HEARINGS EXAMINER MEETING AGENDA
Thursday, June 16, 2016, 7:00 PM
City Municipal Center, 616 NE 4th Avenue

I. CALL TO ORDER

II. INTRODUCTION AND INSTRUCTIONS

III. HEARING ITEMS

A. Parklands at Camas Meadows Subdivision (SUB15-03)
Details: A public hearing will be held before the Hearing Examiner to consider a proposal to develop 36 acres into 42 single family lots and four parcels for future commercial development.
Presenter: Robert Maul, Planning Manager
Recommended Action: Conduct a public hearing, take public testimony and render a decision for the proposed land use action.

Parklands at Camas Meadows Staff Report (SUB15-03

Exhibit 1 - General Application Form

Exhibit 2 - Pre-Application Notes

Exhibit 3 - Project Narrative

Exhibit 4 - MXPD Overlay Map

Exhibit 5 - Recorded Development Agreement

Exhibit 6 - Developer's GIS Packet

Exhibit 7 - SEPA Checklist

Exhibit 8 - SEPA DNS Determination

Exhibit 9 - Completeness Review Letter

Exhibit 10 - Notice of Application

Exhibit 11 - Notice of Public Hearing

Exhibit 12 - Certified Mailing Labels

Exhibit 13 - Traffic Report

Exhibit 14 - Revised Stormwater TIR

Exhibit 15 - Appendix A

Exhibit 16 - Appendix B

Exhibit 17 - Appendix D

Exhibit 18 - Appendix E

Exhibit 19 - Appendix F Geotechnical Report

Exhibit 20 - Preliminary Site Plan and Plat

Exhibit 21 - Parklands Residential Subdivision Map

Exhibit 22 - Preliminary Storm Plan

Exhibit 23 - Existing Conditions without Trees

Exhibit 24 - Existing Conditions with Trees

Exhibit 25A - Landscaping Plans

Exhibit 25B - Landscaping Plans

Exhibit 25C - Landscaping Plans

Exhibit 25D - Landscaping Plans

Exhibit 25E - Landscaping Plans

Exhibit 26 - Tree MapSurvey

Exhibit 27 - Deed and Legal

Exhibit 28 - Deviation Request

Exhibit 29 - Engineering Plan Correspondence

Exhibit 30 - 1996 100 Year Flood Infrared Aerial

Exhibit 31 - Phasing Plan

Exhibit 32 - Parklands Storm & Composite Engineering

Exhibit 33 - Grading Plan

Exhibit 34 - Wetland Delineation Report

Exhibit 35 - Certified Mailing to Tribes

[Exhibit 36 - DAHP Letter]

[Exhibit 37 - TIR and Plan Review]

[Exhibit 38 - Email for Road Standard Deviation Request]

[Exhibit 39_ - DNR Email]

[Exhibit 40 - Public Comment Letter Lofstead]

[Exhibit 41 - Parklands Oak Tree Mitigation]

IV. DECISION

A. Decision for Parklands at Camas Meadows (SUB15-03)

V. ADJOURNMENT

NOTE: The City of Camas welcomes and encourages the participation of all of its citizens in the public meeting process. A special effort will be made to ensure that persons with special needs have opportunities to participate. For more information, please call (360) 834-6864.

STAFF REPORT
Parklands at Camas Meadows
File No. SUB15-02
Report Date: June 13th, 2016

TO:	Hearings Examiner	HEARING DATE: June 16, 2016
PROPOSAL:	The applicant is proposing to subdivide and develop 35+ acres into 42 single family lots and parcels to allow for future commercial development consistent with an adopted Development Agreement and Master plan known as the Parklands at Camas Meadows.	
LOCATION:	The site is located approximately 2/10ths of a mile east of the Camas Meadows Golf Course Clubhouse and northeast of the intersection of NW Payne Road and NW Camas Meadows Drive intersection. The property is further located just north of the NW Larkspur Road dead end. SE and SW ¼ of Section 28, Township 2 North, Range 3 East of the Willamette Meridian. Clark County Parcel ID 175948-000 & 986031-650 and adjacent right of way.	
APPLICANT:	Parklands at Camas Meadows, LLC. 20705 SE Evergreen Highway Camas, WA 98607	Staff Contact: Robert Maul, Planning Manager

