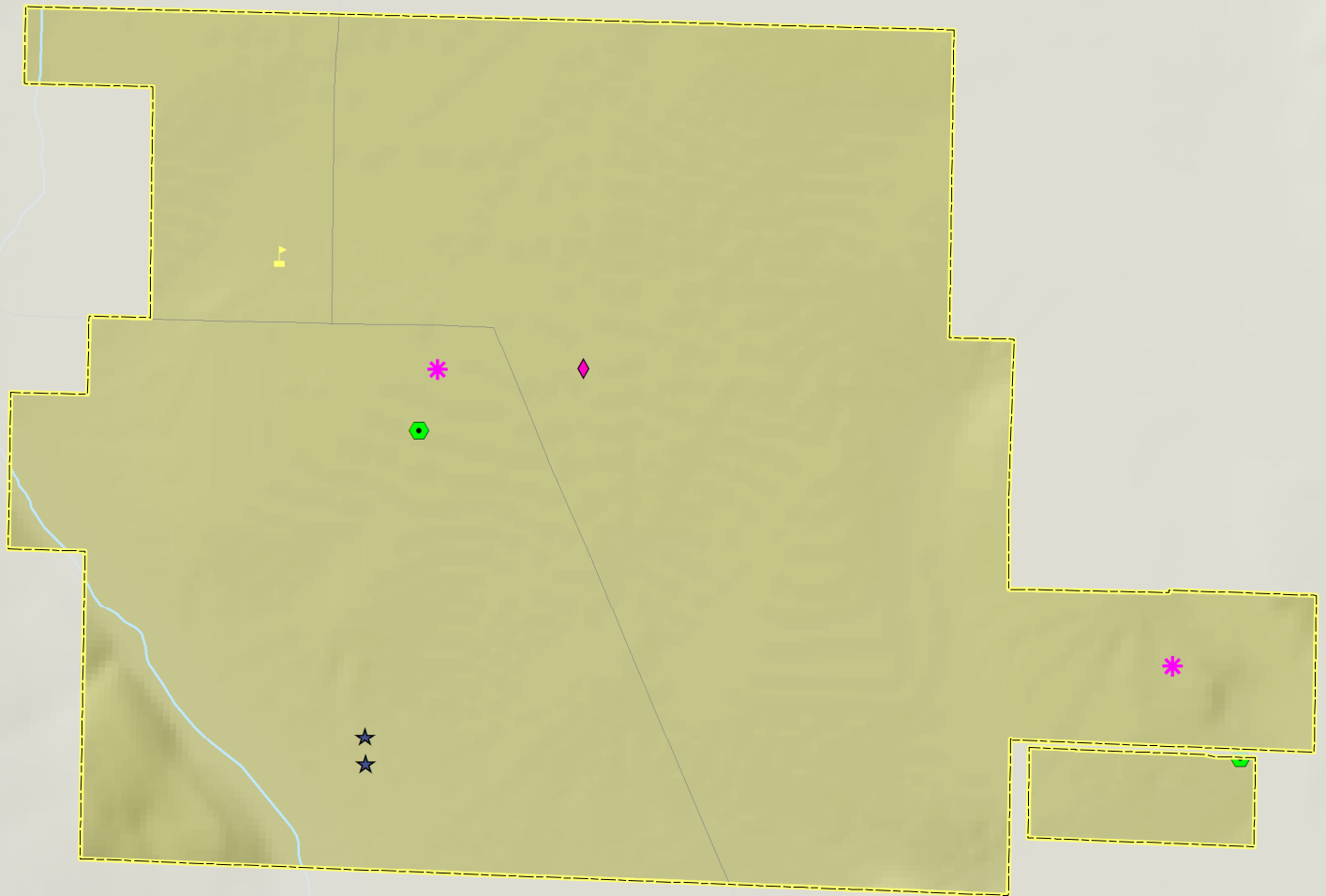
6.10 FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

Yacolt needs to update its emergency plans to better address the issues of wildfires. We also need utilize state and federal funding to make necessary and vital changes to how we address the concerns of hazards

Town of Yacolt

Critical Facilities and Infrastructure

- | | | | |
|---|--------------------------|---|------------------------------|
| ✱ | Communication Facilities | + | Medical Care Facilities |
| ◆ | Dams | ■ | Transportation Systems |
| ★ | Emergency Services | ⚡ | Schools |
| ▲ | Energy Facilities | □ | Water and Sanitation Systems |
| ⬢ | Hazardous Materials | ◇ | Other Facilities |



Base Map Data Sources: Clark County, U.S. Geological Survey

0 0.125 0.25 0.5 Miles



Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

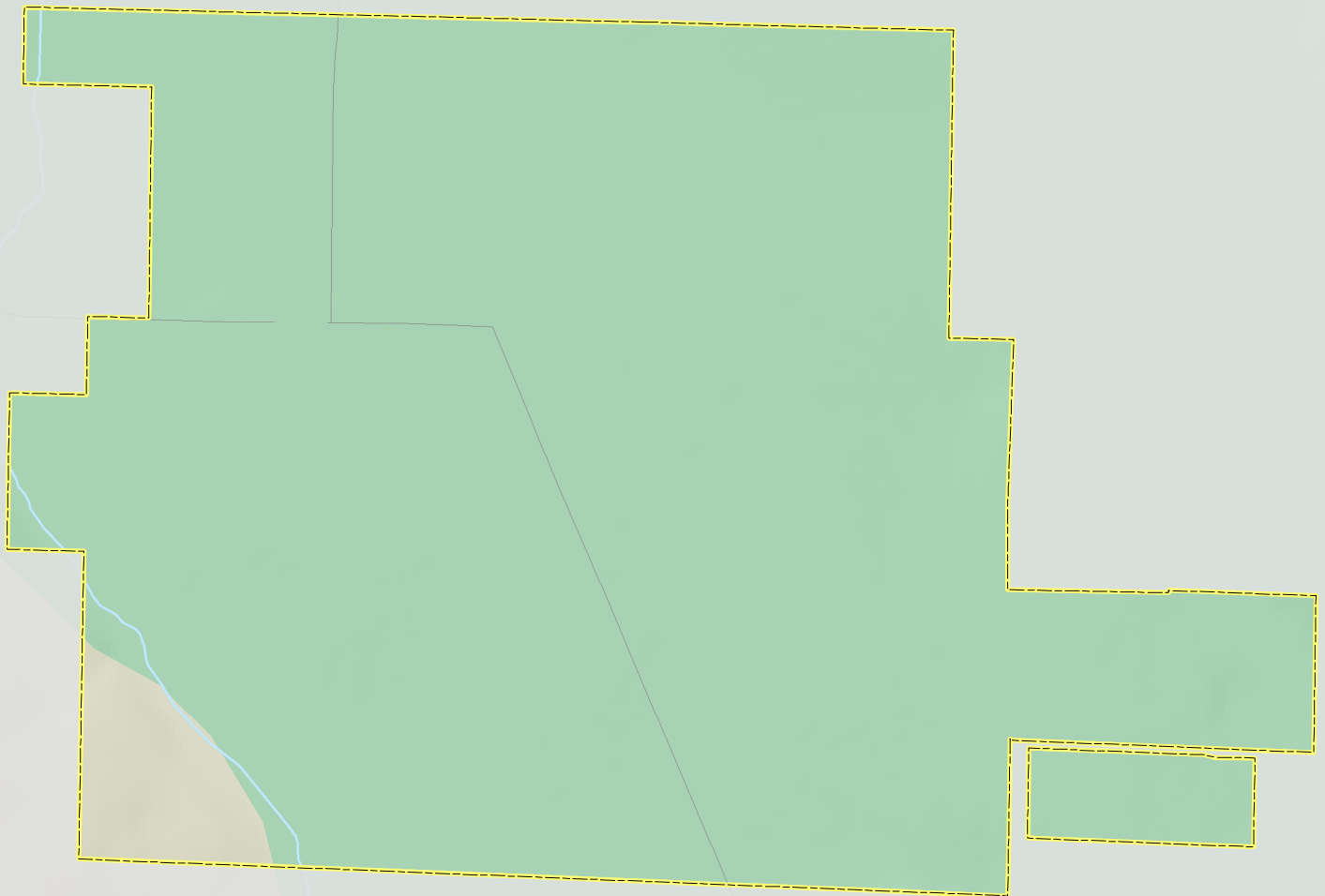
Town of Yacolt

Liquefaction Susceptibility

- Moderate to High
- Moderate
- Low to Moderate
- Low
- Very Low to Low
- Very Low

Not Susceptible to Liquefaction

- Bedrock
- Peat
- Water



Base Map Data Sources: Clark County, U.S. Geological Survey

0 0.125 0.25 0.5 Miles

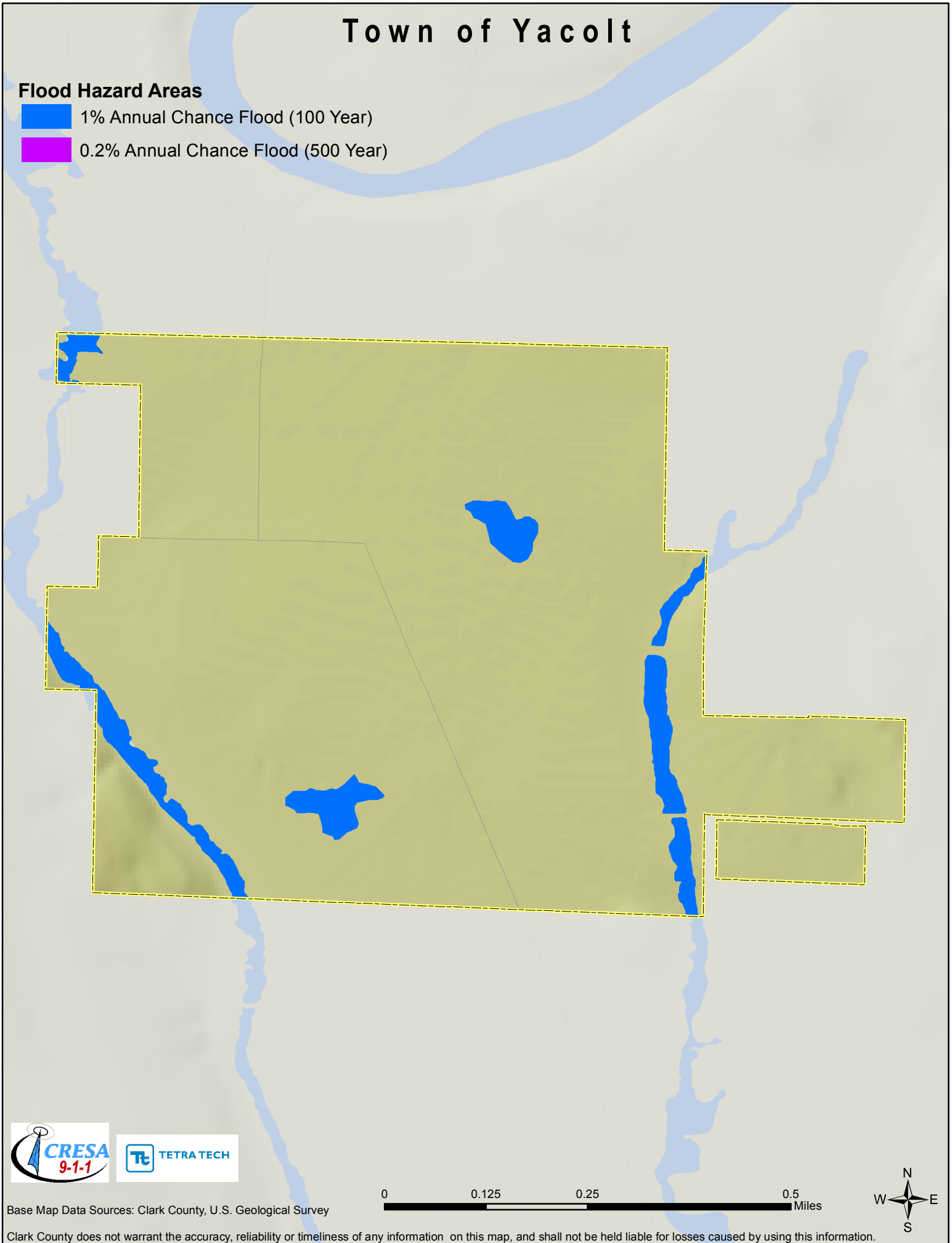


Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

Town of Yacolt

Flood Hazard Areas

- 1% Annual Chance Flood (100 Year)
- 0.2% Annual Chance Flood (500 Year)




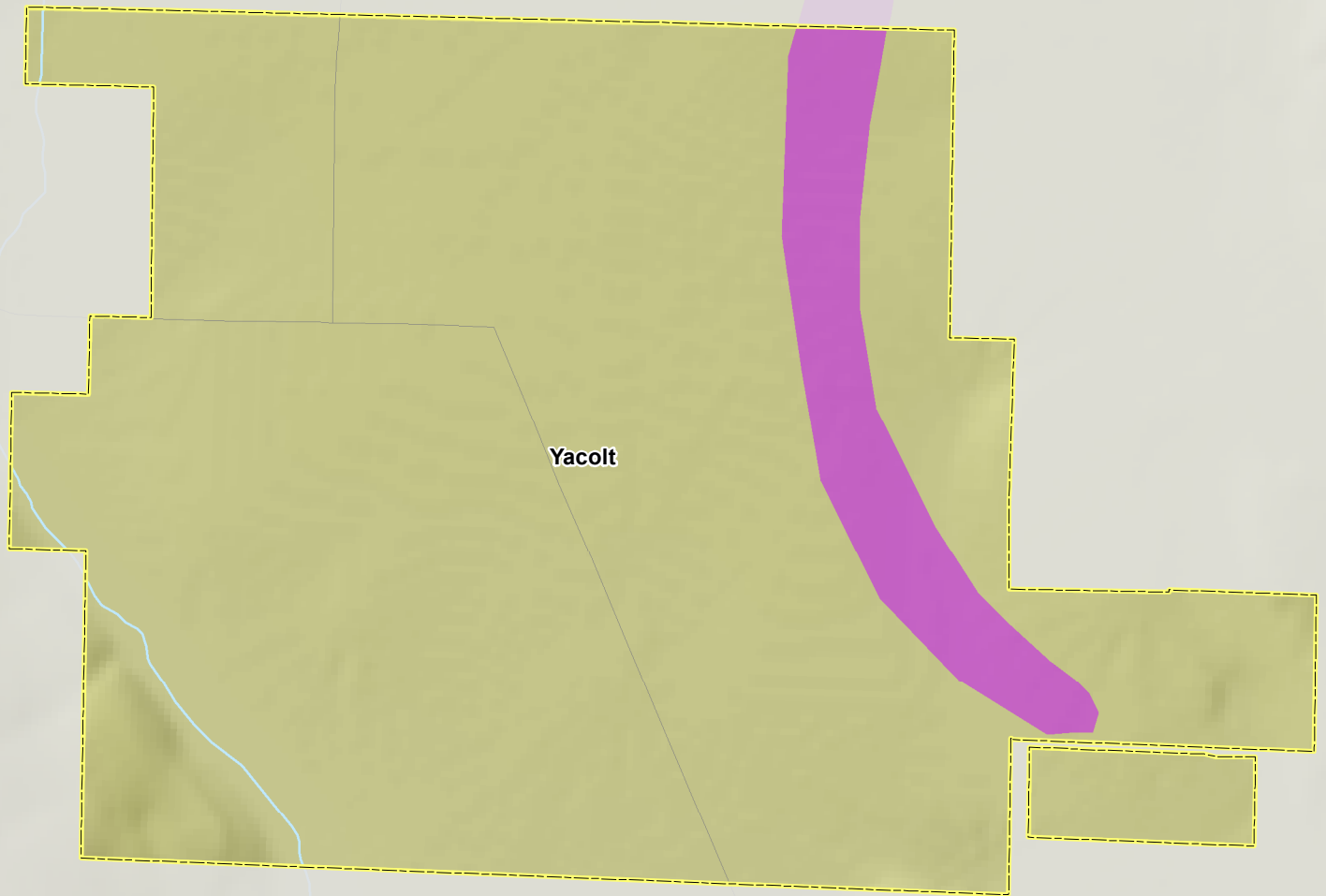
Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

Town of Yacolt

Landslide Hazard Areas

 Landslide Hazard Areas



Base Map Data Sources: Clark County, U.S. Geological Survey

0 0.125 0.25 0.5 Miles

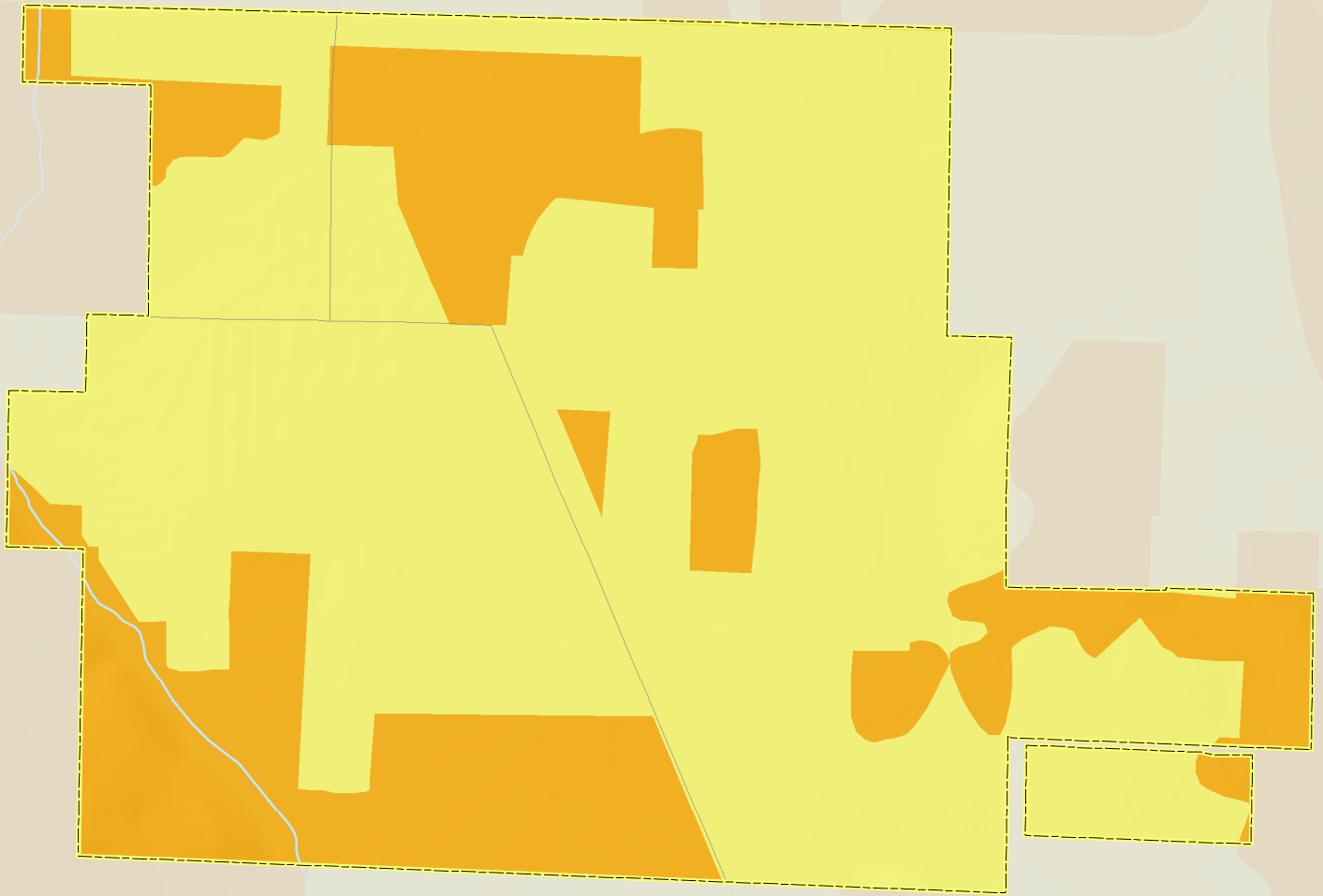


Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

Town of Yacolt

Wildfire Hazard Areas

- Urban
- Intermix
- Wildland



Base Map Data Sources: Clark County, U.S. Geological Survey

0 0.125 0.25 0.5 Miles



Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

7. CITY OF VANCOUVER

7.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Chad Eiken, Director, Community and Economic
Development Department
PO Box 1995
Vancouver, WA 98668-1995
Telephone: 360-487-7882
e-mail Address: chad.eiken@cityofvancouver.us

Alternate Point of Contact

Doug Koellermeier, Deputy Fire Chief
PO Box 1995
Vancouver, WA 98668-1995
Telephone: 360-487-7218
e-mail Address: Doug.Koellermeier@cityofvancouver.us

7.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- Date of Incorporation—January 23, 1857
- Current Population—170,400 (April 1, 2015 Washington OFM official estimate)
Population Growth—Local population growth continues to recover following the end of the national recession. Vancouver has grown at a rate of 1.04 percent annually since 2010, slightly higher than Washington State’s rate over this time, 0.98 percent. Future growth through 2035 for Clark County as a whole is projected by OFM to most likely average approximately 1.3 percent per year over this time, with variation from year to year. The City of Vancouver has proportionately less buildable land than Clark County and is anticipated to grow at a slightly slower annual pace on average, although future annexation may result in higher growth.
- Location and Description—The City of Vancouver is located on the Columbia River, the largest river in the Pacific Northwest. Located 106 miles upriver from the Pacific Ocean on the Columbia River, Vancouver is on the North shore across the river from Portland, OR. Vancouver is the largest city in southwest Washington and the gateway to the Columbia River Gorge National Scenic area. Vancouver has a robust port, thriving waterfront and community connection with the river through waterfront redevelopment, better public access and trails as well as parks and educational facilities that tie our past with our future and the Columbia River. Most properties adjacent to the border of Vancouver are within unincorporated Clark County; however, Vancouver shares much of its easternmost boundary with the City of Camas.
- Brief History—In 1825, Vancouver became headquarters for the Hudson’s Bay Company. For many years, Vancouver was the center of all fur trading in the Pacific Northwest due to its vital location on the Columbia River. Over the century, Vancouver steadily developed. In 1908, the first rail line reached Vancouver. During World War I, Vancouver was home to the world’s largest spruce cut-up mill. The mill made lumber for airplanes that helped win the war in Europe. During World War II, Vancouver’s Kaiser Shipyard built a variety of crafts that contributed greatly to America’s war effort.
- Climate—Vancouver enjoys mild weather with less average annual rainfall than Boston, Washington D.C. or Atlanta. Seasons are distinct. Summer temperatures generally climb into the 80s. Winter nights rarely

fall below 30 degrees Fahrenheit. Average annual rainfall is 41.3 inches and average annual snowfall is 6.5 inches

- **Governing Body Format**—The City of Vancouver is managed by a Council/Manager form of government. The council has seven members including a mayor. The City is divided into three primary functions, Safety and Services, Business and Development and Recreation. The City Council assumes responsibility for the adoption of this plan; the City Manager will oversee its implementation.
- **Development Trends**—Recent development in the City of Vancouver has consisted primarily of new multifamily housing, which is encouraged by a state development incentive that provides a reduction in property tax for both affordable and market rate housing. Office space has been slower to develop, however, the city's premier development site of 32 acres of undeveloped waterfront recently announced its first office tenant. Overall development is guided by the city's Comprehensive Plan, which provides the long term vision and policy direction for managing the built and natural environment in Vancouver, and providing necessary public facilities. The Land Use and Development Code contains use and development standards. The Plan and Code also contain zoning maps which designate the general categories of uses (e.g. commercial, industrial, residential) that are allowed on individual properties citywide. Development activity levels are approaching or - in the case of multi-family developments - exceeding pre-recession levels.

7.3 CAPABILITY ASSESSMENT

An assessment of legal and regulatory capabilities is presented in Table 7-1. An assessment of fiscal capabilities is presented in Table 7-2. An assessment of administrative and technical capabilities is presented in Table 7-3. Information on National Flood Insurance Program (NFIP) compliance is presented in Table 7-4. Classifications under various community mitigation programs are presented in Table 7-5. An assessment of education and outreach capabilities is presented in Table 7-6.

Table 7-1. Legal and Regulatory Capability

	Local Authority	Other Jurisdiction Authority	State Mandated
Building Code	Yes	No	Yes
<i>Comment: The City's Building Codes are based on International Building Codes that are adopted by the state. City Building Code is codified at Vancouver Municipal Code (VMC), Title 17. The latest version of the WA State Code became effective on July 1, 2013 (Chapter 19.27RCW). The requirements and standards of this code are implemented and enforced by the Community and Economic Development Department. City Building Code is at http://www.cityofvancouver.us/vmc?tid=331&throbber=1</i>			
Zoning Code	Yes	No	Yes
<i>Comment: The City controls land use and many development standards through its zoning code. This is codified at VMC Title 20, and is referred to as the City's Land Use and Development Code. The requirements and standards of this code are implemented and enforced by the Community and Economic Development Department. See http://www.cityofvancouver.us/vmc?tid=334&throbber=1</i>			
Subdivisions	Yes	No	Yes
<i>Comment: The City has approval authority over land divisions of property (short plats, subdivisions, binding site plans.) The procedures and standards that pertain to land divisions are located in VMC 20.320, in the City's Land Use and Development Code. See http://www.cityofvancouver.us/vmc?tid=334&throbber=1</i>			
Stormwater Management	Yes	No	Yes
<i>Comment: The City has approval authority over storm water management facilities. Under Clean Water Act regulations, local governments in Washington State and those subject to the federal National Pollutant Discharge Elimination System (NPDES) Storm Water Program are required to have stormwater management programs. As authorized by the Clean Water Act, the U.S. Environmental Protection Agency's NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. The City's Storm Water regulations and standards are codified at VMC Title 14.</i>			

	Local Authority	Other Jurisdiction Authority	State Mandated
Post-Disaster Recovery <i>Comment: The City does not have a Recovery Ordinance in place, but should consider enacting a version of the Model Recovery Ordinance in the short term.</i>	No	No	No
Real Estate Disclosure <i>Comment: There are several ordinances in Vancouver that require disclosure to a renter or buyer of property, including: VMC Title 8 (Public Peace and Safety): 1) residential rental agreement requirements; 2) rental agreement that waives tenant's remedies is prohibited; 3) additional affirmative defense created for renters; and VMC Title 20 (Land Use and Development): a) notice on title required for residential projects located in a Noise Impact Combining District; b) Plat note required for nearby surface mining operations; c) City may require applicant to complete SEPA public notice requirements.. See http://www.cityofvancouver.us/vmc?tid=334&throbber=1</i>	Yes	No	Yes
Growth Management <i>Comment: The City's Comprehensive Plan and associated ordinances are in compliance with state GMA law Policy EN-11 states that the City will "(m)anage development in geologically hazardous areas and floodplains to protect public safety."</i>	Yes	No	Yes
Site Plan Review <i>Comment: The City requires site plan review approval of most commercial, industrial and multi-family projects prior to issuance of a building permit, per VMC 20.270. The procedural requirements and development standards that are applied to site plan reviews are implemented and enforced by the Community and Economic Development Department. See http://www.cityofvancouver.us/vmc?tid=334&throbber=1</i>	Yes	No	No
Environmental Protection <i>Comment: The City has authority to review environmental impacts under the State Environmental Policy Act (SEPA) of any development project not otherwise exempted from SEPA review. The City has adopted the maximum thresholds in state law for triggering SEPA review, which are codified at VMC 20.790. The following ordinances protect the natural environment: Shoreline Management Ordinance, VMC 20.760; Critical Areas Ordinance, VMC 20.740 (includes wetlands, critical habitat, floodplains, and geo-hazard areas); and Tree Conservation Ordinance, VMC 20.770. These laws are implemented and enforced by the Community and Economic Development Department. See http://www.cityofvancouver.us/vmc?tid=334&throbber=1. Additionally, the Water Resources Protection Ordinance (VMC 14.26) sets minimum standards that help protect critical aquifers underlying the entire city, establishes greater standards of compliance for businesses and industries that manage hazardous materials, and creates Special Protection Areas around the City's water stations as an additional safeguard.</i>	Yes	No	Yes
Flood Damage Prevention <i>Comment: The City reviews developments in the flood plain under its local floodplain ordinance, which is a part of the Critical Areas Ordinance, VMC 20.740. This ordinance is implemented and enforced by the Community and Economic Development Department. See http://www.cityofvancouver.us/vmc?tid=334&throbber=1</i>	Yes	No	Yes
Emergency Management <i>Comment: The City of Vancouver is a participant in the CRESA-led 2013 Clark County Comprehensive Emergency Management Plan http://cresa911.org/emergency-management/response-plans/</i>	Yes	Yes	Yes
Climate Change <i>Comment: The City does not currently have specific policies or regulations that refer to climate change impacts</i>	No	No	No
General or Comprehensive Plan <i>Is the plan equipped to provide linkage to this mitigation plan?</i> <i>Comment: The plan does not currently provide information from the NHMP, nor does it include any specific reference to the NHMP. The plan could, however, be amended on an annual basis to include such references. The City's Comprehensive Plan was last updated in full in 2011, and is incrementally amended annually. Local comprehensive plans must include the following elements: land use, housing, capital facilities, utilities, and transportation.</i>	Yes	No	Yes
Capital Improvement Plan <i>What types of capital facilities does the plan address? Streets, water, sewer, storm water, parks</i> <i>How often is the plan updated? Updated annually. Current CIP runs through 2021</i> <i>Comment: The City has detailed adopted capital improvement plans for all public facilities.</i>	Yes	No	Yes
Floodplain or Watershed Plan <i>Comment:</i>	Yes	Yes	No

	Local Authority	Other Jurisdiction Authority	State Mandated
Stormwater Plan <i>Comment: Vancouver's Surface Water Management Program is the core administration for coordinating activities required by the federal Clean Water Act and the City's Phase II National Pollution Discharge Elimination System (NPDES) Permit for Western Washington, issued by the WA Department of Ecology. The City's stormwater ordinances and related codes comply with the City's NPDES permit. The City's general permit requirements supplement and clarify the Western Washington Stormwater Manual to provide guidance for local conditions. The City's 2016 Stormwater Management Plan is at http://www.cityofvancouver.us/sites/default/files/fileattachments/public_works/page/1125/01_2016_final_swmp.pdf.</i>	Yes	Yes	Yes
Habitat Conservation Plan <i>Comment: The City has wetland and habitat ordinances in place which protect critical areas from development, and regulations that protect endangered species from development in its Fish and Wildlife Conservation Area ordinance, at VMC 20.740.110 http://www.cityofvancouver.us/vmc/7380/20740110-fish-and-wildlife-habitat-conservation-areas?throbber=1</i>	Yes	No	No
Economic Development Plan <i>Comment: The City has adopted the County's Economic Development Plan, dated September 2011: http://static1.squarespace.com/static/53fcd546e4b09b99036a0e5f/t/54b31812e4b034ff307c51fb/1421023250596/FINAL_Clark+County+E+D+Plan+9_2011.pdf</i>	Yes	No	Yes – dependent on funding
Shoreline Management Plan <i>Comment: The City has a locally-adopted Shoreline Management Plan and ordinance (VMC 20.760) which regulates uses in the shoreline environment. The Shoreline Management Plan, adopted in 1975 and updated in 2012, is implemented and enforced by the Community and Economic Development Department.</i>	Yes	No	Yes
Community Wildfire Protection Plan <i>Comment:</i>	No	No	No
Forest Management Plan <i>Comment: The City has an Urban Forest Management Plan (2007), as well as a tree conservation ordinance that contains regulations and best practices regarding the protection of trees and criteria for removal of trees. This ordinance is codified at VMC 20.770 and is implemented and enforced by the Urban Forester (Public Works Department) and the Community and Economic Development Department. Urban Forest Management Plan is at http://www.cityofvancouver.us/sites/default/files/fileattachments/public_works/page/1389/ufmp_fina-web.pdf</i>	No	No	No
Climate Action Plan <i>Comment: The City does not have a Climate Action Plan in place.</i>	No	No	No
Other <i>Comment: The City of Vancouver is a participant with Clark County in the Regional Solid Waste Management Plan, through an interlocal agreement, and has coordinated with the County to prepare a Draft Disaster Debris Management Plan which is currently being updated.</i>	Yes	N/A	N/A
Comprehensive Emergency Management Plan <i>Comment: Vancouver is a participant in the CRESA-led 2013 Clark County Comprehensive Emergency Management Plan. http://cresa911.org/emergency-management/response-plans/</i>	Yes	Yes	Yes
Threat & Hazard Identification & Risk Assessment <i>Comment: Clark County Hazards Identification Vulnerability Analysis- 201; Document is maintained by CRESA</i>	Yes	Yes	No
Post-Disaster Recovery Plan <i>Comment: The City does not have a Post-Disaster Recovery Plan but should enact a Model Recovery Ordinance as future mitigation</i>	No	No	No
Continuity of Operations Plan <i>Comment: The City has a citywide COOP which is currently being updated</i>	Yes	No	No
Public Health Plan <i>Comment: Region IV Public Health Emergency Response Plan – December 2013</i>	No	Yes	No

Table 7-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes, in qualifying Census Tracts
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	City charges fees for water and sewer service; and such funds would be restricted to utility-related purposes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	Unlikely
Withhold Public Expenditures in Hazard-Prone Areas	Yes, we could if City Council adopts this policy
State-Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes: May only be used for specific purpose (e.g. Parks, Transportation, Schools, etc.)
City General Fund	Yes upon specific budget approval by City Council
City Building Fund	Yes, but may only be used for building code/safety – related studies

Table 7-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Community and Economic Development/Public Works/Planning Official
Engineers or professionals trained in building or infrastructure construction practices	Yes	Community and Economic Development/Public Works/ Building Official
Planners or engineers with an understanding of natural hazards	Yes	Community and Economic Development/Planning Official
Staff with training in benefit/cost analysis	Yes	Finance Department/Budget Manager
Surveyors	Yes	Public Works/City Surveyor
Staff capable of making substantial damage estimates	No	Not available on-staff
Personnel skilled or trained in GIS applications	Yes	Public Works/Engineering Tech
Scientist familiar with natural hazards in local area	No	No on-staff scientists
Emergency manager	Yes	CRESA
Grant writers	Yes	Public Works/CED/Transportation Planner or Surface Water Analyst

Table 7-4. National Flood Insurance Program Compliance

Criteria	Response
When did the community enter the NFIP?	08/17/81
When did the Flood Insurance Rate maps become effective?	09/05/2012
What local department is responsible for floodplain management?	Community and Economic Development
Who is your floodplain administrator? (department/position)	Community and Economic Development/Planning Official
• Is this a primary or auxiliary role?	Primary
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date of adoption of your flood damage prevention ordinance?	8/20/2012
• Does your floodplain management program meet or exceed minimum requirements?	Meet
• If so, in what ways?	N/A
When was the most recent Community Assistance Visit or Community Assistance Contact?	Unknown
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed?	No
• If so, please state what they are.	
Do your flood hazard maps adequately address the flood risk within your jurisdiction?	Yes
• If no, please state why.	
Does your floodplain management staff need any assistance or training to support its floodplain management program?	Yes
• If so, what type of assistance/training is needed?	Refresher course on any new changes to flood plain management best practices is needed
Does your jurisdiction participate in the Community Rating System (CRS)?	No
• If so, is your jurisdiction seeking to improve its CRS Classification?	
• If not, is your jurisdiction interested in joining the CRS program?	Yes
How many Flood Insurance policies are in force in your jurisdiction? ^a	365
• What is the insurance in force? ^a	\$105,016,900
• What is the premium in force? ^a	\$303,906
How many total loss claims have been filed in your jurisdiction? ^a	10
• How many claims were closed without payment/are still open? ^a	6
• What were the total payments for losses? ^a	\$101,610

a. According to FEMA records as of 11/30/15.

Table 7-5. Community Classifications

	Participating?	Classification	Date Classified
Community Rating System	No	N/A	N/A
Building Code Effectiveness Grading Schedule	Unknown	Unknown	Unknown
Public Protection	No	N/A	N/A
Storm Ready	No	N/A	N/A
Firewise	No	N/A	N/A

Table 7-6. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes; Carol Bua (City Communications Director), Kim Kapp (Police PIO), and Loretta Callahan (Public Works PIO)
Do you have personnel skilled or trained in website development?	Yes; Jim Reed (Web Manager)
Do you have hazard mitigation information available on your website? • If yes, please briefly describe.	No
Do you utilize social media for hazard mitigation education and outreach? • If yes, please briefly describe.	Yes Yes, Vancouver uses Twitter and Facebook to alert the public to potential flooding, high winds, etc.
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, please briefly specify.	No
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, please briefly describe.	Yes Neighborhood Association/Liaison program, local cable TV, city website, public information app that is currently in development
Do you have any established warning systems for hazard events? • If yes, please briefly describe.	Reverse 911 and “FlashNews” and we have the ability to push out messages using email (EMMA) distribution lists for various departments. The new MyVancouver app has the potential to allow push messages for those who have signed up, as does the Solid Waste RecycleRight app. Vancouver also participates in the Regional Disaster Preparedness Organization (http://www.portlandoregon.gov/rdpo/) for Portland UASI Region.

7.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction’s process for integrating the natural hazard mitigation plan into local planning mechanisms.

7.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- City Critical Areas Ordinance (includes regulations for Fish and Habitat Conservation Areas, Frequently Flooded Areas and Geologic Hazard Areas) codified at VMC 20.740
- City Shoreline Management Plan and Ordinance, codified by reference at VMC 20.760.
<http://www.cityofvancouver.us/vmc/7384/20760010-purpose?throbber=1>
- City Water System Comprehensive Plan
- City Transportation Improvement Plan
- City General Sewer Plan

7.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- City Strategic Plan (2016-2021)
<http://www.cityofvancouver.us/sites/default/files/2016StrategicPlan/index.html>
- City Comprehensive Plan could provide more specific references to the Natural Hazard Mitigation Plan goals, risk assessment and recommendations
- County Regional Disaster Recovery Plan (in draft form)

7.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 7-7 lists all past occurrences of natural hazards within the jurisdiction.

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Wind Storm	N/A	12/11/2014	N/A
Severe Winter Storm	1825	3/2/2009	N/A
Snow Event	N/A	12/19-26/2008	N/A
Severe Winter Storm	1682	2/14/2007	N/A
Severe Storm, Flooding	1671	12/12/2006	N/A
Severe Winter Storm	N/A	1/6-9/2004	\$160,000 in public sector debris management
Hail, Severe Storm	N/A	6/27/2001	N/A
Earthquake (Nisqually Quake Magnitude 6.8)	1361	2/28/2001	N/A
Severe Winter Storm, Flooding	1159	1/17/1991	N/A
Flood	1100	2/9/1996	\$29M; Damage to 120 businesses and 82 residences
Severe Storm(s)	1079	1/3/1996	N/A
Earthquake (Spring Break Quake Magnitude 5.6)	N/A	3/25/1993	N/A
Wind	N/A	1/10/1988	N/A
Wind	N/A	12/24/1983	N/A
Volcanic Eruption	623	5/21/1980	N/A
Flood	545	12/10/1977	N/A
Hail, Wind	N/A	5/1/1976	N/A
Tornado	N/A	4/5/1972	\$28.3M

7.6 JURISDICTION-SPECIFIC VULNERABILITIES

Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: 0
- Number of FEMA-identified Severe-Repetitive-Loss Properties: 0
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: 0

Other noted vulnerabilities include:

1. City-Owned Facilities - The City has recently completed seismic surveys with a focus on fire stations. A number of the stations have issues, including Fire Station #5 on Andresen which is the headquarters facility. It is known that the newest station and two new additional replacement stations, to be completed in 2017, do/will meet the most recent seismic criteria. The East and West Police precincts buildings are new and meet standards, however, the Police headquarters building is vulnerable. The Operations Center

is vulnerable to failure in a large earthquake. City Hall is less than 10 years old so it meets seismic standards – in previous Hazard Mitigation plan the old city hall was listed as a vulnerability. Some buildings are located in the flood plain or are in areas susceptible to liquefaction.

2. Water System – Eighty percent of the City’s water distribution system consists of ductile iron pipe, which is not only better for reducing water losses, but is also more resilient to failure in an earthquake, considered the greatest natural hazard. Both the distribution and production systems of the City’s water supply, including treatment and storage facilities, are susceptible to damage from a significantly sized earthquake hazard. Details are provided in the City’s Water System Comprehensive Plan. Some storage tanks are vulnerable to natural or other hazards. If areas of the water system fail due to natural disaster it will likely take time to restore the service throughout the community.
3. On-Site Septic Systems – The City still has a number of homes in areas of the community that are still utilizing septic systems. Most have public sanitary sewer directly available to the property. These systems may be more susceptible to failure as the result of an earthquake, liquefaction, or landslides.
4. Sewer System – The system which includes sewer lines, interceptors, lift stations and treatment plants as well as a sludge incinerator are potentially vulnerable to impacts of earthquakes and liquefaction, landslides and floods. Power disruption resulting from these events or hazards also has the potential to disrupt normal functions.
5. Transportation System – The City has a number of structures, including bridges and retaining walls that might be damaged or compromised by earthquakes, landslides, flooding or volcanic ash fall. In many cases responsibility for inspecting the soundness of these assets may fall to partners or contractors (county, state, consultants) who might be involved in work for others during a wide spread event. Some areas of the community experience occasional shallow flooding which limits the flow of traffic and/or may isolate access to some areas of the community during periods of localized or Columbia River flooding. Similarly, travel may be impacted or routes need to be closed as a result of snow, storm debris or other weather events, landslides or hazardous material spills. During short-term or ongoing power outages the City’s signal lights and street lights will not function and this will limit the flow of traffic.
6. Surface Water System – There are a number of areas in the community that present seasonal challenges as a result of shallow urban flooding during prolonged periods of high precipitation, this can impact mobility as well as threats to life and property. Drainage and/or infiltration structures and pipes may become blocked by excess water, debris, sediment, landslides, or volcanic ash. Hazardous material spills may move off-site and contaminate downstream locations if not properly managed.
7. Disaster Debris Planning – The Regional Debris Management Plan has been drafted but was never finalized and lacks important information such as pre-identified debris collection sites. Earthquakes – High Risk: Some areas of Vancouver, especially in the southwest along the Columbia River are built on “F” soils subject to liquefaction and “D” soils which have potential for liquefaction. The remainder is built on “B” and “C” soils, which are less likely to fail.

7.7 HAZARD RISK RANKING

Table 7-8 presents the ranking of the hazards of concern.

Table 7-8. Hazard Risk Ranking

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Severe Weather	33	High
2	Earthquake	32	High
3	Flood	9	Low
4	Landslide	6	Low
5	Dam Failure	4	Low
6	Volcano	3	Low
7	Wildfire	3	Low
8	Drought	0	Low

7.8 STATUS OF PREVIOUS PLAN INITIATIVES

Table 7-9 summarizes the initiatives that were recommended in the previous version of the natural hazard mitigation plan and their implementation status at the time this update was prepared. It should be noted, that the actions identified in the following table were developed in 2004. Due to the significant amount of time and staff turnover that has occurred since their identification, the status of some actions may be unknown. Additionally, many of the action items identified were to be led by CRESA or other non-City agencies. For ease of annual progress reporting, these actions have generally been removed from the City's action plan or rephrased to be within the capabilities of the City. This will allow for a fresh start consistent with the comprehensive update to the natural hazard mitigation plan conducted during the 2016 planning process.

Table 7-9 Status of Previous Plan Initiatives

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Support voluntary structural retrofitting of older homes on vulnerable soils. <i>Comment: CRESA is identified in the NHMP as the lead agency on this action item so this should not appear in Vancouver's appendix. Vancouver is willing to assist as needed.</i>			X
Require the retrofitting of older, vulnerable or critical structures located on NEHRP 'E' and 'F' soils. <i>Comment: The City would only have legal authority to require this if other changes (such as structural alterations, additions, etc.) to the affected building are proposed. Action Item VC-17 in Table 1-9</i>		X	
Encourage non-structural retrofitting throughout the County. <i>Comment: Vancouver's Building Official works with property owners who have older buildings considered vulnerable to seismic events to encourage non-structural (and structural, as needed) retrofitting. Action Item VC-18 in Table 1-9</i>	X	X	
Join the CRS program <i>Comment: Vancouver is not currently a member of the Community Rating System, but plans to devote resources to become a member of the CRS program by end of 2018. CED staff has contacted FEMA's ISO department and they indicated that the process can take over one year to complete. Action Item VC-1 in Table 1-9</i>		X	
Prepare a 'Buy-out' Plan for parcels within the Urban Growth Boundary. <i>Comment: Vancouver's jurisdiction only extends to incorporated city limits, therefore the County would be the lead in a plan in the remainder of the Urban Growth Boundary. Vancouver has not yet initiated such a program within city limits, and action item should consist of researching priority properties that should be bought to minimize impacts from disasters, priority for such acquisitions, estimated costs associated with such buy-outs, and possible sources of funding. Action Item VC-15 in Table 1.9</i>	X	X	
Encourage elevation of homes in the Trails Mobile Home Park <i>Comment: This is located in the County's jurisdiction and should be removed as a Vancouver action item.</i>			X

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Encourage [increased] elevation of homes in the Vancouver Lake area. <i>Comment: Lakeside Mobile Estates located northeast of Vancouver Lake are within the 100-year floodplain and experienced flooding during the 1996 Flood. Action item is for Vancouver CED Department to work with property owner on a plan and schedule for raising or removing mobile homes that are located in the 100-year floodplain, and identification of possible grant funding that can assist in the costs of such enhancements. Action Item VC-16 in Table 1-9</i>	X	X	
Retrofit hazardous material containment areas. <i>Comment: No Vancouver Code was written or approved to enforce this Action Item. See Action Item VC-19 in Table 1-9</i>		X	
Encourage non-structural retrofitting of hazardous materials containment <i>Comment: CRESA is identified in the NHMP as the lead agency for this action item, however City of Vancouver Public Works and Fire Departments do this through routine fire and industrial discharge inspections, on an ongoing basis Action Item #VC-20 in Table 1-9</i>	X	X	
Develop an automated method to notify the public of events during a disaster. <i>Comment: Vancouver and Clark County first responders are working on such a system with CRESA. In the meantime, Vancouver can use Twitter, email distribution, its website, and a new MyVancouver app to push out information regarding during a disaster. Action Item VC-21 in Table 1-9</i>	X	X	
Expand weather radio systems to include all of Clark County <i>Comment: CRESA is the lead agency for this action item. Vancouver is willing to assist as needed.</i>			X
Provide fast, accurate spatial incident information for emergency services response. <i>Comment: CRESA is the logical lead agency for this action item. Vancouver is willing to assist as needed.</i>			X
Conduct pre-earthquake assessments for critical and essential facilities and develop a risk-reduction strategy <i>Comment: Substantial progress has been made since 2004 Plan, including assessments of water and sewer facilities, and several fire stations. Two older fire stations will be replaced by 2017, and the VPD headquarters building - which has been identified as potentially vulnerable to a seismic event - will be repurposed when headquarter functions are consolidated with West Precinct facility in 2017-18. Action Items VC-5, -6, -7, -13 and -14 in Table 1-9</i>	X	X	
Determine critical government functions and establish redundancy for these functions. <i>Comment: City Continuity of Operations Plan (COOP) has been in place for several years, but needs to be updated and refined. Update of CRESA emergency plan addresses this. Action Item VC-23 in Table 1-9</i>	X	X	
Target development and preparedness efforts of Tier II hazardous material facilities <i>Comment: There are a number of Tier II facilities in Vancouver, however further analysis of location, types of materials, and preparedness for flood and earthquake events is needed. Action Item VC-24 in Table 1-9</i>		X	
Develop a contingency/Business resumption organization <i>Comment: This action item is adequately captured by the City's Continuity of Operations Plan (COOP) under "Determine critical government functions and establish redundancy for these functions," which is being carried forward to the Update See Action Item VC-23 in Table 1-9</i>			X
Provide opportunities for strategic relations between emergency managers and social service providers. <i>Comment:</i>			X
Require the construction of earthquake-resilient structures <i>Comment: State and City building codes require that structures meet advanced seismic codes, and these are applied to all new structures in Vancouver through its permitting process. Action Item #VC-27 in Table 1-9</i>	X	X	
Develop integrated County stormwater basin-wide plans <i>Comment: Clark County would be the lead in this effort, and Vancouver would be willing to participate in the development of integrated storm water basin plans. Action Item VC-28 in Table 1-9</i>	X	X	

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Promote development [outside] of the floodplain <i>Comment: Vancouver's floodplain regulations (VMC 20.740) discourage development in the 100-year floodplain, and prohibit fill and structures in designated floodways. City ordinances only allow for minimal development in the floodplain and only then if measures to reduce impacts from flooding are provided, and require that there be no net loss of flood storage capacity in flood fringe areas. A forthcoming requirement from a recent federal court decision may result in substantial curtailment of development in the 100-year floodplain due to Endangered Species Act-related concerns (Puget Sound is in Phase 1 of this ruling, remainder of WA State is in Phase 2, timing undetermined). Action Item VC-29 in Table 1-9</i>	X	X	
Consider adoption of a zero-rise floodway <i>Comment: VMC 20.740.120 prohibits fill and structures in floodways, and further requires that there be no net loss of flood storage capacity in flood fringe areas.</i>	X		
Expand the County Clean Water Program <i>Comment: This is a County Action Item and should be removed from Vancouver's identified action items</i>			X
Develop a method of assessing and documenting landslide hazard areas. <i>Comment: Completed- Vancouver code defines landslide hazard areas and requirements for development including a geologic hazard area study by a State of Washington registered geotechnical engineer using the "best available engineering and geologic practice." The geotechnical information and plan requirements are defined in Vancouver Municipal Code and triggers for review by multiple departments are in place.</i>	X		
Support the use of LIDAR mapping technology to refine landslide hazard maps <i>Comment: Given the relatively limited areas in Vancouver that would be subject to landslide impacts, city resources would be better spent on other mitigation actions</i>			X
Ensure state certification of licensing for professionals performing geotechnical evaluations <i>Comment: This requirement is checked by CED building staff as part of any building permit review for a structure in areas of seismic risk or steep slopes.</i>	X		
Institute Low Impact Development Practices <i>Comment: Vancouver is currently in the process of adopting comprehensive LID standards based on WA State Department of Ecology guidance for storm water, land use development (site plans and subdivisions), building, and transportation-related ordinances, and these will be in effect by the end of 2016 Action Item VC-4 in Table 1-9</i>		X	
Initiate a vegetation management program <i>Comment: Vancouver amended its Critical Areas Ordinance VMC 20.740.040 I in 2007, and Shoreline Management Master Plan (SMMP) in 2012 to allow for vegetation management and tree maintenance in areas adjacent to residential structures (fire-defensible space), to minimize risk from urban wildland fires. Link to Critical Areas Ordinance: http://www.cityofvancouver.us/vmc/581/18453/20740040-approval-process?throbber=1 Link to SMMP: http://www.cityofvancouver.us/sites/default/files/fileattachments/city_council/page/10925/05b_sr071-12_smp_-_exhibit_a_-_revised_smp.pdf. Additionally, Vancouver adopted a minimum property maintenance code VMC Chapter 17 requires property owners to remove hazard trees, and maintain premises free from uncontrolled vegetation in order to reduce fire risk. http://www.cityofvancouver.us/vmc/518/17146/1714270-minimum-maintenance-standards-yards?throbber=1</i>	X		
Ensure emergency vehicle access to all residents to allow effective response and recovery from disaster events. <i>Comment: Fire Department staff will work with Public Works and CED Transportation Planners to evaluate access to residents in the event of a natural disaster. Action Item VC-31 in Table 1-9</i>		X	
Develop priority routes throughout the county and improve them to a higher standard. <i>Comment: Vancouver would conduct this analysis on City streets only. Action Item VC-32 in Table 1-9</i>		X	
Ensure that electricity is available to populations requiring priority for electricity. <i>Comment: Clark Public Utilities is the lead agency for this action item. The City will cooperate with CPU in developing this plan</i>			X
Ensure appropriate equipment is available during events. <i>Comment: Vancouver's Operations Department is able to mobilize crews and equipment to respond to severe storm (including winter storms) and flood events. Additional work is needed to ensure the right equipment is available for other types of events. Action Item VC-33 in Table 1-9</i>	X	X	

7.9 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 7-10 lists the actions that make up the City of Vancouver hazard mitigation action plan. Table 7-11 identifies the priority for each action. Table 7-12 summarizes the mitigation actions by hazard of concern and the six mitigation types.