APPLICATION SUBMITTED:	**August 31st, 2015**	**APPLICATION COMPLETE:**	**March 25th, 2016**
STATE ENVIRONMENTAL POLICY ACT (SEPA):	The City issued a Determination of Nonsignificance (DNS) on January 12, 2016, as file #SEPA15-14 (Exhibit 8)		
PUBLIC NOTICE:	Notice of Application mailed to property owners within 300 feet of the site on April 26th, 2016, and published in the Post Record on April 26th, 2016. Legal publication 559090. Public hearing notice was mailed to property owners and published in the Post Record on May 31st, 2016. Comment and appeal period ends on March 29, 2016, at 5:00 p.m. Legal publication 561690.		

APPLICABLE LAW: The application was submitted **on March 25, 2016**, and the applicable codes are those vested and in effect per a Development Agreement recorded at Clark County as recording number 5268706 AGR on 03/28/2016. Accept as otherwise agreed to in the recorded Development Agreement the applicable codes shall be those in effect at the date of Application (March 18, 2015). Camas Municipal Code Chapters (CMC): Title 16 Environment, Title 17 Land Development; and Title 18 Zoning; Specifically (not limited to): Chapter 16.53 Wetlands; Chapter 16.61 Fish & Wildlife Habitat Conservation Areas; Chapter 17.11 Subdivisions, Chapter 17.19 Design & Improvement Standards; Chapter 18.07 Use Authorization, Chapter 18.09 Density and Development, Chapter 18.55 Administrative Provisions, and Chapter 3.88 (Impact Fees). [Note: Citations from Camas Municipal Code (CMC) are indicated with italicized type.]

Contents:

I. SUMMARY/BACKGROUND

Zoning: R-15 and BP with an MXPD overlay **Proposed Lots:** 42 - Single family lots; 4 – MXPD employment lots	**Acreages/Areas** R-15 – 20.9 acres; BP/MXPD Overlay 15.5 acres Total site area: approximately 36.1 acres **Uses: R-15 zone.** To include Single Family Dwellings with allowances for incidental and accessory uses including Accessory Dwelling Units. **MXPD.** To include a mix of uses as set forth in the MXPD Master Plan adopted with the Development Agreement (Exhibit 5). Separate Site Plan and Design Review submittals will be required prior to development of the MXPD - employment lots.

The applicant is proposing to develop the 36.1 acre site into 42 single family lots, four commercial lots for mixed use employment, and will have associated public and private improvements. The subject site consists of parcels that provide the total acreage. The southern parcel, #175948000, is 15.72 acres in size and has a base zoning designation of Business Park (BP). The northern parcel, #986031650, is 20.97 acres and has a base zoning designation of R-15 (single family 15,000 square foot lots).

The site is largely covered with trees and has roughly 7.5 acres of wetlands on site. With proposed buffers, the critical areas and open space will total 11 acres. The site does slope down towards the northwest of the site.

Abutting land uses include an existing golf course to the west and north, and northeast, and an existing residential subdivision to the east and southeast corner. Additional land use descriptions will be addressed further in this report. The majority of the southern boundary abuts existing unimproved public right of way that will become the main public access point for the site.

The applicant has coordinated with the City of Camas to create a Mixed Use Planned Development overlay for the subject site, which was memorialized in a recorded Development Agreement (DA). The goal was to integrate land uses in a cohesive master plan, which does place some residential lots in the BP zone (see Exhibit 4 Master Plan). Those lots are also future phases of the development; 2R and 3R (see Exhibit 31). Other elements of the master plan included vested dimensional standards, an employment use table, phasing, street scape design, SEPA review and approval, and performance measures to name a few.