- Key to Acronyms:

- CED Community and Economic Development Department
- CMO City Manager's Office
- FEMA Federal Emergency Management Agency
- VPD Vancouver Police Department

Table 7-10. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
<i>VC-1—Join FEMA's Community Rating System (CRS)</i>						
Existing/New	Flood	1, 2, 7	CED	Low	Operating	Short-term
<i>VC-2—Create Four PSA Videos to educate the public about disaster preparedness. Vancouver's CVTV staff will work with Vancouver Fire and community partners create several short Public Service Announcement videos that describe the risks from most common disasters with concrete action steps that the public can take to either prepare for or respond to such events. Such videos could be tailored to seasons (e.g. winter ice and snow storms, flooding) and aired as "fillers" in between other programming or at community events.</i>						
Existing/New	Flood, Earthquake, Severe weather, Wildfire	1, 2, 4	CED/CMO*/ Fire	Low	Staff Time, General Fund	Short-term
<i>VC-3—Join WAsafe, a state program through the Department of Health that provides expert assistance through its team of Safety Assessment Facility Evaluators which can be deployed to evaluate structural safety of buildings</i>						
Existing	All Hazards	2, 4	CED	None	Staff Time	Short-term
<i>VC-4—Implement Low Impact Development Standards for Buildings, Streets, Parking Lots, Storm Water Management Facilities, etc.</i>						
New	Flood, Severe Storms	2, 4, 6, 7, 11, 12	CED/Public Works*	Medium	Staff Time, General Fund	Short-term
<i>VC-5—Replace Fire Station #2. The City is in the process of building a new fire station at approximately 2000 Norris Road to replace Fire Station #2 (located 400 NE 37th St.) in order to be better positioned to respond to emergencies both in and outside of the downtown core area, and also to meet current seismic codes. The new station will be located outside of a seismic hazard area. City has acquired the property and is currently in the design and permitting phase, with construction slated to start in the summer of 2016.</i>						
New	Earthquake	2, 5, 9, 10, 12	Fire	High	Budget Surplus	Short-term
<i>VC-6—Replace Fire Station #1 The City is in the process of building a new fire station at 2607 Main Street to replace Fire Station #1 (located 900 W Evergreen Blvd.) in order to be better positioned to respond to emergencies both in and outside of the downtown core area, and also to meet current seismic codes. City has acquired the property and is currently in the design and permitting phase, with construction slated to start in the summer of 2016.</i>						
New	Earthquake	2, 5, 9, 10, 12	Fire	High	Budget Surplus	Short-term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
<p>VC-7—Implement Seismic Retrofit Recommendations of Water Tower Seismic Evaluation. As distribution pipes are replaced, ductile iron is used as a standard throughout the water system. The City recently completed a seismic evaluation of the water storage tanks and a capital improvement plan has been developed that includes strategies for replacing and/or upgrading inadequate tanks. The City is also scheduled to update: a vulnerability assessment, a water shortage response plan, and an emergency response plan for the water system. The City is currently making significant investment in upgrading Water Station #1, which provides the greatest contribution to assuring an adequate water supply. Additionally, the system has built in redundancy and capabilities within the distribution system to direct water where it is needed if one part of the system is compromised.</p>						
New	Earthquake, Drought	2, 5, 9, 10, 12	Public Works	High	Capital Budget	Short-term
<p>VC-8—Continue Incentive Program for Eliminating Private Septic Systems. For the areas that are currently un-sewered, the City has an ongoing capital improvement plan that will continue to install public sanitary sewer collection services in areas where they have not been available. As part of the Capital program the City offers an incentive to connect and financing to encourage residents to connect and decommission existing septic systems.</p>						
Existing	Earthquake, Flood, Landslide	5, 7, 11	Public Works	Medium	Capital Budget	On-going
<p>VC-9—Implement Recommended Priority Improvements from Citywide Sewer System Study. A nearly completed Engineering study includes an evaluation of condition and vulnerabilities of large diameter pipes in the sewer system (interceptors). One of the deliverables from the study will be a prioritization of upgrades and repairs to extend the life of pipes and reduce risks of adverse events. The evaluations included consideration of sensitive locations (waterways, soils, population areas, etc.). In another project for 2017, the City plans to upgrade a mothballed sewage pump station, Burnt Bridge Creek Pump Station, to provide flexibility in directing sewage to Vancouver's two wastewater treatment plants, and to alleviate flow through the Burnt Bridge Creek Interceptor, especially during heavy rain events, which currently places the interceptor at risk for sewage overflows. Lastly, the City is embarking on a design and construction of bypass mitigation system for the headworks of Westside Wastewater Treatment Plant. The recently-bid operations contract for the treatment plants incorporates emergency planning and response activities and preparedness for those assets. Back-up power is provided for the treatment plants as well as key lift stations.</p>						
Existing	Flood, Earthquake	5, 8, 10, 11, 12	Public Works	High	Capital Budget	Short-term
<p>VC-10—Address Areas of Localized Street Flooding and Ensure Bridges are Inspected by Partner Agencies. The City has a Transportation Improvement Plan and newly authorized dedicated funding that supports our capability to maintain and upgrade the entire transportation and this will address some of the noted vulnerabilities. We work with partners to provide annual bridge inspections and the City's Operations Center and Surface Water Engineering teams coordinate to address known areas of seasonal urban flooding. Operations Center crews are fully prepared to respond to non-catastrophic levels of nature caused hazard events and emergency access priority clearance arterials (for example to access hospitals and schools, etc.) have been pre-identified to be prioritized in response efforts.</p>						
Existing/New	Flood, Earthquakes	4, 5, 8, 10, 12	Public Works	Medium	Transportation Improvement Plan	On-going
<p>VC-11—Prioritize Surface Water System Improvements that Decrease Vulnerabilities. The Operations Center provides ongoing maintenance of the City's surface water infrastructure and Engineering uses a Capital Improvements Program to prioritize and undertake projects that improve system function.</p>						
Existing/New	Flood, Landslide	5, 8, 10, 12	Public Works	Medium	Capital Budget	Short-term
<p>VC-12—Finalize and Adopt Regional Debris Management Plan. City staff is currently participating with Clark County and City of Battle Ground to update and finalize the Regional Debris Management Plan.</p>						
Existing/New	Severe weather, Earthquake, Flood, Wildfire	1, 4	Public Works	Low	Staff Time, Operating	Short-term
<p>VC-13—Replace City Operations Center located at 4711 NE Fourth Plain Blvd. The City has also acquired property at 4915 NE Fourth Plain adjacent to existing city property and will begin design of a replacement Operations Center (to occur within 5-6 years), with the benefit of meeting current seismic standards. The existing operations center will either be repurposed or demolished.</p>						
New	Earthquake	5, 9, 10	Public Works	High	Capital Budget	Long-term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
<i>VC-14—Consolidate Vancouver Police Headquarters (currently located at 605 E Evergreen Blvd) from aging, vulnerable building to newer, seismic compliant West Precinct building, located at 2800 NE Stapleton and East Precinct building, located at 520 SE 155th Ave. Repurpose HQ building for non-emergency related uses.</i>						
Existing	Earthquake	5, 9, 10	VPD	High	Capital Budget	Long-term
<i>VC-15—Evaluate and Prioritize Properties in Extreme Hazard Areas for Future Buy-out</i>						
Existing	Flood, Landslide	2, 9, 12	CED	Medium	General Fund, HMGP, PDM, FMA for implementation	Short-term
<i>VC-16—Develop a Plan and Agreement to Increase Elevation of Units within Lakeside Mobile Estates. Work with property owner on a plan and schedule for raising or removing mobile homes that are located in the 100-year floodplain, and identification of possible grant funding that can assist in the costs of such enhancements.</i>						
Existing	Flood	2, 9, 12	CED	Medium	Staff Time, General Fund	Short-term
<i>VC-17—Require the retrofitting of older, vulnerable or critical structures located on NEHRP 'E' and 'F' soils. This would only apply when substantial alterations or additions are proposed to such structures, and will be applied at the time a building permit is reviewed.</i>						
Existing	Earthquake	2, 4, 5	CED	Low (cost to City)	Staff Time, Building Fund	On-going
<i>VC-18—Encourage non-structural retrofitting where appropriate in the City, given scope of project and intended use of building.</i>						
Existing	Earthquake	2, 4, 5	CED	Low (cost to City)	Staff Time, Building Fund	On-going
<i>VC-19—Retrofit hazardous material containment areas.</i>						
Existing	Fire, Flood	2, 4, 5	Fire*/Public Works/CED	Medium	HMGP, PDM, FMA	Short-term
<i>VC-20—Encourage non-structural retrofitting of hazardous materials containment through the establishment of a program to encourage structural retro-fitting of hazardous materials containment during City of Vancouver Fire Marshal operational permit inspections.</i>						
Existing	Fire, Flood	2, 4, 5	Fire	Low	Operating	On-going
<i>VC-21—Develop an automated method to notify the public of events during a disaster.</i>						
Existing	All Hazards	1, 3	CRESA*/CMO/Fire	Low	Operating	Short-term
<i>VC-22—Conduct pre-earthquake assessments for critical and essential facilities and develop a risk-reduction strategy</i>						
Existing	Earthquake	4, 5, 10, 12	CED	High	Building Fund	Long-term
<i>VC-23—Determine critical government functions and establish redundancy for these functions.</i>						
Existing	All Hazards	1, 4, 8	CMO	Low	Staff Time, General Fund	Short-term
<i>VC-24—Target development and preparedness efforts of Tier II hazardous material facilities</i>						
Existing	Earthquake, Flood	2, 4, 5, 11	Fire*/CED	High	HMGP, PDM, FMA	Short-term
<i>VC-25—Continue to maintain good standing and compliance under the National Flood Insurance Program (NFIP). This will be accomplished through the implementation of floodplain management programs that will, at a minimum, meet the requirements of the NFIP:</i>						
<ul style="list-style-type: none"> • Enforcement of the flood damage prevention ordinance • Participate in floodplain identification and mapping updates • Provide public assistance/information on floodplain requirements and impacts. 						
New and Existing	Flood	1, 4, 5, 9	CED*/Public Works	Low	Staff Time, General Funds	On-going
<i>VC-26 – Tailor and Adopt a Model Post-Disaster Recovery Ordinance for Vancouver</i>						

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
New	All Hazards	1, 4, 6	CED	High	Staff Time, General Funds for Consultant	Short-term
VC-27—Require the construction of earthquake-resilient structures through application of Building Codes as applicable						
New	Earthquake	2, 4, 5	CED	Low	Staff Time, Building Fund	On-going
VC-28—Support development of integrated County storm water basin-wide plans						
Existing/New	Flood	2, 4, 5, 10, 12	Public Works	Low	Staff Time, Operating	Long-term
VC-29—Promote development outside of the floodplain. This includes responding to any directive from a recent court case that will make development in floodplains much more restrictive due to ESA-related concerns. Puget Sound is under this order currently (Phase 1) and the rest of the state including Vancouver is under Phase 2, which is not yet in effect but anticipated in the next several years.						
New	Flood	2, 4, 5, 7, 10, 11	CED	Low	Staff Time, General Fund	On-going
VC-30 - Integrate the natural hazard mitigation plan into other plans, programs, ordinances, codes and databases that dictate land use decisions, unified development, comprehensive planning, critical areas ordinances, stormwater etc. within the community.						
New and Existing	All Hazards	1, 2, 4, 6	CED	Low	Staff Time, General Funds	Long-term
VC-31—Ensure emergency vehicle access to all residents to allow effective response and recovery from disaster events.						
Existing/New	All Hazards	2, 4, 8	Fire	High	HMGP	Long-term
VC-32—Develop priority routes throughout the City and improve these routes to a higher standard.						
Existing	All Hazards	2, 4, 8	Fire*/Public Works	High	Transportation Improvement Fund, Possibly DHS Program Grant	Long-term
VC-33—Ensure appropriate equipment is available during events.						
Existing	All Hazards	1, 4, 6	Public Works*/Fire	High	General Fund	Long-term
VC-34—Where appropriate, support retro-fitting, relocation or acquisition from willing property owners of structures located in hazard prone areas to protect structures from future damage, with repetitive and severe repetitive loss as a priority. Seek opportunities to leverage partnerships within the planning area in these pursuits.						
Existing	All Hazards	4, 5, 7, 9, 10	CED	High	HMGP, PDM, FMA, CDBG-DR	Short-term

Table 7-11. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
VC-1	3	High	Low	Yes	No	Yes	High	Low
VC-2	3	High	Medium	Yes	No	Yes	High	Low
VC-3	2	Medium	Low	Yes	No	Yes	High	Low
VC-4	6	High	Medium	Yes	Maybe	No	High	Medium
VC-5	5	High	High	Yes	No	Yes	Medium	Low
VC-6	5	High	High	Yes	No	Yes	Medium	Low
VC-7	5	High	High	Yes	No	Yes	Medium	Low
VC-8	3	High	Medium	Yes	No	Yes	High	Low
VC-9	5	High	High	Yes	No	Yes	Medium	Low
VC-10	5	High	Medium	Yes	No	Yes	High	Low
VC-11	4	Medium	Medium	Yes	Maybe	No	Medium	Medium
VC-12	2	Medium	Low	Yes	Maybe	Yes	High	Low
VC-13	3	High	High	Yes	No	No	Medium	Low
VC-14	3	High	High	Yes	No	Yes	Medium	Low
VC-15	3	Medium	Medium	Yes	Maybe	No	Medium	Medium
VC-16	3	Low	Medium	Yes	Maybe	No	Low	Medium
VC-17	3	High	Low	Yes	No	Yes	High	Low
VC-18	3	High	Low	Yes	No	Yes	High	Low
VC-19	3	Medium	Medium	Yes	Maybe	No	Medium	Medium
VC-20	3	Medium	Low	Yes	Maybe	Yes	High	Medium
VC-21	2	High	Low	Yes	No	No	High	Low
VC-22	4	High	High	Yes	Maybe	No	Medium	Medium
VC-23	3	High	Medium	Yes	No	No	Medium	Low
VC-24	4	Medium	Low	Yes	No	No	Medium	Low
VC-25	4	Medium	Low	Yes	No	Yes	High	Low
VC-26	3	High	High	Yes	Maybe	No	Medium	Medium
VC-27	3	High	Low	Yes	No	Yes	High	Low
VC-28	3	Medium	Medium	Yes	No	Yes	Medium	Low
VC-29	5	High	Low	Yes	No	Yes	High	Low
VC-30	4	High	Medium	Yes	No	No	High	Low
VC-31	5	Medium	Medium	Yes	No	No	Medium	Low
VC-32	3	Medium	High	No	Maybe	No	Low	Medium
VC-33	3	High	High	No	No	No	Low	Low
VC-34	5	High	High	Yes	Yes	Maybe	Medium	High

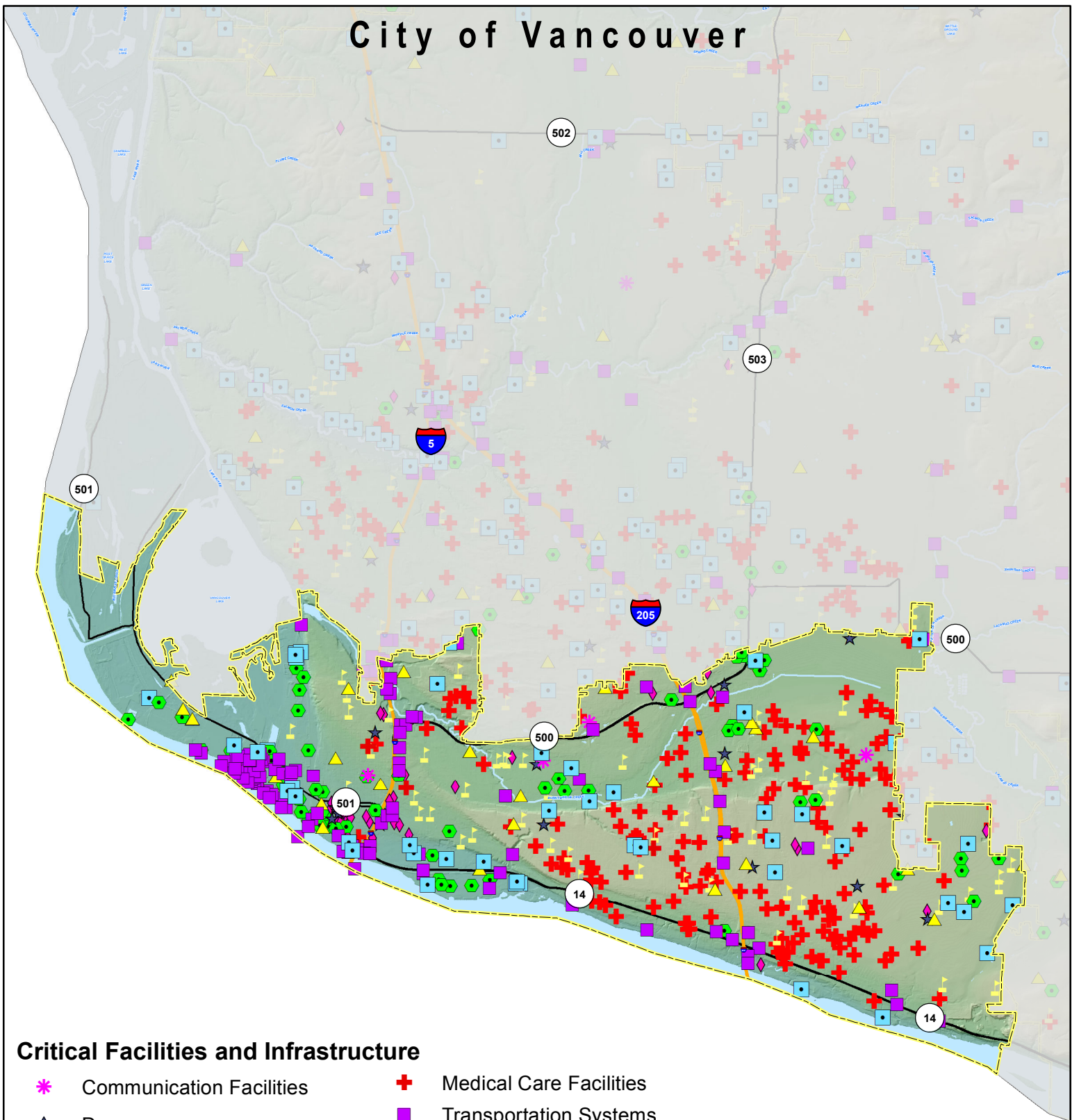
a. See the introduction to this volume for explanation of priorities.

Table 7-12. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	VC-29, VC-34,	VC-29, VC-26, VC-34,	VC-21, VC-30	VC-24, VC-26	VC-12, VC-21, VC-23, VC-26, VC-31, VC-32, VC-33	
Drought	VC-7, VC-34		VC-21			
Earthquake	VC -10, VC-22, VC-24, VC-25VC-27,	VC-8, VC-10, VC-17, VC-18, VC-22, V-26, VC-27, VC-30, VC-34	VC-2, VC-21, VC-22, VC-30	VC-24, VC-26	VC-5, VC-6, VC-12, VC-14, VC-21, VC-23, VC-31, VC-32, VC-33	VC-3, VC-5, VC-6, VC-7, VC-10, VC-13, VC-17, VC-22, VC-27
Flood	VC-4, VC-10, VC-11, VC-19, VC-20, VC-24 VC-28, VC-29, VC-25, VC-34	VC-3, VC-8, VC-10, VC-11, VC-15, VC-16, VC-19, VC-20 VC-26, VC-28, VC-29, VC-30, VC-34	VC-2, VC-16, VC-21, VC-30	VC-3, VC-9, VC-19, VC-20, VC-24, VC-26, VC-28, VC-29	VC-12, VC-21, VC-23, VC-31, VC-32, VC-33	VC-3, VC-7, VC-10
Landslide	VC-4, VC-8, VC-11, VC-30, VC-34	VC-3, VC-8, VC-11, VC-15, VC-26, VC-30, VC-34	VC-2, VC-21, VC-30	VC-26,	VC-12, VC-21, VC-23, VC-31, VC-32, VC-33	VC-3, VC-7
Severe Weather	VC-4, VC-10 VC-28, VC-25	VC-3, VC-10, VC-28, VC-30	VC-2, VC-21	VC-9 VC-26, VC-28	VC-12, VC-21, VC-23, VC-31, VC-32, VC-33	VC-3, VC-7, VC-9, VC-10
Volcano	VC-25	VC-26, VC-30	VC-21		VC-12, VC-21, VC-23, VC-31, VC-32, VC-33	
Wildfire	VC-25	VC-26, VC-30	VC-21	VC-26	VC-21, VC-23, VC-32, VC-33	

a. See the introduction to this volume for explanation of mitigation types.

City of Vancouver



Critical Facilities and Infrastructure

- | | |
|----------------------------|--------------------------------|
| ✱ Communication Facilities | ✚ Medical Care Facilities |
| ◆ Dams | ■ Transportation Systems |
| ★ Emergency Services | ▲ Schools |
| ▲ Energy Facilities | ■ Water and Sanitation Systems |
| ⬢ Hazardous Materials | ◆ Other Facilities |



Base Map Data Sources: Clark County, U.S. Geological Survey

0 1.25 2.5 5 Miles



Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

City of Vancouver



Liquefaction Susceptibility

- Moderate to High
- Moderate
- Low to Moderate
- Low
- Very Low to Low
- Very Low

Not Susceptible to Liquefaction

- Bedrock
- Peat
- Water



Base Map Data Sources: Clark County, U.S. Geological Survey

0 1.25 2.5 5 Miles





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City of Vancouver



Flood Hazard Areas

-  1% Annual Chance Flood (100 Year)
-  0.2% Annual Chance Flood (500 Year)



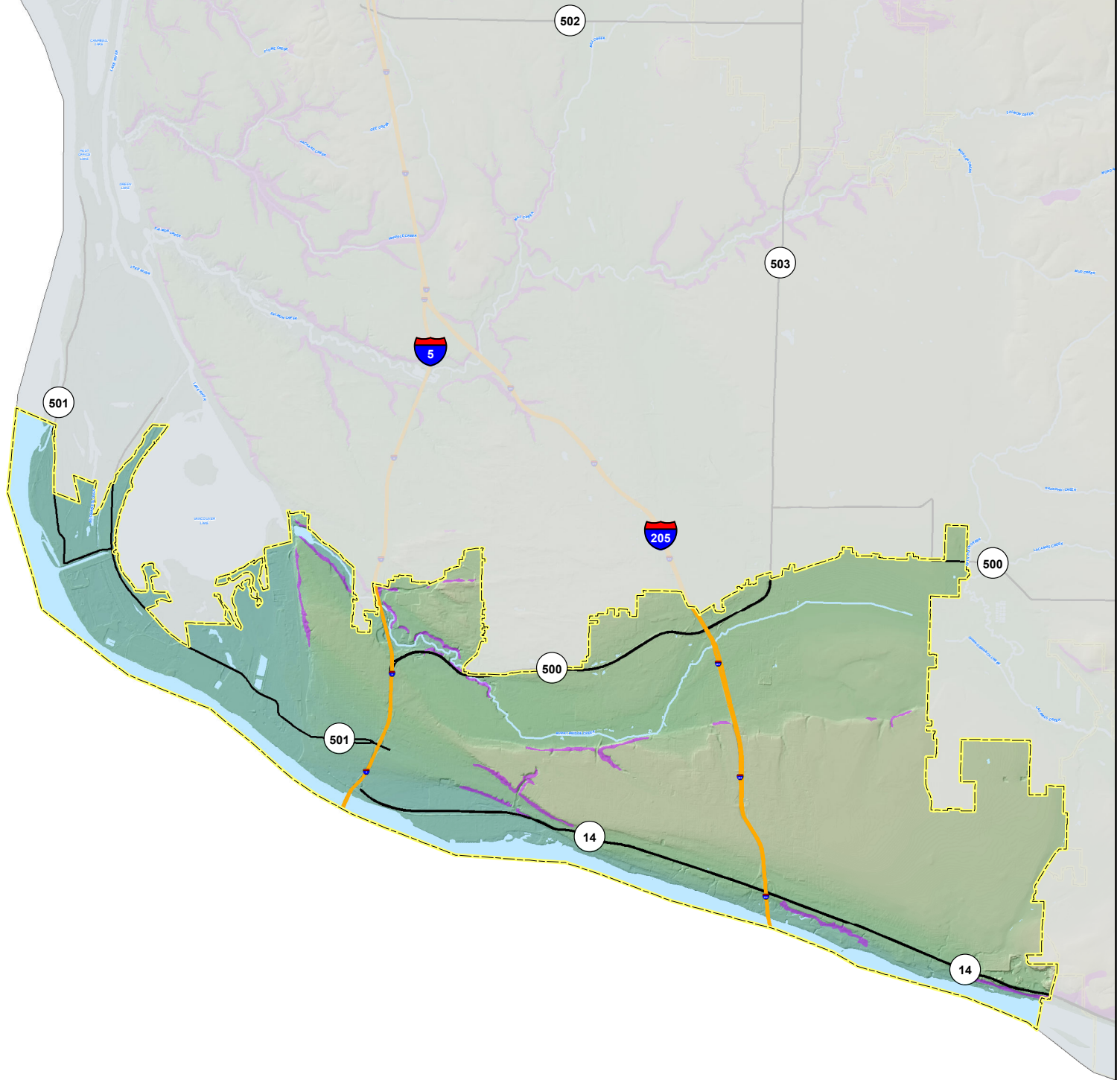
Base Map Data Sources: Clark County, U.S. Geological Survey

0 1.25 2.5 5 Miles




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Landslide Hazard Areas

 Landslide Hazard Areas



Base Map Data Sources: Clark County, U.S. Geological Survey

0 1.25 2.5 5 Miles



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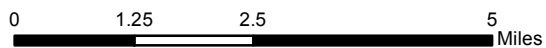
Volcano Hazard Areas



Distal Volcano Hazard Zone - Mt. Hood



Base Map Data Sources: Clark County, U.S. Geological Survey



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Wildfire Hazard Areas

- Urban
- Intermix
- Wildland



Base Map Data Sources: Clark County, U.S. Geological Survey

0 1.25 2.5 5 Miles



Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

8. CITY OF WASHOUGAL

8.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Mitch Kneipp, Community Development Director
1701 C Street
Washougal, WA 98671
360-835-8501 x604
mitch.kneipp@cityofwashougal.us

Alternate Point of Contact

Trevor Evers, Public Works Director
1701 C Street
Washougal, WA 98671
360-835-8501 x202
trevor.evers@cityofwashougal.us

8.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- Date of Incorporation—1908
- Current Population—15,170 as of April 1, 2015 (2015 OFM estimate)
- Population Growth—Based on OFM data the City of Washougal has seen relatively steady growth with a population increase of nearly 50% from 7,575 in the year 2000 to 15,170 in 2015.
- Location and Description—The City is located in Clark County, in southwest Washington along the Columbia River on the Oregon/Washington border. The City lies approximately 23 miles northeast from Portland, Oregon, 18 miles east of Vancouver, Washington and approximately 180 miles south of the City of Seattle. State Route 14 bisects the City as it heads east into the Columbia River Gorge National Scenic Area which defines the City's easternmost boundary and Washougal is immediately east of the City of Camas. Washougal currently occupies a total of approximately 5.7 square miles.
- Brief History—Joseph Durgan and Lewis Love purchased 20-acres from Richard Ough's Donation Land Claim and mapped the town of Washougal and platted it on May 6, 1880. The area was known for its fertile lowlands and supported dairy cattle, farming and logging. When the railroad came to town in 1908 it opened up Washougal to the transcontinental railroad lines and with that growth the City incorporated. The town steadily grew and in 1912 Pendleton Woolen Mills was established and has been the largest employer in the City and a thriving business here ever since. The City continues to thrive and has undertaken an effort to revitalize its downtown which has taken off and that, coupled with a successful Port offering a Marina and Industrial Park, the City is poised for growth.
- Climate—Washougal has a mild climate with an average of 50 inches of rain each year with about five days each winter where snow (usually unmeasurable) or icy conditions exist. The high temperature in the summer is around 82°F and the low temperature in winter is around 34°F.
- Governing Body Format—The City of Washougal operates under the laws of the State of Washington applicable to a Code City with a Mayor-Council form of government. Council members are elected by the citizens of the City and serve four-year terms as part-time elected officials acting in a legislative capacity. The Council holds regular meetings twice a month on second and fourth Mondays and special meetings as needed. All meetings are open to the public as provided by law and agenda items are prepared in advance.

The City Council of the City of Washougal assumes responsibility for the adoption of this plan; the City of Washougal Administration will oversee its implementation.

- **Development Trends**—Washougal has historically been a bedroom community and residential development continues to do well. The City has invested in its downtown with 6.5-million dollars of street improvements and private investment has followed. The Port of Camas/Washougal entered into a development agreement with the City for development of their 120-acre industrial park known as Steigerwald Commerce Center and the first phase of the development is nearly complete. Another development agreement between the Port, a private developer and the City will facilitate the redevelopment of a former lumber yard along the Columbia River into a mixed use development including parks, commercial and residential uses.

8.3 CAPABILITY ASSESSMENT

An assessment of legal and regulatory capabilities is presented in Table 8-1. An assessment of fiscal capabilities is presented in Table 8-2. An assessment of administrative and technical capabilities is presented in Table 8-3. Information on National Flood Insurance Program (NFIP) compliance is presented in Table 8-4. Classifications under various community mitigation programs are presented in Table 8-5. An assessment of education and outreach capabilities is presented in Table 8-6.

Table 8-1. Legal and Regulatory Capability

	Local Authority	Other Jurisdiction Authority	State Mandated
Building Code <i>Comment: Washougal Municipal Code 15.04</i>	Yes	No	Yes
Zoning Code <i>Comment: Washougal Municipal Code Title 18</i>	Yes	No	Yes
Subdivisions <i>Comment: Washougal Municipal Code Title 17</i>	Yes	No	Yes
Stormwater Management <i>Comment: Washougal Municipal Code 14.28 and Washougal Engineering Standards Chapter 4</i>	Yes	No	Yes
Post-Disaster Recovery <i>Comment: N/A</i>	No	No	No
Real Estate Disclosure <i>Comment: N/A</i>	No	No	No
Growth Management <i>Comment: RCW 36.70A / City of Washougal Comprehensive Plan</i>	Yes	Yes	Yes
Site Plan Review <i>Comment: Washougal Municipal Code 18.88</i>	Yes	No	No
Environmental Protection <i>Comment: Washougal Municipal Code Title 16</i>	Yes	No	Yes
Flood Damage Prevention <i>Comment: Washougal Municipal Code 16.28</i>	Yes	No	Yes
Emergency Management <i>Comment: Washougal Municipal Code 2.48</i>	Yes	No	Yes
Climate Change <i>Comment: N/A</i>	No	No	No

	Local Authority	Other Jurisdiction Authority	State Mandated
Other <i>Comment: N/A</i>	No	No	No
General or Comprehensive Plan <i>Is the plan equipped to provide linkage to this mitigation plan?</i> <i>Comment: Washougal Municipal Code 2.48 can be revised to provide linkage, as well as the Comprehensive Plan</i>	Yes	Yes	Yes
Capital Improvement Plan <i>What types of capital facilities does the plan address?</i> <i>How often is the plan updated?</i> <i>Comment: Transportation, Parks, Sewer, Water, Fire. As often as needed but usually amended annually.</i>	Yes	No	Yes
Floodplain or Watershed Plan <i>Comment: N/A</i>	No	No	No
Stormwater Plan <i>Comment: 2014 Stormwater Management Program (SWMP for the City of Washougal)</i>	Yes	No	Yes
Habitat Conservation Plan <i>Comment: N/A</i>	No	No	No
Economic Development Plan <i>Comment: The City is partners with the City of Camas and the Port of Camas/Washougal in our own economic development agency known as the Camas/Washougal Economic Development Association (CWEDA) and the City also contributes to the regional economic development agency known as the Columbia River Economic Development Council (CREDC).</i>	Yes	Yes	Yes – dependent on funding
Shoreline Management Plan <i>Comment: The City's SMP is still being developed and reviewed with completion anticipated in 2016.</i>	Yes	No	Yes
Community Wildfire Protection Plan <i>Comment: N/A</i>	No	No	No
Forest Management Plan <i>Comment: N/A</i>	No	No	No
Climate Action Plan <i>Comment: N/A</i>	No	No	No
Other <i>Comment: N/A</i>	No	No	No
Comprehensive Emergency Management Plan <i>Comment: Washougal Municipal Code 2.48- Emergency Management adopted February 21, 2006.</i>	Yes	No	Yes
Threat & Hazard Identification & Risk Assessment <i>Comment: N/A</i>	No	No	No
Post-Disaster Recovery Plan <i>Comment: N/A</i>	No	No	No
Continuity of Operations Plan <i>Comment: N/A</i>	No	No	No
Public Health Plan <i>Comment: N/A</i>	No	No	No

Table 8-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes (Water, Sewer and Stormwater)
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	Yes (Local Improvement District) (LID)
Withhold Public Expenditures in Hazard-Prone Areas	No
State-Sponsored Grant Programs	Yes (Department of Transportation (TIB); Washington Association of Sheriffs and Police Chiefs (WASPC); Department of Health; Recreation and Conservation Office; Department of Ecology; and Utilities & Transportation Commission)
Development Impact Fees for Homebuyers or Developers	Yes
Other	No

Table 8-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Community Development – Community Development Director and Planner
Engineers or professionals trained in building or infrastructure construction practices	Yes	Community Development – Building Official and Building Inspector Public Works – City Engineer and Engineering Inspector
Planners or engineers with an understanding of natural hazards	No	We would contract this out.
Staff with training in benefit/cost analysis	No	We would contract this out.
Surveyors	Yes	Contract support
Staff capable of making substantial damage estimates	No	We would contract this out.
Personnel skilled or trained in GIS applications	Yes	Community Development – Community Development Director and Planner
Scientist familiar with natural hazards in local area	No	We would contract this out.
Emergency manager	Yes	Camas / Washougal Fire Department and CRESA
Grant writers	Yes	Public Works – Senior Analyst and Parks Manager

Table 8-4. National Flood Insurance Program Compliance

Criteria	Response
When did the community enter the NFIP?	03/02/81
When did the Flood Insurance Rate maps become effective?	09/15/2012
What local department is responsible for floodplain management?	Community Development
Who is your floodplain administrator? (department/position)	Community Development – Community Development Director (Mayor's designee)
• Is this a primary or auxiliary role?	Auxiliary
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date of adoption of your flood damage prevention ordinance?	October 1, 2012
• Does your floodplain management program meet or exceed minimum requirements?	Meet
• If so, in what ways?	
When was the most recent Community Assistance Visit or Community Assistance Contact?	2012
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed?	No
• If so, please state what they are.	
Do your flood hazard maps adequately address the flood risk within your jurisdiction?	Yes
• If no, please state why.	
Does your floodplain management staff need any assistance or training to support its floodplain management program?	No, staff has utilized on-line training
• If so, what type of assistance/training is needed?	N/A
Does your jurisdiction participate in the Community Rating System (CRS)?	No
• If so, is your jurisdiction seeking to improve its CRS Classification?	N/A
• If not, is your jurisdiction interested in joining the CRS program?	Possibly
How many Flood Insurance policies are in force in your jurisdiction? ^a	47
• What is the insurance in force? ^a	\$14,465,000
• What is the premium in force? ^a	\$37,692
How many total loss claims have been filed in your jurisdiction? ^a	10
• How many claims were closed without payment/are still open? ^a	2
• What were the total payments for losses? ^a	\$71,369.59

a. According to FEMA records as of 11/30/2015.

Table 8-5. Community Classifications

	Participating?	Classification	Date Classified
Community Rating System	No	N/A	N/A
Building Code Effectiveness Grading Schedule	Yes	Dwelling – 2; Commercial – 2	8/2012
Public Protection	Yes	Dwelling – 5; Commercial – 5	7/2012
Storm Ready	No	N/A	N/A
Firewise	Yes (West End)	Firewise	2009

Table 8-6. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes – Jennifer Forsberg, Finance Director
Do you have personnel skilled or trained in website development?	Yes – IT Manager, PC/Network Specialist and Social Media Specialist
Do you have hazard mitigation information available on your website? • If yes, please briefly describe.	No, but we could
Do you utilize social media for hazard mitigation education and outreach? • If yes, please briefly describe.	Yes We have recently utilized our website, Twitter feed and Facebook page to publicize this update to the Natural Hazard Mitigation Plan.
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, please briefly specify.	No N/A
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, please briefly describe.	Yes Website, Twitter feed and Facebook page as well as a City maintained email list for subscribers.
Do you have any established warning systems for hazard events? • If yes, please briefly describe.	Yes We utilize our website, social media accounts and email subscribers list to notify the public of inclement weather or other possible hazards.

8.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction’s process for integrating the natural hazard mitigation plan into local planning mechanisms.

8.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- City of Washougal Strategic Plan – “Public Safety” and “Emergency Preparedness” are identified within the “Core Services” pillar of the City’s Strategic Plan.
- Comprehensive Plan – The Plan addressed Critical Areas including Frequently Flooded Areas, Geologically Hazardous Areas, Wetlands, Habitat Conservation Areas and Critical Aquifer Recharge Areas. Development regulations for all of these critical areas have been adopted consistent with the Comprehensive Plan. These regulations incorporate the Best Available Science to protect these areas and if there are impacts then appropriate mitigation is required.

8.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- City of Washougal Strategic Plan – Public Safety is identified within the “Core Services” pillar of the City’s Strategic Plan. Within that pillar Public Safety has been identified and an indicator to monitor improvements in Public Safety is “Emergency Preparedness.” The Strategic Plan could be updated to

reference the natural hazard mitigation plan and the natural hazard mitigation plan can be identified as a project showing progress towards Public Safety and adherence to the Strategic Plan.

- Comprehensive Plan – As part of an update reference to the natural hazard mitigation plan could be incorporated.
- Shoreline Management Plan – With the current update to Washougal’s SMP the goals, risk assessment and/or recommendations of the natural hazard mitigation plan could be incorporated.

8.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 8-7 lists all past occurrences of natural hazards within the jurisdiction.

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Flood	N/A	Oct. 2015	\$75-100K
Blizzard	1825	Dec. 2008	Undetermined
Severe Storm	1682	Dec. 2006	Undetermined
Severe Storm	1671	Nov. 2006	Undetermined
Earthquake	1361	Feb. 2001	Undetermined
Severe Storm	1159	Dec. 1996	Undetermined
Severe Storm	1079	Nov. 1995	Undetermined
Volcanic Eruption	623	May 1980	Undetermined
Severe Storm	137	Oct. 1962	Undetermined

8.6 JURISDICTION-SPECIFIC VULNERABILITIES

Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: 0
- Number of FEMA-identified Severe-Repetitive-Loss Properties: 0
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: 0

Other noted vulnerabilities include:

- Approximately 7.8 percent of structures in Washougal are located in dam inundation areas. Residents and property owners may not be aware of the risk because of the distance from the source of failure.
- Significant portions of the City are located in moderate to high liquefaction potential areas.
- Approximately 13 percent of structures in Washougal are located in Mt. Hood Distal hazard areas. Residents and property owners may not be aware that they are located in a volcano hazard area.
- There are 3 facilities reporting hazardous materials in the 100-year floodplain.
- There is an isolated area along the Washougal River located across from Hathaway Park that is known for flooding during heavy rain events. The City provides sand and sandbags for residents to help fortify their property.
- The City of Washougal only has one bridge crossing the Washougal River serving the residences to the north of town. There is an additional bridge on the west end of town but it is located in Camas.
- This City of Washougal has seven (7) at-grade railroad crossings and only one (1) railroad overpass over the Burlington Northern Railroad tracks. These tracks bisect the city and if they are congested or blocked there is only one way to evacuate the northern portion of the city (highest population area) and if the overpass is also compromised there is no way to evacuate this area to the south or for the area to the south to be evacuated to the north.

8.7 HAZARD RISK RANKING

Table 8-8 presents the ranking of the hazards of concern.

Table 8-8. Hazard Risk Ranking			
Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Severe weather	33	High
2	Earthquake	32	High
3	Flood	18	Medium
3	Landslide	18	Medium
4	Volcano	15	Medium
5	Dam failure	8	Low
6	Wildfire	6	Low
7	Drought	1	Low

8.8 STATUS OF PREVIOUS PLAN INITIATIVES

Table 8-9 summarizes the initiatives that were recommended in the previous version of the natural hazard mitigation plan and their implementation status at the time this update was prepared. It should be noted, that the actions identified in the following table were developed in 2004. Due to the significant amount of time and staff turnover that has occurred since their identification, the status of some actions may be unknown. Additionally, many of the action items identified were to be led by CRESA or other non-City agencies. For ease of annual progress reporting, these actions have generally been removed from the City's action plan or rephrased to be within the capabilities of the City. This will allow for a fresh start consistent with the comprehensive update to the natural hazard mitigation plan conducted during the 2016 planning process.

Table 8-9 Status of Previous Plan Initiatives			
Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Support voluntary structural retrofitting of older homes on vulnerable soils. <i>Comment: CRESA was identified as the Lead Agency on this objective.</i>			X
Require the retrofitting of older, vulnerable or critical structures located on NEHRP 'E' and 'F' soils. <i>Comment: This objective has not been pursued. With such a small staff (1 Building Official and 1 Inspector) projects like this can be challenging but worthwhile. This objective should be carried over (see WS-1).</i>		X	
Encourage non-structural retrofitting throughout the County. <i>Comment: CRESA was identified as the Lead Agency on this objective.</i>			X
Join the CRS program <i>Comment: While a worthwhile program, the level of commitment and accountability to a municipality with such limited staff is too much at this point in time.</i>			X
Support the retrofit of at-risk homes in subdivisions <i>Comment: This objective has not been pursued. Its applicability in the urban area may be limited but it should be carried over (see WS-2).</i>		X	
Retrofit hazardous material containment areas. <i>Comment: This objective has not been pursued. This objective should be carried over (see WS-3).</i>		X	
Encourage non-structural retrofitting of hazardous materials containment <i>Comment: This objective has not been pursued. This objective should be carried over (see WS-4).</i>		X	

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Ensure that the public is informed of the necessity of maintaining a 3 day supply of food and water			X
<i>Comment: CRESA was identified as the Lead Agency on this objective.</i>			
Develop public information packets ready to deploy following a disaster event			X
<i>Comment: CRESA was identified as the Lead Agency on this objective. Washougal does not currently have a PIO.</i>			
Ensure that residents understand the benefits of defensible space to minimize and reduce the impacts of fires.		X	
<i>Comment: This objective has not been pursued. While the hiring of a full-time employee to facilitate this objective may be cost prohibitive it should be carried over (see WS-5).</i>			
Ensure severe weather warning system and public education for tornadoes in place.			X
<i>Comment: CRESA was identified as the Lead Agency on this objective.</i>			
Expand the public awareness program about hazard materials			X
<i>Comment: CRESA was identified as the Lead Agency on this objective.</i>			
Cultivate an awareness program for landslide hazards			X
<i>Comment: CRESA was identified as the Lead Agency on this objective. Landslide hazard areas are identified throughout Washougal and standards are in place to regulate development on and near them.</i>			
Develop an automated method to notify the public of events during a disaster.			X
<i>Comment: CRESA was identified as the Lead Agency on this objective.</i>			
Expand weather radio systems to include all of Clark County			X
<i>Comment: CRESA was identified as the Lead Agency on this objective.</i>			
Provide fast, accurate spatial incident information for emergency services response.		X	
<i>Comment: This objective has not been pursued. This objective should be carried over (see WS-6).</i>			
Conduct pre-earthquake assessments for critical and essential facilities and develop a risk-reduction strategy		X	
<i>Comment: This objective has not been pursued. This objective should be carried over (see WS-7). If training opportunities still exist through FEMA they can be utilized.</i>			
Determine critical government functions and establish redundancy for these functions.		X	
<i>Comment: This objective has not been pursued and should be carried over (see WS-8).</i>			
Target development and preparedness efforts of Tier II hazardous material facilities		X	
<i>Comment: This objective has not been pursued and should be carried over (see WS-9).</i>			
Encourage partnerships among agencies to promote uniformity among no-burn policies in forest lands	X	X	
<i>Comment: The Clark County Fire Marshall collaborates and partners with Federal, State and Local Fire Agencies throughout the year, to promote uniformity among no-burn policies not just in forest lands, but the entire County, during regularly scheduled meetings and based on circumstances, whenever necessary outside regular meetings. (See WS-10)</i>			
Develop a contingency/Business resumption organization			X
<i>Comment: CRESA was identified as lead agency. The Downtown Washougal Association (DWA) could also possibly be a partner.</i>			
Provide opportunities for strategic relations between emergency managers and social service providers.			X
<i>Comment: CRESA and the American Red Cross were identified as lead agencies.</i>			
Require the construction of earthquake-resilient structures	X		
<i>Comment: The City of Washougal has adopted the latest State Building Code.</i>			

Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Develop integrated County stormwater basin-wide plans	X		
<i>Comment: The Clark County Stormwater Plan was completed in 2009 and is updated annually in the first quarter of the year. Last update was March 2016. Plan includes maintenance, repair, etc.</i>			
Promote development off of the floodplain		X	
<i>Comment: Development is encouraged to stay out of the floodplain but it is not required to and if it is developed it must be consistent with the adopted floodplain regulations. Density transfer is an option but it is also not required. This objective should be carried over (see WS-11).</i>			
Consider adoption of a zero-rise floodway		X	
<i>Comment: This objective has not been pursued. This objective should be carried over (see WS-12).</i>			
Expand the County Clean Water Program	X		
<i>Comment: Clark County Environmental Services expanded the program to include an integrated Stormwater Basin plan and retrofitting and property purchase through the Legacy Lands Program.</i>			
Develop a method of assessing and documenting landslide hazard areas.	X		
<i>Comment: Landslide hazard areas have been identified by the City, which requires additional standards for development within these areas.</i>			
Support the use of LIDAR mapping technology to refine landslide hazard maps	X		
<i>Comment: LIDAR has been utilized to better map the topography throughout the County and including Washougal.</i>			
Ensure state certification of licensing for professionals performing geotechnical evaluations	X		
<i>Comment: The City of Washougal requires reports for development in geologically hazardous areas to be completed by a "professional geologist or a professional engineer experienced and knowledgeable in the practice of engineering geology." This requirement was adopted January 17, 2006 under Ordinance 1543.</i>			
Institute Low Impact Development Practices		X	
<i>Comment: This objective is currently underway and should be carried over (see WS-13).</i>			
Initiate a vegetation management program		X	
<i>Comment: This objective is underway and should be carried over (see WS-14).</i>			
Ensure emergency vehicle access to all residents to allow effective response and recovery from disaster events.		X	
<i>Comment: This objective is ongoing and should be carried over (see WS-15).</i>			
Develop priority routes throughout the county and improve these routes to a higher standard.		X	
<i>Comment: The City currently has priority snow routes during winter events, but not all routes have been improved to a higher standard (see WS-16).</i>			
Ensure that electricity is available to populations requiring priority for electricity.			X
<i>Comment: CPU is identified as the lead agency for this objective.</i>			
Ensure appropriate equipment is available during events.		X	
<i>Comment: This is an ongoing objective and should be carried over (see WS-17).</i>			
Condition development in isolated interface zones on adequate fire suppression capability and redundant access.		X	
<i>Comment: This is an ongoing objective but should be more focused on the urban area. It should be carried over (see WS-18).</i>			

8.9 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 8-10 lists the actions that make up the City of Washougal hazard mitigation action plan. Table 8-11 identifies the priority for each action. Table 8-12 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 8-10. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
WS-1—Require the retrofitting of older, vulnerable or critical structures located on NEHRP ‘E’ and ‘F’ soils						
Existing	Earthquakes	1, 2, 4, 7, 9, 12	Community Development	High	HMGP, PDM, FMA, Owner’s Expense	Short-term
WS-2—Through education and outreach support the retrofit of at-risk homes in subdivisions to prevent fire						
Existing	Wildland Fires	1, 2, 4, 7, 9, 12	Community Development / C-W Fire	High	HMGP, PDM, Owner’s Expense	Short-term
WS-3—Encourage the retrofit hazardous material containment areas.						
Existing	Earthquakes	1, 2, 4, 5, 12	Community Development / C-W Fire	High	HMGP, Owner’s Expense	Short-term
WS-4—Encourage non-structural retrofitting of hazardous materials containment.						
Existing	Earthquakes	1, 2, 4, 5, 7, 12	Community Development / C-W Fire	Medium	HMGP, PDM, Owner’s Expense	Short-term
WS-5—Educate residents as to the benefits of defensible space to minimize and reduce the impacts of fires.						
New and Existing	Wildland Fires	1, 2, 4, 7, 9, 12	C-W Fire	Medium	HMGP, PDM, General Fund	Short-term
WS-6—Provide fast, accurate spatial incident information for emergency services response.						
New	All Hazards	1, 2, 3, 4, 5, 12	Washougal PD, C-W Fire	Medium	General Fund	Short-term
WS-7—Conduct pre-earthquake assessments for critical and essential facilities and develop a risk-reduction strategy						
New and Existing	Earthquakes	3, 5, 10, 12	Community Development, Public Works, Washougal PD, C-W Fire	Medium	HMGP, PDM, General Fund	Short-term
WS-8—Determine critical government communication functions and establish redundancy for these functions						
New	All Hazards	1, 3, 5, 8, 10, 12	Community Development, Public Works, Washougal PD, C-W Fire	High	General Fund	Short-term
WS-9—Identify Tier II hazardous material facilities within Washougal and assess spill contingency plans and ensure adequate emergency services and response capabilities.						
New and Existing	Earthquakes	1, 2, 4, 12	Community Development / C-W Fire	Medium	HMGP, PDM, General Fund	Short-term
WS-10—Continue to encourage partnerships among agencies to promote uniformity among no-burn policies.						
New	Wildland Fires	2, 4, 5, 6, 12	C-W Fire	Low	Possibly HMGP, PDM, General Fund	Short-term
WS-11 Promote development off of the floodplain						
New and Existing	Flood	2, 4, 7, 12	Community Development	Medium	General Fund	Short-term
WS-12—Consider adoption of a zero-rise floodway						
New and Existing	Flood	2, 4, 12	Community Development	Medium	General Fund	Short-term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
WS-13—Institute low impact development practices						
New and Existing	Flood	1, 2, 4, 5, 7, 11, 12	Community Development / Public Works	Low	State Grants, General Fund	Short-term
WS-14—Initiate a vegetation management program						
New and Existing	Landslide	1, 2, 4, 5, 7, 12	Community Development / Public Works	Low	General Fund	Short-term
WS-15—Ensure emergency vehicle access to all residents to allow effective response and recovery from disaster events.						
New and Existing	All Hazards	1, 2, 3, 4, 8, 12	Community Development / Public Works / Washougal PD / C-W Fire	High	General Fund	Ongoing
WS-16—Continue to improve the priority routes throughout the city to a higher standard.						
New and Existing	All Hazards	2, 3, 4, 5, 8, 10, 12	Community Development / Public Works / Washougal PD / C-W Fire	High	HMGP, PDM, State Grants, General Fund	Short-term
WS-17—Ensure appropriate communication equipment is available during events.						
New and Existing	All Hazards	1, 2, 4, 6, 8, 12	Community Development / Public Works / Washougal PD / C-W Fire	High	General Fund	Ongoing
WS-18—Condition development in areas without adequate fire suppression to provide greater access.						
New	Wildland Fire	1, 2, 4, 5, 6, 7, 12	C-W Fire	Low	General Fund	Short-term
WS-19—Seek opportunities to provide early warning of hazard events						
New	All Hazards	1, 2, 3, 4, 12	Community Development / Public Works / Washougal PD / C-W Fire	Medium	Possibly HMGP, General Fund	Ongoing
WS-20—Where appropriate, support retro-fitting, purchasing or relocating structures located in high hazard areas and prioritize those structures that have experienced repetitive losses.						
New	All Hazards	1, 2, 4, 5, 7, 9, 12	Community Development / Public Works	High	HMGP, PDM, FMA	Short-term
WS-21—Integrate the natural hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions within the community.						
New	All Hazards	1, 5, 6, 7, 11, 12	Community Development	Low	General Fund	Ongoing
WS-22—Continue to maintain good standing and compliance under the National Flood Insurance Program (NFIP). This will be accomplished through the implementation of floodplain management programs that will, at a minimum, meet the requirements of the NFIP:						
<ul style="list-style-type: none"> Enforcement of the frequently flooded areas ordinance Participate in floodplain identification and mapping updates Provide public assistance/information on floodplain requirements and impacts. 						
New and Existing	Flood	1, 2, 4, 5, 6, 9, 11, 12	Community Development	Low	General Fund	Ongoing

Table 8-11. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
WS-1	6	High	High	Yes	Yes	No	Medium	High
WS-2	6	Medium	High	No	Yes	No	Low	Medium
WS-3	5	Medium	High	No	Yes	No	Low	Medium
WS-4	6	Low	Medium	No	Yes	No	Low	Medium
WS-5	6	Low	Medium	No	Yes	No	High	Medium
WS-6	6	Low	Medium	No	No	No	Low	Low
WS-7	4	Medium	Medium	Yes	Yes	No	Medium	Medium
WS-8	6	High	High	Yes	No	No	Medium	Medium
WS-9	4	Low	Medium	No	Yes	No	Low	Medium
WS-10	5	Low	Low	Yes	Yes	Yes	High	Medium
WS-11	4	High	Medium	Yes	No	No	Medium	Low
WS-12	3	Medium	Medium	Yes	No	No	Medium	Low
WS-13	7	Low	Low	Yes	Yes	Yes	High	Medium
WS-14	6	Low	Low	Yes	No	Yes	High	Low
WS-15	6	High	High	Yes	No	No	Low	Low
WS-16	7	Medium	High	No	Yes	No	Low	Medium
WS-17	6	Medium	High	No	No	No	Low	Low
WS-18	8	Medium	Low	Yes	No	Yes	High	Low
WS-19	5	High	Medium	Yes	Maybe	No	Medium	Medium
WS-20	7	High	High	Yes	Yes	No	Medium	Medium
WS-21	6	Low	Low	Yes	No	Yes	Medium	Low
WS-22	8	High	Low	Yes	No	Yes	Medium	Low

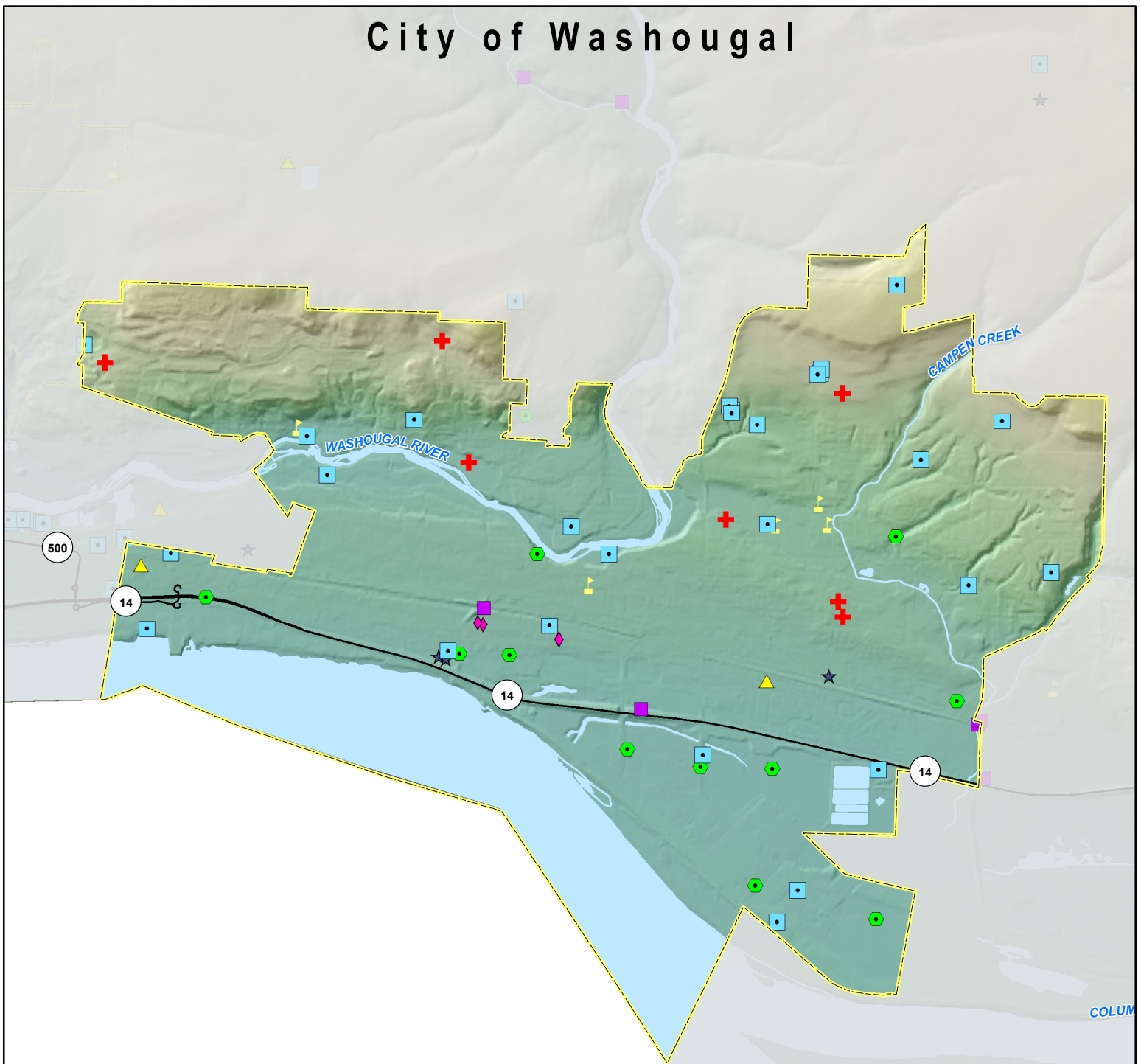
a. See the introduction to this volume for explanation of priorities.

Table 8-12. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	WS-8, WS-15, WS-19, WS-20	WS-6, WS-15, WS-19, WS-20	WS-8, WS-19, WS-21		WS-6, WS-8, WS-15, WS-19	WS-15
Earthquake	WS-1, WS-3, WS-4; WS-7, WS-8, WS-9, WS-15, WS-16, WS-19, WS-20	WS-1, WS-3, WS-4, WS-6, WS-7, WS-9, WS-15, WS-16, WS-17, WS-19, WS-20	WS-1, WS-3, WS-4, WS-8, WS-19, WS-21		WS-6, WS-7, WS-8, WS-15, WS-16, WS-17, WS-19	WS-1, WS-3, WS-15
Landslide	WS-8, WS-13, WS-14, WS-15, WS-13, WS-14, WS-15, WS-16, WS-19, WS-20	WS-6, WS-13, WS-14, WS-15, WS-13, WS-15, WS-16, WS-17, WS-19, WS-20	WS-8, WS-13, WS-14, WS-19, WS-21	WS-13, WS-14, WS-15, WS-13, WS-14	WS-6, WS-8, WS-15, WS-16, WS-17, WS-19	WS-15
Flood	WS-8, WS-12, WS-11, WS-12, WS-13, WS-15, WS-16, WS-19, WS-20, WS-22	WS-6, WS-12, WS-13, WS-12, WS-13, WS-15, WS-16, WS-17, WS-19, WS-20, WS-22	WS-8, WS-19, WS-21, WS-22	WS-12, WS-13, WS-12, WS-13, WS-19	WS-6, WS-8, WS-15, WS-16, WS-17, WS-19	WS-15
Severe Weather	WS-8, WS-15, WS-16, WS-19, WS-20	WS-6, WS-15, WS-16, WS-17, WS-19, WS-20	WS-8, WS-19, WS-21		WS-6, WS-8, WS-15, WS-16, WS-17, WS-19	WS-15
Volcano	WS-8, WS-15, WS-16, WS-19, WS-20	WS-6, WS-15, WS-16, WS-17, WS-19, WS-20	WS-8, WS-19, WS-21		WS-6, WS-8, WS-15, WS-16, WS-17, WS-19	WS-15
Wildland Fire	WS-2, WS-5, WS-10, WS-14, WS-15, WS-16, WS-28, WS-19, WS-20	WS-2, WS-5, WS-10, WS-15, WS-16, WS-17, WS-18, WS-19, WS-20	WS-2, WS-5, WS-8, WS-19, WS-21	WS-5, WS-14	WS-6, WS-8, WS-15, WS-16, WS-17, WS-18, WS-19	WS-2, WS-15

a. See the introduction to this volume for explanation of mitigation types.

City of Washougal



Critical Facilities and Infrastructure

- | | |
|----------------------------|--------------------------------|
| ✴ Communication Facilities | ✚ Medical Care Facilities |
| ◆ Dams | ■ Transportation Systems |
| ★ Emergency Services | 🚩 Schools |
| ▲ Energy Facilities | ■ Water and Sanitation Systems |
| ⬢ Hazardous Materials | ◆ Other Facilities |



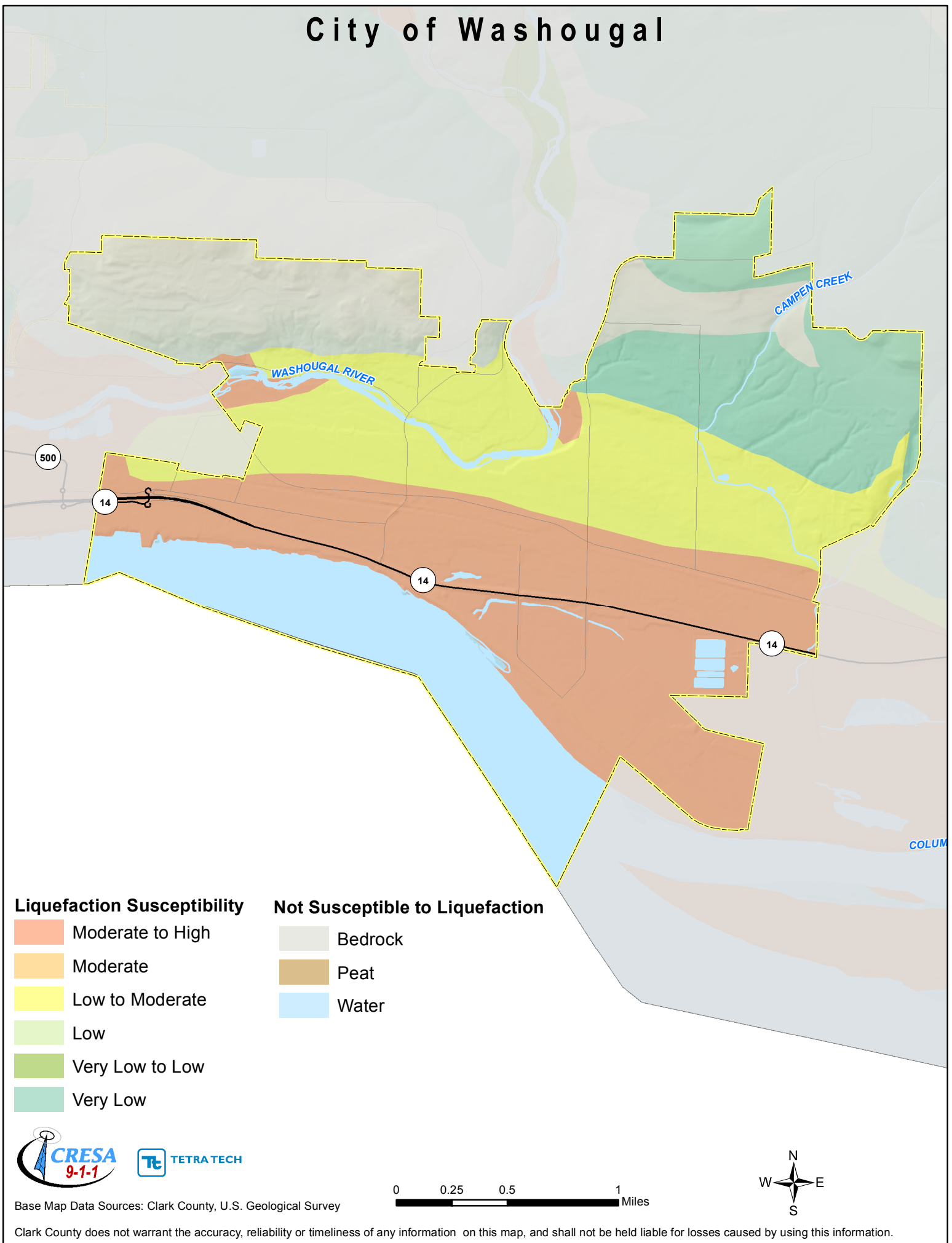
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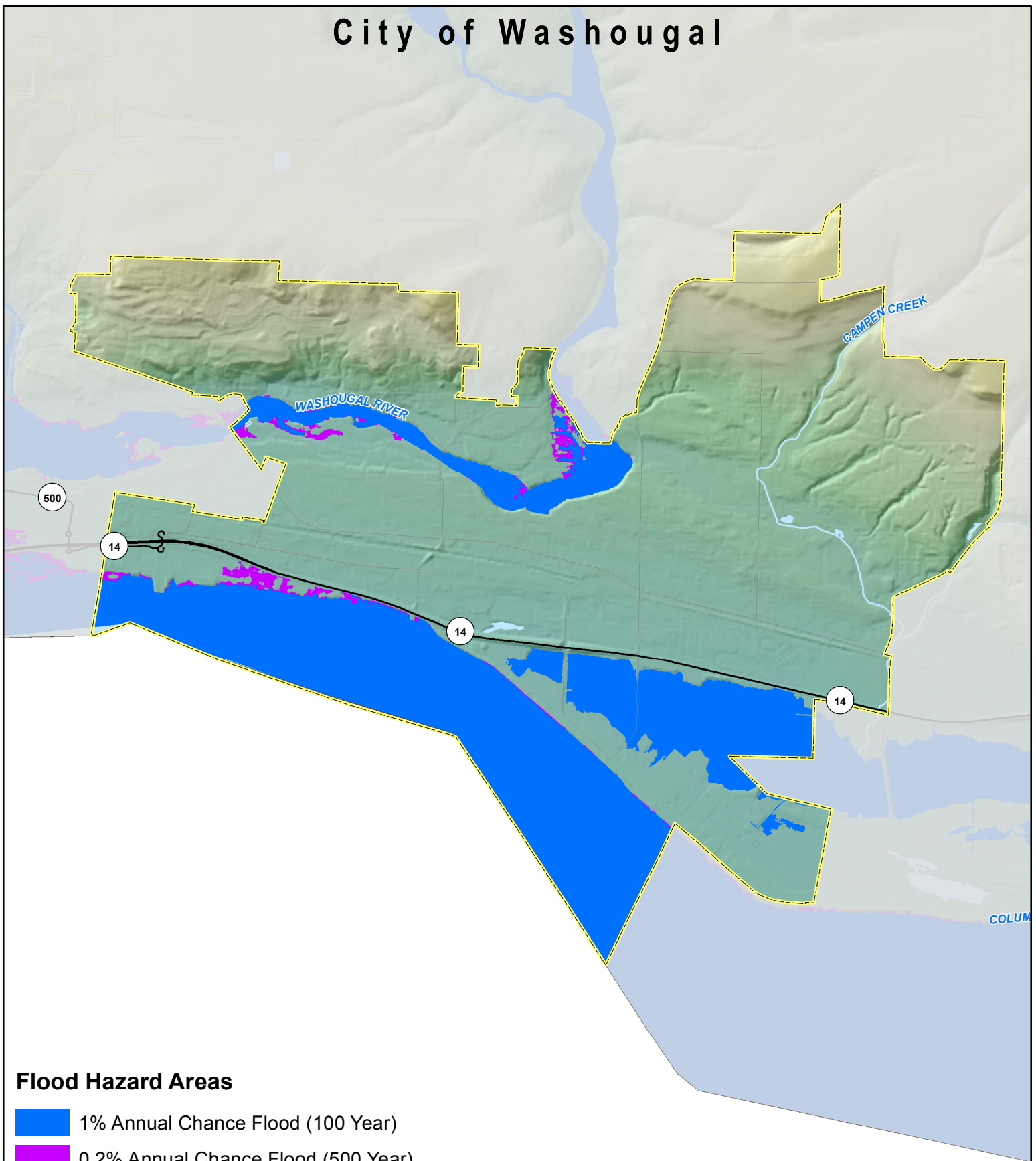


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City of Washougal



City of Washougal

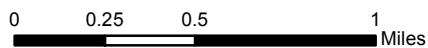


Flood Hazard Areas

-  1% Annual Chance Flood (100 Year)
-  0.2% Annual Chance Flood (500 Year)

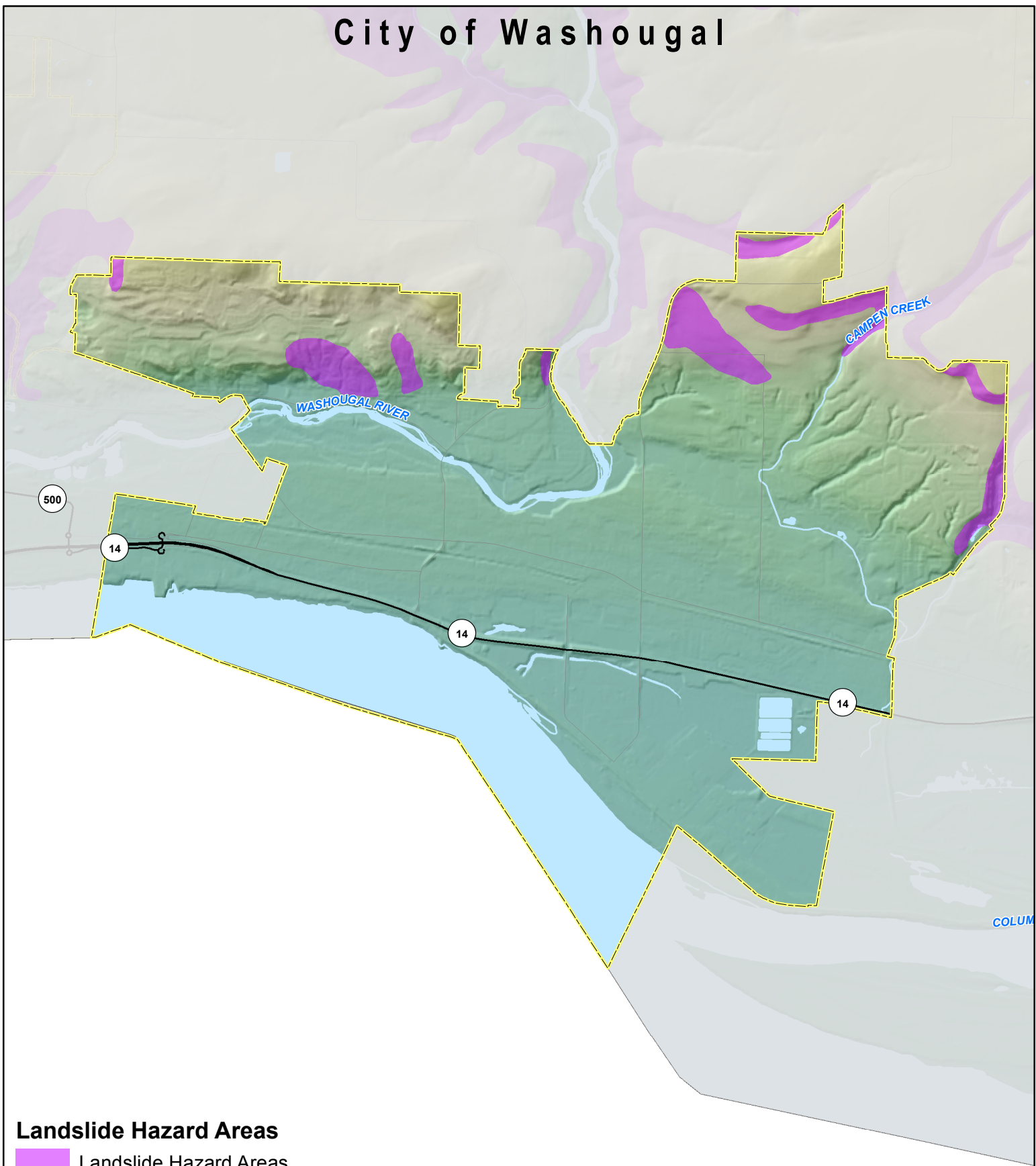


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City of Washougal

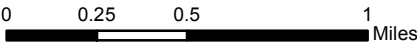


Landslide Hazard Areas

 Landslide Hazard Areas

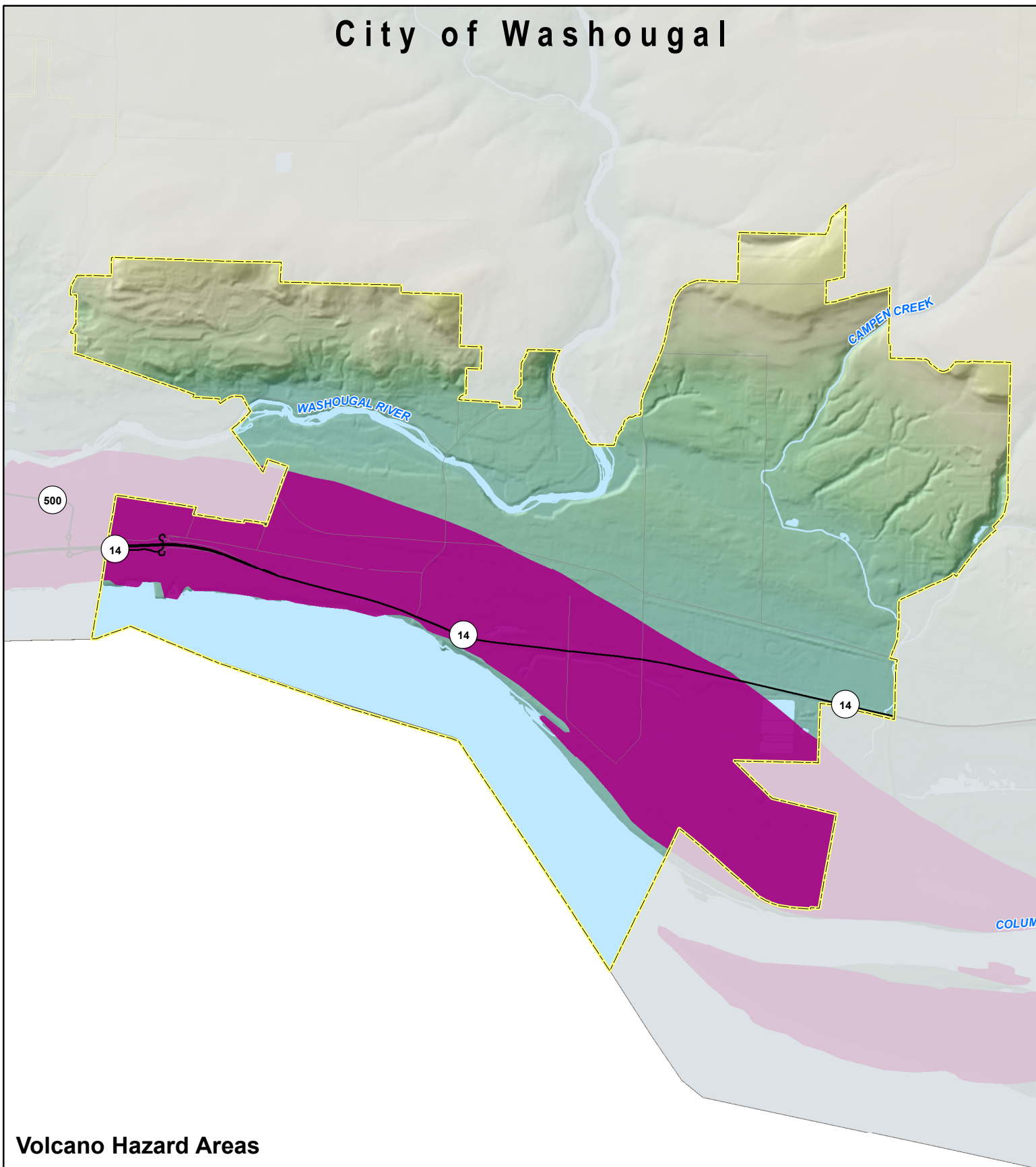


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City of Washougal

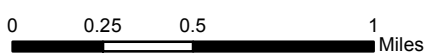


Volcano Hazard Areas

 Distal Volcano Hazard Zone - Mt. Hood

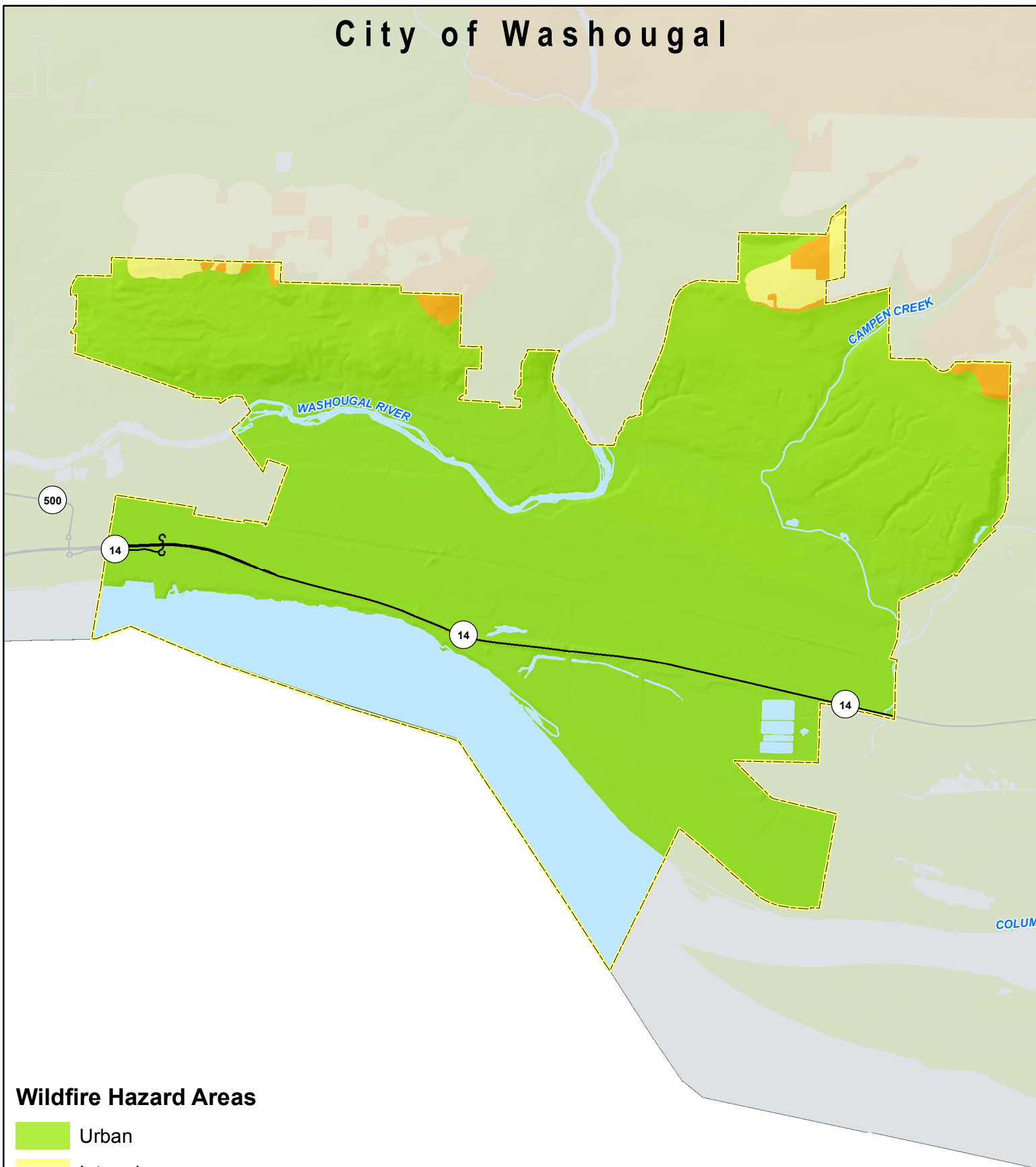


Base Map Data Sources: Clark County, U.S. Geological Survey



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City of Washougal

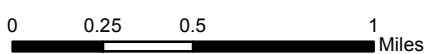


Wildfire Hazard Areas

- Urban
- Intermix
- Wildland



Base Map Data Sources: Clark County, U.S. Geological Survey



Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

9. CITY OF WOODLAND

9.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Dennis Ripp, Acting Public Works Director
PO Box 9, 300 E. Scott Ave
Woodland, WA 98674
Telephone: 360-225-7999
e-mail Address: rippd@ci.woodland.wa.us

Alternate Point of Contact

Jody Bartkowski-Herz
PO Box 9, 300 E. Scott Avenue
Woodland, WA 98674
Telephone: 360-225-7999
e-mail Address: bartkowskij@ci.woodland.wa.us

9.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- Date of Incorporation—1906
- Current Population—5,845 (2015 OFM Estimate)
- Population Growth—2.3 percent a year is 2016 Comp Plan Update Projection
- Location and Description —Woodland is located at the northwest corner of Clark County and is located along the banks of the Lewis River. Most of the City is located within Cowlitz County with just a small part of the City in Clark County. Interstate 5 and BNSF Railroad runs through Woodland north-south and SR 503 runs east-west ending at I-5. Most of the City lies in the historic floodplain of the Lewis River. Dikes protect most of the City, but the eastern residential area lies within the floodplain.
- Brief History—The City was platted in 1889 and incorporated in 1906. Major floods occurred in 1948 and 1996. Woodland is perhaps best known as the home of the Hulda Klager Lilac Gardens, a historical site that was the home of Hulda Klager who was known for breeding Lilacs.
- Climate—According to the Köppen Climate Classification system, Woodland has a warm-summer Mediterranean climate. This type of climate has warm, but not hot, and dry summers with rainy winters that are mild to chilly with low amounts of snowfall.
- Governing Body Format—Council-Mayor form of government with a City Administrator overseeing day to day operations. The City Administrator position was created in 2016. The mayor assumes responsibility for the adoption of this plan; the mayor will oversee its implementation.
- Development Trends—The last 4 years has shown a slow but steady growth in the residential and commercial sectors. There are several industrial developments being proposed for 2016.

9.3 CAPABILITY ASSESSMENT

An assessment of legal and regulatory capabilities is presented in Table 9-1. An assessment of fiscal capabilities is presented in Table 9-2. An assessment of administrative and technical capabilities is presented in Table 9-3. Information on National Flood Insurance Program (NFIP) compliance is presented in Table 9-4. Classifications under various community mitigation programs are presented in Table 9-5. An assessment of education and outreach capabilities is presented in Table 9-6.

Table 9-1. Legal and Regulatory Capability

	Local Authority	Other Jurisdiction Authority	State Mandated
Building Code <i>Comment: Woodland Municipal Code Chapter 14.04, International Building Code, adopted 6/7/2013.</i>	Yes	No	Yes
Zoning Code <i>Comment: Woodland Municipal Code Title 17, Zoning, latest adoption in October 2015.</i>	Yes	No	Yes
Subdivisions <i>Comment: Woodland Municipal Code Title 16, Subdivisions, latest adoption date 2012.</i>	Yes	No	Yes
Stormwater Management <i>Comment: Woodland Municipal Code Chapter 15.12, Stormwater Management, adopted 11/19/12.</i>	Yes	No	Yes
Post-Disaster Recovery <i>Comment: N/A</i>	No	No	No
Real Estate Disclosure <i>Comment: N/A</i>	No	No	No
Growth Management <i>Comment: Woodland Municipal Code Title 15 Environment, Title 16 Subdivisions, Title 17 Zoning, Title 18 Annexation, and Title 19 Development Code Administration. Adoption dates vary.</i>	Yes	Yes	Yes
Site Plan Review <i>Comment: Woodland Municipal Code Chapter 19.10, Site Plan Review, adopted 8/3/2013.</i>	Yes	No	No
Environmental Protection <i>Comment: Woodland Municipal Code Title 15, Environment, includes shorelines management, critical areas regulations, erosion control ordinance, and stormwater management.</i>	Yes	No	Yes
Flood Damage Prevention <i>Comment: Woodland Municipal Code Chapter 14.40, Flood Damage Prevention. Latest adoption date 11/16/15.</i>	Yes	No	Yes
Emergency Management <i>Comment: Cowlitz County is the responsible party for emergency management in Woodland through an interlocal agreement dated 3/9/1987.</i>	No	Yes	Yes
Climate Change <i>Comment: N/A</i>	No	No	No
Other <i>Comment: N/A</i>	No	No	No
General or Comprehensive Plan <i>Is the plan equipped to provide linkage to this mitigation plan? No</i> <i>Comment: Comprehensive Update, latest adoption date April 2016.</i>	Yes	Yes	Yes
Capital Improvement Plan <i>What types of capital facilities does the plan address? Transportation, Parks, Water, Sewer, Facilities, and Schools</i> <i>How often is the plan updated? As needed to meet GMA requirements.</i> <i>Comment: Individual plans for transportation, water, and sewer are completed as needed for state agencies.</i>	Yes	No	Yes
Floodplain or Watershed Plan <i>Comment: N/A</i>	No	No	No
Stormwater Plan <i>Comment: City has an old stormwater management plan that is out of date.</i>	No	No	No
Habitat Conservation Plan <i>Comment: N/A</i>	No	No	No

	Local Authority	Other Jurisdiction Authority	State Mandated
Economic Development Plan <i>Comment: N/A</i>	No	No	No
Shoreline Management Plan <i>Comment: Shoreline plan, latest update was July 2016.</i>	Yes	No	Yes
Community Wildfire Protection Plan <i>Comment: N/A</i>	No	No	No
Forest Management Plan <i>Comment: N/A</i>	No	No	No
Climate Action Plan <i>Comment: N/A</i>	No	No	No
Other <i>Comment: N/A</i>	No	No	No
Comprehensive Emergency Management Plan <i>Comment: Cowlitz County Comprehensive Emergency Management Plan, October of 2008.</i>	No	Yes	Yes
Threat & Hazard Identification & Risk Assessment <i>Comment: N/A</i>	No	No	No
Post-Disaster Recovery Plan <i>Comment: N/A</i>	No	No	No
Continuity of Operations Plan <i>Comment: N/A</i>	No	No	No
Public Health Plan <i>Comment: N/A</i>	No	No	No

Table 9-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes (administered through Clark County)
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes (water, sewer, garbage)
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
Withhold Public Expenditures in Hazard-Prone Areas	Yes
State-Sponsored Grant Programs	Yes (TIB, Safe Route to school, etc.)
Development Impact Fees for Homebuyers or Developers	Yes
Other	Yes (Fees for building and planning services)

Table 9-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Public Works Director and Community Development Planner are knowledgeable about land use
Engineers or professionals trained in building or infrastructure construction practices	Yes	Public Works Director has construction experience
Planners or engineers with an understanding of natural hazards	Yes	Public Works Director and Community Development Planner have experience in the area of shoreline management and critical areas.
Staff with training in benefit/cost analysis	No	
Surveyors	Yes	City hires a licensed surveyor for any surveying work needed.
Staff capable of making substantial damage estimates	Yes	The building official can make building damage estimates. The Public Works Director can make estimates of infrastructure damage.
Personnel skilled or trained in GIS applications	Yes	The City has ArcGIS and an Engineering Technician who is trained in using it.
Scientist familiar with natural hazards in local area	No	
Emergency manager	No	
Grant writers	Yes	The Public Works Director is experienced in writing grant applications for infrastructure improvements.

Table 9-4. National Flood Insurance Program Compliance

Criteria	Response
When did the community enter the NFIP?	02/01/78
When did the Flood Insurance Rate maps become effective?	December 16, 2015
What local department is responsible for floodplain management?	Building and Planning (Community Development)
Who is your floodplain administrator? (department/position)	Building and Planning/ Building Official
• Is this a primary or auxiliary role?	Auxiliary
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date of adoption of your flood damage prevention ordinance?	1996, updated 2015
• Does your floodplain management program meet or exceed minimum requirements?	Meet
• If so, in what ways?	
When was the most recent Community Assistance Visit or Community Assistance Contact?	Unknown
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed?	No
• If so, please state what they are.	
Do your flood hazard maps adequately address the flood risk within your jurisdiction?	Yes
• If no, please state why.	Maps updated in 2015 by FEMA
Does your floodplain management staff need any assistance or training to support its floodplain management program?	No
• If so, what type of assistance/training is needed?	

Criteria	Response
Does your jurisdiction participate in the Community Rating System (CRS)?	No
• If so, is your jurisdiction seeking to improve its CRS Classification?	N/A
• If not, is your jurisdiction interested in joining the CRS program?	Unknown
How many Flood Insurance policies are in force in your jurisdiction? ^a	367
• What is the insurance in force? ^a	\$86,102,700
• What is the premium in force? ^a	\$291,619
How many total loss claims have been filed in your jurisdiction? ^a	69
• How many claims were closed without payment/are still open? ^a	18
• What were the total payments for losses? ^a	\$988,025.89

a. As of 11/30/2015

Table 9-5. Community Classifications

	Participating?	Classification	Date Classified
Community Rating System	No	N/A	N/A
Building Code Effectiveness Grading Schedule	No	N/A	N/A
Public Protection	No	N/A	N/A
Storm Ready	No	N/A	N/A
Firewise	No	N/A	N/A

Table 9-6. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	No
Do you have personnel skilled or trained in website development?	Yes – A clerk handles the City website.
Do you have hazard mitigation information available on your website?	No
• If yes, please briefly describe.	
Do you utilize social media for hazard mitigation education and outreach?	Yes
• If yes, please briefly describe.	Facebook and City website were used to get information out about I-5 closure in 2015.
Do you have any citizen boards or commissions that address issues related to hazard mitigation?	No
• If yes, please briefly specify.	
Do you have any other programs already in place that could be used to communicate hazard-related information?	No
• If yes, please briefly describe.	
Do you have any established warning systems for hazard events?	No
• If yes, please briefly describe.	

9.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into local planning mechanisms.

9.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- Regulation of hazardous areas - Woodland Municipal Code Title 15, Environment, includes shorelines management, critical areas regulations, erosion control ordinance, and stormwater management.

9.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- Water System Plan—The City is required to update our water system plan every 6 years and this plan includes an emergency response plan. Mitigation projects can be identified in this planning process.
- General Sewer Plan—The City is required to update the General Sewer Plan as needed by Ecology and it includes an emergency response section. Mitigation projects can be identified in this planning process.
- Lewis River Dam Failure—Emergency Response Protocol (ERP) —This is a plan in regards to a failure of the Yale, Merwin, or Swift dams on the Lewis River. The inundation areas form the basis for the risk assessment of the natural hazard mitigation plan dam failure assessment.
- City Safety Manual—This is the safety manual for all City employees. Mitigation projects could be incorporated or identified as appropriate.
- Comprehensive Plan— Upon the next update of the comprehensive plan the natural hazard mitigation plan will be linked by reference.
- Shoreline Management Plan— Upon the next update of the Shoreline management plan the natural hazard mitigation plan will be linked by reference.

9.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 9-7 lists all past occurrences of natural hazards within the jurisdiction.

Table 9-7. Natural Hazard Events

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Rain Storm – I5 Slide	N/A	2/15	\$8,000
Severe Storm(s)	1825	3/09	\$8,000
Flood	1817	1/09	\$8,000
Earthquake	N/A	2001	Unknown
Flood	1100	2/96	\$330,000
Volcanic Eruption	623	5/80	Unknown
Flood	N/A	1/72	\$9,809

9.6 JURISDICTION-SPECIFIC VULNERABILITIES

Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: 0
- Number of FEMA-identified Severe-Repetitive-Loss Properties: 0
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: 0

Other noted vulnerabilities include:

- Inundation of entire City except for top of Scott Hill due to failure of Lewis River Dams upstream of Woodland.
- If an earthquake causes the I-5 overpasses at Exit 21 and 22 to collapse, the west and east side of the Cities would effectively be cut off from each other. It would also leave all of the area west of I-5 landlocked between I-5, the Lewis River, and the Columbia River. The east side could also be landlocked if SR-503 is rendered impassable by the earthquake.

9.7 HAZARD RISK RANKING

Table 9-8 presents the ranking of the hazards of concern.

Table 9-8. Hazard Risk Ranking

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Earthquake	48	High
1	Severe Weather	48	High
2	Flood	28	Medium
3	Dam Failure	14	Low
4	Drought	9	Low
5	Volcano	8	Low
5	Wildfire	8	Low
6	Landslide	3	Low

9.8 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 9-9 lists the actions that make up the City of Woodland hazard mitigation action plan. Table 9-10 identifies the priority for each action. Table 9-11 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 9-9. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
WD-1—Where appropriate, support retro-fitting, purchase or relocation of structures located in high hazard areas.						
Existing	All Hazards	4, 5, 7, 9, 10,	Public Works	High	HMGP, PDM, FMA, CDBG-DR	Long-Term
WD-2—Integrate the natural hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions within Woodland.						
New and Existing	All Hazards	5, 6, 7, 10, 11, 12	Planning and Public Works	Low	Staff Time, General Funds	On-going
WD-3—Develop and implement a program to capture perishable data after significant events (e.g. high water marks, preliminary damage estimates, damage photos) to support future mitigation efforts including the implementation and maintenance of the natural hazard mitigation plan.						
Existing	All Hazards	1, 2, 4, 11, 12	Planning and Public Works	Medium	Staff Time, General Funds	Short-Term
WD-4—Support the County-wide initiatives identified in Volume I of the natural hazard mitigation plan.						
New and Existing	All Hazards	All Objectives	Public Works	Low	Staff Time, General Funds	On-going
WD-5—Actively participate in the plan maintenance protocols outlined in Volume I of the natural hazard mitigation plan.						
New and Existing	All Hazards	3, 4, 9, 10	Public Works	Low	Staff Time, General Funds	On-going
WD-6 — Continue to maintain good standing and compliance under the National Flood Insurance Program (NFIP). This will be accomplished through the implementation of floodplain management programs that will, at a minimum, meet the requirements of the NFIP:						
<ul style="list-style-type: none"> • Enforcement of the flood damage prevention ordinance • Participate in floodplain identification and mapping updates • Provide public assistance/information on floodplain requirements and impacts. 						
New and existing	Flood	1, 4, 5, 9	Planning	Low	Staff Time, General Funds	On-going
WD-7—Participate in the BCEGS classification program and work with building officials to identify ways to improve the jurisdiction's classification.						
New	Earthquake, Flood, Landslide, Severe weather, Volcano, Wildfire	4, 5, 6, 7, 10, 12	Building	Low	Staff Time, General Funds	On-going
WD-8—Develop a post-disaster recovery plan and a debris management plan.						
Existing	All hazards	1, 2, 4, 9	Public Works	Medium	EMPG	Long-term
WD-9—Participate in programs such as Firewise, StormReady and the Community Rating System.						
New and Existing	Dam Failure, Flood, Severe Weather, Wildfire	1, 7	Building	Medium	Staff Time, General Funds	Long-term
WD-10—Construct new Public Works Office up on Scott Hill next to Water Treatment Plant and design it to be used as an Emergency Operations Center in case Lewis River dam failure inundates all other City facilities.						
New	Dam Failure, Flood, Earthquake	3, 9, 10	Public Works	High	General, water, and sewer funds, Possibly HMGP, PDM, FMA, CDBG-DR	Long-term
WD-11—Construct seismically rated fire station at 200 E. Scott next to police station.						
New	Earthquake	3, 9, 10	Public Works	High	General Funds	Short-term

Table 9-10. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
WD-1	5	High	High	Yes	Yes	No	Low	High
WD-2	6	Medium	Low	Yes	No	No	Medium	Low
WD-3	5	Low	Medium	No	No	No	Low	Low
WD-4	12	Low	Low	Yes	No	Maybe	High	Low
WD-5	4	Low	Low	Yes	No	Maybe	High	Low
WD-6	4	Medium	Low	Yes	No	Yes	High	Low
WD-7	6	Medium	Medium	Yes	No	No	Medium	Low
WD-8	4	Medium	Medium	Yes	Yes	No	Medium	High
WD-9	2	Medium	Medium	Yes	No	No	Medium	Low
WD-10	3	Medium	High	No	Yes	No	Low	High
WD-11	3	Medium	High	No	Yes	No	Low	Low

a. See the introduction to this volume for explanation of priorities.

Table 9-11. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	WD-2, WD-3, WD-4, WD-5, WD-6, WD-8	WD-1, WD-10	WD-4, WD-6		WD-8, WD-10	WD-10
Drought	WD-2, WD-3, WD-4, WD-5, WD-8	WD-1	WD-4		WD-8	
Earthquake	WD-2, WD-3, WD-4, WD-5, WD-7, WD-8	WD-1, WD-7, WD-10, WD-11	WD-4		WD-8	WD-10, WD-11
Flood	WD-2, WD-3, WD-4, WD-5, WD-6, WD-7, WD-8	WD-1, WD-6, WD-7, WD-10	WD-4, WD-6	WD-6, WD-9	WD-8	WD-10
Landslide	WD-2, WD-3, WD-4, WD-5, WD-7, WD-8	WD-1, WD-7	WD-4		WD-8	
Severe Weather	WD-2, WD-3, WD-4, WD-5, WD-7, WD-8	WD-1, WD-7, WD-9	WD-4		WD-8, WD-9	
Volcano	WD-2, WD-3, WD-4, WD-5, WD-7, WD-8	WD-1, WD-7	WD-4		WD-8	
Wildfire	WD-2, WD-3, WD-4, WD-5, WD-6, WD-7, WD-8	WD-1, WD-7, WD-9	WD-4, WD-9	WD-9		

a. See the introduction to this volume for explanation of mitigation types.

City of Woodland

Critical Facilities and Infrastructure

- | | |
|----------------------------|--------------------------------|
| * Communication Facilities | + Medical Care Facilities |
| ◆ Dams | ■ Transportation Systems |
| ★ Emergency Services | ▲ Schools |
| ▲ Energy Facilities | ■ Water and Sanitation Systems |
| ● Hazardous Materials | ◆ Other Facilities |



Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

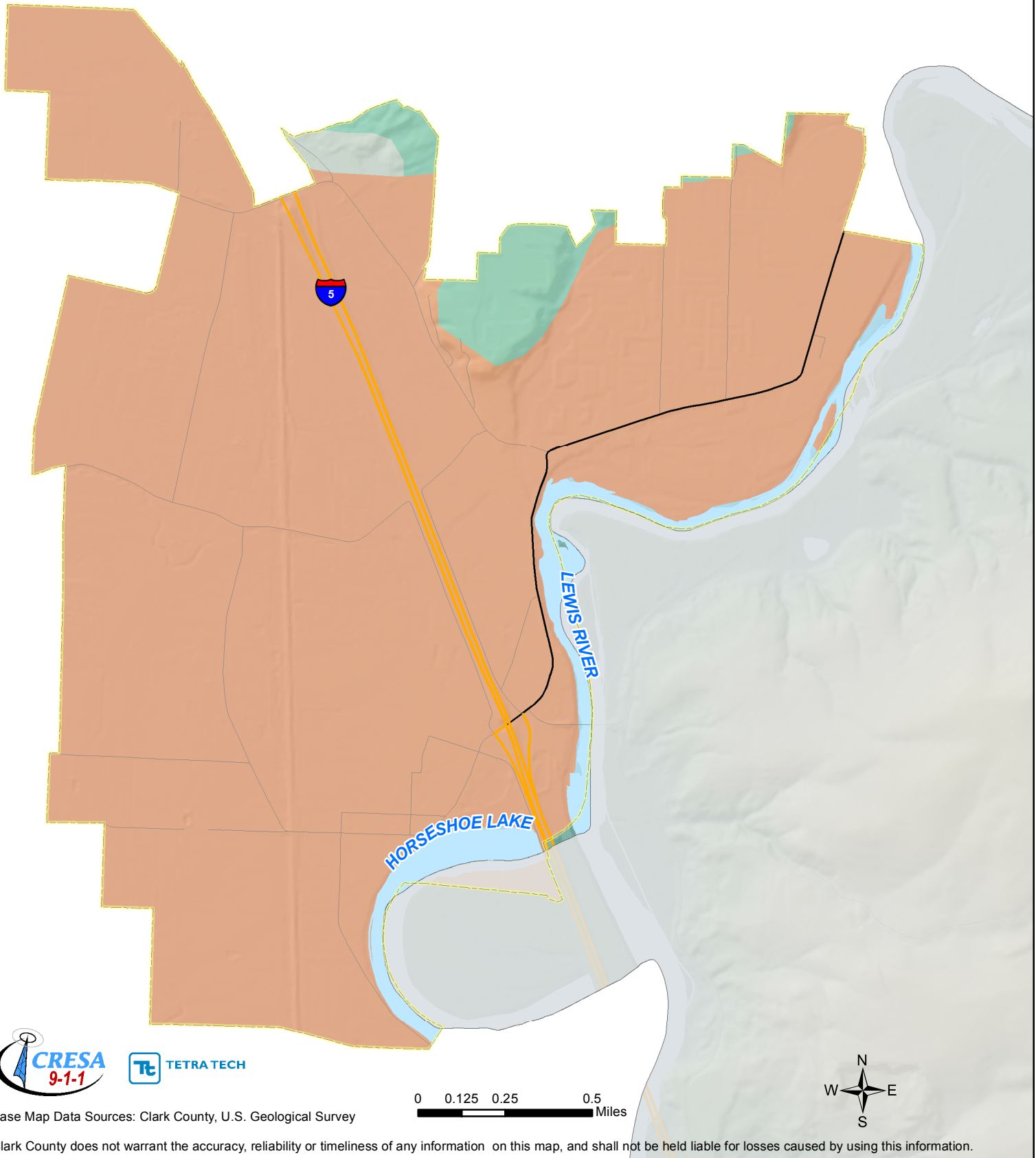
City of Woodland

Liquefaction Susceptibility

Moderate to High	Low
Moderate	Very Low to Low
Low to Moderate	Very Low

Not Susceptible to Liquefaction

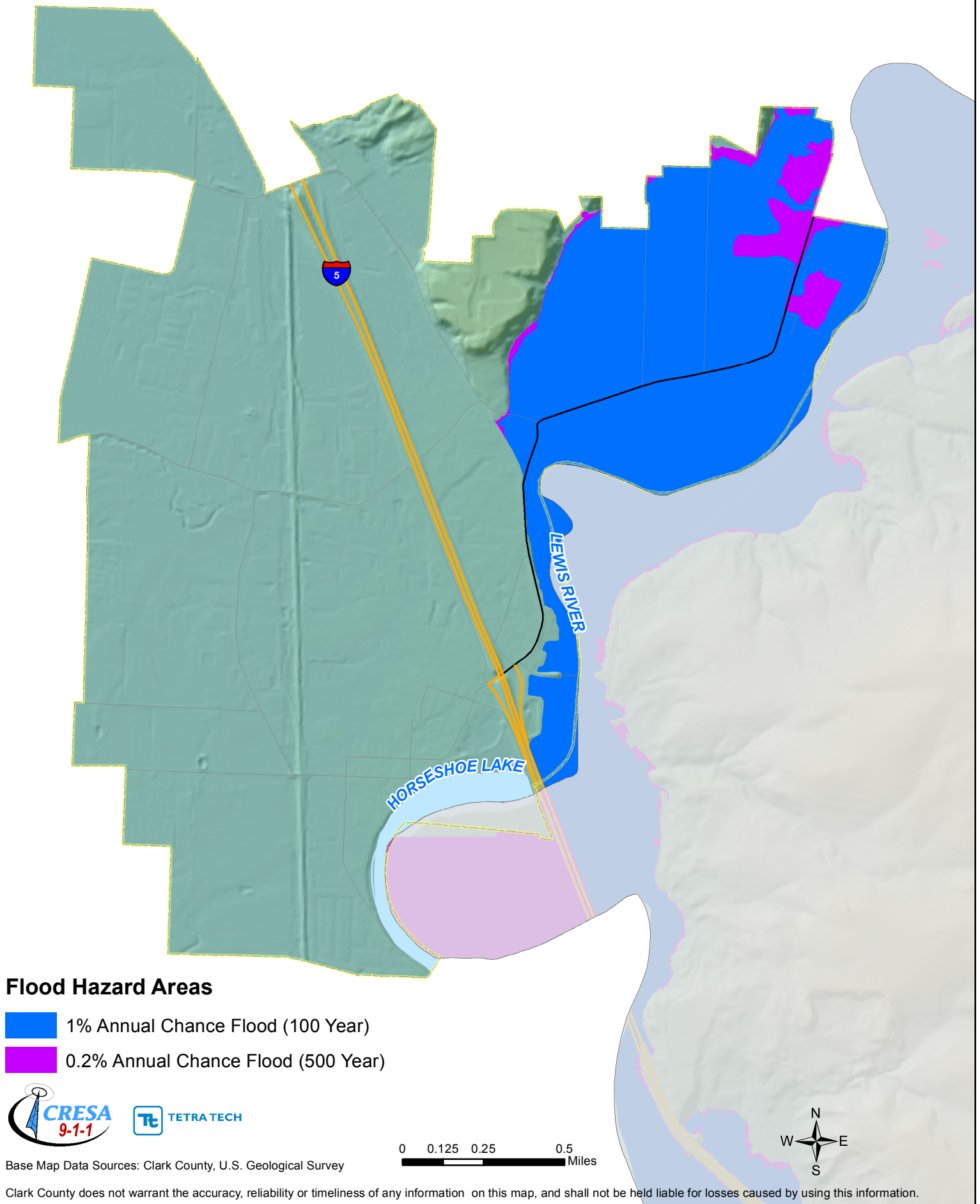
Bedrock
Peat
Water



Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

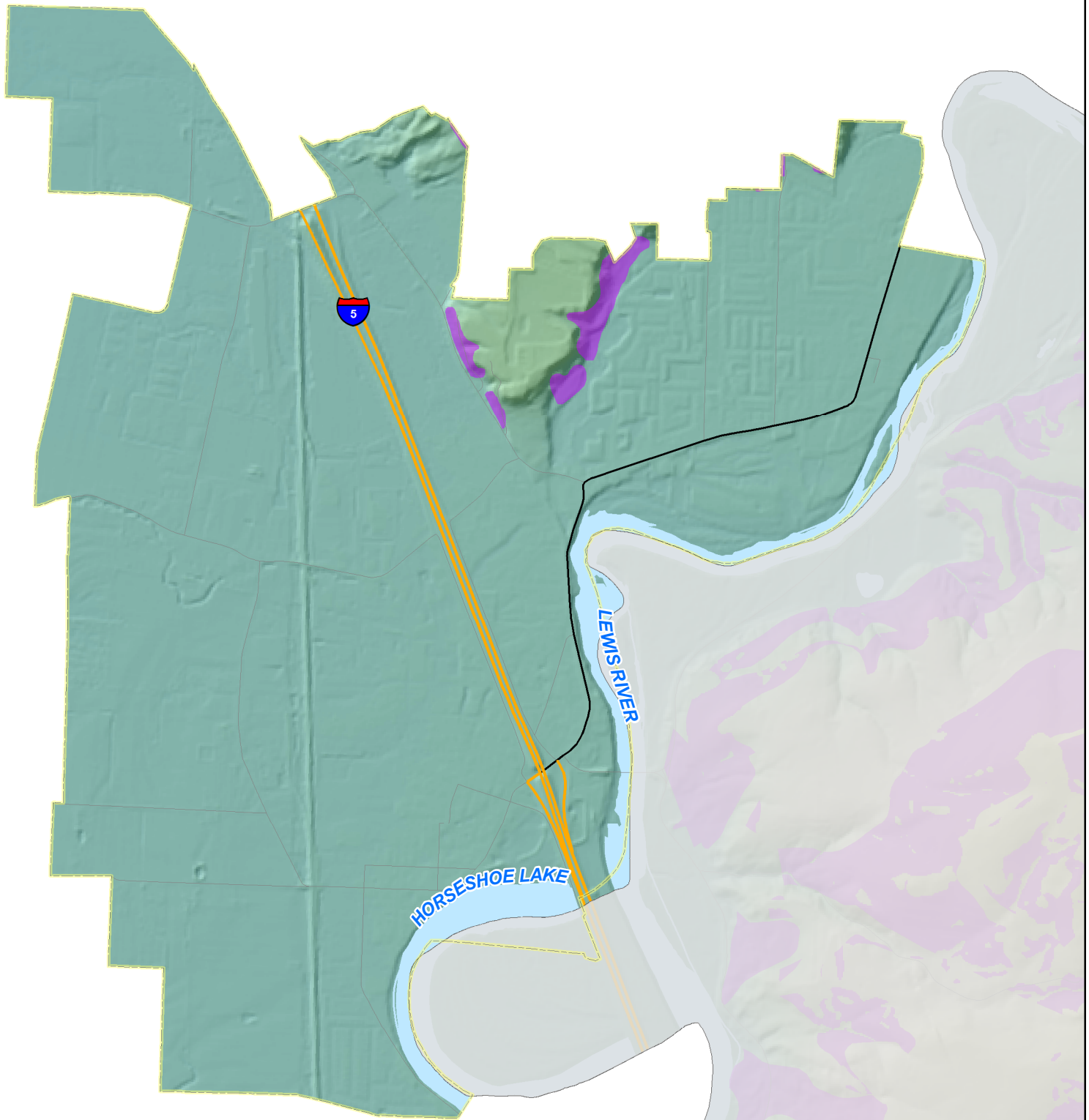
City of Woodland




Base Map Data Sources: Clark County, U.S. Geological Survey

Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

City of Woodland



Flood Hazard Areas

 Landslide Hazard Areas



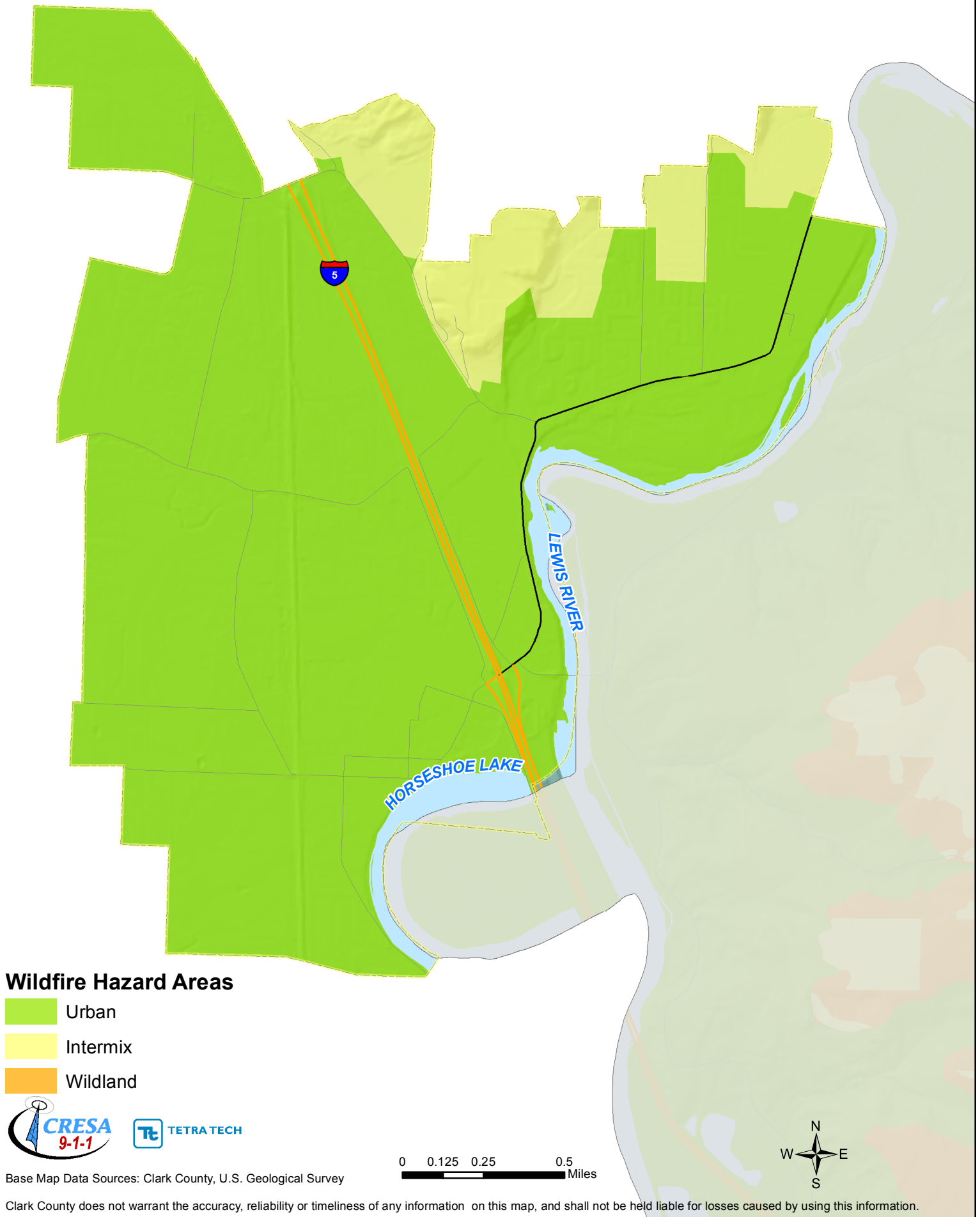
Base Map Data Sources: Clark County, U.S. Geological Survey

0 0.125 0.25 0.5 Miles



Clark County does not warrant the accuracy, reliability or timeliness of any information on this map, and shall not be held liable for losses caused by using this information.