This subdivision process is only for the creation of the residential and commercial lots, and all associated public and private improvements. Individual site plan approval will be done at a later date for the commercial pads contained in the master plan.

II. PRELIMINARY PLAT CRITERIA OF APPROVAL (CMC17.11.030)

The italicized and underlined text is the criteria of approval for preliminary plat applications per CMC§17.11.030(D) (**1 through10**).

1. The proposed subdivision is in conformance with the Camas comprehensive plan, parks and open space comprehensive plan, neighborhood traffic management plan, and any other city adopted plans;

DISCUSSION:

A. The 2004 City of Camas Comprehensive Plan, Chapter IV. Land Use includes the following applicable Goals, Objectives and Policies:

- Primary Goal 3: To offer a harmonious blend of opportunity for living, working, recreating, and cultural activities by protecting natural amenities, and balancing development of services with growth.

  The proposed subdivision includes the creation of up to 42 single family residential lots, open spaces, the development of a portion of the Camas T-20 and T-1 Trails (2014 City of Camas Parks, Recreation and Open Space Comprehensive Plan) together with four primarily employment based lots with a mix of uses consistent with a Development Agreement and Master Plan. Additionally, the development includes at minimum construction of a Transportation Impact Fee eligible connection of Camas Meadows Drive to NW Larkspur.

- Primary Goal 4: To expand the existing permanent open space network and trails system throughout the City while preserving and protecting natural features, wildlife habitat, and critical areas from incompatible land uses.

  Approximately 11 acres of the site is proposed to be preserved through a conservation covenant and maintained by a Homeowners Association. In addition to constructing portions of the T-20 and T-1 City trails, additional trails are proposed within the subject property.

- Land Use Objective: Create a balance between housing and employment that produces a more self-sustaining community; and,

- Policy LU-1. Support the continuation of a strong residential community rooted amid a blend of opportunities for commerce, industry, education, and recreation.

  The subdivision includes provisions for a mix of uses consistent with the 1) MXPD overlay and Chapter 18.22, 2) approved Master Plan and development agreement that includes a balance of housing and jobs integrated into a development with open spaces and trails.

- Policy LU-2. Support a diverse community in an open and natural setting comprised of stable neighborhoods with a variety of housing types and densities; a vibrant, robust downtown, which serves as a focal point for the community; the Business Parks; and other employment and commercial centers.

- Policy LU-4. Maintain compatible use and design with surrounding built and natural environment when considering new development or redevelopment.

Evaluating the existing established development pattern of the surrounding area in terms of lot sizes, densities and uses is necessary in establishing findings of compatibility was addressed with the zone change process for the MXPD overlay zone and Master Plan, which included the following:

North: Clark County tax parcel #986031-650; 20.90 acres; Zoned R-15. One undeveloped parcel is located to the north of the subject parcel, and includes approximately 11 acres of sensitive lands. The applicant is proposing to include this parcel in a master plan and development agreement of a large area that includes the subject property. The anticipated use includes single-family residential lots and natural and passive recreational open spaces.

South:
1) Clark County tax parcel #175951-000; 19.5 acres; Zoned MF-18. Site is currently characterized as underutilized and includes older structures associated with the now defunct Chinook Archery Range. An application is currently pending with the City for a single family and multi-family housing development. 2) Larkspur Estates Phase II; Zoned R-7.5: Clark County tax parcel #175933072; 0.06 acre tract. Site is currently occupied with utilities.
3) Larkspur Estates Phase I – Tract C; Zoned R-7.5; Clark County tax parcel #175933-062; 0.52 acres; Site is currently developed and utilized as a Storm Water Facility.
4) Lacamas Estates; Zoned R-10: Four single family residential lots with three single-family dwellings constructed and occupied. Clark County tax Parcels #175967-014, #175967-016, #175967-018, #175967-032. Lots ranging in size from 0.22 acres (9,654 square feet) to 0.37 (15,934 square feet).