City of Woodland



10. BATTLE GROUND PUBLIC SCHOOLS

10.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Scott McDaniel, Director of Technology and Security
400 N Parkway
Battle Ground, WA 98604
Telephone: 360-885-5350
e-mail Address:
mcdaniel.scott@battlegroundps.org

Alternate Point of Contact

Linda Gellings, Director of Business Services and Risk Management
400 N Parkway
Battle Ground, WA 98604
Telephone: 360-885-5381
e-mail Address:
gellings.linda@battlegroundps.org

10.2 JURISDICTION PROFILE

10.2.1 Overview

Battle Ground Public Schools is a public K-12 school district in northeast Clark County, Washington, and has 19 schools spread over 273 square miles. It stretches from the lowlands of suburban Vancouver on the west, near the confluence of Interstate 5 and Interstate 205, to the Cascade Mountains at the Clark-Skamania county line on the east. Mount St. Helens is just 10 miles outside of the district's northeast boundary. The district serves populations within portions of Clark County, the City of Battle Ground and the City of Vancouver. A five member elected board of directors governs the district. Battle Ground Public Schools Board of Directors assumes responsibility for the adoption of this plan; the Director of Security and Assistant Superintendent of Finance and Operations will oversee its implementation.

The district was established in 1909 and serves approximately 13,000 students and employs 1,528 staff. The school district is funded by the state as well as local levies.

10.2.2 Service Area and Trends

Approximately 65,180 people reside within the district's service area. The district serves a population of 13,000 students. Its service area covers an area of 273 square miles, which has a total replacement value of \$647,528,800 for district assets and \$8.9 billion for overall structure value.

The district has been reviewing building needs to accommodate increases in population but no decisions have been made at this time as to location. We have seen a great deal of new housing starts and apartment construction in the south of our district and expect increases in enrollment.

10.2.3 Assets

Table 10-1 summarizes the critical assets of the district and their value.

Table 10-1. Special Purpose District Assets

Asset	Value
Property	
564 acres	\$28.2 million
Critical Facilities	
Amboy Middle School (6 facilities)	\$34,701,200
Battle Ground High School (22 facilities)	\$135,254,800
Captain Strong Elementary School (7 facilities)	\$34,148,000
Center For Ag Science & Environ. Ed (10 facilities)	\$20,379,600
Chief Middle School	\$31,364,400
Daybreak Campus (5 facilities)	\$35,752,800
Dodge House	\$701,600
Glenwood Heights Primary (9 facilities)	\$27,570,800
Homelink-CAM	\$12,200,000
Laurin Intermediate (8 facilities)	\$24,072,000
Laurin Middle	\$3,175,200
Lewisville Non School (6 facilities)	\$22,676,800
Maple Grove Middle (3 facilities)	\$27,708,800
Maple Grove Primary (8 facilities)	\$29,678,400
Pleasant Valley Middle School (8 facilities)	\$44,716,400
Prairie High School (20 facilities)	\$91,937,600
Tukes Valley Campus (5 facilities)	\$35,941,600
Yacolt Primary (10 facilities)	\$35,548,800
Total:	\$647,528,800

10.3 CAPABILITY ASSESSMENT

10.3.1 Planning and Regulatory Capabilities

The following existing codes, ordinances, policies or plans are applicable to this natural hazard mitigation plan:

- BGPS Board of Directors Policies
- Long Range Facility Plan
- Board of Directors Strategic Plan
- Capital Facilities Plan
- Clark County Codes
- City of Battle Ground Codes
- City of Vancouver Codes
- City of Yacolt Codes.

10.3.2 Fiscal, Administrative and Technical Capabilities

An assessment of fiscal capabilities is presented in Table 10-2. An assessment of administrative and technical capabilities is presented in Table 10-3.

10.3.3 Education and Outreach Capabilities

An assessment of education and outreach capabilities is presented in Table 10-4.

Table 10-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	NA
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
State-Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes - Impact Fees
Other	NA

Table 10-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Operations Department
Engineers or professionals trained in building or infrastructure construction practices	Yes	Operations Department
Planners or engineers with an understanding of natural hazards	Yes	Operations Department
Staff with training in benefit/cost analysis	Yes	Business Services
Surveyors	No	NA
Personnel skilled or trained in GIS applications	Yes	Facilities Department
Scientist familiar with natural hazards in local area	No	NA
Emergency manager	Yes	Business Services/IT
Grant writers	No	NA
Other	No	NA

Table 10-4. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes
Do you have personnel skilled or trained in website development?	Yes
Do you have hazard mitigation information available on your website? • If yes, please briefly describe.	No
Do you utilize social media for hazard mitigation education and outreach? • If yes, please briefly describe.	No
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, please briefly specify.	No
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, please briefly describe.	Yes Blackboard Connect, Parentlink App, FlashAlert, District snow line
Do you have any established warning systems for hazard events? • If yes, please briefly describe.	Yes Blackboard Connect, Parentlink App, FlashAlert, District snow line

10.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into existing plans and programs.

10.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- None identified at this time.

10.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- Long Range Facility Plan
- Board of Directors Strategic Plan
- Capital Facilities Plan
- Battle Ground Public Schools Educational Plan 2015.

10.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 10-5 lists all past occurrences of natural hazards within the jurisdiction.

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Severe Winter Storm, Straight Line Winds, Flooding, Landslides, Mudslides and a Tornado	DR-5253	December 1, 2015	NA
Severe Winter Storm and Record and Near Record Snow	DR-1825	December 12, 2008	NA
Severe Winter Storm, Landslides, and Mudslides	DR-1682	December 14, 2006	NA
Severe Winter Storms, Flooding	DR-1159	December 26, 1996	NA
Volcanic Eruption, Mount St. Helens	DR-623	May 21, 1980	NA
Dole Valley Fire	NA	1929	NA
Yacolt Burn	NA	1903	\$13,000,000

10.6 JURISDICTION-SPECIFIC VULNERABILITIES

Noted vulnerabilities of the jurisdiction include the following:

- Older facilities may not have been built to modern seismic standards.
- Snow routes for school buses have not been designated.

10.7 HAZARD RISK RANKING

Table 10-6 presents the ranking of the hazards of concern.

Table 10-6. Hazard Risk Ranking

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Severe Weather	18	Medium
2	Earthquake	16	Medium
3	Landslide	15	Medium
4	Wildfire	7	Low
5	Volcano	3	Low
6	Flood	2	Low
7	Drought	1	Low
8	Dan Failure	0	None

10.8 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 10-7 lists the actions that make up the Battle Ground Public Schools hazard mitigation action plan. Table 10-8 identifies the priority for each action. Table 10-9 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 10-7. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
BGPS-1—Follow all federal, state, local, Office of Superintendent of Public Instruction (OSPI) applicable building standards						
New	All hazards	4, 5, 10, 11, 12	BGPS Facilities	Low	General Fund, Levy	Ongoing
BGPS-2—Review OSPI Hazard Mitigation Plan goals and objectives						
NA	All hazards	4, 5, 10, 11, 12	BGPS Facilities	Low	General Fund, Levy	Short-term
BGPS-3—Actively participate in plan maintenance outlined in volume 1 of the natural hazard mitigation plan						
New and existing	All hazards	1, 4	BGPS Facilities	Low	General Fund, Levy	Ongoing
BGPS-4—Review potential risk for natural disasters on land purchases						
New	All hazards	4, 5, 10, 11, 12	BGPS	Low	General Fund, Levy	Short-term
BGPS-5—Share the natural hazard mitigation plan with the school board in a public meeting						
NA	All hazards	1, 4	BGPS	Low	General Fund, Levy	Ongoing
BGPS-6—Work with local agencies (ESD112, CRESA, Local Fire and Law Enforcement) on reunification site						
New and existing	All hazards	2, 4	BGPS	Low	General Fund, Levy	Short-term
BGPS-7—Complete state OSPI School Facilities Study and Survey for facilities review. Study addresses overall analysis of the school districts' facilities, educational programs and plans, student population projections, capital finance and operating capabilities and identification of needs for new construction, modernization or replacement of facilities.						
New and existing	All hazards	4, 5, 10, 11, 12	BGPS	Low	General Fund, Levy	Short-term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
BGPS-8—Ensure emergency communication systems functioning (Automated calling, district network and phone systems, e911 identification, district radio systems)						
New and existing	All hazards	3	BGPS	Low	General Fund, Levy	Short-term
BGPS-9—Integrate the natural hazard mitigation plan into other plans and programs that support infrastructure investment choices, such as the capital improvement program.						
New and existing	All hazards	5, 6	BGPS	Low	General Fund, Levy	Short-term
BGPS-10—Store emergency supplies and emergency water supply for students and staff at school for at least one day						
New and existing	All hazards	2, 5	BGPS	Low	General Fund, Levy	Short-term
BGPS-11—Where possible, support construction and retrofitting of vulnerable facilities						
Existing	Earthquake	4, 5, 10, 11, 12	BGPS	High	General Fund, Levy, HMGP, PDM	Long-term
BGPS-12—Designate snow routes with transportation contractor to ensure student safety						
NA	Severe weather	4, 5, 6, 8, 12	BGPS	Low	General Fund, Levy	Short-term
BGPS-13—Install and maintain surge protection on critical electronic equipment						
New and existing	Severe weather	5, 8, 10	BGPS	Low	General Fund, Levy	Short-term

Table 10-8. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
BGPS-1	5	High	Low	Yes	No	Yes	High	Low
BGPS-2	5	Low	Low	Yes	No	Yes	High	Low
BGPS-3	2	Low	Low	Yes	No	Yes	High	Low
BGPS-4	5	High	Low	Yes	No	Yes	High	Low
BGPS-5	2	Low	Low	Yes	No	Yes	High	Low
BGPS-6	2	Medium	Low	Yes	No	Yes	High	Low
BGPS-7	5	High	Low	Yes	No	Yes	High	Low
BGPS-8	1	Medium	Low	Yes	No	Yes	Medium	Low
BGPS-9	2	High	Low	Yes	No	Yes	High	Low
BGPS-10	2	Medium	Low	Yes	No	Yes	High	Low
BGPS-11	5	High	High	Yes	Yes	No	Medium	High
BGPS-12	5	Medium	Low	Yes	No	Yes	High	Low
BGPS-13	3	Medium	Low	Yes	No	Yes	High	Low

a. See the introduction to this volume for explanation of priorities.

Table 10-9. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	BGPS-2, BGPS-3, BGPS-4, BGPS-9	BGPS-1, BGPS-4, BGPS-7	BGPS-5		BGPS-6, BGPS-8, BGPS-10	
Drought	BGPS-2, BGPS-3, BGPS-4, BGPS-9	BGPS-1, BGPS-4, BGPS-7	BGPS-5		BGPS-6, BGPS-8, BGPS-10	
Earthquake	BGPS-2, BGPS-3, BGPS-4, BGPS-9	BGPS-1, BGPS-4, BGPS-7, BGPS-11	BGPS-5		BGPS-6, BGPS-8, BGPS-10	
Flood	BGPS-2, BGPS-3, BGPS-4, BGPS-9	BGPS-1, BGPS-4, BGPS-7	BGPS-5		BGPS-6, BGPS-8, BGPS-10	
Landslide	BGPS-2, BGPS-3, BGPS-4, BGPS-9	BGPS-1, BGPS-4, BGPS-7	BGPS-5		BGPS-6, BGPS-8, BGPS-10	
Severe weather	BGPS-2, BGPS-3, BGPS-4, BGPS-9	BGPS-1, BGPS-4, BGPS-7, BGPS-13	BGPS-5		BGPS-6, BGPS-8, BGPS-10, BGPS-12	
Volcano	BGPS-2, BGPS-3, BGPS-4, BGPS-9	BGPS-1, BGPS-4, BGPS-7	BGPS-5		BGPS-6, BGPS-8, BGPS-10	
Wildfire	BGPS-2 BGPS-3, BGPS-9	BGPS-1	BGPS-5		BGPS-6, BGPS-8, BGPS-10	

a. See the introduction to this volume for explanation of mitigation types.

11. CAMAS SCHOOL DISTRICT

11.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Heidi Burkart, Operations Coordinator
841 NE 22nd Ave
Camas, Washington 98607
Telephone: 360-833-7402
e-mail Address: heidi.burkart@camas.wednet.edu

Alternate Point of Contact

Bryan McGeachy, Operations Director
841 NE 22nd Ave
Camas, Washington 98607
Telephone: 360-335-3000 ext.78217
e-mail Address: bryan.mcgeachy@camas.wednet.edu

11.2 JURISDICTION PROFILE

11.2.1 Overview

Nestled along the beautiful Columbia River with Mt. Hood towering in the distance, Camas is one of the fastest-growing communities in the state. Both new and longtime residents of this community enjoy the benefits of a financially and academically sound school district. The district has two high schools, two middle schools, and six elementary schools. The Camas School District is recognized as a leader in state school reform efforts and for its delivery of dynamic instruction in basic skills. A strong history of community support affords approximately 6,800 students outstanding academic, vocational, cultural, and athletic opportunities.

The Camas Board of Education consists of five citizens of the school district elected from the director districts for a four year term. The Board assumes responsibility for the adoption of this plan; the Operations Department will oversee its implementation. A powerful partnership between businesses, parents, and staff provides challenging and enriching learning experiences for all Camas students. Together, Camas educators, parents, students, and community members have created a vision that promotes lifelong learning and educational innovation.

Camas School District is funded through State, Federal, and Local funds. Camas School District has 850 employees.

11.2.2 Service Area and Trends

Officially incorporated on June 18, 1906, the city is named after the camas lily, a plant with an onion-like bulb prized by Native Americans. At the west end of downtown Camas is a large Georgia-Pacific paper-mill from which the high school teams get their name “the Papermakers.” Accordingly, the city is about 20 miles east (upwind) from Portland, Oregon. Historically, the commercial base of the city was based almost solely on the paper mill; however, the diversity of industries has been enhanced considerably in recent years by the influx of several white-collar, high-tech companies including Hewlett-Packard, Sharp Microelectronics, Linear Technology and WaferTech and Underwriters Labs. Annual events include the summer “Camas Days,” as well as other festivals and celebrations.

The east side of town borders the city of Washougal, Washington, and the west side of town borders Vancouver, Washington. Camas lies along the Washington side of the Columbia River, across from Troutdale, Oregon, and is part of the Portland, Oregon, Metropolitan Statistical Area as defined by the United States Census Bureau. At this juncture the Columbia River is nearly a mile wide; vehicular traffic flows across the Columbia via the Interstate Bridge on I-5 and the Glenn Jackson Bridge on I-205. The main road through town is the limited-access SR 14 expressway.

The City of Camas has experienced significant population growth during the 1990s and the last decade. The recession slowed growth temporarily, but is once again picking up. According to forecasts produced by the Cascade Planning Group in 2014, enrollment in the district is expected to continue to increase. Baseline forecasts estimate a 10 percent increase over 2014 enrollment levels by 2010 and a 27 percent increase by 2035. High growth forecasts estimate a 14 percent increase over 2014 enrollment by 2020 and a 43 percent increase by 2035.

11.2.3 Assets

Table 11-1 summarizes the critical assets of the district and their value.

Table 11-1. Special Purpose District Assets	
Asset	Value
Property	
259.40 acres of land	\$16,744,392
Critical Infrastructure and Equipment	
Buses (77)	\$6,185,682
Other vehicles (40)	\$212,761
Other equipment (45)	\$249,377
Total:	\$6,647,820
Critical Facilities	
Armory Building	\$2,573,027
Camas High School	\$49,491,513
Camas SD Transportation	\$637,868
Doc Harris Stadium	\$9,238,827
Dorothy Fox Elementary School	\$14,528,547
Garfield Performing Arts Center	\$8,125,204
Grass Valley Elementary	\$25,105,737
Hayes Freedom High School	\$5,424,233
Helen Baller Elementary	\$17,639,817
Jack Will & Rob Center	\$2,877,809
Lacamas Heights Elementary	\$7,658,739
Liberty Middle School	\$19,900,763
Maintenance Buildings	\$1,698,124
Prune Hill Elementary	\$12,509,259
Skyridge Middle School	\$19,141,083
Transition House	\$171,023
Woodburn Elementary School	\$18,311,619
Zellerbach Admin Center (ZAC)	\$9,260,107
Total (includes structure and contents):	\$224,293,306

11.3 CAPABILITY ASSESSMENT

11.3.1 Planning and regulatory Capabilities

The following existing codes, ordinances, policies or plans are applicable to this natural hazard mitigation plan:

- Policy No. 6900 Management Support
- Facilities Planning- In order to provide the best possible physical environment for learning and teaching, the following factors will be considered in the planning of district facilities:
 - a. Facilities will accommodate the educational needs of students and be consistent with the educational philosophy and instructional goals of the district;
 - b. Facilities will meet or exceed all health, safety and welfare regulations;
 - c. The district will seek state and federal moneys to the maximum extent available to supplement its own financial resources;
 - d. Undesirable environmental impact will be minimized; and
 - e. Changing demographic factors will be monitored.
- Facilities Master Plan- In order to efficiently manage the district's present and future facilities needs, a facilities master plan will be developed. Such a plan will cover a ten-year period, be developed in conjunction with the local comprehensive land-use plan and other growth management policies, be reviewed annually and include at least the following:
 - a. A cost analysis of financial ability of the district to implement its facilities program;
 - b. Existing and projected enrollment figures, including an analysis of the racial composition of the student population;
 - c. An inventory of the district's undeveloped property and developed facilities, including an analysis of the number of students in each facility and whether the facility is over or under crowded;
 - d. An analysis of the appropriateness of the facilities to meet the needs of all students and members of the public, all district services, programs and activities, will be accessible to individuals with disabilities and appropriate for students regardless of gender;
 - e. Recommendations as to the sale or other disposition of district property not needed in the future; and
 - f. Recommendations as to the acquisition, construction or modification of new sites or facilities and of how such will better meet the needs of students and the educational program.

11.3.2 Fiscal, Administrative and Technical Capabilities

An assessment of fiscal capabilities is presented in Table 11-2. An assessment of administrative and technical capabilities is presented in Table 11-3.

11.3.3 Education and Outreach Capabilities

An assessment of education and outreach capabilities is presented in Table 11-4.

Table 11-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	No
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	No
Incur Debt through Private Activity Bonds	No
State-Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes
Other	No

Table 11-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	No	
Engineers or professionals trained in building or infrastructure construction practices	No	
Planners or engineers with an understanding of natural hazards	No	
Staff with training in benefit/cost analysis	No	
Surveyors	No	
Personnel skilled or trained in GIS applications	No	
Scientist familiar with natural hazards in local area	No	
Emergency manager	Yes	ESD 112/Scott LaBar/Loss Control Specialist
Grant writers	No	
Other	No	

Table 11-4. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes (Doreen McKercher/PIO)
Do you have personnel skilled or trained in website development?	Yes (Doreen McKercher)
Do you have hazard mitigation information available on your website? • If yes, please briefly describe.	Yes Post on Peachjar.
Do you utilize social media for hazard mitigation education and outreach? • If yes, please briefly describe.	Yes Information provided on District website
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, please briefly specify.	No
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, please briefly describe.	Yes Operations website
Do you have any established warning systems for hazard events? • If yes, please briefly describe.	Yes Automated Emergency Notification System

11.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into existing plans and programs.

11.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- None at this time.

11.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- Safety, Operations and Maintenance of School Property – The facilities maintenance and infrastructure management programs allow for the opportunity for integration with the natural hazard mitigation plan. As facilities are maintained and reconditioned, opportunities to incorporate mitigation strategies will be reviewed and assessed.

11.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 11-5 lists all past occurrences of natural hazards within the jurisdiction.

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Severe Storm(s)	1825	3/2/2009	Unknown
Severe Storm(s)	1682	2/14/2007	Unknown
Severe Storm(s)	1671	12/14/2006	Unknown
Earthquake	1361	3/1/2001	Unknown
Severe Storm(s)	1159	1/17/1997	Unknown
Flood	1100	2/9/1996	Unknown
Severe Storm(s)	1079	1/3/1996	Unknown
Volcano	623	5/21/1980	Unknown
Flood	545	12/10/1977	Unknown
Flood	185	12/29/1964	Unknown
Flood	146	3/2/1963	Unknown
Severe Storm(s)	137	10/20/1962	Unknown
Flood	70	3/6/1957	Unknown
Flood	50	2/25/1956	Unknown

11.6 JURISDICTION-SPECIFIC VULNERABILITIES

Noted vulnerabilities of the jurisdiction include the following:

- 2 schools are located in wildfire intermix areas.
- Some schools were built before modern building codes and may be more susceptible to risk from hazard such as earthquake.

11.7 HAZARD RISK RANKING

Table 11-6 presents the ranking of the hazards of concern.

Table 11-6. Hazard Risk Ranking			
Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Earthquake	48	High
1	Severe weather	48	High
2	Flood	18	Medium
2	Landslide	18	Medium
2	Wildfire	18	Medium
3	Volcano	11	Low
4	Drought	9	Low
5	Dam Failure	8	Low

11.8 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 11-7 lists the actions that make up the Camas School District hazard mitigation action plan. Table 11-8 identifies the priority for each action. Table 11-9 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 11-7. Hazard Mitigation Action Plan Matrix						
Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CSD-1—Where appropriate, support retro-fitting, purchase or relocation of structures located in high hazard areas and prioritize those structures that have experienced repetitive losses.						
Existing	All Hazards	4, 5, 7, 9, 10	Maintenance	High	HMGP, PDM, FMA, CDBG-DR	Short-term
CSD-2— Integrate the natural hazard mitigation plan into other plans and programs that support infrastructure investments choices, such as the capital improvement program.						
New and Existing	All Hazards	2, 4,	Board	Low	Staff Time, General Funds	On-going
CSD-3—Develop and implement a program to capture perishable data after significant events (e.g. high water marks, preliminary damage estimates, damage photos) to support future mitigation efforts including the implementation and maintenance of the natural hazard mitigation plan.						
Existing	All Hazards	1, 2, 4, 12	Emergency Management	Medium	Staff Time, General Funds	Short-term
CSD-4—Support the County-wide initiatives identified in Volume I of the natural hazard mitigation plan.						
New and Existing	All Hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Lead Contact Department for Plan	Low	Staff Time, General Funds	Short-term
CSD-5—Actively participate in the plan maintenance protocols outlined in Volume I of the natural hazard mitigation plan.						
New and Existing	All Hazards	1, 4	Lead Contact Department for Plan	Low	Staff Time, General Funds	Short-term
CSD-6—Develop a post-disaster recovery plan and a debris management plan.						
Existing	All Hazards	1, 2, 4, 9	Emergency Management	Medium	EMPG	Long-term

Table 11-8. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
CSD-1	5	High	High	Yes	Yes	No	Medium	High
CSD-2	2	Medium	Low	Yes	No	Yes	High	Low
CSD-3	4	Low	Medium	No	No	Maybe	Low	Low
CSD-4	12	Low	Low	Yes	No	Yes	High	Low
CSD-5	2	Low	Low	Yes	No	Yes	High	Low
CSD-6	4	Medium	Medium	Yes	Yes	No	Medium	High

a. See the introduction to this volume for explanation of priorities.

Table 11-9. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	CSD-2, CSD-3, CSD-4, CSD-5, CSD-6	CSD-1	CSD-4		CSD-6	
Drought	CSD-2, CSD-3, CSD-4, CSD-5, CSD-6	CSD-1	CSD-4		CSD-6	
Earthquake	CSD-2, CSD-3, CSD-4, CSD-5, CSD-6	CSD-1	CSD-4		CSD-6	
Flood	CSD-2, CSD-3, CSD-4, CSD-5, CSD-6	CSD-1	CSD-4		CSD-6	
Landslide	CSD-2, CSD-3, CSD-4, CSD-5, CSD-6	CSD-1	CSD-4		CSD-6	
Severe weather	CSD-2, CSD-3, CSD-4, CSD-5, CSD-6	CSD-1	CSD-4		CSD-6	
Volcano	CSD-2, CSD-3, CSD-4, CSD-5, CSD-6	CSD-1	CSD-4		CSD-6	
Wildfire	CSD-2, CSD-3, CSD-4, CSD-5, CSD-6	CSD-1	CSD-4		CSD-6	

a. See the introduction to this volume for explanation of mitigation types.

12. CLARK COUNTY PUBLIC UTILITIES DISTRICT #1

12.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Dan Krebs, Director of Operations
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Vancouver, WA 98668
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Alternate Point of Contact

Ben Feliz, T&D Manager
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Vancouver, WA 98668
Telephone: 360-992-8518
e-mail Address: bfeliz@clarkpud.com

12.2 JURISDICTION PROFILE

12.2.1 Overview

Clark Public Utilities (Utility) is a customer-owned utility providing electric and water service in Clark County, Washington. A municipal corporation organized under the laws of the state of Washington, the Utility was formed by a vote of the people in 1938 and currently provides electric service to more than 192,000 customers and water service to more than 31,000 homes and businesses. The Utility currently has 370 employees. A three-member board of commissioners is elected by the citizens of Clark County to set policy for the utility. The Board of Commissioners assumes responsibility for the adoption of this plan. The General Manager/CEO will oversee its implementation.

The Utility electric service area includes all of Clark County which is located in the Southwestern region of Washington State. The Columbia River forms its southern and western borders; it is bounded on the north by the Lewis River and on the east by Skamania County.

The water Utility service area covers about 200 square miles and includes the communities of Hazel Dell, Salmon Creek, Lakeshore, Felida, Mt. Vista, La Center, Brush Prairie, Hockinson, Venersborg, Heisson, Meadow Glade, Dollars Corner, Duluth, Pioneer, Manor, Amboy and Yacolt. In addition, we operate several small “satellite” systems for small groups of homes throughout the county.

The utility is funded by revenues from rates charged for the retail sale of electricity and water. When available we also sell surplus electricity and water that can increase revenue. These rates are set by the three elected Board of Commissioners.

12.2.2 Service Area and Trends

The Utility serves a population of 445,000. Its service area covers an area of 630 square miles. Between 2010 and 2014 the utility has experienced customer growth of approximately 6 percent. The Utility expects continued customer growth at the current rate based on current economic trends. The Utility continues to implement cost reductions that have resulted in stable electric and water rates for several years. The estimated replacement value of structures in the Utility’s electric and water service territory is approximately \$91 billion.

12.2.3 Assets

Table 12-1 summarizes the critical assets of the district and their value.

Table 12-1. Special Purpose District Assets	
Asset	Value
Property	
220 acres of land	\$100,000,000
Critical Infrastructure and Equipment	
Electric system transmission, substations and plant	\$98,000,000
Electrical system distribution overhead and underground	\$643,000,000
Electrical generating system, plant, transmission, distribution and structures	\$257,500,000
Water system wells, pumping and treatment	\$30,000,000
Water system transmission, distribution and plant	\$150,000,000
Total:	\$1,178,500,000
Critical Facilities	
Electric Center building	\$9,800,000
Operations Center buildings	\$34,650,000
River Road Generating facility	\$163,000,000
Carol Curtis Well field	\$5,8700,000
Bridge Substation office	\$550,000
Total:	\$266,700,000

12.3 CAPABILITY ASSESSMENT

12.3.1 Planning and Regulatory Capabilities

The following existing codes, ordinances, policies or plans are applicable to this natural hazard mitigation plan:

- National Electrical Safety Code
- National Environmental Protection Act
- Federal Endangered Species Act
- Washington State Building Code
- The District must adhere to all applicable codes and regulations enforced by federal, state and local authorities.

12.3.2 Fiscal, Administrative and Technical Capabilities

An assessment of fiscal capabilities is presented in Table 12-2. An assessment of administrative and technical capabilities is presented in Table 12-3.

12.3.3 Education and Outreach Capabilities

An assessment of education and outreach capabilities is presented in Table 12-4.

Table 12-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	No
User Fees for Water, Sewer, Gas or Electric Service	Yes
Incur Debt through General Obligation Bonds	No
Incur Debt through Special Tax Bonds	No
Incur Debt through Private Activity Bonds	No
State-Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes
Other	No

Table 12-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	No	
Engineers or professionals trained in building or infrastructure construction practices	Yes	Greg Pagel, Facilities Manager Eric Beck, Engineering Manager Water
Planners or engineers with an understanding of natural hazards	No	
Staff with training in benefit/cost analysis	No	
Surveyors	No	
Personnel skilled or trained in GIS applications	Yes	Mike Pratka, Manager GIS/CAD Services
Scientist familiar with natural hazards in local area	No	
Emergency manager	Yes	Dan Krebs, Director of Operations
Grant writers	No	
Other	No	

Table 12-4. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes, Erica Erland, Corporate Communications Manager
Do you have personnel skilled or trained in website development?	Yes, but we contract with a private company, Corporate Media
Do you have hazard mitigation information available on your website? • If yes, please briefly describe.	Yes On our Outage Page we have emergency preparedness links to FEMA, Red Cross, etc.
Do you utilize social media for hazard mitigation education and outreach? • If yes, please briefly describe.	Yes As noted in the previous response
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, please briefly specify.	No
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, please briefly describe.	Yes We can include inserts in our customer's utility bills that cover hazard mitigation topics.
Do you have any established warning systems for hazard events? • If yes, please briefly describe.	No

12.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into existing plans and programs.

12.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- Annual Capital Improvement Budget: When reviewing projects consideration is given during the design process if the project is in a known flood area or landslide area. This risk assessment is used by both the Water and Electric Departments. Over the years some capital projects are budgeted for the following year to improve our electrical system based on a natural disaster that occurred in the previous fiscal budget year.

12.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- Develop a strategic plan to identify high impact facilities such as substations and water reservoirs in need of seismic retrofits.

12.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 12-5 lists all past occurrences of natural hazards within the jurisdiction.

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Severe weather	4249	12/8/2015	200,000
Severe weather	NA	12/11/2014	1,200,000
Severe weather	NA	11/11/2014	\$425,000
Severe weather	1671	12/12/2006	1,100,000
Severe weather	NA	01/06/2004	1,600,000
Severe weather	NA	12/26/1996	1,400,000
Severe weather	NA	12/12/1995	1,800,000
Severe weather	137	10/20/1962	unknown

12.6 JURISDICTION-SPECIFIC VULNERABILITIES

Noted vulnerabilities of the jurisdiction include the following:

- Substations and switching stations
- Water reservoirs
- River Road generating plant

12.7 HAZARD RISK RANKING

Table 12-6 presents the ranking of the hazards of concern.

Table 12-6. Hazard Risk Ranking

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Earthquake	54	High
2	Severe Storm	54	High
3	Flood	45	High
4	Volcano	16	Medium
5	Dam Failure	11	Low
6	Landslide	8	Low
7	Wildfire	8	Medium
8	Drought	5	Low

12.8 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 12-7 lists the actions that make up the Clark County Public Utilities District #1 hazard mitigation action plan. Table 12-8 identifies the priority for each action. Table 12-9 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 12-7. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CPU #1 Educate customers in outage prone areas by providing informational pamphlets with mailed bills.						
New & Existing	Earthquake, severe weather and flooding.	1, 2, 3	CPU, Communications	Low	District funds	Short term
CPU #2 Where appropriate, support retrofitting, purchase, or relocation of structures located in hazard areas to protect structures from future damage, with properties with exposure to repetitive losses as a priority.						
Existing	Earthquake, severe weather, flooding, landslide	1, 2, 3, 6	CPU, Engineering/Operations	High	District funds, FEMA Grant funding, local contributions	Long term
CPU #3 Consider, where appropriate, the adoption of higher construction standards for building substations, transmission lines and distribution lines that will result in an increase in resilience for new infrastructure						
New	Earthquake, severe weather, flooding, landslide	1, 2, 3, 6	CPU, Engineering/Operations	High	District funds, FEMA hazard mitigation grants	Long term
CPU #4 Consider, purchasing mobile back-up generators to be used to serve critical infrastructure including, water, and sewer treatment and distribution facilities owned by CPU and others.						
New & Existing	Earthquake, severe weather, flooding landslide	1, 2, 3, 6	CPU, Water/Fleet	Medium	District funds, FEMA hazard mitigation grants	Long term
CPU #5 Consider upgrading lines and poles to improve wind/ice loading, undergrounding critical lines, and adding additional interconnection switches to allow alternate feed paths.						
New & Existing	Severe weather, flooding, landslide	2, 3, 6	CPU, Engineering/Operations	High	District funds, FEMA hazard mitigation funds	Long term
CPU #6 Actively participate in the plan maintenance protocols outlined in Volume I of the natural hazard mitigation plan.						
New & Existing	All Hazards	1, 4	CPU, Operations Department for Plan	Low	District funds, staff time	Short term
CPU #7 Support County wide initiatives identified in Volume I of the natural hazard mitigation plan.						
New & Existing	All Hazards	1, 2, 3, 4, 5, 6, 7, 8	CPU, Commissioners	Low	District funds, staff time	Short term

Table 12-8. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
CPU #1	3	Low	Low	Yes	No	Yes	High	NA
CPU #2	4	High	High	Yes	Yes	No	Medium	High
CPU #3	4	High	High	Yes	Yes	No	Medium	High
CPU #4	4	High	High	Yes	Yes	No	Medium	Medium
CPU #5	3	High	High	Yes	Yes	No	Medium	High
CPU #6	2	Low	Low	Yes	No	Yes	High	Low
CPU #7	8	Low	Low	Yes	No	Yes	High	Low

a. See the introduction to this volume for explanation of priorities.

Table 12-9. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Earthquake	CPU-1, CPU-2, CPU-3, CPU-4, CPU-5, CPU-6, CPU-7	CPU-2, CPU-3	CPU-1, CPU-3		CPU-4	CPU-2, CPU-3, CPU-5
Severe Storm	CPU-1, CPU-2, CPU-3, CPU-4, CPU-5, CPU-6, CPU-7	CPU-2, CPU-3	CPU-1, CPU-3		CPU-4	CPU-2, CPU-3, CPU-5
Flood	CPU-1, CPU-2, CPU-3, CPU-4, CPU-5, CPU-6, CPU-7	CPU-2, CPU-3	CPU-1, CPU-3		CPU-4	CPU-2, CPU-3, CPU-5
Volcano	CPU-1, CPU-2, CPU-3, CPU-4, CPU-5, CPU-6, CPU-7	CPU-2, CPU-3	CPU-1, CPU-3		CPU-4	CPU-2, CPU-3, CPU-5
Dam Failure	CPU-1, CPU-2, CPU-3, CPU-4, CPU-5, CPU-6, CPU-7	CPU-2, CPU-3	CPU-1, CPU-3		CPU-4	CPU-2, CPU-3, CPU-5
Landslide	CPU-1, CPU-2, CPU-3, CPU-4, CPU-5, CPU-6, CPU-7	CPU-2, CPU-3	CPU-1, CPU-3		CPU-4	CPU-2, CPU-3, CPU-5
Wildfire	CPU-1, CPU-2, CPU-3, CPU-4, CPU-5, CPU-6, CPU-7	CPU-2, CPU-3	CPU-1, CPU-3		CPU-4	CPU-2, CPU-3, CPU-5
Drought	CPU-1, CPU-2, CPU-3, CPU-4, CPU-5, CPU-6, CPU-7	CPU-2, CPU-3	CPU-1, CPU-3		CPU-4	CPU-2, CPU-3, CPU-5

a. See the introduction to this volume for explanation of mitigation types.

12.9 FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

This is the first time the Utility has participated in the updating of the Clark Regional Natural Hazard Mitigation Plan and development of this annex. Staff resources needed to complete this process was limited and gathering the needed information required assistance from many different departments. Future updates would include additional personnel to perform a more comprehensive risk assessment and identification of potential hazard risk mitigation projects.

CPU will develop a utility wide working group to monitor progress of proposed mitigation efforts as well as identifying future projects for hazard mitigation.

13. CLARK REGIONAL WASTEWATER DISTRICT

13.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Hugh Findlay, Human Resources/Risk
Management Director
8000 NE 52nd ct.
Vancouver WA 98685
Telephone: (360) 993-8845
e-mail Address: hfindlay@crwwd.com

Alternate Point of Contact

Shawn Moore, Assistant Manager
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Vancouver WA 98685
Telephone: (360) 993-8849
e-mail Address: smoore@crwwd.com

13.2 JURISDICTION PROFILE

13.2.1 Overview

The Clark Regional Wastewater District (District) is a special purpose district organized under Title 57 RCW. It was formed in 1958 to provide urban wastewater services for unincorporated Clark County. The District has 50 full time staff and is governed by a 3 member elected Board of Commissioners (Board). The District is funded through rates and connection charges. The District provides service to roughly 90,000 people, mostly residential. In addition to the unincorporated areas of Clark County (City of Vancouver urban growth area), the District's service area includes the City of Ridgefield and the rural centers of Meadow Glade and Hockinson. The Board is responsible for the adoption of the plan which will be implemented under the supervision of the General Manager.

13.2.2 Service Area and Trends

The District serves a population of over 90,000 across a service area which covers more than 46 square miles. The total replacement value of all structures located in the service area is estimated at \$14.5 billion dollars.

The District is expecting an average growth rate of 2% over the next 20 years. Residential growth rates (sewer access population) in the district over the last 5, 10, and 20 years has averaged 1.6%, 2.1% and 3.2% respectively.

The Clark Regional Wastewater District is a member of the Discovery Clean Water Alliance, which was legally formed on January 4, 2013 under the Joint Municipal Utility Services Act (RCW 39.106). The Alliance serves four Member agencies – the City of Battle Ground, Clark County, Clark Regional Wastewater District and the City of Ridgefield. The Alliance Members jointly own and jointly manage regional wastewater assets under Alliance ownership. The Alliance seeks to optimize the long-term framework for delivery of regional wastewater transmission and treatment services to the urban growth areas in the central portion of Clark County, Washington. The District is the official 'Administrative Lead' agency for the Alliance. Responsibilities include executive, administrative, financial, and engineering functions.

13.2.3 Assets

Table 13-1 summarizes the critical assets of the district and their value.

Table 13-1. Special Purpose District Assets	
Asset	Value
Property	
8.5 acres of land	\$2,100,000
28 acres of land ^a	\$6,000,000
Critical Infrastructure and Equipment	
600 miles of pipe	\$120,000,000
66 pump stations	\$24,000,000
750 STEP Systems	\$3,750,000
6 portable generators	\$150,000
21 district vehicles	\$1,061,000
36th Ave Pump Station ^a	\$11,000,000
117th St. Pump Station ^a	\$20,000,000
22 miles of force main and interceptors ^a	\$39,000,000
Total:	\$211,061,000
Critical Facilities	
District Operations Center	\$6,000,000
Salmon Creek Treatment Plant ^a	\$160,000,000
Ridgefield Treatment Plant ^a	\$8,000,000
Total:	\$174,000,000

a. Discovery Clean Water Alliance assets under management by District.

13.3 CAPABILITY ASSESSMENT

13.3.1 Planning and Regulatory Capabilities

The following existing codes, ordinances, policies or plans are applicable to this natural hazard mitigation plan:

- Policy 037 Comprehensive Emergency Response Plan Adopted 4/28/15
- Comprehensive General Sewer Plan adopted 08/27/2013
- 2016-2021 Capital Improvement Program adopted 12/23/2015
- District Code 2.36 Declaration of Emergency
- District Code 2.28 Contracts for Architectural and Engineering Services
- District Code 2.32 Small Works Roster and Vendor Lists
- Resolution 1586 – Joint Standards for Management, Operations and Maintenance of Wastewater Collection Systems adopted May 28, 2013

13.3.2 Fiscal, Administrative and Technical Capabilities

An assessment of fiscal capabilities is presented in Table 13-2. An assessment of administrative and technical capabilities is presented in Table 13-3.

13.3.3 Education and Outreach Capabilities

An assessment of education and outreach capabilities is presented in Table 13-4.

Table 13-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	No
User Fees for Water, Sewer, Gas or Electric Service	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	No
Incur Debt through Private Activity Bonds	No
State-Sponsored Grant Programs (Community Economic Revitalization Board)	Yes
Development Impact Fees for Homebuyers or Developers	Yes (SDCs)
Other	No

Table 13-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Engineering Development Program Manager Administration: Assistant Manager
Engineers or professionals trained in building or infrastructure construction practices	Yes	Engineering: District Engineer, Senior Project Manager Administration: General Manager and Assistant Manager Operations: Operations Manager
Planners or engineers with an understanding of natural hazards	No	
Staff with training in benefit/cost analysis	Yes	Engineering: District Engineer, Senior Project Manager Finance: Finance Director and Accounting Manager Administration: General Manager and Assistant Manager
Surveyors	No	
Personnel skilled or trained in GIS applications	Yes	Engineering: Senior Eng. Tech GIS
Scientist familiar with natural hazards in local area	No	
Emergency manager	No	
Grant writers	No	
Other	Yes	Pretreatment Coordinator

Table 13-4. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes (General Manager and Assistant General Manager)
Do you have personnel skilled or trained in website development?	No
Do you have hazard mitigation information available on your website? • If yes, please briefly describe.	No
Do you utilize social media for hazard mitigation education and outreach? • If yes, please briefly describe.	No
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, please briefly specify.	No
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, please briefly describe.	Yes Website, Monthly Newsletter & IVR System
Do you have any established warning systems for hazard events? • If yes, please briefly describe.	No

13.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into existing plans and programs.

13.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- None identified at this time.

13.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- Strategic Plan for the District-The current portion of the Strategic Plan is update annually with an expectation that the full plan would be updated every 4-5 years of after a significant event.
- Comprehensive Emergency Response Plan- The Emergency Response Plan has an annex which outlines the risks associated with Clark County. This annex would be updated along with any more specific risk assessments and mitigation plans.
- Comprehensive General Sewer Plan- The GSP is updated on a six year basis to include proposed infrastructure requirements by basin. Risks and mitigation strategies associated with future infrastructure planning can be incorporated.

13.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 13-5 lists all past occurrences of natural hazards within the jurisdiction.

Table 13-5. Natural Hazard Events

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Severe Winter Storm	4253	2015	\$300,000 District mainline pipe next to a small stream was broken by the stream swollen by rain going outside of its stream bed and scouring the land that contained the pipe.
Severe Winter Storm	1825	2009	No impact on infrastructure but did impact the electrical utility requiring portable generators to be sent to pump stations until the electrical grid was restored.
Severe Winter Storm	1682	2007	No impact on infrastructure but did impact the electrical utility requiring portable generators to be sent to pump stations until the electrical grid was restored.
Severe Winter Storm	1671	2006	No impact on infrastructure but did impact the electrical utility requiring portable generators to be sent to pump stations until the electrical grid was restored.
Earthquake	1361	2001	No impact on infrastructure.
Flood	1100	1996	Impact on key pump station requiring emergency pumping, sandbagging and pump around. County built a flood wall that can withstand a 500 year flood.
Volcano	623	1980	No impact on infrastructure.

13.6 JURISDICTION-SPECIFIC VULNERABILITIES

Noted vulnerabilities of the jurisdiction include the following:

- Access to 68 pump stations when roads are closed due to winter storms or a potential large earthquake impacting roads and access with fallen trees and power lines.
- Localized large scale flooding where new pump stations have been added as backbone infrastructure is added to the District.
- Large scale flooding in the Columbia which can impact the treatment plant's ability to send treated effluent into the Columbia.
- Provision of electricity to District pump stations during wide-spread power outages and access to emergency fuel supplies for redundant power systems (e.g. generators) at pump stations and treatment plants.

13.7 HAZARD RISK RANKING

Table 13-6 presents the ranking of the hazards of concern.

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Severe weather	45	High
2	Earthquake	36	High
3	Flood	11	Medium
3	Volcano	11	Medium
4	Landslide	8	Low
5	Drought	1	Low
6	Wildfire	0	None
6	Dam Failure	0	None

13.8 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 13-7 lists the actions that make up the Clark Regional Wastewater District hazard mitigation action plan. Table 13-8 identifies the priority for each action. Table 13-9 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CRWWD-1 - Review all critical assets that show probability of extensive damage for the Cascadia event over 2% and probability of extensive damage over 5% for the 500 year earthquake.						
Existing	Earthquake	5, 10, 12	Engineering	Low	Staff time	Short term
CRWWD-2 - Define retrofit requirements, redundancy strategy and costs to meet current code and mitigate probability of extensive damage. Determine policy and capital programming strategy by executives.						
Existing	Earthquake	2, 8, 9	Senior Mgt. and BOC	High	Staff time	Long term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CRWWD-3 - Define response policy and procedures in the event of a large scale event and significant impact on the asset(s) for operations staff decisions.						
Existing	Earthquake	3, 6	Operations	Low	Staff time	On-going
CRWWD-4 - Review all infrastructure defined as being impacted by the 500 year flood. Define impact, on system, emergency response strategy, time to bring back on line.						
Existing	Flood	5, 10, 12	Operations	Low	Staff time	Short term
CRWWD-5 - Evaluate and establish relocation and protection measures alternatives for infrastructure potentially impacted by the 500 year flood event.						
Existing	Flood	5, 9, 10	Engineering	Low	Staff time	Short term
CRWWD-6 - Define expected cost estimate to bring system back on line after flood event. Define capital costs strategy and requirements for policy decisions and capital improvements planning.						
New and Existing	Flood	2, 8, 9	Engineering	High	Staff time	Long term
CRWWD-7 - Define response policy and procedures in the event of a large scale event and significant impact on the asset(s) for operations staff decisions.						
Existing	Flood	3, 6	Operations	Low	Staff time	On-going
CRWWD-8 - Review all infrastructure that has a single access point and the potential for reduced or eliminated access on roads in a severe weather event.						
Existing	Severe Weather	5, 10, 12	Operations	Low	Staff time	Short term
CRWWD-9 - Define alternate strategy cost estimates for capital programming for mitigation of single access to key infrastructure and the placement of redundant energy supply (generator and fuel).						
Existing	Severe Weather	2, 8, 9		High	Staff time	Long term
CRWWD-10 - Define response policy and procedures in the event of a large scale event and significant impact to multiple assets.						
Existing	Severe Weather	3, 6	Operations	Low	Staff time	On-going
CRWWD-11 - Evaluate District customer communication measures, equipment and capabilities.						
Existing	Severe Weather	1, 2, 3	Administration	Low	Staff time	Short term
CRWWD-12 - Where appropriate, acquire system/equipment to communicate hazard mitigation, disaster preparedness, response and recovery information with customers.						
New	Severe Weather	1, 2, 3	Administration	High	Possibly DHS grants	Long term
CRWWD-13 - Evaluate redundant power capabilities and operating procedures.						
Existing	Severe Weather	5, 10	Operations	Low	Staff time	Short term
CRWWD-14 - Where appropriate, implement/purchase measures to increase capabilities. Including emergency fuel storage, onsite generators, etc.						
New and Existing	Severe Weather	5, 10	Operations	High	General Fund, HMGP, PDM	Long term
CRWWD-15 - Evaluate critical facilities and identify failure modes, locations and energy capacity.						
Existing	Severe Weather	6, 8, 10	Operations	Low	Staff time	Short term
CRWWD-16 - Review all assets that are listed in landslide potential zones and determine impact to system.						
Existing	Landslide	5, 10, 12	Engineering	Low	Staff time	Short term
CRWWD-17 - Define strategy on short-term emergency response and cost as well as long term mitigation strategy and capital impact including retro fitting where applicable.						
Existing	Landslide	2, 8, 9	Engineering	High	Staff time	Long term
CRWWD-18 - Investigate potential impact on treatment plants for conveyance flows to contain additional sediment from a volcano and direct ash flow into uncovered treatment infrastructure.						
Existing	Volcano	5, 10, 12	Engineering	Low	Staff time	Short term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CRWWD-19 - Define strategy for short term response and mitigation to include long term mitigation capital plan.						
New and Existing	Volcano	2, 8, 9	Engineering	High	Staff time	Long term
CRWWD-20 - Review District code for all new infrastructure(s) to include hazard review for Earthquake, Flood, Severe Winter Events and Landslide impacts. Require capability investment to mitigate large scale events where feasible including redundancy, additional equipment on site and in inventory. Define average length of time to order equipment and install in the analysis.						
Existing	All Hazards	5, 10, 12, 2, 6	Engineering	Low	Staff time	Short term
CRWWD-21 - Integrate current assessment and mitigation strategies into the District's Strategic Plan and Emergency Plan.						
Existing	All Hazards	6, 5	Administration	Low	Staff time	Short term
CRWWD-22 - Develop a post disaster recovery plan and procedures and incorporate into Emergency Plan.						
New and existing	All Hazards	6, 5	Administration	Low	Possibly UASI	Short term
CRWWD-23 - Support county-wide initiatives, where appropriate, identified in NHMP.						
New and existing	All Hazards	1, 4, 12	Administration	Low	Staff time	On-going
CRWWD-24 - Actively, participate in plan maintenance protocols, where appropriate, identified in NHMP.						
New and existing	All Hazards	1, 4, 12	Operations	Low	Staff time	On-going
CRWWD-25 - Evaluate impacts of climate change on District operations and facilities.						
New and existing	All Hazards	2, 5, 10, 11, 12	Engineering	High	Possibly EPA	Long term
CRWWD-26 - Adopt climate change policy and implement, where appropriate, changes in District procedures, planning documents and operations.						
New and existing	All Hazards	11, 12	Engineering	High	Staff time	On-going
CRWWD-27 - Define and develop ratepayer education on impact of a natural disaster on District infrastructure. Include what they can do to minimize impact until infrastructure is back on line.						
Existing	All Hazards	1, 4	Administration	Low	Staff time	Short term
CRWWD-28 - Capture data after each hazard event to include impact, cost, and additional effort to support analysis for future mitigation efforts and update the natural hazard mitigation plan.						
New and existing	All Hazards	10, 12	Operations	Low	Staff time	On-going
CRWWD-29 - Evaluate and implement measures to increase emergency capacity for emergency management, operational capability and continuity of business.						
New and existing	All Hazards	5, 10, 8	Administration	High	Staff time, Possible FEMA, DHS, EPA or UASI grants	On-going

Table 13-8. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
1	3	Medium	Medium	Yes	No	Yes	Medium	Low
2	3	Medium	High	Yes	No	No	Medium	Low
3	2	Medium	Low	Yes	No	Yes	High	Low
4	3	Medium	Medium	Yes	No	Yes	Medium	Low
5	4	Medium	Low	Yes	No	Yes	High	Low
6	3	Medium	High	Yes	No	No	Medium	Low
7	2	Medium	Low	Yes	No	Yes	High	Low
8	3	Medium	Medium	Yes	No	Yes	Medium	Low
9	3	Medium	High	Yes	No	No	Medium	Low
10	2	Medium	Low	Yes	No	Yes	High	Low
11	3	High	Low	Yes	No	Yes	Medium	Low
12	3	High	High	Yes	No	No	Medium	Low
13	2	Medium	Low	Yes	No	Yes	Medium	Low
14	2	Medium	High	Yes	Yes	No	Medium	High
15	3	Medium	Low	Yes	No	Yes	Medium	Low
16	3	Medium	Medium	Yes	No	Yes	Medium	Low
17	3	Medium	High	Yes	No	No	Medium	Low
18	3	Medium	Medium	Yes	No	No	Medium	Low
19	3	Medium	High	Yes	No	No	Medium	Low
20	5	Medium	Low	Yes	No	No	Medium	Low
21	2	Medium	Low	Yes	No	Yes	High	Low
22	2	High	Low	Yes	Maybe	Yes	High	Medium
23	2	Medium	Low	Yes	No	Yes	High	Low
24	3	High	Low	Yes	No	Yes	High	Low
25	5	Medium	High	Yes	Maybe	No	Low	Medium
26	2	Medium	High	Yes	No	No	Low	Low
27	2	Medium	Low	Yes	No	No	Medium	Low
28	2	Medium	Low	Yes	No	Yes	High	Low
29	3	Medium	High	Yes	Maybe	No	Medium	Medium

a. See the introduction to this volume for explanation of priorities.

Table 13-9. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Earthquake	CRWWD-1, CRWWD-14, CRWWD-16, CRWWD-20	CRWWD-2	CRWWD-11, CRWWD-12, CRWWD-21, CRWWD-23, CRWWD-24, CRWWD-27	CRWWD-2, CRWWD-25, CRWWD-26	CRWWD-3, CRWWD-12, CRWWD-29	CRWWD-2
Flood	CRWWD-4, CRWWD-6, CRWWD-20	CRWWD-5	CRWWD-11, CRWWD-12, CRWWD-21, CRWWD-23, CRWWD-24, CRWWD-27	CRWWD-5, CRWWD-25, CRWWD-26	CRWWD-7, CRWWD-12, CRWWD-29	CRWWD-5
Severe Weather	CRWWD-8, CRWWD-14, CRWWD-20	CRWWD-9, CRWWD-13, CRWWD-15	CRWWD-11, CRWWD-12, CRWWD-21, CRWWD-23, CRWWD-24, CRWWD-27	CRWWD-9	CRWWD-10, CRWWD-13, CRWWD-12, CRWWD-29	CRWWD-14
Landslide	CRWWD-16, CRWWD-20	CRWWD-17	CRWWD-11, CRWWD-12, CRWWD-21, CRWWD-23, CRWWD-24, CRWWD-27	CRWWD-25, CRWWD-26, CRWWD-17	CRWWD-17, CRWWD-12, CRWWD-29	CRWWD-17
Volcano	CRWWD-18, CRWWD-19, CRWWD-20	CRWWD-19	CRWWD-11, CRWWD-12, CRWWD-21, CRWWD-23, CRWWD-24, CRWWD-27	CRWWD-18, CRWWD-25, CRWWD-26	CRWWD-19, CRWWD-12, CRWWD-29	CRWWD-19

a. See the introduction to this volume for explanation of mitigation types.

14. C-TRAN PUBLIC TRANSIT BENEFIT AREA

14.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Terry Lohnes, Sr. Safety and Training Manager
2425 NE 65th Ave.
Vancouver, WA 98668-2529
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Alternate Point of Contact

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Vancouver, WA 98668-2529
Telephone: 360-906-7536
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14.2 JURISDICTION PROFILE

14.2.1 Overview

The C-TRAN Public Transit Benefit Area (PTBA) is an entity founded in 1980 to provide fixed-route, paratransit, on-demand (Connector) and vanpool services to the Vancouver Urban Growth Area, and the city limits of Camas, Washougal, Ridgefield, Battleground, La Center, and Yacolt. C-TRAN operates three transit centers: Vancouver Mall at Westfield Vancouver, Fisher's Landing in east country, and 99th Street at Stockford Village. A nine-member elected Board of Directors governs the C-TRAN PTBA. The board assumes responsibility for the adoption of this plan; the C-TRAN Executive Director/CEO will oversee its implementation. As of October 13, 2015, C-TRAN serves 31 fixed routes across Clark County with commuter service into Portland, Oregon utilizing a staff of 408. Funding comes from local sales tax revenue and Federal grants.

14.2.2 Service Area and Trends

The district serves a population of approximately 447,000 (2014 Clark County Census data). Its service area covers an area of 141 square miles, which has a total replacement value of \$55.3 billion.

The population within Clark County is projected to grow 13.6% over the next ten years with most of these additional 61,000 residents living within the PTBA. Demand for transit service is expected to grow at a similar rate as these new residents access jobs, education and other needs requiring transportation. Current funding, at best, will only maintain existing service.

14.2.3 Assets

Table 14-1 summarizes the critical assets of the district and their value.

Table 14-1. Special Purpose District Assets

Asset	Value
Property	
7th Street, 0.23 acres	\$222,862
Administration, 12.21 acres	\$839,509
Evergreen Transit Center, 2.31 acres	\$154,406
Central County Park-N-Ride, 11.55 acres	\$2,295,134
Fisher's Landing Park-N-Ride, 20.39 acres	\$6,606,148
99th Street Transit Center, 10.14 acres	\$5,239,499
Total:	\$15,357,558
Critical Infrastructure and Equipment	
Revenue Vehicle Coaches (47 Vanpool, 52 Demand Response Buses, 116 Fixed Route Buses)	\$46,751,693
Service Vehicles (26 vehicles)	\$833,806
VAST ITS System	\$4,524,091
Total:	\$52,109,590
Critical Facilities	
AOM	\$19,425,967
99th Street	\$11,569,448
Fisher's Landing	\$5,816,313
Salmon Creek	\$213,368
Evergreen	\$1,897,470
Total:	\$38,922,566

14.3 CAPABILITY ASSESSMENT

14.3.1 Planning and Regulatory Capabilities

The following existing codes, ordinances, policies or plans are applicable to this natural hazard mitigation plan:

- C-TRAN Security and Emergency Preparedness Plan (SEPP).

14.3.2 Fiscal, Administrative and Technical Capabilities

An assessment of fiscal capabilities is presented in Table 14-2. An assessment of administrative and technical capabilities is presented in Table 14-3.

14.3.3 Education and Outreach Capabilities

An assessment of education and outreach capabilities is presented in Table 14-4.

Table 14-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	No
User Fees for Water, Sewer, Gas or Electric Service	No
Incur Debt through General Obligation Bonds	No
Incur Debt through Special Tax Bonds	No
Incur Debt through Private Activity Bonds	No
State-Sponsored Grant Programs:	Yes
• Paratransit Special Needs Formula Grant Program	
• Regional Mobility Grant Program	
Development Impact Fees for Homebuyers or Developers	No
Other:	Yes
	<ul style="list-style-type: none"> Federally sponsored grant programs (Sections 5307, 5337, and 5339 Formula Funds) Existing Sales Tax Revenues Fare Revenue Advertising Revenue

Table 14-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	No	N/A
Engineers or professionals trained in building or infrastructure construction practices	No	N/A
Planners or engineers with an understanding of natural hazards	No	N/A
Staff with training in benefit/cost analysis	No	N/A
Surveyors	No	N/A
Personnel skilled or trained in GIS applications	No	N/A
Scientist familiar with natural hazards in local area	No	N/A
Emergency manager	No	N/A
Grant writers	No	N/A
Other	No	N/A

Table 14-6. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes: Scott Patterson, Development and Public Affairs Director
Do you have personnel skilled or trained in website development?	Yes, Dean Horn, Graphics Coordinator/Web Design
Do you have hazard mitigation information available on your website?	No
• If yes, please briefly describe.	N/A
Do you utilize social media for hazard mitigation education and outreach?	Yes
• If yes, please briefly describe.	Weather Detours, Construction-Related Detours
Do you have any citizen boards or commissions that address issues related to hazard mitigation?	Yes
• If yes, please briefly specify.	C-TRAN Citizens Action Committee (CCAC)
Do you have any other programs already in place that could be used to communicate hazard-related information?	Yes
• If yes, please briefly describe.	Facebook page, Twitter, Instagram, Gov Delivery
Do you have any established warning systems for hazard events?	Yes
• If yes, please briefly describe.	Adverse Weather Plan

14.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into existing plans and programs.

14.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- None at this time.

14.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- C-TRAN Agency Safety Plan. Recommendations from the NHMP to be integrated in the future if applicable.
- C-TRAN Security and Emergency Preparedness Plan (SEPP) Recommendations from the NHMP to be integrated in the future if applicable.
- C-TRAN Adverse Weather Plan. Recommendations from the NHMP to be integrated in the future if applicable.

14.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 14-5 lists all past occurrences of natural hazards within the jurisdiction.

Table 14-5. Natural Hazard Events

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Severe Storm	1825	17 December , 2008 through January 5, 2009	\$107,588.71
Severe Storm	N/A	14 Dec, 2006	Unknown
Severe Storm	N/A	11 Nov, 2006	Unknown
Severe Storm	N/A	10 Feb, 1997	Unknown
Flooding	N/A	23 Feb 1996	Unknown
Severe Storm	N/A	18 Dec 1995	Unknown

14.6 JURISDICTION-SPECIFIC VULNERABILITIES

Noted vulnerabilities of the jurisdiction include the following:

- Access to a fuel source (unleaded and diesel) after a natural disaster
- Operations building is a temporary structure that is 10 years old and is not seismically sound
- Single Ingress/Egress from our Bus Yard
- Service impact from severe weather, including inability of our employees to get to work
- Service impact from power loss at main facility and transit centers.

14.7 HAZARD RISK RANKING

Table 14-6 presents the ranking of the hazards of concern.

Table 14-6. Hazard Risk Ranking

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Severe Weather	51	High
1	Earthquake	51	High
2	Wildfire	16	Medium
3	Flood	15	Medium
3	Landslide	15	Medium
4	Dam Failure	8	Low
5	Volcano	7	Low
6	Drought	0	Low

14.8 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 14-7 lists the actions that make up the C-TRAN Public Transit Benefit Area hazard mitigation action plan. Table 14-8 identifies the priority for each action. Table 14-9 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 14-7. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CTRAN-1—Where appropriate, support retro-fitting, purchase or relocation of structures located in high hazard areas and prioritize those structures that have the highest risk of loss.						
Existing	All Hazards	4, 5, 7, 9, 10	Board	High	HMGP, PDM, FMA	Short-Term
CTRAN-2—Integrate the natural hazard mitigation plan into the Security and Emergency Preparedness Plan (SEPP), the Agency Safety Plan (ASP) and the Adverse Weather Plan (AWP) as appropriate in support of infrastructure investment choices, such as capital improvement.						
Existing	All Hazards	1, 2, 3, 4, 5	Executive Staff	Low	Staff Time, General Funds	On-Going
CTRAN-3—Improve existing C-TRAN hazard and maintenance databases to capture perishable data after significant events (e.g. preliminary damage estimates, claims associated with storm damage, damage photos) to support future mitigation efforts including the implementation and maintenance of the natural hazard mitigation plan, the SEPP, the ASP, and the AWP.						
New and Existing	All Hazards	5, 6, 8, 10, 12	Executive Staff	Low	Staff Time, General Funds	On-Going
CTRAN-4—Incorporate mitigation retrofits for C-TRAN facilities into the bi-annual capital improvements program, following seismic risk assessments to target high hazard buildings for mitigation opportunities.						
Existing	All Hazards	2, 4, 5, 9, 10	Board	High	HMGP, PDM, FMA	Short-Term
C-TRAN 5—Purchase portable generators and install quick-connect emergency generator hook-ups to power critical OEM and Transit Station assets to supplement existing emergency power and provide redundancy for critical functions.						
Existing	All Hazards	5, 8, 9, 10	Board	Medium	HMGP, PDM, General Funds	Short-Term
CTRAN-6—Perform non-structural assessments and mitigation activities (e.g. anchor bookcases to the wall) and educate C-TRAN employees on the possible impacts of earthquake and how to deal with them.						
Existing	Earthquake	1, 2, 3, 4, 6, 10	All C-TRAN Employees	Low	Staff Time	Ongoing
CTRAN-7—Communicate earthquake secondary hazards to the public (e.g. landslides, dam failure, fires, damage to transportation infrastructure) via website and social media						
Existing	Earthquake	1, 2, 3, 4	Public Affairs	Low	Staff Time, General Funds	Ongoing
CTRAN-8—Develop a contingency plan to supply and dispense diesel and unleaded fuel from an alternate source (e.g. tanker trucks with powered pumps) in case the primary re-supply source is unavailable/damaged, or the onsite dispensing system is unavailable/damaged						
Existing	Earthquake, Flood, Severe Storm/Weather	5, 6, 8, 10	Operations	Medium	Staff Time, General Funds, Possibly DHS grants	Short-Term
CTRAN-9—Support the County-wide initiatives identified in Volume I of the natural hazard mitigation plan.						
New and Existing	All Hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Lead Contact Department for Plan	Low	Staff Time, General Funds	Short-Term

Table 14-8. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
CTAN-1	5	High	High	Yes	Yes	No	Medium	High
CTAN-2	5	Medium	Low	Yes	No	Yes	High	Low
CTAN-3	5	Low	Low	Yes	No	Yes	High	Low
CTAN-4	5	High	High	Yes	Yes	No	Medium	High
CTAN-5	4	High	Medium	Yes	Yes	No	Medium	High
CTAN-6	6	Medium	Low	Yes	No	Yes	High	Low
CTAN-7	4	Low	Low	Yes	No	Yes	High	Low
CTAN-8	4	High	Medium	Yes	Possibly	No	Medium	Medium
CTAN-9	12	Low	Low	Yes	No	Yes	High	Low

a. See the introduction to this volume for explanation of priorities.

Table 14-9. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	CTAN-2 C-TRAN-3 CTAN-9	CTAN-1 CTAN-4			CTAN-5	CTAN-4
Drought	CTAN-2 C-TRAN-3 CTAN-9	CTAN-1 CTAN-4			CTAN-5	CTAN-4
Earthquake	CTAN-2 C-TRAN-3 CTAN-9	CTAN-1 CTAN-4 CTAN-8	CTAN-6 CTAN-7		CTAN-5 CTRAN-8	CTAN-4
Flood	CTAN-2 C-TRAN-3 CTAN-9	CTAN-1 CTAN-4 CTAN-8			CTAN-5 CTRAN-8	CTAN-4
Landslide	CTAN-2 C-TRAN-3 CTAN-9	CTAN-1 CTAN-4			CTAN-5	CTAN-4
Severe Weather	CTAN-2 C-TRAN-3 CTAN-9	CTAN-8			CTAN-5 CTRAN-8	CTAN-4
Volcano	CTAN-2 C-TRAN-3 CTAN-9				CTAN-5	CTAN-4
Wildfire	CTAN-2 C-TRAN-3 CTAN-9				CTAN-5	CTAN-4

a. See the introduction to this volume for explanation of mitigation types.

15. CLARK FIRE PROTECTION DISTRICT #3

15.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Sean Smith, Battalion Chief
17718 NE 159 ST
Brush Prairie, WA 98606
Telephone: 360-892-2331
e-mail Address: sean@fire3.org

Alternate Point of Contact

Scott Sorenson, Assistant Chief
17718 NE 159 ST
Brush Prairie, WA 98606
Telephone: 360-892-2331
e-mail Address: scott@fire3.org

15.2 JURISDICTION PROFILE

15.2.1 Overview

Fire District 3 is an all-risk response agency; meaning, that to the best of its ability, it will respond to any emergency-related situation (fires, rescues, medical emergencies, hazardous materials incidents, natural and manmade disasters, etc.). Fire District 3 was legally formed in 1947 as authorized by Washington State statute (RCW 52.02.020). The District is governed under the policy-making direction of a three member board of Fire Commissioners. The board assumes responsibility for the adoption of this plan; the Fire Chief will oversee its implementation.

Fire District 3 currently employs 38 full time employees and maintains a pool of approximately 25 volunteers. Fire District 3 is a Junior Taxing District and receives its funds through property taxes, some special purpose taxes like timber tax, and a service contract with the City of Battle Ground. The District's services span 88 square miles, including the City of Battle Ground and eight major unincorporated areas: (a) Hockinson, (b) Brush Prairie, (c) Venersborg, (d) Rawson Rd, (e) Heisson, (f) Battle Ground Lake, (g) Crawford, and (h) Lucia Falls. As reported by the County's GIS, approximately 39,185 people reside within Fire District 3's response area.

15.2.2 Service Area and Trends

The district serves a population of 39,185. Its service area covers an area of 88 square miles, which has a total replacement value of \$4.4 billion.

Over the last three years, Fire District 3 has seen an average of a 10 percent increase in assessed valuation annually. There has been an increase of undeveloped land being converted to light industrial and residential use in our service area. This increase in density of land uses will represent an increase in population and thus a projected increase in call volume. Our District is experiencing an average annual increase in call volume of 6 percent per year. With the proposed rezoning and development of the Urban Land Bank along SR 503, we are projecting the necessity of adding an additional station to meet the service needs of that area as well as increased staffing levels to meet the needs of the entire District.

15.2.3 Assets

Table 15-1 summarizes the critical assets of the district and their value.

Table 15-1. Special Purpose District Assets	
Asset	Value
Property	
12.81 acres of land	\$541,553
Critical Infrastructure and Equipment	
7 Fire Engines and contents	\$4,550,000
5 Squads and contents	\$625,000
2 Rescues and contents	\$160,000
2 Water Tenders and contents	\$700,000
3 Command Vehicles	\$180,000
Total:	\$6,215,000
Critical Facilities	
Station 31, Hockinson	\$2,028,300
Station 32, Versborg	\$552,100
Station 33, Battle Ground Lake	\$643,700
Station 34, Rawson Rd	\$861,400
Station 35, Battle Ground	\$1,200,000
Total:	\$5,285,500

15.3 CAPABILITY ASSESSMENT

15.3.1 Planning and Regulatory Capabilities

The following existing codes, ordinances, policies or plans are applicable to this natural hazard mitigation plan:

- Interim Final Rule 44 CFR part 201.6 – Requires a local jurisdiction have a Local Mitigation Plan in place to be FEMA compliant.
- Washington State Legislature RCW 38.52.070 - Directs local organizations to develop an emergency management plan which becomes a part of the state's comprehensive emergency management plan.
- Clark Regional Comprehensive Regional Emergency Response Plan - Identifies authorities and assigns responsibilities for planning, response, and recovery activities.

15.3.2 Fiscal, Administrative and Technical Capabilities

An assessment of fiscal capabilities is presented in Table 15-2. An assessment of administrative and technical capabilities is presented in Table 15-3.

15.4 EDUCATION AND OUTREACH CAPABILITIES

An assessment of education and outreach capabilities is presented in Table 15-4.

Table 15-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Capital Improvements Project Funding	No
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	No
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
State-Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes
Other-Private Grants	Yes

Table 15-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	No	
Engineers or professionals trained in building or infrastructure construction practices	No	
Planners or engineers with an understanding of natural hazards	No	
Staff with training in benefit/cost analysis	Yes	Steve Wrightson, Fire District 3, Fire Chief; Scott Sorenson, Fire District 3, Assistant Chief
Surveyors	No	
Personnel skilled or trained in GIS applications	Yes	Clark County GIS, Contract Support
Scientist familiar with natural hazards in local area	No	
Emergency manager	Yes	Sean Smith, Fire District 3, Battalion Chief
Grant writers	Yes	Steve Wrightson, Fire District 3, Fire Chief; Scott Sorenson, Fire District 3, Assistant Chief
Other	No	

Table 15-4. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes, volunteer with limited capabilities.
Do you have personnel skilled or trained in website development?	Yes
Do you have hazard mitigation information available on your website? • If yes, please briefly describe.	Yes We periodically put information about wildfires, floods, earthquakes, volcanoes, and tornadoes on our website. We also have links to various sites with useful information.
Do you utilize social media for hazard mitigation education and outreach? • If yes, please briefly describe.	Yes Much like our website, we periodically put information about hazard mitigation on our Facebook page.
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, please briefly specify.	No
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, please briefly describe.	Yes We have a large roadside variable message sign that we can and do place out at strategic locations making people aware of certain conditions.
Do you have any established warning systems for hazard events? • If yes, please briefly describe.	No

15.5 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into existing plans and programs.

15.5.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- **Emergency Management Program:** The program manager leads the process for creation and implementation of the natural hazard mitigation plan. Prior to implementation, the plan is reviewed and voted on the adoption of the plan by a Board of Commissioners.

15.5.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- **Fire District 3 utilizes a strategic planning process** where a new strategic plan is developed once every five years guiding the District's growth and operations. The District's new strategic plan which is scheduled for development in 2016 will include implementation of the natural hazard mitigation plan.
- **Fire District 3 Disaster Plan:** This plan currently lays out the roles and responsibilities of Fire District 3 personnel in the event of a disaster. Information from the natural hazard mitigation plan will be incorporated as appropriate.

- Policy 1102 Emergency Power. The purpose of this policy is to establish a process for identifying emergency power needs or relocation plans for critical facilities and/or equipment. The Fire Chief is responsible for creation and implementation of the Emergency Power plan.
- Policy 716 Public Alerts. The purpose of this policy is to provide guidelines for notifying the public of vital fire safety information and/or emergency evacuation instructions. The Fire Chief is responsible for appointing an administrator for the Public Alert system.

15.6 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 15-5 lists all past occurrences of natural hazards within the jurisdiction.

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Tornado	N/A	03/21/2013	\$15,000
Wind Storm	1682	12/14/2006	\$190,000
Wind Storm	N/A	12/18/2005	\$45,000
Wind Storm	N/A	12/12/2004	\$50,000
Lightning	N/A	6/21/1997	Unknown
Flood	N/A	12/12/1996	Unknown

15.7 JURISDICTION-SPECIFIC VULNERABILITIES

Noted vulnerabilities of the jurisdiction include the following:

- Station 34, Rawson Road is not currently equipped with a backup generator.

15.8 HAZARD RISK RANKING

Table 15-6 presents the ranking of the hazards of concern.

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Earthquake	54	High
2	Severe Weather	42	High
3	Wildfire	32	High
4	Landslide	6	Low
5	Flood	3	Low
5	Volcano	3	Low
6	Drought	1	Low
7	Dam Failure	0	None

15.9 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 15-7 lists the actions that make up the Clark Fire Protection District #3 hazard mitigation action plan. Table 15-8 identifies the priority for each action. Table 15-9 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 15-7. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
FD3-1—Where appropriate, support retro-fitting, purchase or relocation of structures located in high hazard areas and prioritize those structures that have experienced repetitive losses.						
Existing	All Hazards	4, 5, 7, 9, 10	Facilities	High	HMGP, PDM,	Short-term
FD3-2—Integrate the natural hazard mitigation plan into other plans and programs that support infrastructure investments choices, such as the capital improvement program.						
New and Existing	All Hazards	2, 4,	Board	Low	Staff Time, General Funds	On-going
FD3-3—Develop and implement a program to capture perishable data after significant events (e.g. high water marks, preliminary damage estimates, damage photos) to support future mitigation efforts including the implementation and maintenance of the natural hazard mitigation plan.						
Existing	All Hazards	1, 2, 4, 12	Emergency Management	Medium	Staff Time, General Funds	Short-term
FD3-4—Support the County-wide initiatives identified in Volume I of the natural hazard mitigation plan.						
New and Existing	All Hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Lead Contact Department for Plan	Low	Staff Time, General Funds	Short-term
FD3-5—Actively participate in the plan maintenance protocols outlined in Volume I of the natural hazard mitigation plan.						
New and Existing	All Hazards	1, 4	Lead Contact Department for Plan	Low	Staff Time, General Funds	Short-term
FD3-6—Develop a post-disaster recovery plan and a debris management plan.						
Existing	All Hazards	1, 2, 4, 9	Emergency Management	Medium	EMPG	Long-term
FD3-7—Require rapid damage assessment training for all staff.						
New and Existing	All Hazards	2, 4, 6, 12	Training	Low	Staff Time, General Funds	On-going
FD3-8—Identify funding opportunities for the purchase of a backup generator at Station 34.						
New and Existing	All Hazards	5, 6, 8, 9, 10	Facilities	High	EMPG, HMGP, PDM, Staff Time, General Funds	Short-term
FD3-9—Assess emergency response routes and determine backup options in case of damage or disruption.						
New and Existing	All Hazards	2, 4, 5, 6,	Operations	Low	Staff Time, General Funds	On-going
FD3-10—Develop and implement a 10-14 day food and water plan for staff members at critical facilities.						
New and Existing	All Hazards	4, 5, 6, 10, 12	Emergency Management	Medium	EMPG, Staff Time, General Funds	On-going
FD3-11—Perform non-structural assessments and mitigation activities (e.g. anchor bookcases to the wall).						
Existing	Earthquake, Severe Weather	5, 6, 9, 10	Facilities	Medium	EMPG, Staff Time, General Funds	Short-term
FD3-12—Encourage residents to post addresses where they are visible to first responders.						
Existing	All Hazards	1, 2, 4,	Public Education	Low	Staff Time, General Funds	On-going
FD3-13—Replace 44 year old water tender with updated apparatus.						
Existing	All Hazards	1, 2, 4,	Apparatus	High	AFG, EMPG, Staff Time, General Funds	Short-Term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
FD3-14—Develop evacuation/emergency road plans and prioritize roads for response efforts.						
New and Existing	All Hazards	1, 2, 4, 5, 6,	Operations	Low	Staff Time, General Funds	Short-term
FD3-15—Seek alternative water supplies in urban wildland interface areas.						
New and Existing	Wildfire	4, 6, 11	Operations	Low	Staff Time, General Funds	Short-term

Table 15-8. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
FD3-1	5	High	High	Yes	Yes	No	Medium	High
FD3-2	2	Medium	Low	Yes	No	Yes	High	Low
FD3-3	4	Low	Medium	Yes	No	No	Low	Low
FD3-4	12	Low	Low	Yes	No	Yes	High	Low
FD3-5	2	Low	Low	Yes	No	Yes	High	Low
FD3-6	4	Medium	Medium	Yes	Yes	No	Medium	High
FD3-7	4	Low	Low	Yes	No	Yes	Medium	Low
FD3-8	5	Medium	High	Yes	Yes	No	Medium	High
FD3-9	4	Medium	Low	Yes	No	Yes	High	Low
FD3-10	5	Medium	Medium	Yes	Yes	Yes	Medium	Low
FD3-11	4	High	Medium	Yes	Yes	Yes	Medium	Low
FD3-12	3	High	Low	Yes	No	Yes	High	Low
FD3-13	3	High	High	Yes	Yes	No	Medium	High
FD3-14	5	Medium	Low	Yes	No	Yes	High	Low
FD3-15	4	Medium	Low	Yes	No	Yes	High	Low

a. See the introduction to this volume for explanation of priorities.

Table 15-9. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	FD3-2, FD3-3, FD3-4, FD3-5, FD3-6	FD3-1, FD3-8	FD3-4, FD3-12		FD3-6, FD3-7, FD3-9, FD3-10, FD3-12, FD3-13, FD3-14	
Drought	FD3-2, FD3-3, FD3-4, FD3-5, FD3-6	FD3-1, FD3-8	FD3-4, FD3-12		FD3-6, FD3-7, FD3-9, FD3-10, FD3-12, FD3-13, FD3-14	
Earthquake	FD3-2, FD3-3, FD3-4, FD3-5, FD3-6	FD3-1, FD3-8, FD3-11	FD3-4, FD3-12		FD3-6, FD3-7, FD3-9, FD3-10, FD3-11, FD3-12, FD3-13, FD3-14	
Flood	FD3-2, FD3-3, FD3-4, FD3-5, FD3-6	FD3-1, FD3-8	FD3-4, FD3-12		FD3-6, FD3-7, FD3-9, FD3-10, FD3-12, FD3-13, FD3-14	
Landslide	FD3-2, FD3-3, FD3-4, FD3-5, FD3-6	FD3-1, FD3-8	FD3-4, FD3-12		FD3-6, FD3-7, FD3-9, FD3-10, FD3-12, FD3-13, FD3-14	
Severe Weather	FD3-2, FD3-3, FD3-4, FD3-5, FD3-6	FD3-1, FD3-8, FD3-11	FD3-4, FD3-12		FD3-6, FD3-7, FD3-9, FD3-10, FD3-11, FD3-12, FD3-13, FD3-14	
Volcano	FD3-2, FD3-3, FD3-4, FD3-5, FD3-6	FD3-1, FD3-8	FD3-4, FD3-12		FD3-6, FD3-7, FD3-9, FD3-10, FD3-12, FD3-13, FD3-14	
Wildfire	FD3-2, FD3-3, FD3-4, FD3-5, FD3-6	FD3-1, FD3-8	FD3-4, FD3-12		FD3-6, FD3-7, FD3-9, FD3-10, FD3-12, FD3-13, FD3-14, FD3-15	

a. See the introduction to this volume for explanation of mitigation types.

16. PORT OF VANCOUVER USA

16.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Scott Ouchi, Safety, Risk, & Emergency Mgr.
3103 NW Lower River Rd
Vancouver, WA 98660
Telephone: 360-816-9847
e-mail Address: souchi@portvanusa.com

Alternate Point of Contact

Todd Krout, Director of Operations
3103 NW Lower River Rd
Vancouver, WA 98660
Telephone: 360-993-8642
e-mail Address: tkrout@portvanusa.com

16.2 JURISDICTION PROFILE

16.2.1 Overview

The Port of Vancouver was created in 1912 by Clark County residents to ensure that prime industrial and marine property on the waterfront was retained for public economic benefit. The Port receives income from tenant leases and vessel fees which covers operating costs such as salaries, rents, utilities and business services. The Port also invests in capital improvements to build and improve port facilities like rail and docks. These capital improvements are paid partly from income the port generates. But they also are paid by tenants and customers through fees, port district residents through taxes, and state and federal grant programs.

Today, the Port is home to more than 50 businesses that employ more than 3,200 employees and indirectly employ another 20,000 people which generates about \$2.9 billion in economic activity annually. Combined, the Port and its tenants pay more than \$103 million annually in state and local taxes.

The port is governed by a three-person Board of Commissioners, whose members are elected on six-year staggered terms. The commissioners hire a CEO who is charged with overseeing port operations, carrying out policies and overseeing staff. The Board of Commissioners will assume responsibility for the adoption of this plan and the CEO will oversee its implementation.

16.2.2 Service Area and Trends

The Port District serves a population of roughly 300,000 within 111 square miles that makes up the three taxing districts. Its service area covers an area of 2,100 acres, which has a total replacement value of \$43.6 billion.

According to a recent economic study, the economic benefit of the port's marine and industrial activities increased from \$1.6 billion in 2010 to \$2.9 billion. Focus over the next few years to maximize marine business and development include increasing efficiencies and minimizing the number of times cargo is handled within port facilities. Also, the development of new rail served marine terminals is essential to growing the economic benefit to our community over the next 10 years. For industrial business and development, industrial warehouse space continues to be nearly or completely leased, driving the need for new shovel-ready properties. The Port owns 50 acres of shovel-ready and over 150 acres of undeveloped industrial-zoned land.

16.2.3 Assets

Table 16-1 summarizes the critical assets of the district and their value.

Table 16-1. Special Purpose District Assets	
Asset	Value
Property	
2,100 acres of land	\$43.6 billion
Critical Infrastructure and Equipment	
Rail Infrastructure	\$36,415,309
Equipment	\$78,577,454
Total:	\$114,992,763
Critical Facilities	
Warehouse (54)	\$144,680,378
Piers (17)	\$98,221,114
Total:	\$242,901,492

16.3 CAPABILITY ASSESSMENT

16.3.1 Planning and Regulatory Capabilities

The following existing codes, ordinances, policies or plans are applicable to this natural hazard mitigation plan:

- 2016 Capital Maintenance Improvement Plan
- 2016-2025 Strategic Plan

16.3.2 Fiscal, Administrative and Technical Capabilities

An assessment of fiscal capabilities is presented in Table 16-2. An assessment of administrative and technical capabilities is presented in Table 16-3.

Table 16-2. Fiscal Capability	
Financial Resources	Accessible or Eligible to Use?
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	Yes
State-Sponsored Grant Programs	Yes
Freight Mobility Strategic Investment Board	
Development Impact Fees for Homebuyers or Developers	No
Other	

Table 16-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Engineering & Project Delivery
Engineers or professionals trained in building or infrastructure construction practices	Yes	Engineering & Project Delivery
Planners or engineers with an understanding of natural hazards	Yes	Engineering & Project Delivery
Staff with training in benefit/cost analysis	Yes	Finance & Admin
Surveyors	No	
Personnel skilled or trained in GIS applications	No	
Scientist familiar with natural hazards in local area	Yes	Environmental Services
Emergency manager	Yes	Operations
Grant writers	Yes	Finance & Admin
Other		

16.3.3 Education and Outreach Capabilities

An assessment of education and outreach capabilities is presented in Table 16-4.

Table 16-4. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes, External Affairs
Do you have personnel skilled or trained in website development?	Yes, External Affairs
Do you have hazard mitigation information available on your website? • If yes, please briefly describe.	No
Do you utilize social media for hazard mitigation education and outreach? • If yes, please briefly describe.	No
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, please briefly specify.	No
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, please briefly describe.	Yes Radio communications, bi-weekly staff meetings, safety committee meetings and Joint Accident Prevention Committee meetings
Do you have any established warning systems for hazard events? • If yes, please briefly describe.	No

16.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into existing plans and programs.

16.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- None at this time.

16.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- Emergency Response Plan—Identifies potential hazards and protocols for dealing with hazards. Information from the natural hazard mitigation plan will be incorporated at the next update, as appropriate.
- Water System Emergency Response Plan—Identifies potential hazards and protocols for dealing with hazards. Information from the natural hazard mitigation plan will be incorporated at the next update, as appropriate.

16.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 16-5 lists all past occurrences of natural hazards within the jurisdiction.

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
High Winds	N/A	11/01/2015	\$17,585.73
High Winds	N/A	11/11/2014	\$16,626.39

16.6 JURISDICTION-SPECIFIC VULNERABILITIES

Noted vulnerabilities of the jurisdiction include the following:

- Identified areas of vulnerability include: volcanic ash fall; earthquake liquefaction; flooding and severe weather events.
 - POV has facilities located on liquefiable soil.
 - POV has many structures that are older and may not be built to current seismic codes.

16.7 HAZARD RISK RANKING

Table 16-6 presents the ranking of the hazards of concern.

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
	Severe weather	48	High
	Earthquake	36	High
	Flood	28	Medium
	Dam failure	18	Medium
	Landslide	3	Low
	Volcano	3	Low
	Drought	0	None
	Wildfire	0	None

16.8 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 16-7 lists the actions that make up the Port of Vancouver USA hazard mitigation action plan. Table 16-8 identifies the priority for each action. Table 16-9 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 16-7. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
POV-1: Where appropriate, support retro-fitting, purchase or relocation of structures located in high hazard areas and prioritize those structures that have experienced repetitive losses.						
Existing	All Hazards	4, 5, 9, 10	POV Operations	High	Staff time/Port expense	On-going
POV-2: Perform assessments of non-structural items (bookcases/racking, etc.) and ensure secured to fixed structure.						
Existing	Earthquake	4, 5, 9, 10	POV Operations	Low	Staff time/Port expense	Short term
POV-3: Develop a Business Continuity and Disaster Recovery plan, involving key stakeholders.						
Existing	All Hazards	4, 5, 8, 12	POV Operations	Low	Staff time/Port expense	Short term
POV-4: Assess property elevations to ensure the floodplain is considered in existing and future developments.						
Both	Flood	4, 5, 6, 8, 9, 10	POV Operations	Low	Staff time/Port expense	On-going
POV-5: Develop volcanic emergency action plan; identify resources that may be negatively impacted; and educate employees on impacts and emergency plans.						
Both	Ash Fall (Volcano)	4, 5, 6, 8, 10	POV Operations	Medium	Staff time/Port expense	On-going

Table 16-8. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
POV-1	4	Low	High	No	Yes	No	Medium	High
POV-2	4	High	Low	Yes	No	Yes	High	Medium
POV-3	4	Low	Low	Yes	Yes	Yes	High	Low
POV-4	6	Low	Low	Yes	No	Yes	Medium	Low
POV-5	5	Low	Low	Yes	No	Yes	Medium	Low

a. See the introduction to this volume for explanation of priorities.

Table 16-9. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Severe Weather	POV-1, POV-2, POV-3, POV-4, POV-5	POV-1, POV-2	POV-3		POV-3	POV-1
Flood	POV-1, POV-3, POV-4	POV-1, POV-4	POV-3	POV-4	POV-3	
Earthquake	POV-1, POV-2, POV-3, POV-4	POV-1, POV-2	POV-3		POV-3	POV-1
Dam failure	POV-1, POV-3	POV-1	POV-3		POV-3	POV-1
Landslide	POV-1, POV-3	POV-1	POV-3		POV-3	POV-1
Volcanic Ash Fall	POV-1, POV-3, POV-5	POV-1, POV-3, POV-4	POV-3, POV-5		POV-3	

a. See the introduction to this volume for explanation of mitigation types.

16.9 FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

- Seismic infrastructure and structural retrofit assessment.

17. RIDGEFIELD SCHOOL DISTRICT

17.1 NATURAL HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Chris Griffith, Assistant Superintendent
2724 South Hillhurst Road
Ridgefield, WA 98642
Telephone: 360-619-1304
e-mail Address: chris.griffith@ridgefieldsd.org

Alternate Point of Contact

Nathan McCann, Superintendent
2724 South Hillhurst Road
Ridgefield, WA 98642
Telephone: 360-619-1302
e-mail Address: Nathan.mccann@ridgefieldsd.org

17.2 JURISDICTION PROFILE

17.2.1 Overview

The Ridgefield School District offers an academic program with a proven record of achievement. Ridgefield has a long history as a district with a strong curriculum—a blend of common-sense basic skills instruction and creative strategies that promotes higher-level thinking and reasoning. Ridgefield students typically have performed at or among the highest when compared with students across the region.

Teacher Information (2014-15) (more info)	
Classroom Teachers	99
Average Years of Teacher Experience	14.7
Teachers with at least a Master's Degree	77.8%
Total number of teachers who teach core academic classes	103
% of teachers teaching with an emergency certificate	0.0%
% of teachers teaching with a conditional certificate	0.0%
Total number of core academic classes	415
<i>ESEA Highly Qualified Teacher Information</i>	
% of classes taught by teachers meeting ESEA highly qualified (HQ) definition	100.0%
% of classes taught by teachers who do not meet ESEA HQ definition	0.0%
% of classes in high poverty schools taught by teachers who meet ESEA HQ definition	100.0%
% of classes in high poverty schools taught by teachers who do not meet ESEA HQ definition	0.0%
% of classes in low poverty schools taught by teachers who meet ESEA HQ definition	100.0%
% of classes in low poverty schools taught by teachers who do not meet ESEA HQ definition	0.0%

Ridgefield School District currently employs nearly 120 certificated teachers, 8 administrators and roughly 50 classified employees to support students and certificated staff.

The district operates on a budget of nearly \$24 million collected from a variety of sources.

- 75 percent from state funding
- 18 percent from local taxes
- 4 percent from local support
- 3 percent from Federal funding.

The Ridgefield School District school board assumes responsibility for the adoption of this plan; the Office of the Superintendent will oversee its implementation.

17.2.2 Assets

Table 17-1 summarizes the critical assets of the district and their value.

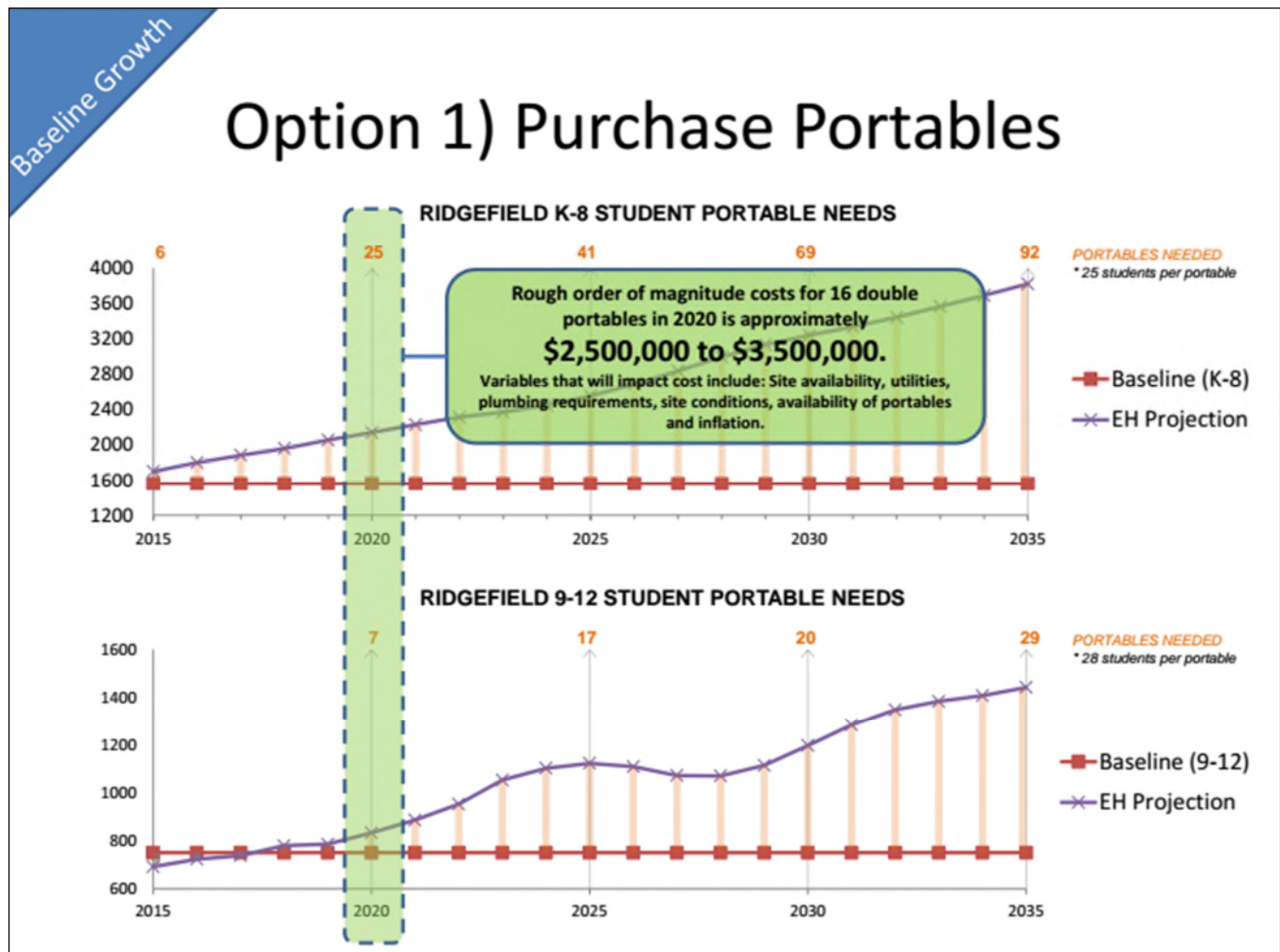
Table 17-1. Special Purpose District Assets	
Asset	Value
Property	
57.3 square miles	\$2.7 billion
Critical Infrastructure and Equipment	
District van (x2)	\$10,000 each
Maintenance vehicle - van	\$15,000
Maintenance vehicle - van	\$15,000
Maintenance vehicle - van	\$15,000
Maintenance vehicle - truck	\$5,000
Total:	\$60,000
Critical Facilities	
South Ridge Elementary School	
Union Ridge Elementary School	
View Ridge Middle School	
Ridgefield High School	
RHS stadium	
District office	
Total^a	\$19,254,771

a. District property has been valued as a whole, not as individual buildings

17.2.3 Service Area and Trends

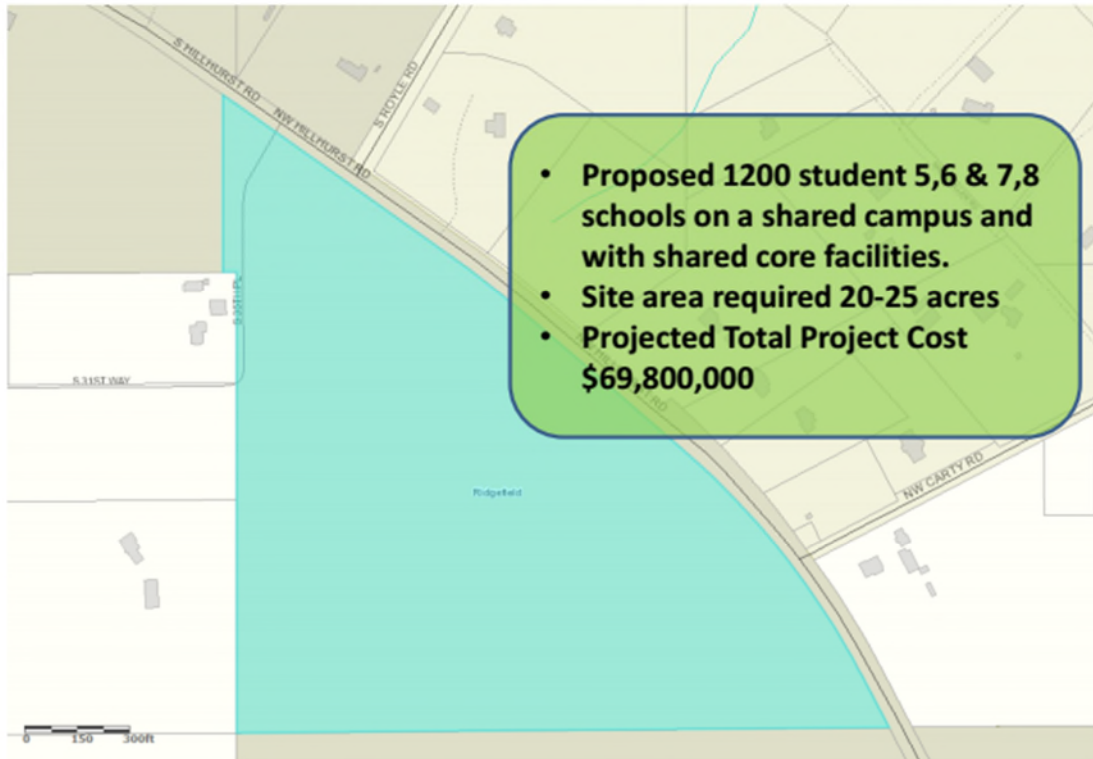
The district serves a population of 2,444 students. Its service area covers an area of 57.3 square miles, which has a total replacement value of \$2.7 billion. Approximately, 13,920 people reside within the service area of the district.

Currently the Ridgefield School District is the fastest growing district in Clark County (percent of student population based). This has created a need for additional classrooms.



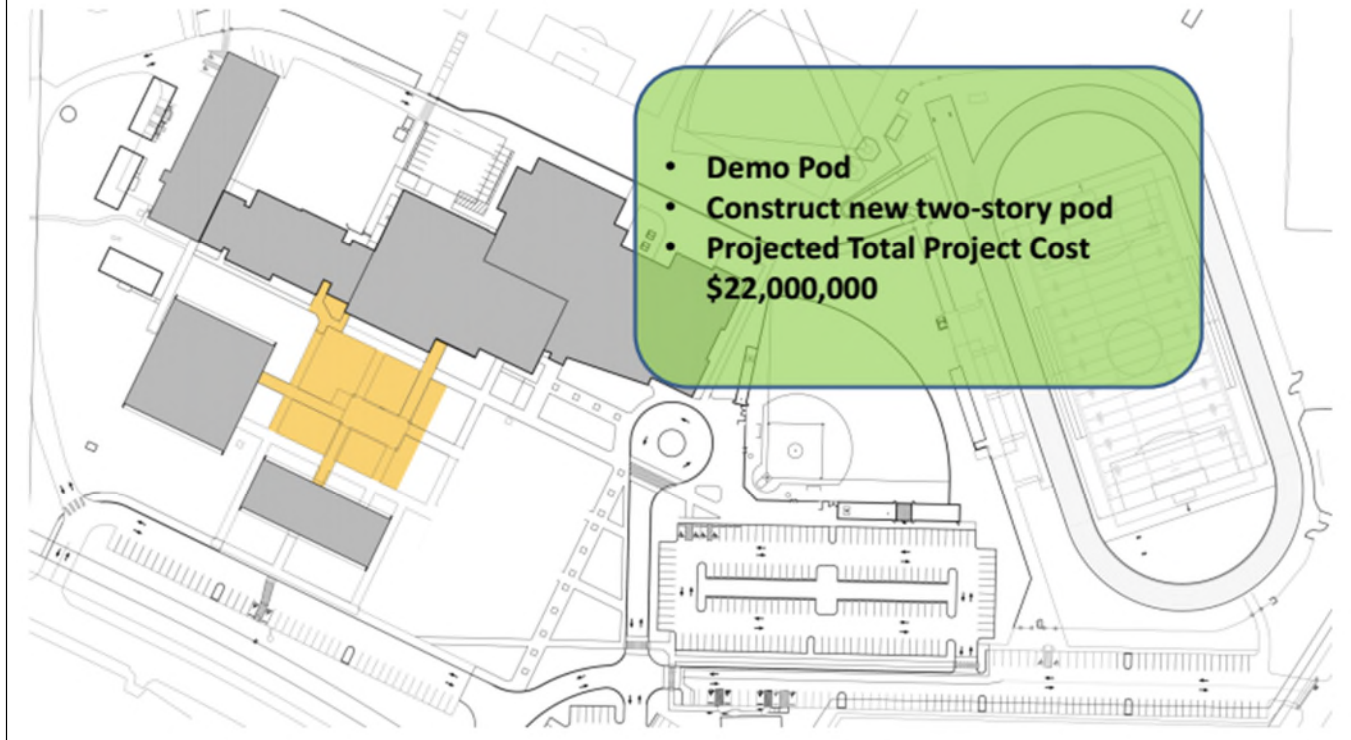
Baseline Growth

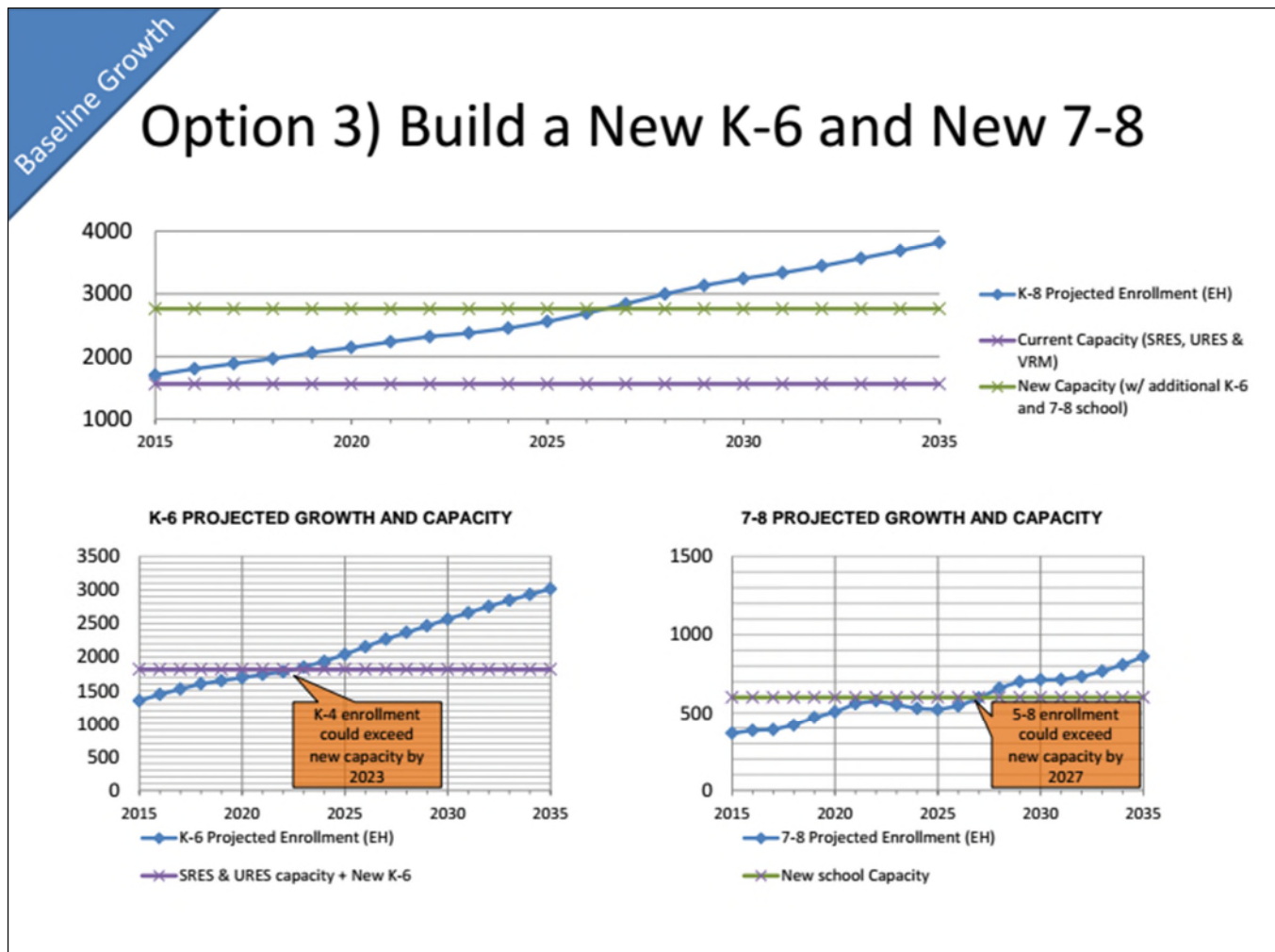
Option 2) Build a New School for Grades 5-8, Reconfigure SRES and URES as K-4



Baseline Growth

Option 2) Replace a Classroom Pod at Ridgefield HS





17.3 CAPABILITY ASSESSMENT

17.3.1 Planning and Regulatory Capabilities

The following existing codes, ordinances, policies or plans are applicable to this natural hazard mitigation plan:

- More information on these plans can be found - <http://www.ridgefieldsd.org/about-us/board-of-directors/policies-and-procedures>
 - Capital Facilities Plan (6900)
 - Risk Management Program (6500)
 - Site Acquisition (6905)
- Ridgefield School District Safety Committee

17.3.2 Fiscal, Administrative and Technical Capabilities

An assessment of fiscal capabilities is presented in Table 17-2. An assessment of administrative and technical capabilities is presented in Table 17-3.

Table 17-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	No
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	No
Incur Debt through Private Activity Bonds	No
State-Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers (GMA)	Yes
Other	No

Table 17-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Outside consultant(s)
Engineers or professionals trained in building or infrastructure construction practices	Yes	Maintenance director LSW Architects
Planners or engineers with an understanding of natural hazards	Yes	LSW Architects
Staff with training in benefit/cost analysis	Yes	LSW Architects
Surveyors	Yes	Outside consultant(s)
Personnel skilled or trained in GIS applications	Yes	Outside consultant(s)
Scientist familiar with natural hazards in local area	Yes	Outside consultant(s)
Emergency manager	Yes	Maintenance director, principals, superintendent
Grant writers	Yes	Federal Programs office
Other	No	

17.3.3 Education and Outreach Capabilities

An assessment of education and outreach capabilities is presented in Table 17-4.

17.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the natural hazard mitigation plan into existing plans and programs.

17.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan:

- Emergency Operations Plan—the District is currently in the process of revising and updating the Emergency Operations Plan. As part of this process the Ridgefield School District has been working with CRESA, the Ridgefield Police Department and Clark County Fire & Rescue. We have planned an RRAT exercise to take place on January 14. Once completed, the district will take the lessons learned and apply them to our plan. Additionally, we will discuss and include the natural hazard mitigation plan.

Table 17-4. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes - Nathan McCann, Superintendent
Do you have personnel skilled or trained in website development?	Yes – Technology Department
Do you have hazard mitigation information available on your website? • If yes, please briefly describe.	No
Do you utilize social media for hazard mitigation education and outreach? • If yes, please briefly describe.	Yes We posted a link to the natural hazard mitigation plan public survey on the district website and used the district email system to notify parents of our activities.
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, please briefly specify.	No
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, please briefly describe.	Yes The district has a safety committee that meets four times a year. Information related to the plan could be shared with this group. The group would then take the material back to their buildings to share with all staff members.
Do you have any established warning systems for hazard events? • If yes, please briefly describe.	Yes Building intercom and phone systems. Additionally, flash alerts can be sent.

17.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the natural hazard mitigation plan, but provide an opportunity for future integration:

- The Ridgefield School District is working with Clark County school districts regarding an area wide adoption of the Standard Response Protocol and Standard Reunification Plan (<http://www.iloveguys.org/>).
- The Ridgefield School District Safety Committee will be kept apprised of the District's progress on the implementation and maintenance of the natural hazard mitigation plan.

17.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 17-5 lists all known, past occurrences of natural hazards within the jurisdiction.