East: Lacamas Shores, Phases 6-C and D; Zoned R-15: Five single family lots with four existing single family dwellings. Clark County tax Parcels #110187-004; #110187-002, #110186-974, #110186-972, Parklands at Camas Meadows, LLC MXPD Overlay zone | ZC15-01 page 5 of 5 #110186-970. Lots ranging in size from 0.36 acres (16,195 square feet) to 0.83 acres (36, 899 square feet).

West: Clark County tax parcel #175978-000; 5.00 acres; Zoned Business Park (BP). This site include the existing Camas Meadows Golf Course Clubhouse which further includes retail sales, restaurant services, and events.

The surrounding areas are a mix of existing uses ranging from commercial to recreational and residential. The City has reconsidered the planning of the area in 2012-13 and designated additional areas for higher density residential which are now beginning to materialize. The proposed MXPD will provide for transition uses from the existing commercial use to the west, the planned higher density residential to the south to the lower density residential use planned or developed to the south and east.

- Strategy LU-3. Support and encourage Planned Developments which can provide "cluster housing" (to protect sensitive lands), higher density, and mixed-use residential/commercial (where appropriately zoned), and where compatibility can be demonstrated.

- Policy LU-8. Provide the opportunity for a broad range of housing choices to meet the changing needs of the community.

  The project includes provisions for single family residential development, will support the establishment of accessory dwelling units, and includes provision for a higher density mixed use building centrally located.

- Policy LU-11. Ensure compatibility with adjacent neighborhoods by using development, design review, and landscaping regulations.

  Residential lots of similar sized are proposed adjacent to existing residential lots. Where employment based uses are located adjacent to residential neighborhoods the Development Agreement has established standards for adequate separation. Additionally, site plan and design Review are further required prior to construction of commercial or mixed use development.

- Strategy LU-10. Support the enhancement of Business Parks with emphasis on aesthetic and community compatibility.

  The subdivision blends the streetscape and trail system of the Camas Meadows Business Park through the extension of NW Camas Meadows Drive through to NW Larkspur.

- Policy LU-13. Encourage the master planning of mixed use developments that emphasize aesthetics and community and neighborhood compatibility.

  The subdivision implements an approved mixed use master plan and emphasizes design and aesthetic through standards of the Master Plan, development code, site plan review, and design review processes.

- Housing Goal 3: To encourage a variety of residential site planning alternatives that increase housing opportunities on residential or commercial land (where appropriately zoned) in a manner that compliments or enhances the character of existing development, protects sensitive environmental features, and considers transit corridors and land use patterns.

(NTM)

The city has a Neighborhood Traffic Management Plan (NTM). This plan identifies the need for installation of acceptable traffic calming features when a proposed development will generate 700 Average Daily Trips (ADT) or more. The submitted Transportation Impact Analysis (TIA), dated November 18, 2015 submitted by H. Lee & Associates indicates that this project at buildout will generate 1,895 ADT with 197 new AM peak hour trips and 191 new PM peak hour trips.

Staff finds that the submitted TIA clearly demonstrates that this threshold will be met with this development.

The applicant is proposing a gated community (2 gates) with 3 private streets to serve the proposed 42 single family lots. The easterly private streets will consist of a 28 foot wide street located within a 48 foot wide tract with two detached 5 foot wide sidewalks. The westerly private street is a shorter street serving fewer lots and as such will only require a 42 foot wide tract with 28 feet of paved width and one detached 5 foot wide sidewalk.

Staff finds that this development with the proposed gated entries and narrower private streets serving an isolated community that is not interconnected to other neighborhoods will consist of very low volume streets such that additional traffic calming features are not warranted.

NW Camas Meadows Drive will be a three lane collector street with landscaped median islands. There will be a roundabout located at the intersection of Payne Road and NW Camas Meadows Drive that will also provide a level of traffic calming due to the need to navigate around said roundabout.

Staff finds that the street systems as proposed will provide adequate traffic calming features and when constructed will meet the intent of the city's NTM plan.