Table 17-5. Natural Hazard Events

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Severe Winter Weather	4253	12/15	\$0 - School Closure, Interstate 501 lane closure
Severe Winter Weather	N/A	2/7/14 and 2/10/14	\$0- School Closure, Interstate 501 lane closure
Severe Winter Weather	N/A	12/10/13 and 12/11/13	\$0- School Closure, Interstate 501 lane closure
Severe Winter Weather	N/A	1/18/12	\$0- School Closure
Severe Winter Weather	N/A	2/24/11	\$0- School Closure
Severe Winter Weather	N/A	11/23/10	\$0- School Closure
Volcanic Eruption	623	5/80	\$0

17.6 JURISDICTION-SPECIFIC VULNERABILITIES

Noted vulnerabilities of the jurisdiction include the following:

- The downtown portion of Ridgefield is served by Pioneer. In the last 3 years, one lane of Pioneer has been closed twice due to slides during the winter. When this occurs, the lane is closed for a good deal of time. This limits transportation access to the downtown area.
- Many of the core district facilities have not been seismically retrofitted.

17.7 HAZARD RISK RANKING

Table 17-6 presents the ranking of the hazards of concern.

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Severe Weather	51	High
3	Earthquake	36	High
4	Landslide	24	Medium
5	Flood	16	Medium
6	Dam Failure	9	Low
7	Drought	8	Low
8	Volcano (ash fall)	8	Low
9	Wildfire	0	None

17.8 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 17-7 lists the actions that make up the Ridgefield School District hazard mitigation action plan. Table 17-8 identifies the priority for each action. Table 17-9 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 17-7. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
RSD-1—Ridgefield School District has many older facilities that were not designed with seismic activity in mind. Perform non-structural retrofits on all facilities.						
Existing	Earthquake	9, 10	Ridgefield School District - Maintenance	Medium	General fund - maintenance	Short term
RSD-2—Purchase back-up generators for facilities (Union Ridge, South Ridge, Ridgefield High School).						
Existing	All hazards	2, 3, 10	Ridgefield School District - Maintenance	High	HMGP, PDM	Short term
RSD-3—Retro fit all brick buildings for seismic activity (Union Ridge, South Ridge, Ridgefield High School).						
Existing	Earthquake	9, 10	Ridgefield School District - Maintenance and Contractor	High	HMGP, PDM	Long term
RSD-4—Work with local agencies to identify a standard Reunification Site for use by all schools when evacuation of school facilities is necessary. Currently working with CRESA, Ridgefield Police, Clark County Fire & Rescue, Clark County Sheriff.						
N/A	All hazards	1, 4	Ridgefield School District, Ridgefield Police Department, Clark County Fire & Rescue, Clark County Event Center	Low	General fund	Short term
RSD-5—Share the Hazard Mitigation work with the school board during a public meeting annually.						
N/A	All hazards	1	Ridgefield School District	Low	Staff time	Short term
RSD-6 —Support the County –wide initiative in Volume I of the natural hazard mitigation plan.						
New and Existing	All hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Lead contact Department for Plan	Low	Staff Time, General Funds	Short-term
RSD – 7—Actively participate in the plan maintenance strategy outlined in Volume I of the natural hazard mitigation plan.						
New and Existing	All hazards	1, 4	Lead Contact Department for Plan	Low	Staff Time, General Funds	Short-term

Table 17-8. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
1	2	High	Medium	Yes	No	Yes	High	Low
2	3	High	High	Yes	Yes	No	Low	High
3	2	High	High	Yes	Yes	No	Low	High
4	2	High	Low	Yes	No	Yes	High	Low
5	5	Low	Low	Yes	No	Yes	Medium	Low
6	12	Low	Low	Yes	No	Yes	High	Low
7	2	Low	Low	Yes	No	Yes	High	Low

a. See the introduction to this volume for explanation of priorities.

Table 17-9. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Severe Weather	RSD-1, RSD-2, RSD-3, RSD-6, RSD-7	RSD-1, RSD-2, RSD-3	RSD-5		RSD-4, RSD-5	RSD-3
Earthquake	RSD-1, RSD-2, RSD-3, RSD-6, RSD-7	RSD-1, RSD-3	RSD-5		RSD-4	RSD-3
Landslide	RSD-2, RSD-6, RSD-7	RSD-2	RSD-5, RSD-8		RSD-4	
Flood	RSD-2, RSD-6, RSD-7	RSD-2	RSD-5, RSD-8		RSD-4	
Dam Failure	RSD-2, RSD-6, RSD-7	RSD-2	RSD-5, RSD-8		RSD-4	
Drought	RSD-2, RSD-6, RSD-7	RSD-2	RSD-5, RSD-8			
Volcano (ash fall)	RSD-2, RSD-6, RSD-7	RSD-2	RSD-5, RSD-8		RSD-4	

a. See the introduction to this volume for explanation of mitigation types.

17.9 FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

The Ridgefield School District will continue to partner with the City of Ridgefield considering long term planning in regards to traffic impact.

17.10 ADDITIONAL COMMENTS

As the Ridgefield School District continues to grow, we will take into consideration potential hazards when designing new construction.

Clark Regional Natural Hazard Mitigation Plan: Volume 2—Planning Partner Annexes

Appendix A. Example Letter of Intent

A. EXAMPLE LETTER OF INTENT TO PARTICIPATE

Clark Regional Natural Hazard Mitigation Planning Partnership

C/O Kristen Gelino, Tetra Tech, Inc.

949.809.5019

Via email at: kristen.gelino@tetratech.com

Clark Regional Natural Hazard Mitigation Planning Partnership,

Please be advised that the _____ (*insert City or district name*) is committed to participating in the development of the Clark Regional Natural Hazard Mitigation Plan. As the _____ (title, e.g., Chief Administrative Official) for this jurisdiction, I certify that I will commit all necessary resources in order to meet Partnership expectations as outlined in the “Planning Partners expectations” document provided by the planning team, in order to obtain Disaster Mitigation Act (DMA) compliance for our jurisdiction.

Mr./Ms. _____ will be our jurisdiction’s primary point of contact for this process and they can be reached at (*insert: address, phone number and e-mail address*). Mr./Ms. _____ will be our jurisdiction’s secondary point of contact for this process and they can be reached at (*insert: address, phone number and e-mail address*).

Sincerely,

Clark Regional Natural Hazard Mitigation Plan: Volume 2—Planning Partner Annexes

Appendix B. Procedures for Linking to Natural Hazard Mitigation Plan

B. PROCEDURES FOR LINKING TO NATURAL HAZARD MITIGATION PLAN

Not all eligible local governments in Clark County are included in the Clark Regional Natural Hazard Mitigation Plan Update. Some or all of these non-participating local governments may choose to “link” to the Plan at some point to gain eligibility for programs under the federal Disaster Mitigation Act (DMA). In addition, some current partners may not continue to meet eligibility requirements due to a lack of participation prescribed by the plan. The following “linkage” procedures define the requirements established by the Planning Team for dealing with an increase or decrease in the number of planning partners linked to this plan. No currently non-participating jurisdiction within the defined planning area is obligated to link to this plan. These jurisdictions can choose to do their own “complete” plan that addresses all required elements of Section 201.6 of Chapter 44 of the Code of Federal Regulations (44 CFR).

INCREASING THE PARTNERSHIP THROUGH LINKAGE

Eligible jurisdictions located in the planning area may link to this plan at any point during the plan’s performance period (5 years after final approval). It is expected that linking jurisdictions will complete the requirements outlined below and submit their completed template to the lead agency (CRESA) for review within three months of beginning the linkage process:

- The eligible jurisdiction requests a “Linkage Package” by contacting the Point of Contact (POC) for the plan:

Anthony Vendetti, Emergency Management Coordinator
Phone: 360-992-6271
Email: Anthony.Vendetti@clark.wa.gov
- The POC will provide a linkage procedure package that includes linkage information and a linkage tool-kit:
 - Linkage Information
 - Procedures for linking to the natural hazard mitigation plan update
 - Planning partner’s expectations for linking jurisdictions
 - A sample “letter of intent” to link to the Natural Hazard Mitigation Plan
 - A copy of Section 201.6 of 44 CFR, which defines the federal requirements for a local natural hazard mitigation plan.
 - Linkage Tool-Kit
 - Copy of Volume 1 and 2 of the plan
 - A special purpose district template and instructions

- The critical facility results from the risk assessment (for official use only)
 - A catalog of hazard mitigation best practices
 - An annex review check-list
 - A copy of the FEMA plan review crosswalk
 - A sample resolution for plan adoption.
- The new jurisdiction will be required to review both volumes of the Natural Hazard Mitigation Plan, which include the following key components for the planning area:
 - Goals and objectives
 - The planning area risk assessment
 - Comprehensive review of alternatives
 - Countywide actions
 - Action prioritization scheme
 - Plan implementation and maintenance procedures.

Once this review is complete, the jurisdiction will complete its specific annex using the template and instructions provided by the POC.

- The development of the new jurisdiction's annex must not be completed by one individual in isolation. The jurisdiction must develop, implement and describe a public involvement strategy and a methodology to identify and vet jurisdiction-specific actions. The original partnership was covered under a uniform public involvement strategy and a process to identify actions that covered the planning area described in Volume 1 and Volume 2 of this plan. Since new partners were not addressed by these strategies, they will have to initiate new strategies and describe them in their annex. For consistency, new partners are encouraged to develop and implement strategies similar to those described in this plan.
- The public involvement strategy must ensure the public's ability to participate in the plan development process. At a minimum, the new jurisdiction must solicit public opinion on hazard mitigation at the onset of the linkage process and hold one or more public meetings to present the draft jurisdiction-specific annex for comment at least two weeks prior to adoption by the governing body.
- The methodology to identify actions should include a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard and a description of the process by which chosen actions were identified. As part of this process, linking jurisdictions should coordinate the selection of actions amongst the jurisdiction's various departments.
- Once their public involvement strategy and template are completed, the new jurisdiction will submit the completed package to the POC for a pre-adoption review to ensure conformance with the plan format and linkage procedure requirements.
- The POC will review for the following:
 - Documentation of public involvement and action plan development strategies
 - Conformance of template entries with guidelines outlined in instructions
 - Chosen initiatives are consistent with goals, objectives and mitigation catalog of the Natural Hazard Mitigation Plan Update
 - A designated point of contact
 - A completed FEMA plan review crosswalk.
- Plans will be reviewed by the POC and submitted to Washington State Emergency Management Division (EMD) for review and approval.
- EMD will review plans for federal compliance. Non-compliant plans are returned to the lead agency for correction. Compliant plans are forwarded to FEMA for review with annotation as to the adoption status.

- FEMA reviews the new jurisdiction's plan in association with the approved plan to ensure DMA compliance. FEMA notifies the new jurisdiction of the results of review with copies to EMD and the approved plan lead agency.
- New jurisdiction corrects plan shortfalls (if necessary) and resubmits to EMD through the approved plan lead agency.
- For plans with no shortfalls from the FEMA review that have not been adopted, the new jurisdiction governing authority adopts the plan and forwards adoption resolution to FEMA with copies to lead agency and EMD.
- FEMA regional director notifies the new jurisdiction's governing authority of the plan's approval.

The new jurisdiction plan is then included with the county plan, and the new jurisdiction is committed to participate in the ongoing plan implementation and maintenance strategies.

DECREASING THE PARTNERSHIP

The eligibility afforded under this process to the planning partnership can be rescinded in two ways. First, a participating planning partner can ask to be removed from the partnership. This may be done because the partner has decided to develop its own plan or has identified a different planning process for which it can gain eligibility. A partner that wishes to voluntarily leave the partnership shall inform the POC of this desire in writing. This notification can occur any time during the calendar year. A jurisdiction wishing to pursue this avenue is advised to make sure that it is eligible under the new planning effort, to avoid any period of being out of compliance with the Disaster Mitigation Act.

After receiving this notification, the POC shall immediately notify both the Washington State Emergency Management Division and FEMA in writing that the partner in question is no longer covered by the Clark Regional Natural Hazard Mitigation Plan Update, and that the eligibility afforded that partner under this plan should be rescinded based on this notification.

The second way a partner can be removed from the partnership is by failure to meet the participation requirements specified in the "Planning Partner Expectations" package provided to each partner at the beginning of the process, or the plan maintenance and implementation procedures specified under Chapter 18 in Volume 1 of the plan. Each partner agreed to these terms by adopting the plan.

Eligibility status of the planning partnership will be monitored by the POC. The determination of whether a partner is meeting its participation requirements will be based on the following parameters:

- Are progress reports being submitted annually by the specified time frames?
- Are partners notifying the POC of changes in designated points of contact?
- Are the partners supporting the natural hazard mitigation plan working group by attending designated meetings or responding to needs identified by the body?
- Are the partners continuing to be supportive as specified in the Planning Partners expectations package provided to them at the beginning of the process?

Participation in the plan does not end with plan approval. This partnership was formed on the premise that a group of planning partners would pool resources and work together to strive to reduce risk within the planning area. Failure to support this premise lessens the effectiveness of this effort. The following procedures will be followed to remove a partner due to the lack of participation:

- The POC will advise the natural hazard mitigation plan working group of this pending action and provide evidence or justification for the action. Justification may include: multiple failures to submit annual progress reports, failure to attend meetings determined to be mandatory by the natural hazard mitigation

plan working group, failure to act on the partner's action plan, or inability to reach designated point of contact after a minimum of five attempts.

- The natural hazard mitigation plan working group will review information provided by POC, and determine action by a vote. The natural hazard mitigation plan working group will invoke the voting process established in the ground rules established during the formation of this body.
- Once the natural hazard mitigation plan working group has approved an action, the POC will notify the planning partner of the pending action in writing via certified mail. This notification will outline the grounds for the action, and ask the partner if it is their desire to remain as a partner. This notification shall also clearly identify the ramifications of removal from the partnership. The partner will be given 30 days to respond to the notification.
- Confirmation by the partner that they no longer wish to participate or failure to respond to the notification shall trigger the procedures for voluntary removal discussed above.
- Should the partner respond that they would like to continue participation in the partnership, they must clearly articulate an action plan to address the deficiencies identified by the POC. This action plan shall be reviewed by the natural hazard mitigation plan working group to determine whether the actions are appropriate to rescind the action. Those partners that satisfy the natural hazard mitigation plan working group's review will remain in the partnership, and no further action is required.
- Automatic removal from the partnership will be implemented for partners where these actions have to be initiated more than once in a 5-year planning cycle.

Clark Regional Natural Hazard Mitigation Plan: Volume 2—Planning Partner Annexes

Appendix C. Annex Instructions and Templates

1. MUNICIPAL JURISDICTION NAME

1.1 HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Name, Title
Street Address
City, State ZIP
Telephone: xxx-xxx-xxxx
e-mail Address: xxx@xxx.xxx

Alternate Point of Contact

Name, Title
Street Address
City, State ZIP
Telephone: xxx-xxx-xxxx
e-mail Address: xxx@xxx.xxx

1.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- Date of Incorporation—
- Current Population—
- Population Growth—
- Location and Description—
- Brief History—
- Climate—
- Governing Body Format—
- Development Trends—

1.3 CAPABILITY ASSESSMENT

An assessment of legal and regulatory capabilities is presented in Table 1-1. An assessment of fiscal capabilities is presented in Table 1-2. An assessment of administrative and technical capabilities is presented in Table 1-3. Information on National Flood Insurance Program (NFIP) compliance is presented in Table 1-4. Classifications under various community mitigation programs are presented in Table 1-5.

Table 1-1. Legal and Regulatory Capability

	Local Authority	State or Federal Prohibitions	Other Jurisdiction Authority	State Mandated
Codes, Ordinances & Requirements				
Building Code				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Zoning Code				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Subdivisions				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Stormwater Management				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Post-Disaster Recovery				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Real Estate Disclosure				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Growth Management				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Site Plan Review				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Public Health and Safety				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Environmental Protection				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Planning Documents				
General or Comprehensive Plan				
Is the plan equipped to provide linkage to this mitigation plan? Yes/No				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Capital Improvement Plan				
What types of capital facilities does the plan address? List facility types				
How often is the plan updated? Indicate update frequency				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Floodplain or Basin Plan				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Stormwater Plan				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Habitat Conservation Plan				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Economic Development Plan				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Shoreline Management Plan				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				
Community Wildfire Protection Plan				
<i>Comment:</i> Insert Code Number and Adoption Date; Other Comments				

	Local Authority	State or Federal Prohibitions	Other Jurisdiction Authority	State Mandated
Response/Recovery Planning				
Comprehensive Emergency Management Plan				
<i>Comment: Insert Code Number and Adoption Date; Other Comments</i>				
Threat & Hazard Identification & Risk Assessment				
<i>Comment: Insert Code Number and Adoption Date; Other Comments</i>				
Terrorism Plan				
<i>Comment: Insert Code Number and Adoption Date; Other Comments</i>				
Post-Disaster Recovery Plan				
<i>Comment: Insert Code Number and Adoption Date; Other Comments</i>				
Continuity of Operations Plan				
<i>Comment: Insert Code Number and Adoption Date; Other Comments</i>				
Public Health Plan				
<i>Comment: Insert Code Number and Adoption Date; Other Comments</i>				

Table 1-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Community Development Block Grants	Yes/No
Capital Improvements Project Funding	Yes/No
Authority to Levy Taxes for Specific Purposes	Yes/No
User Fees for Water, Sewer, Gas or Electric Service	Yes/No
Incur Debt through General Obligation Bonds	Yes/No
Incur Debt through Special Tax Bonds	Yes/No
Incur Debt through Private Activity Bonds	Yes/No
Withhold Public Expenditures in Hazard-Prone Areas	Yes/No
State-Sponsored Grant Programs	Yes/No
Development Impact Fees for Homebuyers or Developers	Yes/No
Other	Yes/No

Table 1-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes/No	Insert appropriate information
Engineers or professionals trained in building or infrastructure construction practices	Yes/No	Insert appropriate information
Planners or engineers with an understanding of natural hazards	Yes/No	Insert appropriate information
Staff with training in benefit/cost analysis	Yes/No	Insert appropriate information
Surveyors	Yes/No	Insert appropriate information
Personnel skilled or trained in GIS applications	Yes/No	Insert appropriate information
Scientist familiar with natural hazards in local area	Yes/No	Insert appropriate information
Emergency manager	Yes/No	Insert appropriate information
Grant writers	Yes/No	Insert appropriate information

Table 1-4. National Flood Insurance Program Compliance

Criteria	Response
What local department is responsible for floodplain management?	Insert appropriate information
Who is your floodplain administrator? (department/position)	Insert appropriate information
Are any certified floodplain managers on staff in your jurisdiction?	Yes/No
What is the date of adoption of your flood damage prevention ordinance?	Insert appropriate information
When was the most recent Community Assistance Visit or Community Assistance Contact?	Insert appropriate information
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed?	Yes/No
<ul style="list-style-type: none"> If so, please state what they are. 	Insert appropriate information
Do your flood hazard maps adequately address the flood risk within your jurisdiction?	Yes/No
<ul style="list-style-type: none"> If no, please state why. 	Insert appropriate information
Does your floodplain management staff need any assistance or training to support its floodplain management program?	Yes/No
<ul style="list-style-type: none"> If so, what type of assistance/training is needed? 	Insert appropriate information
Does your jurisdiction participate in the Community Rating System (CRS)?	Yes/No
<ul style="list-style-type: none"> If so, is your jurisdiction seeking to improve its CRS Classification? 	Yes/No
<ul style="list-style-type: none"> If not, is your jurisdiction interested in joining the CRS program? 	Yes/No

Table 1-5. Community Classifications

	Participating?	Classification	Date Classified
Community Rating System	Yes/No		Date
Building Code Effectiveness Grading Schedule	Yes/No		Date
Public Protection	Yes/No		Date
Storm Ready	Yes/No		Date
Firewise	Yes/No		Date

1.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the hazard mitigation plan into existing plans and programs.

1.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the hazard mitigation plan:

- Name of plan or program—Brief description of how the plan/program is integrated with the hazard mitigation plan
- Name of plan or program—Brief description of how the plan/program is integrated with the hazard mitigation plan

1.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the hazard mitigation plan, but provide an opportunity for future integration:

- Name of plan or program—Brief description of how the plan/program can be integrated with the hazard mitigation plan
- Name of plan or program— Brief description of how the plan/program can be integrated with the hazard mitigation plan

1.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 1-6 lists all past occurrences of natural hazards within the jurisdiction.

Table 1-6. Natural Hazard Events

Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
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1.6 JURISDICTION-SPECIFIC VULNERABILITIES

Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: XX
- Number of FEMA-identified Severe-Repetitive-Loss Properties: XX
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: XX

Other noted vulnerabilities include:

- Insert as appropriate.

1.7 HAZARD RISK RANKING

Table 1-7 presents the ranking of the hazards of concern.

Table 1-7. Hazard Risk Ranking

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Insert hazard type		High/Medium/Low
2	Insert hazard type		High/Medium/Low
3	Insert hazard type		High/Medium/Low
4	Insert hazard type		High/Medium/Low
5	Insert hazard type		High/Medium/Low
6	Insert hazard type		High/Medium/Low
7	Insert hazard type		High/Medium/Low
8	Insert hazard type		High/Medium/Low
9	Insert hazard type		High/Medium/Low

1.8 STATUS OF PREVIOUS PLAN INITIATIVES

Table 1-8 summarizes the initiatives that were recommended in the previous version of the hazard mitigation plan and their implementation status at the time this update was prepared.

Table 1-8 Hazard Mitigation Action Plan Matrix			
Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Action #—Description			
Comment:			
Join the CRS program			
Comment:			
Action #—Description			
Comment:			
Action #—Description			
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Action Item	Completed	Carry Over to Plan Update	Removed; No Longer Feasible
Action #—Description			
Comment:			
Action #—Description			
Comment:			

1.9 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 1-9 lists the actions that make up the Municipal Jurisdiction Name hazard mitigation action plan. Table 1-10 identifies the priority for each action. Table 1-11 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 1-9. Hazard Mitigation Action Plan Matrix						
Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Action #—Description						
Action #—Description						
Action #—Description						
Action #—Description						
Action #—Description						
Action #—Description						
Action #—Description						
Action #—Description						
Action #—Description						
Action #—Description						

Table 1-10. Mitigation Strategy Priority Schedule								
Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/ Budgets?	Implementation Priority ^a	Grant Priority ^a

a. See the introduction to this volume for explanation of priorities.

Table 1-11. Analysis of Mitigation Actions						
Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects

a. See the introduction to this volume for explanation of mitigation types.

1.10 FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

Insert text, if any; otherwise, delete section

1.11 ADDITIONAL COMMENTS

Insert text, if any; otherwise, delete section

1. INSTRUCTIONS FOR COMPLETING MUNICIPALITY ANNEX TEMPLATE

The jurisdictional annex templates for the 2016 Clark County Hazard Mitigation Plan will be completed in three phases. **This document provides instructions for completing all phases of the template for municipalities.**

If your jurisdiction completed and submitted Phase 1 and Phase 2, Phase 3 has been added to the end of your annex to date. Any planning team comments, questions or suggestions have been included as blue highlighted notes and/or comments. Any text edits were made via track changes. Any yellow highlights indicate areas where missing information should be filled in. Phase 3 instructions begin on page 8.

If your jurisdiction did not complete Phase 1 or Phase 2, please complete all phases at this time.

Completed, draft templates should be completed by Friday, April 15, 2016. If you will not be able to meet this deadline, you must let the planning team know by April 8, 2016.

Any questions on completing the template should be directed to:

Kristen Gelino
Tetra Tech, Inc.
(646) 576-4029
e-mail: Kristen.gelino@tetratech.com

Municipality Annex:

This document provides instructions for completing all phases of the jurisdictional annex template for municipalities. **Phase 3 templates should be completed by Friday, April 15, 2016. If you will not be able to meet this deadline, you must let the planning team know by April 8, 2016.**

Associated Documents:

Phas32_MUNICIPALITYNAME.dotm
ClarkCo_2016HMP_Toolkit

A Note About Formatting:

The template for the annex is a Microsoft Word document in a format that will be used in the final plan. Partners are asked to use this template so that a uniform product will be completed for each partner. Partners who do not have Microsoft Word capability may prepare the document in other formats, and the planning team will convert it to the Word format.

Content should be entered within the yellow, highlighted text that is currently in the template, rather than creating text in another document and pasting it into the template. Text from another source will alter the style and formatting of the document.

The numbering in the document will be updated when completed annexes are combined into the final document. Please do not adjust any of this numbering.

PHASE 1 STARTS HERE

CHAPTER TITLE

In the chapter title at the top of Page 1, type in the complete official name of your municipality (City of Owen, West County, etc.). Please do not change the chapter number. Revise only the jurisdiction name.

HAZARD MITIGATION PLAN POINT OF CONTACT

Please provide the name, title, mailing address, telephone number, and e-mail address for the primary point of contact for your jurisdiction. This should be the person responsible for monitoring, evaluating and updating the annex for your jurisdiction. This person should also be the principle liaison between your jurisdiction and the Steering Committee overseeing development of this plan.

In addition, designate an alternate point of contact to contact should the primary point of contact be unavailable or no longer employed by the jurisdiction.

Note: Both contacts should match the contacts designated in your jurisdiction's letter of intent to participate in this planning process. If you have changed the primary or secondary contact, please let the planning team know by inserting a comment into the document.

JURISDICTION PROFILE

Provide information specific to your jurisdiction, in a style similar to the example provided in the box at right. This should be information not be provided in the overall mitigation plan document. For population, use the most current data for your jurisdiction from an official source (e.g., the U.S. Census or state office of financial management).

Example Jurisdiction Profile:

- **Date of Incorporation**—1858
- **Current Population**—17,289 as of July 2014 (2014 Department of Finance estimates)
- **Population Growth**—Based on the state data, Smithburg has experienced a relatively flat rate of growth. The overall population has increased 3.4% since 2010 and growth averaged 0.74% per year from 2000 to 2014.
- **Location and Description**—The City of Smithburg is on the Pacific coast, 275 miles south of Portland. Smithburg is the home of Smithburg State University and is situated between the communities of Murphy to the north and Blue Lake to the east. It sits at the intersection of State Routes 101 and 299.
- **Brief History**—The Smithburg area was settled in the 1850s as a supply center for miners. Timber later became the area's major economic resource. Smithburg was incorporated in 1858 and by 1913 Smithburg College was founded. Recently, the presence of the college has come to shape Smithburg's population into a young, liberal, and educated crowd.
- **Climate**—Smithburg's weather is typical of the Northern California coast, with mild summers and cool, wet winters. It rarely freezes in the winter and it is rarely hot in the summer. Annual average rainfall is over 40 inches, with 80% of that falling from November through April. The average year-round temperature is 59°F. Humidity averages 72 to 87 percent. Prevailing winds are from the north, and average 5 mph.
- **Governing Body Format**—The City is governed by a five-member city council. The City consists of three departments: Finance, Environmental Services, and Community Development. The City has 13 committees, commissions and task forces, which report to the City Council. The City Council assumes responsibility for the adoption of this plan; the City Manager will oversee its implementation.
- **Development Trends**—Anticipated development levels for Smithburg are low to moderate, consisting primarily of residential development. The majority of recent development has been infill, with a focus on affordable housing. The 2012 City of Smithburg general plan focuses on issues of the greatest concern to the community. City actions, such as those relating to land use allocations, annexations, zoning, subdivision, and capital improvements, must be consistent with the plan. Future growth and development in the City will be managed as identified in the general plan.

PHASE 2 STARTS HERE

CAPABILITY ASSESSMENT

Please note that it is unlikely that you will be able to complete all sections of this phase on your own. You will likely need to reach out to other departments within your local government such as planning, finance, public works, etc. When reaching out to these individuals, you may want to provide them with a little background information about this planning process as you will certainly want some input/feedback during phase 3 of your annex development – selecting mitigation actions.

Legal and Regulatory Capability

Describe the legal authorities available to your jurisdiction and/or enabling legislation at the state level affecting planning and land management tools that can support hazard mitigation actions. In the table titled “Legal and Regulatory Capability,” indicate “Yes” or “No” for each listed code, ordinance, requirement or planning document in each of the following columns:

- **Local Authority**—Enter “Yes” if your jurisdiction has prepared or adopted the identified item; otherwise, enter “No.” If yes, then enter the code, ordinance number, or plan name and its date of adoption in the comments column.
- **Other Jurisdiction Authority**—Enter “Yes” if there are any regulations that may impact your action that are enforced or administered by another agency (e.g., a state agency or special purpose district) or if you know that there are any state or federal regulations or laws that would prohibit local implementation of the identified item; otherwise, enter “No.” Note - If you answer yes, please indicate the other agency in the comments.
- **State Mandated**—Enter “Yes” if state laws or other requirements enable or require the listed item to be implemented at the local level; otherwise, enter “No.”
- **Comments**—Enter the code number and adoption date for any local code indicated as being in place; provide other comments as appropriate to describe capabilities for each entry.
- For the categories “General or Comprehensive Plan” and “Capital Improvement Plan,” answer the specific questions shown, in addition to completing the four columns indicating level of capability.

The table on the following page provides information and resources that may be helpful to you in completing the legal and regulatory capability table in you annex.

Legal and Regulatory Capability – Helpful Information	
Additional Information	
Codes, Ordinances & Requirements	
Building Code	The State Building Code is the minimum requirements for all local jurisdictions in the State. Local jurisdictions may enforce more stringent standards. The latest version of the WA State Code became effective on July 1, 2013 (Chapter 19.27 RCW). It is recommended that building codes are adopted locally. Resource: http://mrsc.org/Home/Stay-Informed/MRSC-Insight/February-2013/New-Building-Codes-Go-Into-Effect-on-July-1,-2013.aspx
Zoning Code	You may have a unified development code or separate ordinances for zoning, subdivision, etc. Clark County is a GMA community. Resource: http://mrsc.org/Home/Explore-Topics/Planning/Development-Regulations/Development-Regulations-and-Zoning.aspx
Subdivisions	The subdivision of land into lots is governed in Washington State by chapter 58.17 RCW and by city and county ordinances adopted under that chapter's authority. Resource: http://mrsc.org/Home/Explore-Topics/Planning/Development-Regulations/Subdivisions.aspx
Stormwater Management	Under Clean Water Act regulations, local governments in the Puget Sound Basin and those subject to the federal National Pollutant Discharge Elimination System (NPDES) Storm Water Program are required to have stormwater management programs. As authorized by the Clean Water Act, the U.S. Environmental Protection Agency's NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Resource: http://mrsc.org/Home/Explore-Topics/Environment/Water-Topics/Storm-and-Surface-Water-Management.aspx Map - http://waecy.maps.arcgis.com/home/item.html?id=df7f487bf29b4c24bf195146f22c3cb5
Post-Disaster Recovery	One action a community can take to move toward better management of disaster mitigation, preparedness, response, and recovery is the adoption of an ordinance before or after a damaging event to serve as either a forerunner or supplement to a full-blown recovery plan. Resource: https://www.planning.org/research/postdisaster/pdf/modelrecoveryordinance.pdf
Real Estate Disclosure	This is referring to real estate disclosure pertaining to natural hazards. There has been some recent legislation in WA State impacting this information. Resource: http://mrsc.org/Home/Stay-Informed/MRSC-Insight/September-2015/New-Property-Disclosure-Requirements-Will-Impact-S.aspx
Growth Management	Clark County is a required Growth Management Act planning community. Local jurisdictions should have implementing laws for their Comprehensive Plans. Resource: http://mrsc.org/Home/Explore-Topics/Planning/Development-Regulations/Development-Regulations-and-Zoning.aspx
Site Plan Review	Site plans include general site plan review and binding site plans Resource: http://mrsc.org/Home/Explore-Topics/Planning/Development-Regulations/Site-Plans-and-Binding-Site-Plans.aspx
Environmental Protection	This refers to critical areas and SEPA and/or Shoreline Management and anything specific to your jurisdiction as appropriate. Resource: Critical Areas: http://mrsc.org/Home/ExploreTopics/Environment/Critical-Areas-and-Species/Critical-Areas.aspx SEPA: http://mrsc.org/Home/Explore-Topics/Environment/Environmental-Laws/State-Environmental-Policy-Act.aspx Shoreline Management: http://www.ecy.wa.gov/programs/sea/shorelines/smp/status.html

	Additional Information
Flood Damage Prevention	All National Flood Insurance Program participating communities are required to have a flood damage prevention ordinance. Resource: http://mrsc.org/Home/Explore-Topics/Public-Safety/Emergency-Services/Flood-Hazard-Management-Planning-(1).aspx
Emergency Management	Each local government in Washington State is authorized and directed to establish a local organization or to be a member of a joint local organization for emergency management in accordance with the state comprehensive emergency management plan and program (see RCW 38.52.070). Resource: http://mrsc.org/Home/Explore-Topics/Public-Safety/Emergency-Services/Emergency-Management-and-Disaster-Planning/Emergency-Planning-at-the-Local-Government-Level.aspx
Climate Change Adaptation	This refers to any local ordinances that you may have that require that you examine or plan for climate change adaptation. It is unlikely that you have such laws currently on the books. An example from California is below. Resource: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB379
Other	Please provide any other ordinance that you think is relevant to the hazard mitigation plan. An example might be a bulkhead ordinance or a public health and safety ordinance or a Continuity of Operations or Emergency Declaration Authority. Resource:
Planning Documents	
General or Comprehensive Plan	You may also want to list out any optional elements. Local comprehensive plans must include the following elements: land use, housing, capital facilities, utilities, transportation, and, for counties, a rural element. Shoreline master program policies are also an element of local comprehensive plans. Implementation of required parks and economic development elements is on hold until adequate state funding is available. Local comprehensive plans may also include optional elements. (See RCW 36.70A.080.) <i>Is the plan equipped to provide linkage to this mitigation plan?</i> Does the plan include information from the HMP and/or is the HMP included by reference? Resource:
Capital Improvement Plan	Each jurisdiction should have a CIP. Resource: http://www.commerce.wa.gov/Services/localgovernment/GrowthManagement/Capital-Facilities/Pages/default.aspx
Floodplain or Watershed Plan	This might be a CRS Floodplain Management Plan or a Watershed Management Plan or a Comprehensive Flood Control Management Plan Resource: http://www.ecy.wa.gov/programs/eap/wrias/Planning/27-28.html http://app.leg.wa.gov/RCW/default.aspx?cite=86.12.200
Stormwater Plan	You will probably have a Stormwater Management Plan if you are a NPDES permittee. Resource: For example - http://www.cityofvancouver.us/publicworks/page/stormwater-management-plan
Habitat Conservation Plan	This is a specific plan relating to endangered species. Resource: http://www.fws.gov/endangered/esa-library/pdf/hcp.pdf
Economic Development Plan	Clark County belongs to the Oregon-based Portland Regional Partners Council of Economic Development. If you have a specific economic development plan, please include. Resource:
Shoreline Management Plan	Over 260 towns, cities and counties are required to comprehensively update their Shoreline Master Programs. Most local programs have not been fully updated in over 30 years. Resource: http://www.ecy.wa.gov/programs/sea/shorelines/smp/status.html

	Additional Information
Community Wildfire Protection Plan	I don't believe any Clark jurisdictions have a CWPP. If you have a related plan, please list below. Resource: http://www.dnr.wa.gov/programs-and-services/wildfire/wildfire-preparedness/community-wildfire-protection
Forest Management Plan	These refer to a variety of plans for urban and rural forests and street trees. Resource: Urban - http://mrsc.org/Home/Explore-Topics/Environment/Natural-Resources-Topics/Urban-Forestry.aspx Rural - http://www.clark.wa.gov/environment/documents/camp_bonneville_mngt_plan.pdf
Climate Action Plan	Some Washington State cities include climate change plans as elements in their comprehensive plans, while some have standalone plans. Such plans are not required in Washington State. Resource: http://mrsc.org/Home/Explore-Topics/Environment/Special-Topics/Climate-Change.aspx
Other	If you have any other plans that you feel are relevant for the hazard mitigation plan, please include them here. An example might be a vegetation management plan or a debris management plan. Resource:
Response/Recovery Planning	
Comprehensive Emergency Management Plan	Local jurisdictions are required to develop comprehensive emergency management plans. Resource: http://mrsc.org/Home/Explore-Topics/Public-Safety/Emergency-Services/Emergency-Management-and-Disaster-Planning/Emergency-Planning-at-the-Local-Government-Level.aspx
Threat & Hazard Identification & Risk Assessment	Threat and Hazard Identification and Risk Assessment (THIRA) provides a comprehensive approach for identifying and assessing risks and associated impacts. It expands on existing local, tribal, territorial, and state Hazard Identification and Risk Assessments (HIRAs) and other risk methodologies by broadening the factors considered in the process, incorporating the whole community throughout the entire process, and by accounting for important community-specific factors. Resource:
Post-Disaster Recovery Plan	This might also be a resiliency plan. Resource: http://mil.wa.gov/uploads/pdf/seismic-safety-committee/RWS%20final%20report.pdf
Continuity of Operations Plan	Resource: http://mrsc.org/Home/Explore-Topics/Public-Safety/Emergency-Services/Emergency-Management-and-Disaster-Planning/Emergency-Planning-at-the-Local-Government-Level.aspx
Public Health Plan	Local plans might address pandemic, mass casualties, etc. Resource:

Fiscal Capability

Identify what financial resources (other than the Hazard Mitigation Grant Program and the Pre-Disaster Mitigation Grant Program) are available to your jurisdiction for implementing mitigation actions.

Complete the table titled "Fiscal Capability" by indicating whether each of the listed financial resources is accessible to your jurisdiction. Enter "Yes" if the resource is fully accessible to your jurisdiction. Enter "No" if there are limitations or prerequisites that may hinder your eligibility for this resource.

Please note that some helpful comments are included in the template document.

Administrative and Technical Capability

This section requires you to take inventory of the staff/personnel resources available to your jurisdiction to help with hazard mitigation planning and implementation of specific mitigation actions.

Complete the table titled “Administrative and Technical Capability” by indicating whether your jurisdiction has access to each of the listed personnel resources. Enter “Yes” or “No” in the column labeled “Available?”. If yes, then enter the department and position title in the right-hand column.

Please note that if you have contract support staff with these capabilities you can still answer “Yes.” Please just indicate contract support in the department column.

National Flood Insurance Program Compliance

Identify your jurisdiction’s capabilities in terms of complying with the requirements of the National Flood Insurance Program.

Complete the table titled “National Flood Insurance Program Compliance” by indicating your jurisdiction’s capabilities related to each question in the table.

Please note that some helpful comments are included in the template document.

Classification in Hazard Mitigation Programs

Complete the table titled “Community Classifications” to indicate your jurisdiction’s participation in various national programs related to natural hazard mitigation. For each program enter “Yes” or “No” in the second column to indicate whether your jurisdiction participates. If yes, then enter the classification that your jurisdiction has earned under the program in the third column and the date on which that classification was issued in the fourth column; enter “N/A” in these columns if your jurisdiction is not participating.

Please note that some helpful comments are included in the template document.

Education and Outreach Capabilities

Complete the table titled “Education and Outreach” to indicate your jurisdiction’s capabilities and existing efforts regarding natural hazard mitigation education and outreach.

INTEGRATION WITH OTHER PLANNING INITIATIVES

After reviewing the plans, programs and ordinances identified in the above capability assessment tables, please identify those plans and programs where the goals and recommendations of the hazard mitigation plan have already been integrated and those plans and programs that offer opportunities for future integration. It is important to describe the process by which these plans and programs are or will be integrated. Generally speaking, FEMA recommends integration through

- Integrating plan goals with community objectives (e.g. incorporating goals for risk reduction and safety into the policies of other plans)
- Using the risk assessment to inform plans and policies (e.g. incorporation into land use plans and site plan review)
- Implementing mitigation actions through existing mechanisms (e.g. including mitigation projects in the capital improvement plan)

- Thinking about mitigation pre- and post-disaster (e.g. building recovery planning on existing mitigation plans and goals).

PHASE 3 STARTS HERE

JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Chronological List of Hazard Events

In the table titled “Natural Hazard Events,” list in chronological order (most recent first) any natural hazard event that has caused damage to your jurisdiction. Include the date of the event and the estimated dollar amount of damage it caused. You are welcome to include any events, but special attention should be made to include major storms and federally declared disasters. Please refer to the SHELDUS data and Federal Disaster Declarations included in the tool kit, and the summary of natural hazard events within risk assessment of the overall hazard mitigation plan. Potential sources of damage information include:

- Preliminary damage estimates your jurisdiction filed with the county or state
- Insurance claims data
- Newspaper archives
- Other plans/documents that deal with emergency management (safety element of a comprehensive plan, emergency response plan, etc.)
- Citizen input.

If you do not have estimates for dollars of damage caused, please list “Not Available” in the appropriate column. Please note that tracking such damages, is a valid and useful mitigation action if your jurisdiction does not currently track such information.

JURISDICTION-SPECIFIC NOTED VULNERABILITIES

Repetitive Loss Properties

A repetitive loss property is any property for which FEMA has paid two or more flood insurance claims in excess of \$1,000 in any rolling 10-year period since 1978. In the space provided, Tetra Tech has inserted the following information based on data provided by FEMA:

- The number of any FEMA-identified repetitive-loss properties in your jurisdiction.
- The number of any FEMA-identified severe-repetitive-loss properties in your jurisdiction.
- The number (if any) of repetitive-loss or severe-repetitive-loss properties in your jurisdiction that have been mitigated. Mitigated for this exercise means that flood protection has been provided to the structure.

Please review and verify the information that has been provided in this part of your annex.

Other Vulnerabilities

Please list any noted vulnerabilities in your jurisdiction related to hazard mitigation. This may include things such as the following:

- An urban drainage issue that results in localized flooding every time it rains.

- An area of the community that frequently loses power due to a lack of tree maintenance.
- A critical facility, such as a police station, that is not equipped with a generator.
- A neighborhood that has the potential to have ingress and egress cut off as the result of a hazard event, such as a flood or earthquake (e.g. bridge only access).
- Substantial number of buildings in one area of the community are unreinforced masonry.
- An area along the river is eroding and threatening public and/or private property.

HAZARD RISK RANKING

The risk ranking performed for the overall planning area is presented in the risk assessment section of the overall hazard mitigation plan. However, each jurisdiction has differing degrees of risk exposure and vulnerability and therefore needs to rank risk for its own area, using the same methodology as used for the overall planning area. The risk-ranking exercise assesses two variables for each hazard: its probability of occurrence; and its potential impact on people, property and the economy. The instructions below outline steps for assessing risk in your jurisdiction to develop results that are to be included in the template.

Please complete this portion of the annex using the Risk Ranking Worksheet and Loss Estimate Matrix provided in the tool kit.

Note: When completing this exercise it is important to remember that this exercise is about categorizing hazards into broad levels of risk (e.g. high, medium, low). It is not an exercise in precision.

Determine Probability of Occurrence for Each Hazard

A probability factor is assigned based on how often a hazard is likely to occur. The probability of occurrence of a hazard event is generally based on past hazard events in an area, although some weight can be given to expected future probability of occurrence based on established return intervals. For example, if your jurisdiction has experienced two damaging floods in the last 25 years, the probability of occurrence is high for flooding and scores a 3 under this category. If your jurisdiction has experienced no damage from landslides in the last 100 years, your probability of occurrence for landslide is low, and scores a 1 under this category.

In **Table 1**, list the probability of occurrence for each hazard as it pertains to your jurisdiction. Simply write, “**High**,” “**Medium**,” “**Low**,” or “**None**” in the grey column in Table 1:

- High—Hazard event is likely to occur within 25 years (Probability Factor = 3)
- Medium—Hazard event is likely to occur within 100 years (Probability Factor = 2)
- Low—Hazard event is not likely to occur within 100 years (Probability Factor = 1)
- None—If there is no exposure to a hazard, there is no probability of occurrence (Probability Factor = 0)

Determine Potential Impacts of Each Hazard

The impact of each hazard are divided into three categories: impacts on people, impacts on property, and impacts on the economy. These categories are also assigned weighted values. Impact on people was assigned a weighting factor of 3, impact on property was assigned a weighting factor of 2 and impact on the economy was assigned a weighting factor of 1.

Impact factors for each category (people, property, economy) are described below:

- **People**—Values are assigned based on the percentage of the total *population exposed* to the hazard event. The degree of impact on individuals will vary and is not measurable, so the calculation assumes for

simplicity and consistency that all people exposed to a hazard because they live in a hazard zone will be equally impacted when a hazard event occurs. Impact factors were assigned as follows:

- High—25 percent or more of the population is exposed to a hazard (Impact Factor = 3)
 - Medium—10 percent to 24 percent of the population is exposed to a hazard (Impact Factor = 2)
 - Low—9 percent or less of the population is exposed to the hazard (Impact Factor = 1)
 - No impact—None of the population is exposed to a hazard (Impact Factor = 0)
- **Property**—Values are assigned based on the percentage of the total *property value exposed* to the hazard event:
 - High—25 percent or more of the total replacement value is exposed to a hazard (Impact Factor = 3)
 - Medium—10 percent to 24 percent of the total replacement value is exposed to a hazard (Impact Factor = 2)
 - Low—9 percent or less of the total replacement value is exposed to the hazard (Impact Factor = 1)
 - No impact—None of the total replacement value is exposed to a hazard (Impact Factor = 0)
 - **Economy**—Values were assigned based on the percentage of the total *property value vulnerable* to the hazard event. Values represent estimates of the loss from a major event of each hazard in comparison to the total replacement value of the property exposed to the hazard. For some hazards, such as wildfire and landslide, vulnerability may be considered to be the same or a portion of exposure due to the lack of loss estimation tools specific to those hazards.
 - High—Estimated loss from the hazard is 10 percent or more of the total replacement value (Impact Factor = 3)
 - Medium—Estimated loss from the hazard is 5 percent to 9 percent of the total replacement value (Impact Factor = 2)
 - Low—Estimated loss from the hazard is 4 percent or less of the total replacement value (Impact Factor = 1)
 - No impact—No loss is estimated from the hazard (Impact Factor = 0).

The following sections provide information on completing the risk ranking for your jurisdiction.

Impacts on People

The percent of the total population exposed to each hazard of concern with a defined extent and location (e.g. floodplain) can be found in the loss estimate matrix in the **green highlighted column**. For those hazards that do not have a defined extent and location (e.g. severe weather) the entire population is generally considered to be exposed. For the drought hazard, it is common for jurisdictions to list “low” or “none,” because all people in the planning area would be exposed to drought, but impacts to the health and safety of individuals are expected to be minimal.

In the grey column in **Table 2**, please list the *percentage of the total population exposed* (e.g. 4.5 or 100). Remember, when you are estimating, the range limits are more important than the actual number (i.e. more than 25, between 25 and 10, and less than 10).

Impacts on Property

The percent of the total value exposed to each hazard of concern with a defined extent and location (e.g. floodplain) can be found in the loss estimate matrix in the **blue highlighted column**. For those hazards that do not have a defined extent and location (e.g. severe weather) the entire building stock is generally considered to be

exposed. For the drought hazard, it is common for jurisdictions to list “low” or “none,” because all structures in the planning area would be exposed to drought, but impacts to structures are expected to be minimal.

In the grey column in **Table 4**, please list the *percentage of the total value exposed* (e.g. 4.5 or 100). Remember, when you are estimating, the range limits are more important than the actual number (i.e. more than 25, between 25 and 10, and less than 10).

Impacts on the Economy

The loss estimates for each hazard of concern that was modeled (i.e. dam failure, flood, earthquake) can be found in the loss estimate matrix in the **purple highlighted column**. For those hazards that have a defined extent and location, but do not have modelled loss results, loss estimates can be the same as exposure or a portion thereof. For example, a large percentage of the building stock may be exposed to landslide or wildfire risk, but it would not be expected that one event that resulted in loss to all exposed structures would occur. For those hazards that do not have a defined extent and location (e.g. severe weather) the entire building stock is generally considered to be exposed, but impacts are generally considered to be “low.”

In the grey column in **Table 6**, please list the *percentage of the total value loss* (e.g. 4.5 or 10). Remember, when you are estimating, the range limits are more important than the actual number (i.e. more than 10, between 10 and 5, and less than 5).

Determine Risk Rating for Each Hazard

A risk rating for each hazard is determined by multiplying the assigned probability factor by the sum of the weighted impact factors for people, property and the economy:

$$\text{Risk Rating} = \text{Probability Factor} \times \text{Weighted Impact Factor \{people + property + economy\}}$$

The risk ranking results will be automatically tabulated for you for each hazard of concern in **Table 7**.

Complete Risk Ranking in Template

Once **Table 7** has been completed above, complete the table titled “Hazard Risk Ranking” in your template. The hazard with the highest risk rating in **Table 7** should be listed at the top of table titled “Hazard Risk Ranking” in your template and given a rank of 1; the hazard with the second highest rating should be listed second with a rank of 2; and so on. Two hazards with equal risk ratings should be given the same rank. After completing this, review the distribution of hazard scores and determine “High,” Medium,” and “Low” assignments for each hazard of concern. It is important to note, that this should be determined by the range of scores rather than assigning a certain number of hazards to each category.

It is also important to note that this exercise should not override your subjective assessment of relative risk based on your knowledge of the history of natural hazard events in your jurisdiction. If this risk ranking exercise generates results other than what you know based on substantiated data and documentation, you may alter the ranking based on this knowledge. If this is the case, please note this fact in your template (see notations in County-wide risk ranking in Tool Kit). Remember, one of the purposes of this exercise is to support the selection and prioritization of actions in your plan. If you identify an action with a high priority that mitigates the risk of a hazard you have ranked low, that project may not be competitive in the grant arena.

STATUS OF PREVIOUS PLAN ACTIONS

Provide a status report of actions recommended in your previous hazard mitigation plan. You must be able to reconcile your original action plan to meet FEMA requirements for plan updates. All the recommended actions from your previous plan have been entered in **Table 1-8** in your annex. Put an ✓ in one of the following three columns for each action to indicate its status:

- **Completed**—If the action has been completed, place a check mark in this column and enter a brief explanation in the “Comments” column (e.g., “Action #WC31 was completed by the Public Works Department on 3/12/2009”). Ongoing actions, such as annual outreach projects or maintenance activities, should also be indicated as “Completed,” with a statement about the ongoing nature of the action provided in the “Comments” column (e.g., “Ongoing action, implemented annually by Community Development Department”). Please note that these ongoing actions can have checkmarks in both the completed and carry over columns.
- **Carry Over to Plan Update**—If you did not complete an action and want to carry it over to your updated action plan, place a check mark in this column, and enter an explanatory statement in the comment section (e.g., “Action carried over as Action #WC14 in updated action plan”).
- **Removed; No Longer Feasible**—If you want to remove an action because you have determined that it is no longer feasible, place a check mark in this column. “No longer feasible” means that you have determined that you do not have the capability to implement the action or that the action does not serve the best interest of your jurisdiction. Lack of funding does not mean that it is no longer feasible, unless the sole source of funding for an action is no longer available. Place a comment in the comment section explaining why the action is no longer feasible (e.g., “Action no longer considered feasible due to lack of political support to complete it.”)

Additional information on each identified action item can be found in Chapter 7 of the 2004 plan. There is a table in the document that lists identified actions for each jurisdiction, hazards addressed, timeline, lead agency, etc.

Note: Populated previous plan action plan review tables were emailed out to the planning partnership on February 9th. If you completed your review of actions, you may copy and paste the table into your annex.

HAZARD MITIGATION ACTION PLAN

Action Plan Matrix

Identify the actions your jurisdiction would like to pursue with this plan. Refer to the mitigation catalog for mitigation options you might want to consider. Be sure to consider the following factors in your selection of actions:

- Select actions that are consistent with the overall purpose, goals, and objectives of the hazard mitigation plan.
- Identify projects where benefits exceed costs.
- Include any project that your jurisdiction has committed to pursuing regardless of grant eligibility.
- Know what is and is not grant-eligible under the HMGP and PDM (see fact sheet provided). Listing HMGP or PDM as a potential funding source for an ineligible project will be a red flag when this plan goes through review. If you have projects that are not HMGP or PDM grant eligible, but do mitigate part or all of the hazard and may be eligible for other grant programs sponsored by other agencies, include them in this section.
- You should identify at least one action for your highest ranked risk, but hazard-specific projects for every hazard are not required. If you have not identified an earthquake related project, and an earthquake occurs that causes damage in your jurisdiction, you are not discounted from HMGP project grant eligibility.

Wording Your Action Descriptions:

Descriptions of your actions need not provide great detail. That will come when you apply for a project grant. Provide enough information to identify the project's scope and impact. The following are typical descriptions for an action plan action:

- **Action 1**—Address repetitive-loss properties. Through targeted mitigation, acquire, relocate or retrofit the five repetitive loss structures in the County as funding opportunities become available.
- **Action 2**—Perform a non-structural, seismic retrofit of City Hall.
- **Action 3**—Acquire floodplain property in the Smith subdivision.
- **Action 4**—Enhance the County flood warning capability by joining the NOAA "Storm Ready" program.

Recommended Actions

We recommend that the following actions be included in every planning partners' annex. The specifics of these actions should be adjusted as needed for the particulars of each community.

- Where appropriate, support retro-fitting, purchase or relocation of structures located in high hazard areas and prioritize those structures that have experienced repetitive losses.
- Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions within the community.
- Develop and implement a program to capture perishable data after significant events (e.g. high water marks, preliminary damage estimates, damage photos) to support future mitigation efforts including the implementation and maintenance of the hazard mitigation plan.
- Support the County-wide initiatives identified in Volume I of the hazard mitigation plan.
- Actively participate in the plan maintenance protocols outlined in Volume I of the hazard mitigation plan.
- Continue to maintain good standing and compliance under the National Flood Insurance Program (NFIP). This will be accomplished through the implementation of floodplain management programs that will, at a minimum, meet the requirements of the NFIP:
 - Enforcement of the flood damage prevention ordinance
 - Participate in floodplain identification and mapping updates
 - Provide public assistance/information on floodplain requirements and impacts.
- Work with building officials to identify ways to improve the jurisdictions' BCEGS classification.
- Consider the development of a post-disaster recovery plan and a debris management plan.

- Consider participation in programs such as Firewise, StormReady and the Community Rating System.

Complete the Table

Complete the table titled “Hazard Mitigation Action Plan Matrix” for all the actions you have identified:

- Enter the action number and description .
- Indicate whether the action mitigates hazards for new or existing assets.
- Identify the specific hazards the action will mitigate.
- Identify by number the mitigation plan objectives that the action addresses (see Tool Kit).
- Indicate who will be the lead in administering the project. This will most likely be a department within your jurisdiction (e.g. planning or public works). If you wish to indicate more than one department, please ensure that it is clear who the lead agency will be (i.e note with an *)
- Enter an estimated cost in dollars if known; otherwise, enter “High,” “Medium” or “Low” as determined for the prioritization process described in the following section.
- Identify funding sources for the project. If it is a grant, include the funding sources for the cost share. Refer to your fiscal capability assessment to identify possible sources of funding.
- Indicate the time line as “short term” (1 to 5 years) or “long term” (5 years or greater) or on-going (a continual program)

Action Item Numbering:

- Please use the following action item numbering conventions:
 - Battle Ground: BG-1
 - Camas: CM-1
 - La Center: LC-1
 - Ridgefield: RF-1
 - Vancouver: VC-1
 - Washougal: WS-1
 - Woodland: WD-1
 - Yacolt: YA-1
 - Clark County: CC-1

Note: Please don’t forget to carryover actions as appropriate from the review of the previous plan actions. You may reword these actions to indicate next steps or to make them more specific.

Please see the table below for an example for the recommended initiatives above:

Example Action Plan Matrix						
Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
EX-1 —Where appropriate, support retro-fitting, purchase or relocation of structures located in high hazard areas and prioritize those structures that have experienced repetitive losses.						
Existing	All Hazards	4, 5, 7, 9, 10	Planning	High	HMGP, PDM, FMA, CDBG-DR	Short-term
EX-2 —Integrate the hazard mitigation plan into other plans, ordinances and programs that dictate land use decisions within the community.						
New and Existing	All Hazards	2, 4,	Planning	Low	Staff Time, General Funds	On-going
EX-3 —Develop and implement a program to capture perishable data after significant events (e.g. high water marks, preliminary damage estimates, damage photos) to support future mitigation efforts including the implementation and maintenance of the hazard mitigation plan.						
Existing	All Hazards	1, 2, 4, 12	Emergency Management	Medium	Staff Time, General Funds	Short-term
EX-4 —Support the County-wide initiatives identified in Volume I of the hazard mitigation plan.						
New and Existing	All Hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Lead Contact Department for Plan	Low	Staff Time, General Funds	Short-term
EX-5 —Actively participate in the plan maintenance protocols outlined in Volume I of the hazard mitigation plan.						
New and Existing	All Hazards	1, 4	Lead Contact Department for Plan	Low	Staff Time, General Funds	Short-term
EX-6 —Continue to maintain good standing and compliance under the National Flood Insurance Program (NFIP). This will be accomplished through the implementation of floodplain management programs that will, at a minimum, meet the requirements of the NFIP:						
<ul style="list-style-type: none"> • Enforcement of the flood damage prevention ordinance • Participate in floodplain identification and mapping updates • Provide public assistance/information on floodplain requirements and impacts. 						
New and Existing	Flood	1, 4, 5, 9	Public Works	Low	Staff Time, General Funds	On-going
EX-7 —Work with building officials to identify ways to improve the jurisdictions' BCEGS classification.						
New	Earthquake, Flood, Landslide, Severe weather, Volcano Wildfire	5, 6, 7, 10, 12	Building and Development Services	Low	Staff Time, General Funds	Short-term
EX-8 —Develop a post-disaster recovery plan and a debris management plan.						
Existing	All Hazards	1, 2, 4, 9	Emergency Management	Medium	EMPG	Long-term
EX-9 —Participate in programs such as Firewise, StormReady and the Community Rating System.						
New and Existing	Dam Failure, Flood, Severe weather, Wildfire	1, 7	Emergency Management* and Public Works	Low	Staff Time, General Funds	Short-term
*Identified Lead Agency						

Prioritization of Mitigation Actions

Complete the information in the table titled “Mitigation Strategy Priority Schedule” as follows:

- **Action #**—Indicate the action number from the previous annex table (Hazard Mitigation Action Plan Matrix).
- **# of Objectives Met**—Enter the number of objectives the action will meet.
- **Benefits**—Enter “High,” “Medium” or “Low” as follows:
 - High: Project will have an immediate impact on the reduction of risk exposure to life and property.
 - Medium: Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
 - Low: Long-term benefits of the project are difficult to quantify in the short term.
- **Costs**—Enter “High,” “Medium” or “Low” as follows:
 - High: Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.
 - Medium: Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
 - Low: Possible to fund under existing budget. Project is or can be part of an existing ongoing program.

If you know the estimated cost of a project because it is part of an existing, ongoing program, indicate the amount.

- **Do Benefits Exceed the Cost?**—Enter “Yes” or “No.” This is a qualitative assessment. Enter “Yes” if the benefit rating (high, medium or low) is the same as or higher than the cost rating (high benefit/high cost; high benefit/medium cost; medium benefit/low cost; etc.). Enter “No” if the benefit rating is lower than the cost rating (medium benefit/high cost, low benefit/medium cost; etc.)
- **Is the Project Grant-Eligible?**—Enter “Yes” or “No.” Refer to the fact sheet on HMGP and PDM.
- **Can Project Be Funded Under Existing Program Budgets?**—Enter “Yes” or “No.” In other words, is this action currently budgeted for, or would it require a new budget authorization or funding from another source such as grants?
- **Implementation Priority**— Enter “High,” “Medium” or “Low” as follows:
 - High Priority—An initiative that meets multiple objectives, has benefits that exceed cost, has funding secured or is an ongoing project and meets eligibility requirements for a grant program. High priority initiatives can be completed in the short term (1 to 5 years). The key factors for high priority initiatives are that they have funding secured and can be completed in the short term.
 - Medium Priority—An initiative that meets multiple objectives, that has benefits that exceed costs, and for which funding has not yet been secured, but is eligible for funding. Initiative can be completed in the short term, once funding is secured. Medium priority projects will become high priority projects once funding is secured. The key factors for medium priority initiatives are that they are eligible for funding, but do not yet have funding secured, and they can be completed within the short term.
 - Low Priority—An initiative that will mitigate the risk of a hazard, that has benefits that do not exceed the costs or are difficult to quantify, for which funding has not been secured, that is not eligible for grant funding, and for which the time line for completion is long term (1 to 10 years). Low priority initiatives may be eligible for grant funding from other programs that have not yet been identified. Low priority projects are generally “blue-sky” or “wish-list.” projects. Financing is unknown, and they can be completed over a long term.

- **Grant Funding Priority**— Enter “High,” “Medium” or “Low” as follows:
 - High Priority—An initiative that has been identified as meeting grant eligibility requirements, assessed to have high benefits, is listed as high or medium priority, and where local funding options are unavailable or where dedicated funds could be utilized for projects that are not eligible for grant funding.
 - Medium Priority—An initiative that has been identified as meeting grant eligibility requirements, assessed to have medium or low benefits, is listed as medium or low priority, and where local funding options are unavailable.
 - Low Priority—An initiative that has not been identified as meeting grant eligibility requirements, or has low benefits.

This prioritization is a simple way to determine that your identified actions meet one of the primary objectives of the Disaster Mitigation Act. It is not the detailed benefit/cost analysis required for HMGP/PDM project grants. The prioritization will identify any projects whose probable benefits will not exceed the probable costs. Those initiatives identified as high-priority grant funding initiatives should be closely reviewed for consideration when grant funding opportunities arise.

Note: If a jurisdiction wishes to identify a project as high priority that is outside of the prioritization scheme for high priorities. A note indicating so should be inserted and a rationale should be provided.

Please see the example below based off the recommended initiatives:

Table 1-9. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
EX-1	5	High	High	Yes	Yes	No	Medium	High
EX-2	2	Medium	Low	Yes	No	Yes	High	Low
EX-3	4	Low	Medium	No	No	Maybe	Low	Low
EX-4	12	Low	Low	Yes	No	Yes	High	Low
EX-5	2	Low	Low	Yes	No	Yes	High	Low
EX-6	4	Medium	Low	Yes	No	Yes	High	Low
EX-7	5	Medium	Low	Yes	No	Yes	High	Low
EX-8	4	Medium	Medium	Yes	Yes	No	Medium	High
EX-9	2	Medium	Low	Yes	No	Yes	High	Low

a. See the introduction to this volume for explanation of priorities

Analysis of Mitigation Actions

Complete the table titled “Analysis of Mitigation Actions” summarizing the mitigation actions by hazard of concern and the following six mitigation types:

- Prevention—Government, administrative or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.

- **Property Protection**—Modification of buildings or structures to protect them from a hazard or removal of structures from a hazard area. Includes acquisition, elevation, relocation, structural retrofit, storm shutters, and shatter-resistant glass.
- **Public Education and Awareness**—Actions to inform citizens and elected officials about hazards and ways to mitigate them. Includes outreach projects, real estate disclosure, hazard information centers, and school-age and adult education.
- **Natural Resource Protection**—Actions that minimize hazard loss and preserve or restore the functions of natural systems. Includes sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- **Emergency Services**—Actions that protect people and property during and immediately after a hazard event. Includes warning systems, emergency response services, and the protection of essential facilities.
- **Structural Projects**—Actions that involve the construction of structures to reduce the impact of a hazard. Includes dams, setback levees, floodwalls, retaining walls, and safe rooms.

This exercise demonstrates that the jurisdiction has selected a comprehensive range of actions.

Please see the example below based off the recommended initiatives, but please note that these recommendations are heavy on the prevention spectrum and light in other areas. Planning partners should aim to identify at least one action in each category:

Analysis of Mitigation Actions						
Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	EX-2, EX-3, EX-4, EX-5, EX-6, EX-8	EX-1, EX-6	EX-4, EX-6		EX-8	
Drought	EX-2, EX-3, EX-4, EX-5, EX-8	EX-1	EX-4,		EX-8	
Earthquake	EX-2, EX-3, EX-4, EX-5, EX-7, EX-8	EX-1, EX-7	EX-4		EX-8	
Flood	EX-2, EX-3, EX-4, EX-5, EX-6, EX-7, EX-8	EX-1, EX-6, EX-7	EX-4, EX-6	EX-9	EX-8	
Landslide	EX-2, EX-3, EX-4, EX-5, EX-7, EX-8	EX-1, EX-7	EX-4		EX-8	
Severe weather	EX-2, EX-3, EX-4, EX-5, EX-7, EX-8	EX-1, EX-7, EX-9	EX-4		EX-8, EX-9	
Volcano	EX-2, EX-3, EX-4, EX-5, EX-7, EX-8	EX-1, EX-7	EX-4		EX-8	

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Wildfire	EX-2, EX-3, EX-4, EX-5, EX-7	EX-1, EX-7, EX-9	EX-4, EX-9	EX-9		

FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

In this section, identify any future studies, analyses, reports, or surveys your jurisdiction needs to better understand its vulnerability to identified or currently unidentified risks. These could be needs based on federal or state agency mandates. Please note that this section is optional.

ADDITIONAL COMMENTS

Use this section to add any additional information pertinent to hazard mitigation and your jurisdiction not covered in this template. Please note that this section is optional.

1. SPECIAL PURPOSE DISTRICT NAME

1.1 HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Name, Title

Street Address

City, State ZIP

Telephone: xxx-xxx-xxxx

e-mail Address: xxx@xxx.xxx

Alternate Point of Contact

Name, Title

Street Address

City, State ZIP

Telephone: xxx-xxx-xxxx

e-mail Address: xxx@xxx.xxx

1.2 JURISDICTION PROFILE

1.2.1 Overview

Insert Narrative Profile Information, per Instructions

1.2.2 Service Area and Trends

The district serves a population of population. Its service area covers an area of area, which has a total value of \$ value.

Insert summary description of service trends.

1.2.3 Assets

Table 1-1 summarizes the critical assets of the district and their value.

Table 1-1. Special Purpose District Assets

Asset	Value
Property	
<u>number</u> acres of land	\$ <u>value</u>
Critical Infrastructure and Equipment	
<u>description</u>	\$ <u>value</u>
<u>description</u>	\$ <u>value</u>
<u>description</u>	\$ <u>value</u>
<u>description</u>	\$ <u>value</u>
<u>description</u>	\$ <u>value</u>
Total:	\$ <u>value</u>
Critical Facilities	
<u>description</u>	\$ <u>value</u>
<u>description</u>	\$ <u>value</u>
<u>description</u>	\$ <u>value</u>
<u>description</u>	\$ <u>value</u>
<u>description</u>	\$ <u>value</u>
<u>description</u>	\$ <u>value</u>
Total:	\$ <u>value</u>

1.3 CAPABILITY ASSESSMENT

1.3.1 Planning and Regulatory Capabilities

The following existing codes, ordinances, policies or plans are applicable to this hazard mitigation plan:

- name of code, ordinance, policy or plan
- name of code, ordinance, policy or plan
- name of code, ordinance, policy or plan
- name of code, ordinance, policy or plan

1.3.2 Fiscal, Administrative and Technical Capabilities

The jurisdiction participates in the Public Protection Class Rating System and currently has a rating of X. This rating was achieved in MONTH, YEAR. An assessment of fiscal capabilities is presented in Table 1-2. An assessment of administrative and technical capabilities is presented in Table 1-3.

Table 1-2. Fiscal Capability

Financial Resources	Accessible or Eligible to Use?
Capital Improvements Project Funding	<u>Yes/No</u>
Authority to Levy Taxes for Specific Purposes	<u>Yes/No</u>
User Fees for Water, Sewer, Gas or Electric Service	<u>Yes/No</u>
Incur Debt through General Obligation Bonds	<u>Yes/No</u>
Incur Debt through Special Tax Bonds	<u>Yes/No</u>
Incur Debt through Private Activity Bonds	<u>Yes/No</u>
State-Sponsored Grant Programs	<u>Yes/No</u>
Development Impact Fees for Homebuyers or Developers	<u>Yes/No</u>

Financial Resources	Accessible or Eligible to Use?
Other	Yes/No (if yes, please specify)

Table 1-3. Administrative and Technical Capability

Staff/Personnel Resources	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes/No	Insert appropriate information
Engineers or professionals trained in building or infrastructure construction practices	Yes/No	Insert appropriate information
Planners or engineers with an understanding of natural hazards	Yes/No	Insert appropriate information
Staff with training in benefit/cost analysis	Yes/No	Insert appropriate information
Surveyors	Yes/No	Insert appropriate information
Personnel skilled or trained in GIS applications	Yes/No	Insert appropriate information
Scientist familiar with natural hazards in local area	Yes/No	Insert appropriate information
Emergency manager	Yes/No	Insert appropriate information
Grant writers	Yes/No	Insert appropriate information
Other	Yes/No	Insert appropriate information

1.3.3 Education and Outreach Capabilities

An assessment of education and outreach capabilities is presented in [Table 1-4](#).

Table 1-4. Education and Outreach

Criteria	Response
Do you have a Public Information Officer or Communications Office?	Yes/No (if yes, please specify)
Do you have personnel skilled or trained in website development?	Yes/No (if yes, please specify)
Do you have hazard mitigation information available on your website?	Yes/No
• If yes, please briefly describe.	Insert appropriate information
Do you utilize social media for hazard mitigation education and outreach?	Yes/No
• If yes, please briefly describe.	Insert appropriate information
Do you have any citizen boards or commissions that address issues related to hazard mitigation?	Yes/No
• If yes, please briefly specify.	Insert appropriate information
Do you have any other programs already in place that could be used to communicate hazard-related information?	Yes/No
• If yes, please briefly describe.	Insert appropriate information
Do you have any established warning systems for hazard events?	Yes/No
• If yes, please briefly describe.	Insert appropriate information

1.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The following describe the jurisdiction's process for integrating the hazard mitigation plan into existing plans and programs.

1.4.1 Existing Integration

The following plans and programs currently integrate the goals, risk assessment and/or recommendations of the hazard mitigation plan:

- Name of plan or program—Brief description of how the plan/program is integrated with the hazard mitigation plan
- Name of plan or program—Brief description of how the plan/program is integrated with the hazard mitigation plan

1.4.2 Opportunities for Future Integration

The following plans and programs do not currently integrate the goals, risk assessment and/or recommendations of the hazard mitigation plan, but provide an opportunity for future integration:

- Name of plan or program—Brief description of how the plan/program can be integrated with the hazard mitigation plan
- Name of plan or program— Brief description of how the plan/program can be integrated with the hazard mitigation plan

1.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 1-5 lists all past occurrences of natural hazards within the jurisdiction.

Table 1-5. Natural Hazard Events			
Type of Event	FEMA Disaster # (if applicable)	Date	Preliminary Damage Assessment
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$
Insert event type		Date	\$

1.6 JURISDICTION-SPECIFIC VULNERABILITIES

Noted vulnerabilities the jurisdiction include:

- Insert as appropriate.

1.7 HAZARD RISK RANKING

Table 1-6 presents the ranking of the hazards of concern.

Table 1-6. Hazard Risk Ranking			
Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Insert hazard type		High/Medium/Low
2	Insert hazard type		High/Medium/Low
3	Insert hazard type		High/Medium/Low
4	Insert hazard type		High/Medium/Low
5	Insert hazard type		High/Medium/Low
6	Insert hazard type		High/Medium/Low
7	Insert hazard type		High/Medium/Low
8	Insert hazard type		High/Medium/Low
9	Insert hazard type		High/Medium/Low

1.8 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 1-7 lists the actions that make up the Special Purpose District Name hazard mitigation action plan. Table 1-8 identifies the priority for each action. Table 1-9 summarizes the mitigation actions by hazard of concern and the six mitigation types.

Table 1-7. Hazard Mitigation Action Plan Matrix						
Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
Action #—Description						
Action #—Description						
Action #—Description						
Action #—Description						
Action #—Description						
Action #—Description						
Action #—Description						
Action #—Description						
Action #—Description						
Action #—Description						

Table 1-8. Mitigation Strategy Priority Schedule								
Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/ Budgets?	Implementation Priority ^a	Grant Priority ^a

a. See the introduction to this volume for explanation of priorities.

Table 1-9. Analysis of Mitigation Actions						
Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects

a. See the introduction to this volume for explanation of mitigation types.

1.9 FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

Insert text, if any; otherwise, delete section

1.10 ADDITIONAL COMMENTS

Insert text, if any; otherwise, delete section

1. INSTRUCTIONS FOR COMPLETING SPECIAL-PURPOSE DISTRICT ANNEX TEMPLATE

The jurisdictional annex templates for the 2016 Clark County Hazard Mitigation Plan will be completed in three phases. **This document provides instructions for completing all phases of the template for municipalities.**

If your jurisdiction completed and submitted Phase 1 and Phase 2, Phase 3 has been added to the end of your annex to date. Any planning team comments, questions or suggestions have been included as blue highlighted notes and/or comments. Any text edits were made via track changes. Any yellow highlights indicate areas where missing information should be filled in. Phase 3 instructions begin on page 6.

If your jurisdiction did not complete Phase 1 or Phase 2, please complete all phases at this time.

Completed, draft templates should be completed by Friday, April 15, 2016. If you will not be able to meet this deadline, you must let the planning team know by April 8, 2016.

Any questions on completing the template should be directed to:

Kristen Gelino
Tetra Tech, Inc.
(646) 576-4029
e-mail: Kristen.gelino@tetrattech.com

Assistance in completing Phase 3 and any uncompleted portions of Phase 1 and Phase 2 of the template will be provided at the workshop for all planning partners to be scheduled in March.

Special Purpose District Annex:

This document provides instructions for completing **Phase 3** of the jurisdictional annex template for special purpose districts. **Phase 3 templates should be completed by Friday, April 15, 2016. If you will not be able to meet this deadline, you must let the planning team know by April 8, 2016.**

Associated Document:

Phase3_DISTRICTNAME.dotm
ClarkCo_2016HMP_ToolKit

A Note About Formatting:

The template for the annex is a Microsoft Word document in a format that will be used in the final plan. Partners are asked to use this template so that a uniform product will be completed for each partner. Partners who do not have Microsoft Word capability may prepare the document in other formats, and the planning team will convert it to the Word format.

Content should be entered within the yellow, highlighted text that is currently in the template, rather than creating text in another document and pasting it into the template. Text from another source will alter the style and formatting of the document.

The numbering in the document will be updated when completed annexes are combined into the final document. Please do not adjust any of this numbering.

PHASE 1 STARTS HERE

CHAPTER TITLE

In the chapter title at the top of Page 1, type in the complete official name of your district (e.g. West County Fire Protection District #1, Johnsonville Flood Protection District, etc.). Please do not change the chapter number. Revise only the jurisdiction name.

HAZARD MITIGATION PLAN POINT OF CONTACT

Please provide the name, title, mailing address, telephone number, and e-mail address for the primary point of contact for your jurisdiction. This should be the person responsible for monitoring, evaluating and updating the annex for your jurisdiction. This person should also be the principle liaison between your jurisdiction and the Steering Committee overseeing development of this plan.

In addition, designate an alternate point of contact. This would be a person to contact should the primary point of contact be unavailable or no longer employed by the jurisdiction.

Note: Both of these contacts should match the contacts that were designated in your jurisdiction's letter of intent to participate in this planning process. If you have changed the primary or secondary contact, please let the planning team know by inserting a comment into the document.

JURISDICTION PROFILE

Overview

Please provide a brief summary description of your jurisdiction. Please be sure to include:

- the purpose of the jurisdiction,
- the date of inception,
- the type of organization,
- the number of employees,
- the mode of operation (i.e., how operations are funded),
- the type of governing body, and who has adoptive authority,
- a description of who the jurisdiction's customers are (if applicable, include number of users or subscribers), and
- a geographical description of the service area.

Example Jurisdiction Narrative Profile:

The Johnsonville Community Services District is a special-purpose district created in 1952 to provide water and sewer service to the unincorporated area east of the City of Smithburg known as Johnsonville. The District's designated service area expanded throughout the years to include other unincorporated areas of Jones County: Creeks Corner, Jones Hill, Fields Landing, King Salmon, and Freshwater. A five-member elected Board of Directors governs the District. The Board assumes responsibility for the adoption of this plan; the General Manager will oversee its implementation. As of April 30, 2014, the District serves 7,305 water connections and 6,108 sewer connections, with a current staff of 21. Funding comes primarily through rates and revenue bonds.

Provide information similar to the example provided in the box above. This should be information that is specific to your jurisdiction and will not be provided in the overall, county-wide mitigation plan document.

Service Area and Trends

In the first paragraph, insert the following:

- **Population Served**—List the population that your jurisdiction provides services to. If you do not know this number directly, create an estimate (e.g., the number of service connections times the average service area household size based on Census data).
- **Land Area Served**—Enter the service area of your jurisdiction in acres or square miles.
- **Value of Area Served**—Enter the approximate replacement value of structures in your service area based on the information provided in the table below. These numbers have been generated by overlaying your jurisdiction's service area boundary on the general building stock information acquired and updated for the risk assessment portion of this plan. If you believe we have used an incorrect service area boundary for your jurisdiction, please let the planning team know and we will update the estimate.

Boundary Map:

Maps that illustrate the service area boundary for all special-purpose district partners have been provided with this document. At this time we ask that you please confirm that the boundaries reflected on the maps are current and accurate for your jurisdiction. If you have a GIS-based boundary file that you would prefer we use, please let the planning team know.

Special Purpose District	Boundary Source	Estimated Replacement Value for Service Area (structure value)
Battle Ground Public Schools	Clark GIS schdst file	\$8.9 billion
Camas School District	Clark GIS schdst file	\$5.2 billion
Clark Public Utilities	Clark County boundary Unincorporated areas and Yacolt	\$64.2 billion
Electrical service		\$26.7 billion
Water service		
Clark Regional Wastewater District	UGA boundary from CRWWD (updated 12/7 version)	\$14.5 billion
C-TRAN	Vancouver Urban Growth Area, city limits of Camas, Washougal, Ridgefield, La Center, Battle Ground, and Yacolt	\$55.3 billion
Fire District 3	Clark GIS firedst file and Battle Ground city limits	\$5.9 billion
Green Mountain School District No. 103	Clark GIS schdst file	\$131.4 million
Port of Vancouver	Clark GIS portdst file	\$43.6 billion
Ridgefield School District	Clark GIS schdst file	\$2.7 billion

Enter a brief description of how your jurisdiction's services are projected to expand in the foreseeable future and why. Note any identified capital improvements needed to meet the projected expansion. Examples are as follows:

- **For a Fire District**—Portions of the jurisdiction have experienced a 13-percent growth over the last five years. Land use designations allow for an increase in light commercial and residential land uses within the service area. This increase in density will represent an increase in population and thus a projected increase in call volume. Our District is experiencing an average annual increase in call volume of 13 percent.
- **For Dike/Drainage/Flood Control District**—Portions of the jurisdiction have experienced a 13 percent growth over the last five years. Land use designations allow for an increase in light commercial and residential land uses within the service area. This increase in density of land use will result in an increase in impermeable surface within our service area and thus increase the demand on control facilities.
- **For a Water District**—Portions of the jurisdiction have experienced a 13 percent growth over the last five years. Land use designations allow for an increase in light commercial and residential land uses

within the service area. This increase in density of land use will represent an increase in the number of housing units within the service area and thus represent an expansion of the district's delivery network.

Assets

Complete the table titled "Special Purpose District Assets" as follows (Please note: estimates on replacement value are perfectly acceptable):

- **Property**—Enter the area of property owned by the jurisdiction in acres or square miles and the assessed value of that property.
- **List of Critical Infrastructure and Equipment**—List all infrastructure and equipment owned by your jurisdiction that is critical to the jurisdiction's operations. Briefly describe the item and give its estimated replacement-cost value. Examples are as follows:
 - Fire Districts— This is the equipment that is essential for you to deliver services to this area should a natural hazard occur. It is not necessary to provide a detailed inventory of each engine and truck and its contents. A summary will suffice, such as "5 Engines, 2 ladders, and their contents." Do not list reserve equipment.
 - Dike/Flood Control Districts—Miles of levees, pump stations, retention/detention ponds, tide gates, miles of ditches, etc., within natural hazard risk zones.
 - Water Districts—Total length of pipe (it is not necessary to specify size and type), pump stations, treatment facilities, dams and reservoirs, within natural hazard risk zones.
 - Public Utility Districts—Miles of power line (above ground and underground), generators, power generating sub-stations, miles of pipeline, etc.
 - School Districts—Anything, besides school buildings, that is critical for you to operate (e.g., school buses if you own a fleet of school buses).
- **Total Value of Critical Infrastructure/Equipment**—Enter total replacement-cost value of the critical infrastructure and equipment listed above.
- **List of Critical Facilities Owned by the Jurisdiction**—List all buildings and other facilities that are critical to your jurisdiction's operations. Briefly describe the facility and give its estimated replacement-cost value.
- **Total Value of Critical Facilities**— Enter total replacement-cost value of the critical facilities listed above.

Critical Facilities:

As part of the planning process, the planning team will be developing a critical facilities database to assess risk to critical facilities from natural hazards. If your jurisdiction has a GIS-based file of your jurisdiction's critical facilities and/or infrastructure, please let the planning team know. Please note that the results of this assessment will be made available to the planning partnership, but will not be published in full in the plan document. The results will be summarized by facility type.

This asset inventory will be used to assess relative risk from each hazard of concern during the risk ranking exercise that will occur during phase 3 of the jurisdictional annex template development. You will be provided with supplemental information (i.e. HAZUS results and facility exposure information) that you will use to determine the percentage of the total value of your assets exposed to each hazard of concern.

PHASE 2 STARTS HERE

PLANNING AND REGULATORY CAPABILITIES

List any federal, state, local or district laws, ordinances, codes and policies that govern your jurisdiction that include elements related to hazard mitigation. Describe how these laws may support or conflict with the mitigation strategies of this plan. List any other plans, studies or other documents that address hazard mitigation issues for your jurisdiction. “None applicable” is a possible answer for this section.

FISCAL, ADMINISTRATIVE AND TECHNICAL CAPABILITIES

If your jurisdiction is a Fire District and participates in the Public Protection Class Rating System, please complete the first sentence in this section. If your jurisdiction is not a fire district, please delete the yellow highlighted sentence.

Fiscal Capability

Complete the table titled “Fiscal Capability” to identify what financial resources (other than the Hazard Mitigation Grant Program and the Pre-Disaster Mitigation Grant Program) are available to your jurisdiction for implementing mitigation actions. Indicate whether each of the listed financial resources is accessible to your jurisdiction. Enter “Yes” if the resource is fully accessible to your jurisdiction. Enter “No” if there are limitations or prerequisites that may hinder your eligibility for this resource.

Please note that some helpful comments are included in the template document.

Administrative and Technical Capability

This section requires you to take inventory of the staff/personnel resources available to your jurisdiction to help with hazard mitigation planning and implementation of specific mitigation actions.

Complete the table titled “Administrative and Technical Capability” by indicating whether your jurisdiction has access to each of the listed personnel resources. Enter “Yes” or “No” in the column labeled “Available?”. If yes, then enter the department and position title in the right-hand column.

Please note that if you have contract support staff with these capabilities you can still answer “Yes.” Please just indicate contract support in the department column.

EDUCATION AND OUTREACH CAPABILITIES

Complete the table titled “Education and Outreach” to indicate your jurisdiction’s capabilities and existing efforts regarding natural hazard mitigation education and outreach.

INTEGRATION WITH OTHER PLANNING INITIATIVES

After reviewing the plans, programs and ordinances identified in the above capability assessment, please identify those plans and programs where the goals and recommendations of the hazard mitigation plan have already been integrated and those plans and programs that offer opportunities for future integration. It is important to describe the process by which these plans and programs are or will be integrated. Generally speaking, FEMA recommends integration through

- Integrating plan goals with community objectives (e.g. incorporating goals for risk reduction and safety into the policies of other plans)
- Using the risk assessment to inform plans and policies (e.g. incorporation into strategic plans)
- Implementing mitigation actions through existing mechanisms (e.g. including mitigation projects in the capital improvement plan)
- Thinking about mitigation pre- and post-disaster (e.g. building recovery planning on existing mitigation plans and goals).

PHASE 3 STARTS HERE

JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Chronological List of Hazard Events

In the table titled “Natural Hazard Events,” list in chronological order (most recent first) any natural hazard event that has caused damage to your jurisdiction. Include the date of the event and the estimated dollar amount of damage it caused. You are welcome to include any events, but special attention should be made to include major storms and federally declared disasters. Please refer to the SHELDUS data and Federal Disaster Declarations included in the tool kit, and the summary of natural hazard events within risk assessment of the overall hazard mitigation plan. Potential sources of damage information include:

- Preliminary damage estimates your jurisdiction filed with the county or state
- Insurance claims data
- Newspaper archives
- Other plans/documents that deal with emergency management (safety element of a comprehensive plan, emergency response plan, etc.)
- Citizen input.

If you do not have estimates for dollars of damage caused, please list “Not Available” in the appropriate column. You may also provide a brief description of damages if desired. Please note that tracking such damages, is a valid and useful mitigation action if your jurisdiction does not currently track such information.

JURISDICTION-SPECIFIC NOTED VULNERABILITIES

Other Vulnerabilities

Please list any noted vulnerabilities in your jurisdiction related to hazard mitigation. This may include things such as the following:

- An urban drainage issue that results in localized flooding every time it rains.
- An area of the community that frequently loses power due to a lack of tree maintenance.
- A critical facility, such as a police station, that is not equipped with a generator.
- A neighborhood that has the potential to have ingress and egress cut off as the result of a hazard event, such as a flood or earthquake (e.g. bridge only access).
- Substantial number of buildings in one area of the community are unreinforced masonry.
- An area along the river is eroding and threatening public and/or private property.

HAZARD RISK RANKING

The risk ranking performed for the overall planning area is presented in the risk assessment section of the overall hazard mitigation plan. However, each jurisdiction has differing degrees of risk exposure and vulnerability and therefore needs to rank risk for its own area, using an adapted methodology from that which was used for the overall planning area. The risk-ranking exercise assesses two variables for each hazard: its probability of occurrence; and its potential impact on people, property and the economy/operations. The instructions below outline steps for assessing risk in your jurisdiction to develop results that are to be included in the template.

Please complete this portion of the annex using the Risk Ranking Worksheet and Loss Estimate Matrix information provided in the tool kit.

Note: When completing this exercise it is important to remember that this exercise is about categorizing hazards into broad levels of risk (e.g. high, medium, low). It is not an exercise in precision.

Determine Probability of Occurrence for Each Hazard

A probability factor is assigned based on how often a hazard is likely to occur. The probability of occurrence of a hazard event is generally based on past hazard events in an area, although some weight can be given to expected future probability of occurrence based on established return intervals. For example, if your jurisdiction has experienced two damaging floods in the last 25 years, the probability of occurrence is high for flooding and scores a 3 under this category. If your jurisdiction has experienced no damage from landslides in the last 100 years, your probability of occurrence for landslide is low, and scores a 1 under this category.

In **Table 1**, list the probability of occurrence for each hazard as it pertains to your jurisdiction. Simply write, “**High**,” “**Medium**,” “**Low**,” or “**None**” in the grey column in Table 1:

- High—Hazard event is likely to occur within 25 years (Probability Factor = 3)
- Medium—Hazard event is likely to occur within 100 years (Probability Factor = 2)
- Low—Hazard event is not likely to occur within 100 years (Probability Factor = 1)
- None—If there is no exposure to a hazard, there is no probability of occurrence (Probability Factor = 0)

Determine Potential Impacts of Each Hazard

The impact of each hazard was divided into three categories: impacts on people, impacts on property, and impacts on the economy/operations. These categories were also assigned weighted values. Impact on people was assigned a weighting factor of 3, impact on property was assigned a weighting factor of 2 and impact on the economy/operations was assigned a weighting factor of 1.

Impact factors for each category (people, property, economy) are described below:

- **People**—Values are assigned based on the percentage of the total *population exposed* to the hazard event. The degree of impact on individuals will vary and is not measurable, so the calculation assumes for simplicity and consistency that all people exposed to a hazard because they live in a hazard zone will be equally impacted when a hazard event occurs. Impact factors were assigned as follows:
 - High—25 percent or more of the population is exposed to a hazard (Impact Factor = 3)
 - Medium—10 percent to 24 percent of the population is exposed to a hazard (Impact Factor = 2)
 - Low—9 percent or less of the population is exposed to the hazard (Impact Factor = 1)
 - No impact—None of the population is exposed to a hazard (Impact Factor = 0)

- **Property**—Values are assigned based on the percentage of the total *property value exposed* to the hazard event:
 - High—25 percent or more of the total replacement value is exposed to a hazard (Impact Factor = 3)
 - Medium—10 percent to 24 percent of the total replacement value is exposed to a hazard (Impact Factor = 2)
 - Low—9 percent or less of the total replacement value is exposed to the hazard (Impact Factor = 1)
 - No impact—None of the total replacement value is exposed to a hazard (Impact Factor = 0)
- **Economy or Operations**—Impact on operations is assessed based on estimates of *how long it will take your jurisdiction to become 100-percent operable* after a hazard event.
 - High = functional downtime of 365 days or more (Impact Factor = 3)
 - Medium = Functional downtime of 180 to 364 days (Impact Factor = 2)
 - Low = Functional downtime of 180 days or less (Impact Factor = 1)
 - No Impact = No functional downtime is estimated from the hazard (Impact Factor = 0)

The following sections provide information on completing the risk ranking for your jurisdiction.

Impacts on People

The percent of the total population exposed to each hazard of concern with a defined extent and location (e.g. floodplain) can be found in the loss estimate matrix in the **green highlighted column**. It may be necessary for you to make estimates based on looking at the hazard maps and the populations that you serve. For those hazards that do not have a defined extent and location (e.g. severe weather) the entire population is generally considered to be exposed. For the drought hazard, it is common for jurisdictions to list “low” or “none,” because all people in the planning area would be exposed to drought, but impacts to the health and safety of individuals are expected to be minimal.

In the grey column in **Table 2**, please list the *percentage of the total population exposed* (e.g. 4.5 or 100). Remember, when you are estimating, the range limits are more important than the actual number (i.e. more than 25, between 25 and 10, and less than 10).

Impacts on Property

Estimate the impacts on property for your jurisdiction by reviewing the critical facility exposure estimates provided in the loss estimate information. Estimate the percentage of your total assets that are exposed to each hazard of concern (note: review your assets table in phase 1 of your annex). You may also wish to review the maps. For the drought hazard, it is common for jurisdictions to list “low” or “none,” because all structures in the planning area would be exposed to drought, but impacts to structures are expected to be minimal.

In the grey column in **Table 4**, please list the *percentage of the total value exposed* (e.g. 4.5 or 100). Remember, when you are estimating, the range limits are more important than the actual number (i.e. more than 25, between 25 and 10, and less than 10).

Impacts on the Economy/Operations

The loss estimates for each critical facility that was impacted for each hazard of concern that was modeled (i.e. dam failure, flood, earthquake) can be found in the critical facility vulnerability results in the **yellow highlighted column** (note: this information is still being compiled and is forthcoming). For those hazards that do not have modelled results, use your subjective judgement and institutional knowledge.

In the grey column in **Table 6**, please list the *functional downtime in days* (e.g. 1 or 300). Remember, when you are estimating, the range limits are more important than the actual number (i.e. more than 365, between 354 and 180, and less than 180).

Determine Risk Rating for Each Hazard

A risk rating for each hazard is determined by multiplying the assigned probability factor by the sum of the weighted impact factors for people, property and the economy:

$$\text{Risk Rating} = \text{Probability Factor} \times \text{Weighted Impact Factor \{people + property + economy/operations\}}$$

The risk ranking results will be automatically tabulated for you for each hazard of concern in **Table 7**.

Complete Risk Ranking in Template

Once **Table 7** has been completed above, complete the table titled “Hazard Risk Ranking” in your template. The hazard with the highest risk rating in **Table 7** should be listed at the top of table titled “Hazard Risk Ranking” in your template and given a rank of 1; the hazard with the second highest rating should be listed second with a rank of 2; and so on. Two hazards with equal risk ratings should be given the same rank. After completing this, review the distribution of hazard scores and determine “High,” “Medium,” and “Low” assignments for each hazard of concern. It is important to note, that this should be determined by the range of scores rather than assigning a certain number of hazards to each category.

It is also important to note that this exercise should not override your subjective assessment of relative risk based on your knowledge of the history of natural hazard events in your jurisdiction. If this risk ranking exercise generates results other than what you know based on substantiated data and documentation, you may alter the ranking based on this knowledge. If this is the case, please note this fact in your template (see notations in County-wide risk ranking in Tool Kit). Remember, one of the purposes of this exercise is to support the selection and prioritization of actions in your plan. If you identify an action with a high priority that mitigates the risk of a hazard you have ranked low, that project may not be competitive in the grant arena.

HAZARD MITIGATION ACTION PLAN

Action Plan Matrix

Identify the actions your jurisdiction would like to pursue with this plan. Refer to the mitigation catalog for mitigation options you might want to consider. Be sure to consider the following factors in your selection of actions:

- Select actions that are consistent with the overall purpose, goals, and objectives of the hazard mitigation plan.
- Identify projects where benefits exceed costs.
- Include any project that your jurisdiction has committed to pursuing regardless of grant eligibility.
- Know what is and is not grant-eligible under the HMGP and PDM (see fact sheet provided). Listing HMGP or PDM as a potential funding source for an ineligible project will be a red flag when this plan goes through review. If you have projects that are not HMGP or PDM grant eligible, but do mitigate part

Wording Your Action Descriptions:

Descriptions of your actions need not provide great detail. That will come when you apply for a project grant. Provide enough information to identify the project’s scope and impact. The following are typical descriptions for an action plan action:

- **Action 1**—Address repetitive-loss properties. Through targeted mitigation relocate or retrofit the nine pump stations that have been repetitively damaged.
- **Action 2**—Perform a non-structural, seismic retrofit of the administrative building.
- **Action 3**—Develop a schedule to underground overhead powerlines.

or all of the hazard and may be eligible for other grant programs sponsored by other agencies, include them in this section.

- You should identify at least one action for your highest ranked risk, but hazard-specific projects for every hazard are not required. If you have not identified an earthquake related project, and an earthquake occurs that causes damage in your jurisdiction, you are not discounted from HMGP project grant eligibility.

Recommended Actions

We recommend that the following actions be included in every planning partners' annex. The specifics of these actions should be adjusted as needed for the particulars of each community.

- Where appropriate, support retro-fitting, purchase or relocation of structures located in high hazard areas and prioritize those structures that have experienced repetitive losses.
- Integrate the hazard mitigation plan into other plans and programs that support infrastructure investments choices, such as the capital improvement program.
- Develop and implement a program to capture perishable data after significant events (e.g. high water marks, preliminary damage estimates, damage photos) to support future mitigation efforts including the implementation and maintenance of the hazard mitigation plan.
- Support the County-wide initiatives identified in Volume I of the hazard mitigation plan.
- Actively participate in the plan maintenance protocols outlined in Volume I of the hazard mitigation plan.
- Consider the development of a post-disaster recovery plan and a debris management plan.

Complete the Table

Complete the table titled "Hazard Mitigation Action Plan Matrix" for all the actions you have identified:

- Enter the action number and description .
- Indicate whether the action mitigates hazards for new or existing assets.
- Identify the specific hazards the action will mitigate.
- Identify by number the mitigation plan objectives that the action addresses (see Tool Kit).
- Indicate who will be the lead in administering the project. This will most likely be a department within your jurisdiction (e.g. planning or public works). If you wish to indicate more than one department, please ensure that it is clear who the lead agency will be (i.e note with an *)
- Enter an estimated cost in dollars if known; otherwise, enter "High," "Medium" or "Low" as determined for the prioritization process described in the following section.
- Identify funding sources for the project. If it is a grant, include the funding sources for the cost share. Refer to your fiscal capability assessment to identify possible sources of funding.
- Indicate the time line as "short term" (1 to 5 years) or "long term" (5 years or greater) or on-going (a continual program)

Action Item Numbering:

- Please use the following action item numbering conventions:
 - Battle Ground Public Schools: BGPS-1
 - Clark Public Utilities: CPU-1
 - Clark Regional Wastewater District-CRWWD-1
 - C-TRAN: CTRAN-1
 - Fire District 3: FD3-1
 - Green Mountain School District No. 103: GMSD-1
 - Port of Vancouver: POV-1
 - Ridgefield School District: RSD-1

Please see the table below for an example for the recommended initiatives above:

Example Action Plan Matrix						
Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
EX-1 —Where appropriate, support retro-fitting, purchase or relocation of structures located in high hazard areas and prioritize those structures that have experienced repetitive losses.						
Existing	All Hazards	4, 5, 7, 9, 10	Maintenance	High	HMGP, PDM, FMA, CDBG-DR	Short-term
EX-2 —Integrate the hazard mitigation plan into other plans and programs that support infrastructure investments choices, such as the capital improvement program.						
New and Existing	All Hazards	2, 4,	Board	Low	Staff Time, General Funds	On-going
EX-3 —Develop and implement a program to capture perishable data after significant events (e.g. high water marks, preliminary damage estimates, damage photos) to support future mitigation efforts including the implementation and maintenance of the hazard mitigation plan.						
Existing	All Hazards	1, 2, 4, 12	Emergency Management	Medium	Staff Time, General Funds	Short-term
EX-4 —Support the County-wide initiatives identified in Volume I of the hazard mitigation plan.						
New and Existing	All Hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	Lead Contact Department for Plan	Low	Staff Time, General Funds	Short-term
EX-5 —Actively participate in the plan maintenance protocols outlined in Volume I of the hazard mitigation plan.						
New and Existing	All Hazards	1, 4	Lead Contact Department for Plan	Low	Staff Time, General Funds	Short-term
EX-6 —Develop a post-disaster recovery plan and a debris management plan.						
Existing	All Hazards	1, 2, 4, 9	Emergency Management	Medium	EMPG	Long-term
*Identified Lead Agency						

Prioritization of Mitigation Actions

Complete the information in the table titled “Mitigation Strategy Priority Schedule” as follows:

- **Action #**—Indicate the action number from the previous annex table (Hazard Mitigation Action Plan Matrix).
- **# of Objectives Met**—Enter the number of objectives the action will meet.
- **Benefits**—Enter “High,” “Medium” or “Low” as follows:
 - High: Project will have an immediate impact on the reduction of risk exposure to life and property.
 - Medium: Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
 - Low: Long-term benefits of the project are difficult to quantify in the short term.
- **Costs**—Enter “High,” “Medium” or “Low” as follows:
 - High: Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

- Medium: Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
- Low: Possible to fund under existing budget. Project is or can be part of an existing ongoing program.

If you know the estimated cost of a project because it is part of an existing, ongoing program, indicate the amount.

- **Do Benefits Exceed the Cost?**—Enter “Yes” or “No.” This is a qualitative assessment. Enter “Yes” if the benefit rating (high, medium or low) is the same as or higher than the cost rating (high benefit/high cost; high benefit/medium cost; medium benefit/low cost; etc.). Enter “No” if the benefit rating is lower than the cost rating (medium benefit/high cost, low benefit/medium cost; etc.)
- **Is the Project Grant-Eligible?**—Enter “Yes” or “No.” Refer to the fact sheet on HMGP and PDM.
- **Can Project Be Funded Under Existing Program Budgets?**—Enter “Yes” or “No.” In other words, is this action currently budgeted for, or would it require a new budget authorization or funding from another source such as grants?
- **Implementation Priority**— Enter “High,” “Medium” or “Low” as follows:
 - High Priority—An initiative that meets multiple objectives, has benefits that exceed cost, has funding secured or is an ongoing project and meets eligibility requirements for a grant program. High priority initiatives can be completed in the short term (1 to 5 years). The key factors for high priority initiatives are that they have funding secured and can be completed in the short term.
 - Medium Priority—An initiative that meets multiple objectives, that has benefits that exceed costs, and for which funding has not yet been secured, but is eligible for funding. Initiative can be completed in the short term, once funding is secured. Medium priority projects will become high priority projects once funding is secured. The key factors for medium priority initiatives are that they are eligible for funding, but do not yet have funding secured, and they can be completed within the short term.
 - Low Priority—An initiative that will mitigate the risk of a hazard, that has benefits that do not exceed the costs or are difficult to quantify, for which funding has not been secured, that is not eligible for grant funding, and for which the time line for completion is long term (1 to 10 years). Low priority initiatives may be eligible for grant funding from other programs that have not yet been identified. Low priority projects are generally “blue-sky” or “wish-list.” projects. Financing is unknown, and they can be completed over a long term.
- **Grant Funding Priority**— Enter “High,” “Medium” or “Low” as follows:
 - High Priority—An initiative that has been identified as meeting grant eligibility requirements, assessed to have high benefits, is listed as high or medium priority, and where local funding options are unavailable or where dedicated funds could be utilized for projects that are not eligible for grant funding.
 - Medium Priority—An initiative that has been identified as meeting grant eligibility requirements, assessed to have medium or low benefits, is listed as medium or low priority, and where local funding options are unavailable.
 - Low Priority—An initiative that has not been identified as meeting grant eligibility requirements, or has low benefits.

This prioritization is a simple way to determine that your identified actions meet one of the primary objectives of the Disaster Mitigation Act. It is not the detailed benefit/cost analysis required for HMGP/PDM project grants. The prioritization will identify any projects whose probable benefits will not exceed the probable costs. Those initiatives identified as high-priority grant funding initiatives should be closely reviewed for consideration when grant funding opportunities arise.

Note: If a jurisdiction wishes to identify a project as high priority that is outside of the prioritization scheme for high priorities. A note indicating so should be inserted and a rationale should be provided.

Please see the example below based off the recommended initiatives:

Table 1-9. Mitigation Strategy Priority Schedule

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Priority ^a
EX-1	5	High	High	Yes	Yes	No	Medium	High
EX-2	2	Medium	Low	Yes	No	Yes	High	Low
EX-3	4	Low	Medium	No	No	Maybe	Low	Low
EX-4	12	Low	Low	Yes	No	Yes	High	Low
EX-5	2	Low	Low	Yes	No	Yes	High	Low
EX-6	4	Medium	Medium	Yes	Yes	No	Medium	High

a. See the introduction to this volume for explanation of priorities

Analysis of Mitigation Actions

Complete the table titled “Analysis of Mitigation Actions” summarizing the mitigation actions by hazard of concern and the following six mitigation types:

- **Prevention**—Government, administrative or regulatory actions that influence the way land and buildings are developed to reduce hazard losses. Includes planning and zoning, floodplain laws, capital improvement programs, open space preservation, and stormwater management regulations.
- **Property Protection**—Modification of buildings or structures to protect them from a hazard or removal of structures from a hazard area. Includes acquisition, elevation, relocation, structural retrofit, storm shutters, and shatter-resistant glass.
- **Public Education and Awareness**—Actions to inform citizens and elected officials about hazards and ways to mitigate them. Includes outreach projects, real estate disclosure, hazard information centers, and school-age and adult education.
- **Natural Resource Protection**—Actions that minimize hazard loss and preserve or restore the functions of natural systems. Includes sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- **Emergency Services**—Actions that protect people and property during and immediately after a hazard event. Includes warning systems, emergency response services, and the protection of essential facilities.
- **Structural Projects**—Actions that involve the construction of structures to reduce the impact of a hazard. Includes dams, setback levees, floodwalls, retaining walls, and safe rooms.

This exercise demonstrates that the jurisdiction has selected a comprehensive range of actions.

Please see the example below based off the recommended initiatives, but please note that these recommendations are heavy on the prevention spectrum and light in other areas. Planning partners should aim to identify at least one action in each category:

Analysis of Mitigation Actions						
Hazard Type	Action Addressing Hazard, by Mitigation Type ^a					
	1. Prevention	2. Property Protection	3. Public Education and Awareness	4. Natural Resource Protection	5. Emergency Services	6. Structural Projects
Dam Failure	EX-2, EX-3, EX-4, EX-5, EX-6	EX-1	EX-4		EX-6	
Drought	EX-2, EX-3, EX-4, EX-5, EX-6	EX-1	EX-4,		EX-6	
Earthquake	EX-2, EX-3, EX-4, EX-5, EX-6	EX-1	EX-4		EX-6	
Flood	EX-2, EX-3, EX-4, EX-5, EX-6	EX-1	EX-4		EX-6	
Landslide	EX-2, EX-3, EX-4, EX-5, EX-6	EX-1	EX-4		EX-6	
Severe weather	EX-2, EX-3, EX-4, EX-5, EX-6	EX-1	EX-4		EX-6	
Volcano	EX-2, EX-3, EX-4, EX-5, EX-6	EX-1	EX-4		EX-6	
Wildfire	EX-2, EX-3, EX-4, EX-5, EX-6	EX-1	EX-4		EX-6	

FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

In this section, identify any future studies, analyses, reports, or surveys your jurisdiction needs to better understand its vulnerability to identified or currently unidentified risks. These could be needs based on federal or state agency mandates. Please note that this section is optional.

ADDITIONAL COMMENTS



Use this section to add any additional information pertinent to hazard mitigation and your jurisdiction not covered in this template. Please note that this section is optional.