Parks, Recreation and Open Space (PROS)

The adopted 2014 PROS identifies two regional trails in the general vicinity of the proposed project, T-20 and T-1. The T-20 trail coincides with the proposed frontage improvements along Camas Meadows Drive/Larkspur.

The applicant and the neighboring property owner of the Camas Meadows Golf Course are in discussions regarding possible alignment for the T-1 trail. The full installation of the T-1 trail through this site may be difficult as a result of surrounding wetlands, but some participation by the applicant is warranted. The applicant shall be conditioned to coordinate and participate in the implementation of the T-1 connection prior to final plat approval for phase 3R.

Findings:

Under Camas Municipal Code (CMC) 18.22.010 the stated purpose of the MXPD includes: "*The city recognizes that opportunities for employment may be increased through the development of master-planned, mixed-use areas. Consistent with this, the city has created the mixed-use planned development zone (MXPD) to provide for a mix of compatible light industrial, service, office, retail, and residential uses. Standards for development in the mixed-use planned development zone are intended to achieve a pedestrian friendly, active, and interconnected environment with a diversity of uses*".

The applicant submitted to the city an MXPD Overlay, Master Plan and Development Agreement, which was approved by City Council after a public hearing.

The subdivision will include the establishment of lots for a mix of uses consistent with the MXPD zoning, approved Master Plan and addresses applicable provisions for trails and open spaces including transportation as setforth in this report.

Staff finds that the application is generally consistent with the city's comprehensive plans and does not exceed the density standards of the MXPD Master Plan or the R-15 zone. Staff finds that as conditioned the applicant can or will comply with the city's NTM plan.

2. Provisions have been made for water, storm drainage, erosion control and sanitary sewage disposal for the subdivision that are consistent with current standards and plans as adopted in the Camas Design Standard Manual;

DISCUSSION:

Water:

There is an existing 12 inch diameter public ductile iron pipe waterline located within NW Camas Meadows Drive and in NW Payne Road adjacent to the subject property.

The applicant is proposing to connect to the existing 12 inch ductile waterline and extend a new 12 inch ductile water line east in NW Camas Meadows Drive connecting into the existing 8 inch diameter dead end waterline at the northerly terminus of NW Larkspur Street.

Staff has verified with the applicant's engineer that line sizing and flow calculations have not yet been performed in order to determine the minimum flow and line size needed to serve the intended use. Staff finds that the applicant shall be conditioned to provide acceptable line sizing and fire flow calculations prior to final engineering approval of any phase in order to determine an appropriate waterline size for the proposed use.

The proposed utility plan dated January 24, 2106 confuses the water and sewer utilities but the intent of the proposed improvements is clear upon a careful examination of the notes on the plan.

The applicant is proposing to extend 8 inch diameter ductile waterlines in the proposed private streets serving the residential portion of the site consistent with city standards.

Storm Drainage:

The applicant submitted a preliminary stormwater Technical Information Report (TIR) and preliminary storm plans for the proposed development. Additionally, the applicant is proposing phosphorus removal as required in Section 5.04 of the Camas Stromwater Design Standards Manual (CSDSM) for sites over one acre in size and located in the Lacamas watershed above Round Lake.

Historic stormwater flows from this site generally flow to the north and east into the existing sloped wetlands located north of the subject property. The developer of this project has been working with the development team of the Village at Camas Meadows project located south of the NW Camas Meadows Drive extension. Their combined plan is to release stormwater flows from both developments into the sloped wetlands after providing water quality treatment. The released stormwater will then sheet flow north through the wetlands to Lacamas Lake.

Lacamas Lake is listed in the CSDSM and the 2012 Stormwater Management Manual for Western Washington (SMMWW) as a flow control exempt water body. Direct release of stormwater runoff without detention is allowed providing all of the criteria described in Volume I, Section 2.5.7 of the 2012 SMMWW can be met.