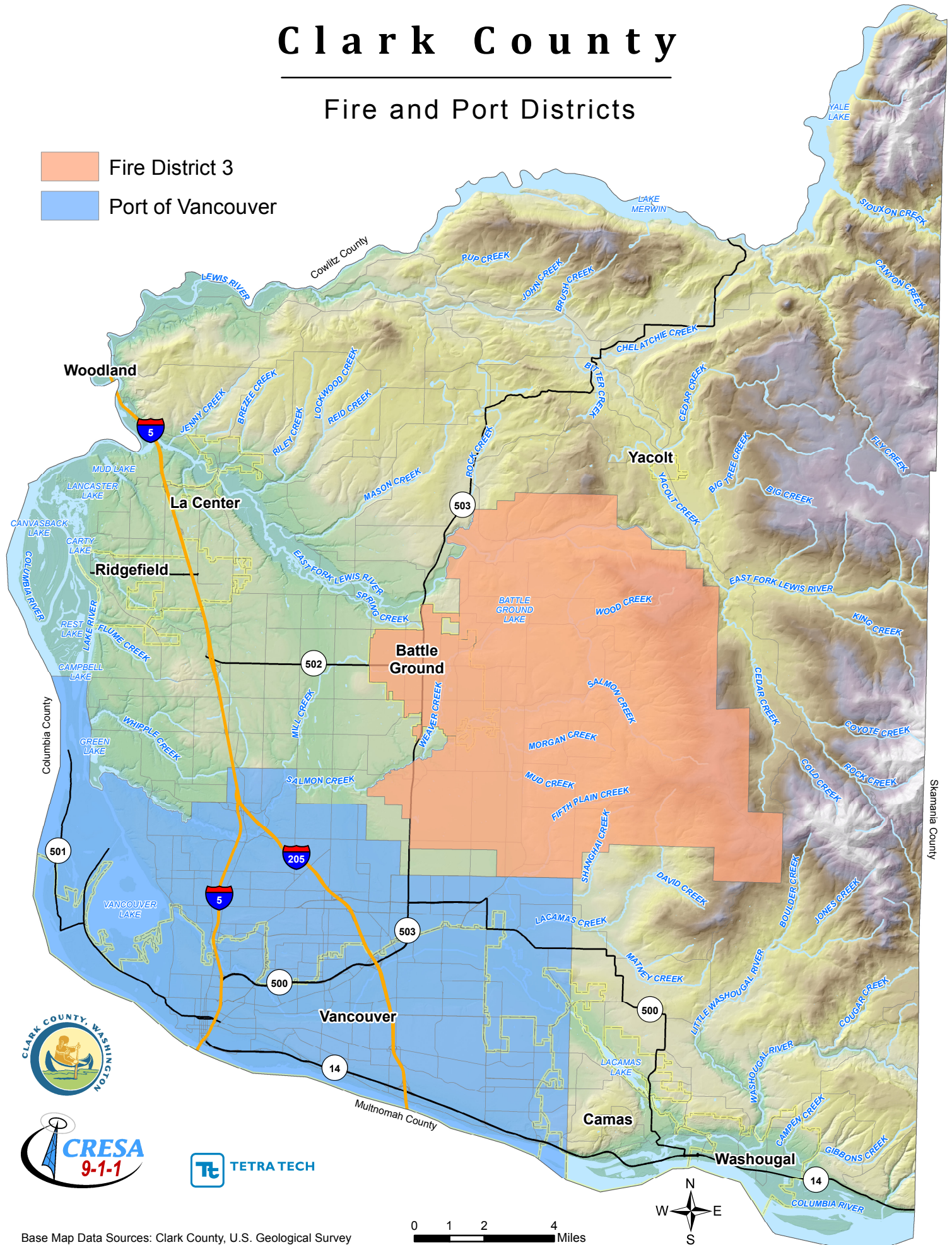
Clark Regional Natural Hazard Mitigation Plan: Volume 2—Planning Partner Annexes

Appendix D. Special Purpose District Maps

Clark County

Fire and Port Districts

-  Fire District 3
-  Port of Vancouver







Base Map Data Sources: Clark County, U.S. Geological Survey

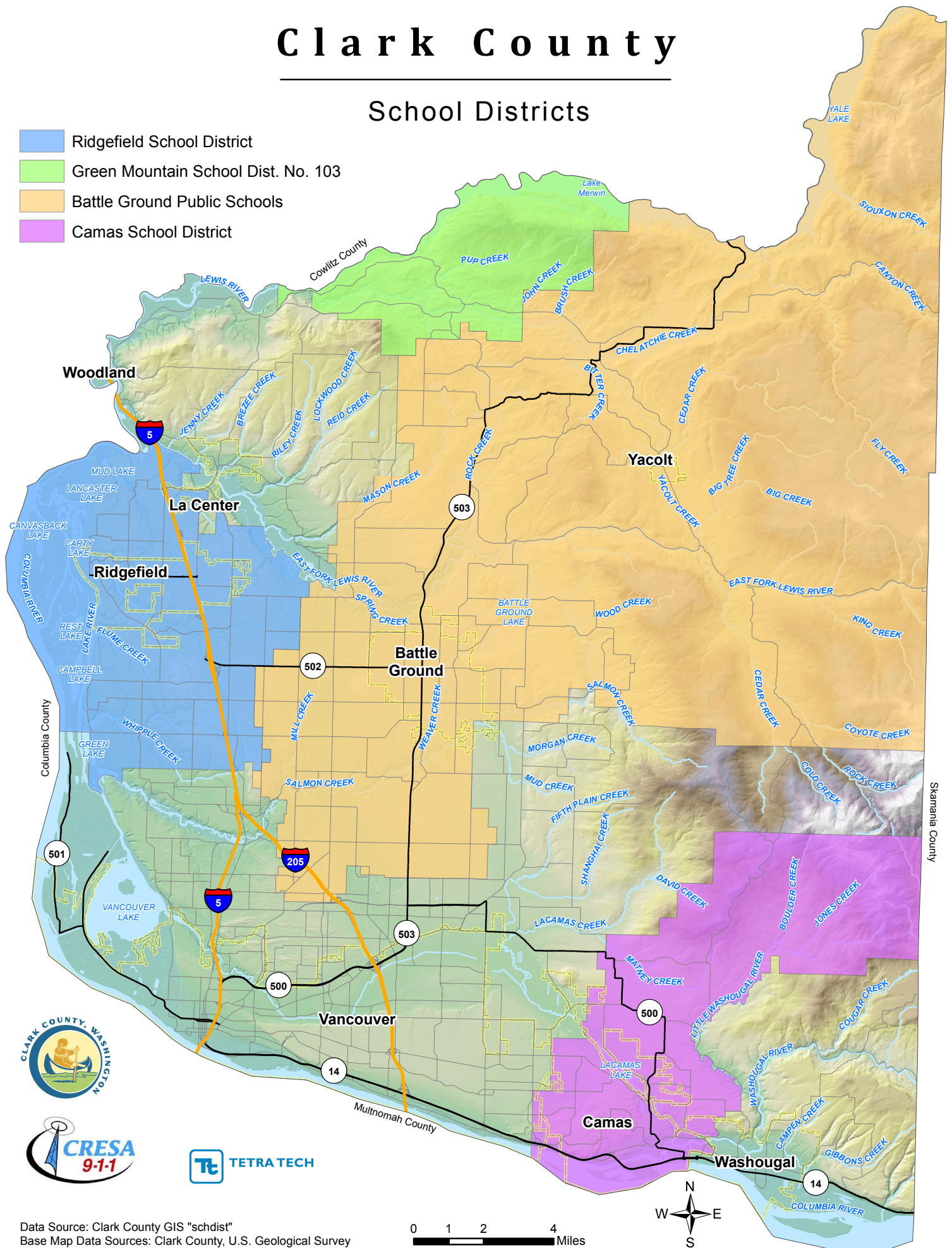
0 1 2 4 Miles



Clark County

School Districts

-  Ridgefield School District
-  Green Mountain School Dist. No. 103
-  Battle Ground Public Schools
-  Camas School District






Data Source: Clark County GIS "schdist"
Base Map Data Sources: Clark County, U.S. Geological Survey

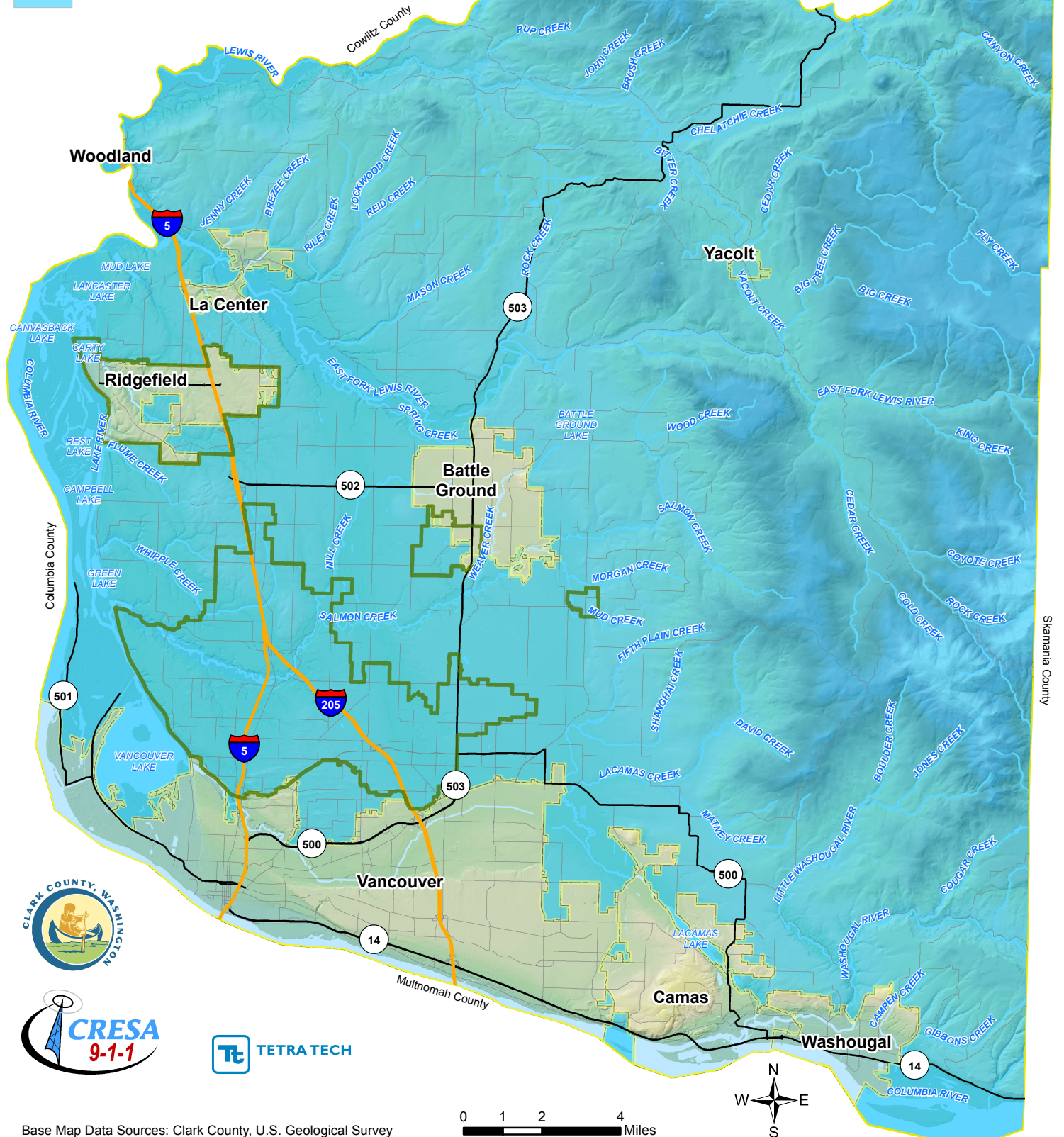
0 1 2 4 Miles



Clark County

Utility Coverage Area

-  Clark Regional Wastewater District Boundaries
-  Clark Public Utilities - Electricity (Covers Entire County)
-  Clark Public Utilities - Water Service



Base Map Data Sources: Clark County, U.S. Geological Survey

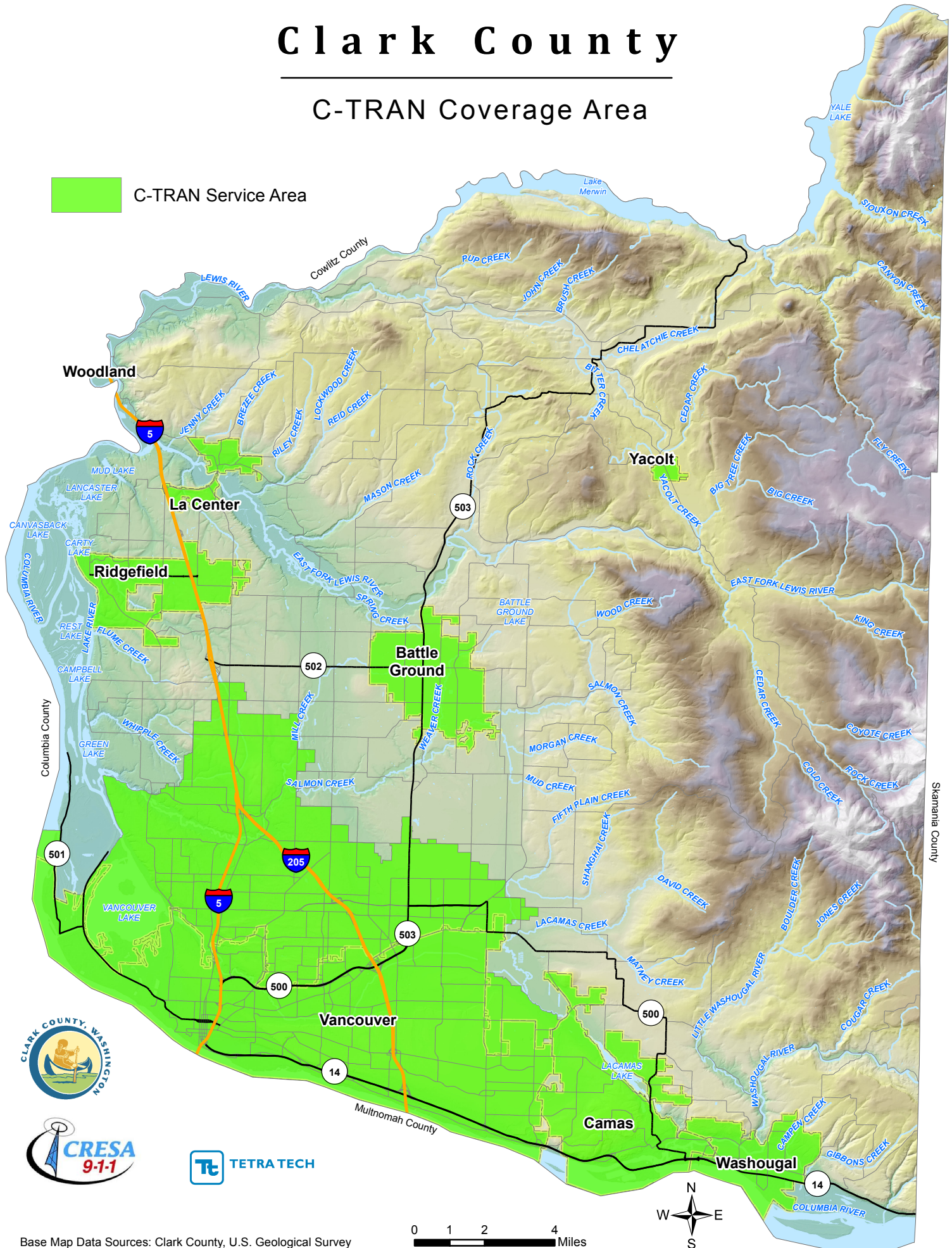
0 1 2 4 Miles



Clark County

C-TRAN Coverage Area

 C-TRAN Service Area



Base Map Data Sources: Clark County, U.S. Geological Survey



Clark Regional Natural Hazard Mitigation Plan

Presented to:
City of Camas Council

March 6, 2017
City of Camas City Hall



Speaker

Lauren Hollenbeck

- Senior Planner
- Role in Project



Today's Discussion

- What is Hazard Mitigation?
- Why Prepare a Hazard Mitigation Plan (HMP)?
- What was the Planning Process?
- What were the Results of this Process?



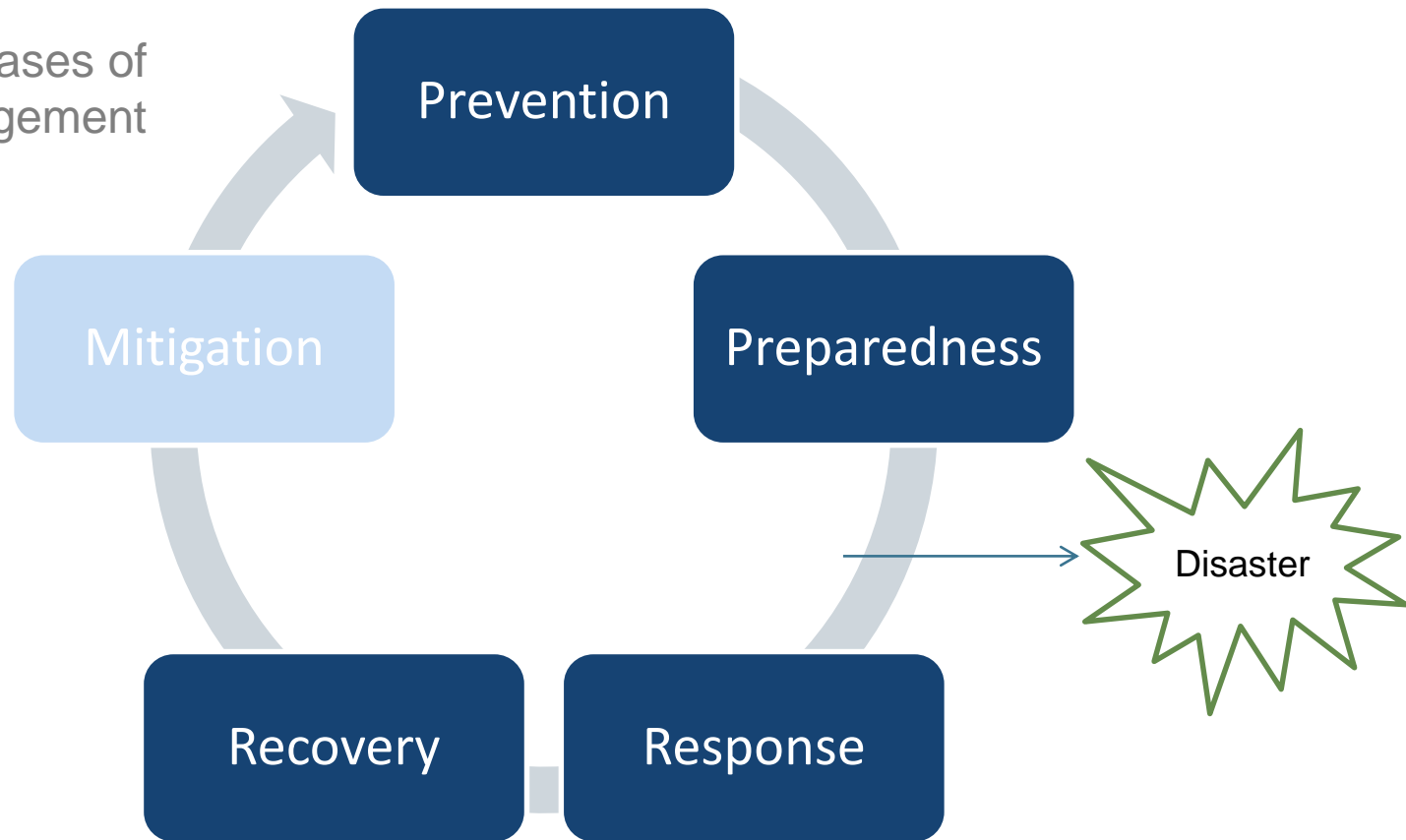
The Problem

- All communities experience losses from natural hazard events
- Local, State, and Federal resources are often spent on recovery costs related to hazard events in the same areas
- Communities are not sustainable and resilient if they do not take proactive action to reduce the impacts from these inevitable hazard events



What is Mitigation?

Five Phases of
Emergency Management



“Sustained action taken to reduce or eliminate long-term risk to life and property”

Why Did We Prepare the Plan?

- Identify natural hazard risks and vulnerabilities
- Develop specific strategies
- Promote jurisdiction coordination
- Restore eligibility for federal mitigation grant funding



The Plan Update Process



Organize Resources

Who Participated?

CRESA led a planning partnership of 9 municipalities and 8 special purpose districts:

- Clark County
- City of Battle Ground
- City of Camas
- City of La Center
- City of Ridgefield
- City of Vancouver
- City of Washougal
- City of Woodland
- Town of Yacolt
- Clark Public Utilities
- Port of Vancouver
- C-TRAN
- Clark Regional Wastewater District
- Battle ground Public Schools
- Camas School District
- Ridgefield School District
- Clark County Fire District 3



Organize Resources

Who Participated?

- A 15 member Steering Committee oversaw the plan development process:
 - Comprised of non-governmental and governmental stakeholders
 - Met 9 times between August 2015 and May 2016
 - All meetings were open to the public and had frequent non-committee attendees



Purpose, Goals, Objectives and Actions

Purpose: Define natural hazard risk and, through collaboration and partnerships, establish strategies and actions for reducing the impacts of disasters in Clark County.



Risk Assessment

Hazards of Concern

The Steering Committee identified 8 hazards of concern that were assessed for the plan:

- Dam Failure
- Drought
- Earthquake
- Flood
- Landslide
- Severe Weather
- Volcano
- Wildfire

Risk Assessment

Hazards of Concern

- Each Hazard of Concern was assessed and profiled:
 - General Background
 - Hazard Profile (Location, Severity, Frequency, Warning Time)
 - Secondary Hazards
 - Exposure (People, property, economy, and environment)
 - Vulnerability (People, property, economy, and environment)
- Results of this assessment were used to rank relative risk county-wide and for each jurisdiction

Risk Assessment

Hazards of Concern

Table 3-8. Hazard Risk Ranking

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Earthquake	51	High
2	Severe Weather	51	High
3	Landslide	36	Medium
4	Flood	21	Medium
5	Wildfire	18	Medium
6	Dam Failure	11	Low
6	Volcano	11	Low
7	Drought	9	Low

Purpose, Goals, Objectives and Actions

- The Steering Committee identified 6 goals and 12 objectives to address issues identified in the risk assessment
- These were used by the planning partners to develop mitigation actions designed to support these goals and objectives:
 - 14 county-wide actions were identified
 - 272 actions were identified by planning partners
 - 31 actions were identified by the City of Camas



Purpose, Goals, Objectives and Actions

- A few notable actions for City of Camas include:

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Lead Agency	Estimated Cost	Sources of Funding	Timeline
CM-10—Support voluntary structural retrofitting of older homes on vulnerable soils.						
Existing	Earthquake	1, 2, 7, 9	Building	Low	Property Owner, FEMA Hazard Mitigation Grant Funding	On-going
CM-16—Develop an automated method to notify the public of events during a disaster.						
New	All Hazards	1, 2, 3, 4, 12	Fire/Emergency Management	Medium	FEMA funds	Short-term
CM-21—Continue and/or enhance where feasible, the city's ongoing drainage system maintenance program to reduce or minimize the impact from stormwater flooding within the City.						
New and Existing	Flood and Severe Weather	2, 5, 10, 11, 12	Public Works	Low	Stormwater Utility, CIP	On-going



Plan Implementation

The long term success of this planning effort will be determined by plan implementation!

- Annual progress reporting
- Hazard Mitigation Working Group will meet quarterly



Outcomes of This Process

- Improved understanding of risks and vulnerabilities
- Reduce negative impact of natural hazards
- Encourage sustainable actions
- Enhanced collaboration between local jurisdictions and residents
- Establish eligibility for grant funds (\$\$\$ for projects)



The Clark Regional Natural Hazard Mitigation Plan

Was submitted to Washington State Emergency Management Division on September 16, 2016. The plan must be formally adopted in order to receive final approval from FEMA.

Volume 1: County-Wide Information

Planning process information

Hazard profiles

County-wide risk ranking

County-wide mitigation strategy

Volume 2: Planning Partner Annexes

Jurisdiction profiles

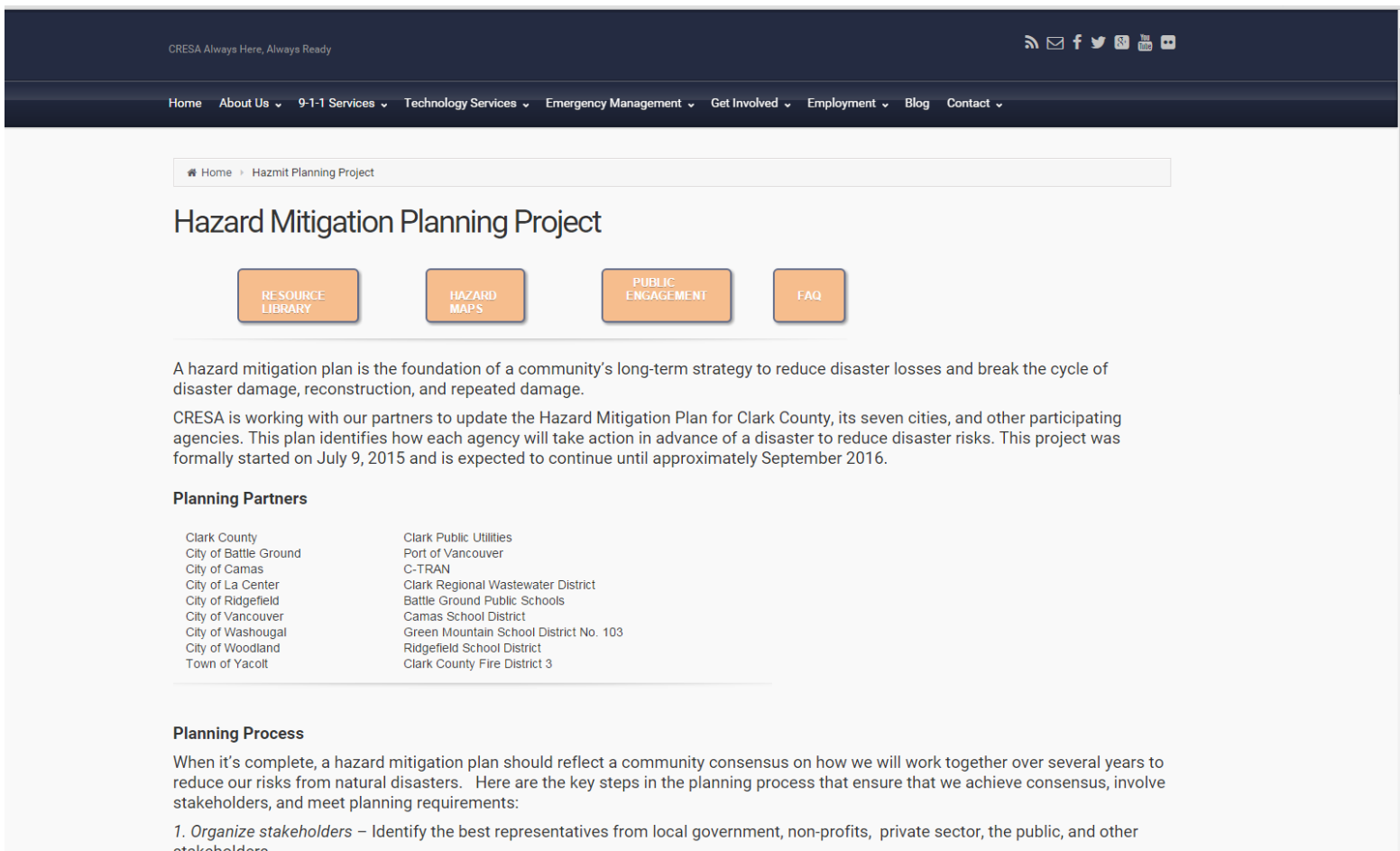
Capability assessments

Jurisdiction specific risk ranking

Jurisdiction specific action plans



For More Information Visit CRESA's Website!



CRESA Always Here, Always Ready

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Home > Hazmit Planning Project

Hazard Mitigation Planning Project

RESOURCE LIBRARY HAZARD MAPS PUBLIC ENGAGEMENT FAQ

A hazard mitigation plan is the foundation of a community's long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage.

CRESA is working with our partners to update the Hazard Mitigation Plan for Clark County, its seven cities, and other participating agencies. This plan identifies how each agency will take action in advance of a disaster to reduce disaster risks. This project was formally started on July 9, 2015 and is expected to continue until approximately September 2016.

Planning Partners

Clark County	Clark Public Utilities
City of Battle Ground	Port of Vancouver
City of Camas	C-TRAN
City of La Center	Clark Regional Wastewater District
City of Ridgefield	Battle Ground Public Schools
City of Vancouver	Camas School District
City of Washougal	Green Mountain School District No. 103
City of Woodland	Ridgefield School District
Town of Yacolt	Clark County Fire District 3

Planning Process

When it's complete, a hazard mitigation plan should reflect a community consensus on how we will work together over several years to reduce our risks from natural disasters. Here are the key steps in the planning process that ensure that we achieve consensus, involve stakeholders, and meet planning requirements:

1. *Organize stakeholders* – Identify the best representatives from local government, non-profits, private sector, the public, and other stakeholders



<http://cresa911.org/emergency-management/mitigation/>

CONTRACT AGREEMENT

BETWEEN

FINANCIAL CONSULTING SOLUTIONS
GROUP, INC.
Redmond Town Center
7525 – 166th Ave. NE, Suite D-215
Redmond, Washington 98052

AND

CITY OF CAMAS
616 NE Fourth Avenue
P.O. Box 1055
Camas, WA 98607

PROJECT: Water, Sewer and Storm Utilities Rate & SDC Study and Solid Waste Peer Review

THIS AGREEMENT combines all understandings between the Parties regarding professional services for the Project named above and supersedes all prior proposals, quotations, solicitations, negotiations, representations, agreements or understandings, whether written or oral.

The performance of the professional services herein described and authorized by **City of Camas**, as well as payment for such services, shall be in accordance with the terms and conditions presented in this Agreement and the following Sections and Exhibits which are attached and incorporated by reference which, taken together, shall constitute the whole Agreement.

- Section I** - **Relationship of the Parties**
- Section II** - **Contract Provisions**
- Exhibit A** - **Scope of Work and Task Plan**
- Exhibit B** - **Fee Schedule**

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands and seals this _____ day of _____, 20____.

APPROVED:

**FINANCIAL CONSULTING
SOLUTIONS GROUP, INC.**

APPROVED:

CITY OF CAMAS

Angie Sanchez Virnoche
Principal

Date: _____

Name:
Title:

Date: _____

ATTEST:

SECTION I: RELATIONSHIP OF THE PARTIES

The **City of Camas** ("Client"), desires to **Water, Sewer and Storm Utilities Rate & SDC Study and Solid Waste Peer Review** ("Project"). In furtherance of the Project, the Client hereby contracts with **Financial Consulting Solutions Group, Inc.** ("FCS GROUP") to perform the professional services described in Exhibit A of this Agreement. All services shall be performed under the joint supervision of the Client's Representative, Steve Wall, or a designee or designees identified in writing to FCS GROUP by the Client's Representative.

This Agreement shall inure to the benefit of and be binding upon successors, assigns, and legal representatives of each of the Parties hereto. Any assignment or transfer of an interest in this Agreement by either Party without the written consent of the other shall be void.

SECTION II: CONTRACT PROVISIONS

1. Scope of Work: FCS GROUP shall perform the service for the Client which as defined in Exhibit A of this Agreement.

2. Time for Completion: The Scope of Work for the conduct of the study as set forth above is anticipated to be completed by FCS GROUP within a time frame approximating that shown by the following schedule:

Notice to Proceed: Upon signature of contract agreement by both parties.

Completion of Project: On or before June 30, 2018.

FCS GROUP agrees to perform the work described in the Scope of Work according to the contract schedule. Any delays shall be agreed upon by FCS GROUP and Client prior to the due date. Changes in the schedule caused by Client delays may require additional compensation and a change order.

If FCS GROUP is delayed in the performance of services by conditions which are beyond their control, or by a change in the scope of work, the schedule showing time of performance may be revised. Any revision thereto shall be submitted in writing to the Client for review and approval by the Client Representative. If FCS GROUP's services are temporarily suspended by the Client in the interest of the Project and with written notice to FCS GROUP, and the suspensions last longer than 90 consecutive days, FCS GROUP shall be compensated for any additional labor and direct expenses incurred due to the interruption and resumption of services.

3. Payment: FCS GROUP will be paid by the Client on a time and materials basis as outlined below and in accordance with the standard billing rates attached hereto as Exhibit B. Direct expenses will be charged as identified in Exhibit B. FCS GROUP agrees to perform the services as set forth in Exhibit A at a cost not to exceed \$110,630. It is understood that FCS GROUP will not exceed this amount without the Client's prior written authorization.

Payment to FCS GROUP for services set forth in Exhibit A shall be: an amount equal to FCS GROUP's standard billing rates as set forth in Exhibit B multiplied by the actual hours worked. Should any unforeseen project delays, not caused by FCS GROUP, and/or any requested amendments to the original scope of work, cause this contract to extend more than 90 days past the original contracted schedule date, any work and/or amendments to the work shall be billed at the standard billing rates in effect for the period of time the work is being performed. If said change in billing rates will cause the project to exceed the amount stated in the preceding paragraph, a change order will be prepared and signed by both parties.

FCS GROUP will invoice Client monthly and payment shall be made within 30 days of receipt of invoice.

4. Supplemental Agreements: Supplemental Agreements may be entered into upon mutual written agreement that would increase or decrease the scope and associated costs and payment.

5. Work to be Accomplished: All work accomplished will be performed under the direction of the Client Representative or his/her Designee.

6. Termination: This contract may be terminated by the Client by giving FCS GROUP written notice of such termination no fewer than fifteen (15) days in advance of the effective date of said termination. FCS GROUP shall be entitled to terminate this agreement only in the case of a material breach by the Client, and upon failure of the Client to remedy said breach within fifteen (15) days of said notice. In the event that the contract is terminated before completion, FCS GROUP shall be paid for the services to date on the basis set forth in Paragraph 3, plus 10% of the total compensation earned to time of termination to compensate for FCS GROUP's rescheduling adjustments, reassignment of personnel, and related costs incurred due to termination. The Client shall notify FCS of termination or abandonment in writing.

7. Indemnity: FCS GROUP shall comply with all Federal Government, State and local laws and ordinances applicable to the work to be done under this Agreement.

FCS GROUP hereby agrees to hold the Client harmless from and shall process and defend at its own expense, specific claims, demands or suits at law or equity, arising from FCS GROUP's negligent performance of the provisions of this Agreement; provided that if the Client and FCS GROUP are concurrently negligent, FCS GROUP shall be required to indemnify and defend only in proportion to negligence of FCS GROUP. These indemnity provisions shall not require FCS GROUP to defend or indemnify the Client against any action based solely on the alleged negligence of the Client.

8. All Work Produced is Joint Property of FCS GROUP and the Client: Subject to the public disclosure laws of the State of Washington, of which client is subject, the materials, computer programs, reports, calculations, analyses, etc., generated by FCS GROUP under this contract including the final report shall be the joint property of the Client and FCS GROUP. FCS GROUP may retain copies thereof for work paper documentation and their own use unless specifically restricted in writing by the Client as to use.

Computer models use generally available software, such as Microsoft Excel (TM), and FCS GROUP does not intend or imply any warranty of those programs.

9. Financial Forecasts: Neither FCS GROUP's name nor the report and its financial projections may be referred to or included in any prospectus or as a part of any offering or representation made in connection with the sale of securities or participation interests to the public, whether through a public or private offering.

The information used in developing the forecast assumptions will be derived from published information and other sources FCS GROUP considers appropriate. However, FCS GROUP cannot assume responsibility for the accuracy of such material. Moreover, forecasts are subject to many uncertainties as to the future; therefore, FCS GROUP cannot represent that the projected financial statements will be representative of the results that actually occur. FCS GROUP will endeavor to include appropriate comments drawing the readers' attention to these matters.

10. Integrated Agreement: This agreement together with attachments or addenda, represents the entire and integrated agreement between the Client and FCS GROUP supersedes all prior negotiations, representations, or agreements written or oral. This agreement may be amended by written instrument signed by both the Client and FCS GROUP.

11. Independent Contractor: The parties intend that an independent Contractor/Client relationship will be created by this agreement. No agent, employee, or representative of FCS GROUP shall be deemed to be an agent, employee, or representative of the Client for any purpose. FCS GROUP shall be solely responsible for all acts of its agents, employees, representatives, and subcontractors during the performance of this contract.

12. Equal Opportunity: FCS GROUP is committed to the principles of providing equal employment opportunities for all employees. The performance and diversity of our employees will help us meet the challenges of the present and the future in serving our clients. This policy statement is a reaffirmation of our long-standing commitment to provide equal opportunity on the basis of individual merit and personal qualifications to employees and applicants for employment without regard to race, color, religious creed, sex, sexual orientation or preference, gender identity, genetic characteristics or information of employee or family, age, national origin, ancestry, marital status, citizenship, the presence of sensory, mental, or physical disability, pregnancy/childbirth or related condition, medical condition, membership in the military service, veteran's status, political ideology or any other basis protected by applicable federal, state, or local laws.

13. Notices: Notices to the Client shall be sent to the following address:

City of Camas
Attention: Steve Wall, Public Works Director
616 NE Forth Avenue
P.O. Box 1055
Camas, WA 98607

Notices to FCS GROUP shall be sent to the following address:

Financial Consulting Solutions Group, Inc.
Attention: Angie Sanchez Virnoche, Principal
Redmond Town Center
7525 – 166th Ave. NE, Suite D-215
Redmond, Washington 98052

EXHIBIT A: SCOPE OF WORK AND TASK PLAN

The following work tasks have been developed to complete a Comprehensive Rate Study and SDC Update for the City of Camas's Water, Sewer and Storm utilities as well as a Solid Waste Rate Study Peer Review. The City's study needs were discussed with Steve Wall, Public Works Director on January 26, 2017. As defined in the task plan, we follow a structured method to arrive at rate conclusions, which will enable us to perform the work in an orderly, efficient and results-oriented manner. The result of this study will establish a blueprint for self-supporting, financially sustainable utilities. All tasks will be performed for each utility unless noted otherwise.

Task 1 | Kick-Off Meeting

A project kickoff meeting will be scheduled before the commencement of the project with the consultant and City project teams. This meeting will establish the goals and objectives of the overall project and focus the efforts of the project team. The items covered at the meeting include review of the scope of work, identify project objectives, expectations and deliverables, outline the project schedule and key milestone review points and discuss appropriate lines of communication. *Bi-weekly standing meetings will be scheduled to review the status of the project and deliverables at regular intervals with the project team.*

Task 2 | Data Collection

FCS GROUP will provide a data needs list encompassing historical and projected financial, operational, billing and planning information. The provided data will be reviewed, analyzed and validated for inclusion in the study process.

Task 3 | Rate Model Toolset Architecture

The rate model forms the framework and foundation of the rate study analysis. As a project deliverable, the City requested the rate study models with the capability to run sensitivity analyses for revenue requirements and review assumptions between rate studies. Based on prior work completed for the City we have a base modeling toolset available for the Water, Sewer, Storm and Solid Waste utilities. There are improvements and added functionality to the toolset that have been incorporated to the rate study approach since the last rate study completed. This task is intended to conceptualize the architecture of the model toolset with the project team. The objective of the model should improve transparency, functionality, flexibility and usability such that it can inform how proposed changes may impact rates and the financial requirements of each system. We will discuss how the City would like to use the models, what answers need to be generated by the tools and what user interface may be most effective. This task will incorporate the changes and updates to the model based on discussions with the City project team.

Task 4 | Customer Statistics Validation

A detailed customer billing statistics validation will be completed for the water, sewer and storm utilities. Individual customer data including; number of accounts, meter size, equivalent service units and billed usage patterns (annual use, winter use and summer use) will be evaluated and validated against actual revenue collections. This revenue reconciliation will identify anomalies to be corrected prior to developing future projections of customer counts and use/demand under "normal" conditions. Validation of the customer statistics data set with customer demands and revenue generation is critical

to the rate study as it establishes the foundation for all of the major analytical phases (revenue requirement, cost-of-service analysis, rate design). The process has also proven beneficial in uncovering anomalies in data that can impact forecast revenue and cost allocation.

Task 5 | Revenue Requirement Analysis

This task establishes a sustainable, multi-year (5-20 year) financial management plan that meets the projected total financial needs of the water, sewer and storm utility through generation of sufficient, sustainable revenue. Annual cash flow needs will be analyzed by identifying expenses incurred to operate and manage each system including:

- Cost increases resulting from staffing changes, enhanced programs or initiatives.
 - Additional staffing required to operate the water utility's slow sand treatment plant.
 - Additional staffing and equipment required to increase the sewer utility's Septic Tank Effluent Pump (STEP) maintenance level of service.
 - Additional cost impacts to the storm utility of the City taking over maintenance of Home Owner Association (HOA) owned facilities.
- Capital project needs (renewal/replacement, upgrades and expansion) identified in the most recent System Comprehensive Plans and condition assessments.
- New and existing debt repayment obligations.
- Fiscal policy achievement related to operating and capital reserve targets, system reinvestment funding or rate funded capital, and coverage requirements.
 - Fiscal policies established in the rate study will form the foundation for the official utility policies the City is planning to present to Council for adoption.

Projected revenue will consider the sensitivities of changes in economic, weather and demand trends in order to mitigate volatility and stabilize revenue. Rate implementation scenarios will be generated to evaluate the impact of changes to key variables such as funding sources, growth rates, capital project need and timing, or others identified by the City. The budget includes three (3) alternative scenarios for the water, sewer and storm utility.

The resulting revenue requirement and multi-year rate strategy developed will meet the City's specified financial metrics, goals and objectives and deliver a self-sustaining, individual utility financial planning toolset.

Task 6 | Cost of Service Analysis (COSA)

The cost of service analysis establishes a defensible basis for assigning "cost shares" and establishing "equity" for system customers based on industry standard methodologies that are tailored to the City's unique systems and customer characteristics.

The COSA develops a series of functional allocations that distribute cost pools to classes of customers linked to a proportionate share of costs required to serve their demand. Specific consideration will be given to total utility costs in relationship to the functions identified below.

Water Functions	Wastewater Functions	Storm Functions
Base capacity (average demand)	Flow (includes inflow and infiltration)	Base (costs that do not vary)
Peak capacity (peak demand)	Strength (BOD/TSS)	Use (variable; possible credits)
Fire	Customer	
Customer		

This analytical exercise will identify the cost to serve each customer class of the water, sewer and storm systems. The results will identify any warranted shifts in cost burden that could improve equity between customers from the existing rate structure. The cost of service will identify the required revenue to collect from each customer class to cover their individual costs. Unit costs by functional component will be calculated to support the rate design process.

Task 7 | Rate Design

Rate design considers both the level (amount of revenue that must be generated) and structure (how the revenue will be collected or bill assessed). Each rate design alternative is developed to generate sufficient revenue to meet the revenue requirement forecast and begin to address any material inequities identified in the COSA findings. Further, we will identify the portion of revenues anticipated to be collected from the fixed and volume rate components to provide for an appropriate balance of revenue stability and the ability of customers to control their bill by changing behavior. The rate designs proposed will be consistent with the City's fiscal policies, billing system capabilities and objectives.

This scope of services includes the following rate design options:

- “Across the board” increases for water, sewer and stormwater rates. The increases for each utility will be applied equally to both fixed and variable (where applicable) components.
- Modified fixed and variable rate increase for water and sewer utility rates. This alternative will evaluate modifying the fixed charges proportionally higher than the volume charges, or vice versa. This type of rate design would allow the City to address goals such as revenue stability or impacts of price elasticity.
- Evaluate consolidation of existing classes of service for the water utility to simplify the existing rate schedule.

Task 8 | System Development Charge (SDC) Update

An SDC is a one-time charge imposed as a condition of service on new development or on expanded connection to the system. The charge represents a prorated share of the capital investment made to provide system capacity. The SDC is calculated based on the intent and structure of the Revised Code of Washington (RCW) statute for Water-Wastewater Cities (RCW 35.092.025). In general, each connection shall bear a proportional share of the cost of the system capacity required.

This task will focus on updating the City's existing SDCs for the water and sewer utilities, as well as developing an SDC for the storm utility, which currently does not assess the charge to new development. SDCs developed for each system shall reflect an updated inventory of existing system

assets, the most recent approved capital improvement program costs related to growth and current expectations for future population/customer growth. The sewer utility will evaluate alternative methodology options to simplify the existing high strength commercial charges.

Task 9 | Solid Waste Peer Review

The City is currently in the process of a Comprehensive Plan development for its Solid Waste utility. As part of the Comprehensive Plan, Chris Bell with Bell & Associates, Inc., is performing the Solid Waste rate study. The City has requested FCS GROUP to perform a peer review and coordinate with Chris to maintain continuity with historical analyses performed by FCS GROUP as well as the existing work for the water, sewer and storm utilities.

This task will review the methodology used in the calculation of the proposed rates in the Comprehensive Plan. The review will focus on two components: revenue requirements and cost of service. As discussed above in Tasks 5 and 6, revenue requirements identify the overall needs of the Solid Waste utility, while the cost of service calculates the unit costs of providing solid waste system services.

Task 10 | Meetings/Presentations

The success of a rate study relies on an open and involved process for informing and educating the staff, City Council, and ratepayers on the rate study process and to clearly define the cost basis for the fees imposed on customers by linking the financial requirements to costs.

This proposal includes four (4) internal review meetings at key milestones with City staff to review key assumptions and outcomes:

- One (1) meeting to review revenue requirement and cost of service tasks for the water, sewer and storm utilities (onsite);
- One (1) meeting to review rate design alternatives for water, sewer and storm utilities as well as the results of the solid waste utility peer review (Ring Central);
- One (1) meeting to review SDC analysis (Ring Central); and
- One (1) meeting to review the recommended water, sewer and storm rate proposals and SDCs to bring forward to the City Council (Ring Central).

In addition to the review meetings, we anticipate four (4) City Council workshops/presentations.

- One (1) City Council workshop to share results of the water, sewer and storm utilities revenue requirement and incorporate input into final recommendations;
- One (1) City Council workshop to share results of the water, sewer and storm cost of service analysis and incorporate input into final recommendations; and
- One (1) City Council workshop to share results of the SDC update and incorporate input into final recommendations;
- One (1) City Council workshop or meeting to present final recommendations.

We are happy to accommodate any additional meetings and presentations the City feels are necessary. Additional meetings will be billed based on time and materials.

Task 11 | Documentation

A written report documenting the rate study process, methodology, key assumptions, results and recommendations will be provided. All technical exhibits will be included in the report technical

appendix. Five (5) bound copies of the report will be provided to the City. Included will be one (1) electronic copy of the report and modeling tool for each utility.

Project Administration

Perform miscellaneous project set up activities, work paper documentation, internal scheduling/workload planning, invoicing, ongoing client correspondence and other miscellaneous administrative/project management activities throughout the study.

SCHEDULE

Comprehensive rate studies for multiple utilities generally require a nine to twelve month timeframe for completion. This includes the time required to gather data, complete the technical analysis, and to accommodate City review time and scheduling of Council presentations. The project schedule is based on a variety of issues include timeliness of receipt of requested data/information; quality of data; ability to schedule meetings in a timely manner; and the ability of the City to provide policy direction for the study to move forward at key study milestones. A specific project schedule will be developed during the kick-off meeting.

EXHIBIT B: FINANCIAL CONSULTING SOLUTIONS GROUP, INC. FEE SCHEDULE

	Principal	Project Manager	Senior Analyst	Admin. Support	Total Estimated Hours	Total Budget
TASK						
Hourly Billing Rates:	\$255	\$185	\$140	\$80		
Water Utility						
Task 2 Data collection			2		2	\$ 280
Task 3 Rate model toolset architecture	1	2	4		7	1,185
Task 4 Customer statistics validation		6	22		28	4,190
Task 5 Revenue requirement analysis	4	8	20		32	5,300
Task 6 Cost of service analysis	4	6	16		26	4,370
Task 7 Rate design	4	6	12		22	3,810
Task 8 System Development Charges	6	8	18		32	5,530
Subtotal Water Utility	19	36	94	0	149	\$ 24,665
Sewer Utility						
Task 2 Data collection			2		2	\$ 280
Task 3 Rate Model Toolset Architecture	1	2	4		7	1,185
Task 4 Customer statistics validation		6	20		26	3,910
Task 5 Revenue requirement analysis	4	8	20		32	5,300
Task 6 Cost of service analysis	4	6	16		26	4,370
Task 7 Rate design (no structure changes)	2	4	8		14	2,370
Task 8 System Development Charges	6	8	18		32	5,530
Subtotal Sewer Utility	17	34	88	0	139	\$ 22,945
Storm Utility						
Task 2 Data collection			2		2	\$ 280
Task 3 Rate Model Toolset Architecture	1	2	4		7	1,185
Task 4 Customer statistics validation		2	16		18	2,610
Task 5 Revenue requirement analysis	2	6	16		24	3,860
Task 6 Cost of service analysis	2	4	12		18	2,930
Task 7 Rate design (no structure changes)	1	2	4		7	1,185
Task 8 System Development Charges	4	6	14		24	4,090
Subtotal Storm Utility	10	22	68	0	100	\$ 16,140
Task 9 Solid Waste Peer Review						
Revenue requirement methodology review	5	10			15	\$ 3,125
Cost of service methodology review	7	14			21	4,375
Subtotal Solid Waste Peer Review	12	24	0	0	36	\$ 7,500
TOTAL TECHNICAL	58	116	250	0	424	\$ 71,250
PROCESS TASKS						
Task 1 Kick off meeting (Ring Central)	2	2	2		6	\$ 1,160
Task 10 Meetings/Presentations						
Internal milestone review meetings (1 on-site)	8	8			16	\$ 3,520
Internal milestone review meetings (3 Ring Central)	6	6	6		18	3,480
City Council workshop w/ presentation material (4 on-site)	32	32	12		76	15,760
Task 11 Documentation	4	16	40	4	64	9,900
Project Administration	16			6	22	4,560
TOTAL PROCESS TASKS	68	64	60	10	202	\$ 38,380
Expenses (mileage 5 round trips)						\$1,000
TOTAL LABOR BUDGET	126	180	310	10	626	\$ 110,630

DIRECT EXPENSES

Direct Expenses will not be charged for ordinary project-related expenses. For any client-requested extraordinary expenses, specific terms will be established prior to expenditure and billing.

ORDINANCE NO. _____

AN ORDINANCE amending Chapter 6.12 and Chapter 6.16 of the Camas Municipal Code relating to livestock and poultry.

THE COUNCIL OF THE CITY OF CAMAS DO ORDAIN AS FOLLOWS:

Section I

Section 6.12.010 – Prohibitions generally, of the Camas Municipal Code is hereby amended to provide as follows:

6.12.010 - Activity.

Notwithstanding activities operating under the Agriculture/Ranching (A/R) overlay zoning classification pursuant to Title 18, Chapter 18.41 of the Camas Municipal Code, livestock is deemed non-compatible with urban development and not an allowed activity within the city limits.

Section II

Section 6.12.020 – Prohibited in public parks, of the Camas Municipal Code is hereby repealed.

Section III

Section 6.12.030 – Violation-Penalty, of the Camas Municipal Code is hereby amended to provide as follows:

6.12.030 - Violation-Penalty.

Any person violating any provision of this Chapter shall be guilty of a misdemeanor and upon conviction thereof shall be punished by fine not exceeding the sum of five hundred dollars.

ORDINANCE NO. _____

Section IV

Section 6.16.010 – Running at large, of the Camas Municipal Code is hereby amended to provide as follows:

6.16.010 - Activity.

Notwithstanding uses operating under the Agriculture/Ranching (A/R) overlay zoning classification pursuant to Title 18, Chapter 18.41 of the Camas Municipal Code, the keeping of more than six chickens, ducks, geese, domesticated hare or rabbit, and similar animals in any combination on a parcel of land containing less than 10,000 square feet shall be deemed a public nuisance. No turkeys or roosters are permitted. Animals subject to this Chapter shall be contained on the premise in a manner as to reasonably preclude the animals from running at large within the city.

Section V

Section 6.16.020 – Violations - Penalty, of the Camas Municipal Code is hereby amended to provide as follows:

6.16.020 – Facilities.

Sheds and shelters used to secure animals under this section shall be permitted when incidental and accessory to the primary use of the property (e.g. Accessory to residential use) and subject to the development standards of the underlying zone.

Section VI

The title to Chapter 6.16 of the Camas Municipal Code is hereby amended to POULTRY AND RABBITS.

Section VII

This ordinance shall take force and be in effect five days from and after its publication according to law.

ORDINANCE NO. _____

PASSED BY the Council and APPROVED by the Mayor this _____ day of
_____, 2017.

SIGNED: _____
Mayor

SIGNED: _____
Clerk

APPROVED as to form:

City Attorney

Chapter 6.12 - LIVESTOCK

Sections:

6.12.010 — ~~Prohibitions generally~~Activity.

~~Notwithstanding activities operating under the Agriculture/Ranching (A/R) overlay zoning classification pursuant to Title 18, Chapter 18.41 of the Camas Municipal Code, livestock is deemed non-compatible with urban development and not an allowed activity with the city limits. On and after the thirtieth day of November, 1912, it shall be unlawful for the owner of any livestock to allow same to run at large within the corporate limits of the city, or to stake, tie or herd the same on any street in the city or on the premises of which the owner of such livestock is not the owner or entitled to the possession of the premises.~~

(Prior code § 8.08.010)

~~6.12.020 — Prohibited in public parks.~~

~~It is unlawful for any person being the owner or custodian of any livestock to lead, ride or allow such livestock in any public park in the city.~~

~~(Prior code § 8.08.030)~~

6.12.030 - Violation—Penalty.

Any person violating any provision of ~~this Chapter~~Section 6.12.010 or 6.12.020 shall be guilty of a misdemeanor and upon conviction thereof shall be punished by fine not exceeding the sum of five hundred dollars.

(Ord. 1593 § 2, 1986; prior code § 8.08.040)

Chapter 6.16 - POULTRY AND RABBITS

Sections:

6.16.010 - ~~Activity~~Running at large.

~~Notwithstanding uses operating under the #Agriculture/Ranching (A/R) overlay zoning classification pursuant to Title 18, Chapter 18.41 of the Camas Municipal Code, the keeping of more than six chickens, ducks, geese, domesticated hare or rabbit, and similar animals in any combination on a parcel of land containing less than 10,000 square feet shall be deemed a public nuisance. No turkeys or roosters are permitted. Animals subject to this Chapter shall be contained on the premise in a manner as to reasonably preclude the animals from running at large within the city is declared unlawful for the owner or person having in charge any chickens, turkeys, ducks, geese or other poultry to allow the same to run at large within the city.~~

(Prior code § 8.12.010)

6.16.020 - ~~Facilities~~Violations—Penalty.

Sheds and shelters used to secure animals under this section shall be permitted when incidental and accessory to the primary use of the property (eg. Accessory to residential use) and subject to the development standards of the underlying zone.~~The owner or person having in charge said poultry who shall allow the same to run at large contrary to the provisions of this chapter, shall, upon conviction, be punished by a fine not exceeding the sum of five hundred dollars for each such offense.~~

(Ord. 1594 § 1, 1986: prior code § 8.12.020)

Chapter 6.12 - LIVESTOCK

Sections:

6.12.010 – Activity.

Notwithstanding activities operating under the Agriculture/Ranching (A/R) overlay zoning classification pursuant to Title 18, Chapter 18.41 of the Camas Municipal Code, livestock is deemed non-compatible with urban development and not an allowed activity with the city limits.

(Prior code § 8.08.010)

6.12.030 - Violation—Penalty.

Any person violating any provision of this Chapter shall be guilty of a misdemeanor and upon conviction thereof shall be punished by fine not exceeding the sum of five hundred dollars.

(Ord. 1593 § 2, 1986: prior code § 8.08.040)

Chapter 6.16 - POULTRY AND RABBITS

Sections:

6.16.010 - Activity.

Notwithstanding uses operating under the Agriculture/Ranching (A/R) overlay zoning classification pursuant to Title 18, Chapter 18.41 of the Camas Municipal Code, the keeping of more than six chickens, ducks, geese, domesticated hare or rabbit, and similar animals in any combination on a parcel of land containing less than 10,000 square feet shall be deemed a public nuisance. No turkeys or roosters are permitted. Animals subject to this Chapter shall be contained on the premise in a manner as to reasonably preclude the animals from running at large within the city.

(Prior code § 8.12.010)

6.16.020 - Facilities.

Sheds and shelters used to secure animals under this section shall be permitted when incidental and accessory to the primary use of the property (eg. Accessory to residential use) and subject to the development standards of the underlying zone.

(Ord. 1594 § 1, 1986: prior code § 8.12.020)

ORDINANCE NO. _____

AN ORDINANCE repealing Chapter 2.72 of the Camas
Municipal Code relating to personnel insurance.

THE COUNCIL OF THE CITY OF CAMAS DO ORDAIN AS FOLLOWS:

Section I

Chapter 2.72 of the Camas Municipal Code – Personnel Insurance is hereby repealed.

Section II

This ordinance shall take force and be in effect five (5) days from and after its publication
according to law.

PASSED by the Council and APPROVED by the Mayor this _____ day of March, 2017.

SIGNED: _____

Mayor

ATTEST: _____

Clerk

APPROVED as to form:

City Attorney

Chapter 2.72 - PERSONNEL INSURANCE

Sections:

2.72.010 - Full-time officer and employee defined.

A "full-time employed officer and employee," as used in this chapter, means any person who has or shall work a minimum of twenty hours per week on a full-year basis in a salaried position included in the annual city budget.

(Prior code § 1.46.030)

2.72.020 - Benefits designated.

As an additional benefit to the contract of employment with the city, the city shall provide each full-time employed officer and employee insurance benefits as follows:

- A. A term life insurance policy, the amount of which shall be equal to the nearest thousand dollars of the normal yearly salary of the officer or employee exclusive of overtime pay;
- B. A choice of two group medical and hospital contracts for officers and employees and their dependents;
- C. As of January 1, 1976, officers and employees, other than those covered by Chapter 209, Laws of 1969, Extraordinary Session (LEOFF Act), shall be provided a vision plan with a full family vision plan to be provided as of January 1, 1977;
- D. No employee shall be provided, at the city's expense, post-retirement medical insurance coverage from retirement to age sixty-five unless (1) the employee is entitled to such benefit under the terms of the employees' collective bargaining agreement, (2) the employee was hired or promoted to a nonrepresented position prior to April 15, 2005, (3) the employee's position was removed from a collective bargaining agreement to a nonrepresented position prior to April 15, 2005, or (4) the employee was entitled to such benefit under the employees' collective bargaining agreement and then was promoted to a nonrepresented position after April 15, 2005;
- E. A dental plan for officers and employees, only until January 1, 1977, at which time a full family dental plan shall be provided.

(Ord. 2404 § 1, 2005; prior code § 1.46.010)