One of the criteria requires *"The project site must be drained by a conveyance system that is comprised entirely of manmade conveyance elements (e.g., pipes, ditches, outfall protection, etc.) and extends to the ordinary high water line of the exempt receiving water…"*

As proposed, the release of the stormwater into the wetlands does not appear to meet the criteria for direct release into a flow control exempt water body.

The applicant shall be conditioned to demonstrate to the satisfaction of the city that the proposed direct release meets the criteria of 2.5.7 of the 2012 SMMWW or provide an acceptable alternative regional stormwater treatment and flow control system as allowed in CMC 17.19.040 (C, 3a) that will serve both this project and the Village at Camas Meadows development south of the site, or provide a separate on-site stormwater treatment and flow control system to serve only the subject property.

It should be noted that this development and the proposed Village at Camas Meadows development to the south are not located adjacent to Lacamas Lake. Should the combined projects undetained stormwater flow into Lacamas Lake, it will require the undetained stormwater flows to cross the Camas Meadows Golf Course property. Staff finds that a perpetual stormwater easement across the golf course is warranted to protect and preserve the proposed stormwater outfall for both developments into the future should the direct release to Lacamas Lake be the stormwater option chosen and approved.

The applicant is proposing to direct much of the roof and yard runoff into the wetlands in order to maintain the hydro period of the wetlands as required in the 2012 SMMWW and the CSDSM.

Staff finds that the 2012 SMMWW deems lawns and landscape areas as pollution generating pervious surfaces due to phosphorous being typically found in most fertilizers and should not be directed to or collected in a stormwater system that will outfall into the wetlands prior to phosphorous removal.

The applicant shall be conditioned to direct the stormwater runoff from the lots and landscaped areas of the site into the proposed streets and/or into a stormwater treatment system that will provide adequate phosphorus removal from the yard and landscaped areas of the site prior to release into the wetlands.

Staff finds that stormwater lines not located within the public ROW shall be located in a private stormwater easement(s) and shall be maintained by the homeowners association. A condition of approval to this effect is warranted.

<u>Erosion Control:</u>

The applicant shall be required to provide adequate erosion control measures during the site improvements contemplated for this subdivision in accordance with adopted city standards. The applicant shall be required to submit the Erosion Sediment Control plans to the city for review and approval prior to any ground disturbance.

Staff finds that CMC 17.21.030 requires submittal of an erosion control bond for ground disturbances of one acre or more. The Washington State Department of Ecology also requires site operators disturbing over one acre of land to file for and obtain an NPDES General Construction Stormwater Permit. CMC 14.06.030 (C) requires submittal of the Stormwater Pollution Prevention Plan (SWPPP) prior to commencement of ground disturbance activities.

Staff finds that adequate provisions for erosion control can or will be made.

<u>Sanitary Sewage Disposal:</u>

This particular area of Camas is served by a pressure sewer system. This system was not designed to convey solids, only the effluent.

The applicant is proposing individual Septic Tank Effluent Pump (STEP) systems to serve the proposed residential lots. The commercial sites will be required to adequately size, install and maintain their own private effluent pressure sewer systems at the time of site improvements and building construction.

Staff finds that the sewer system as proposed can or will meet the city's requirements and standards.

Existing wells, septic tanks and septic drain fields

CMC 17.19.020 (A 3) requires abandonment of existing wells, septic tanks and septic drain fields. Existing water wells shall be properly abandoned in accordance with State and County guidelines prior to final plat approval for the phase they may be located in. Transfer of any existing water rights to the City of Camas will also be conditioned as part of the abandonment. A condition of approval to this effect is warranted.

FINDINGS: As conditioned, staff finds that adequate provisions can or will be made for water, storm drainage, erosion control and sanitary sewage disposal which are consistent with the Camas Municipal Code, the Water System Plan, the General Sewer Plan Amendment and the Camas Design Standard Manual.

3. Provisions have been made for road, utilities, street lighting, street trees and other improvements that are consistent with the six-year street plan, the Camas Design Standard Manual and other state adopted standards and plans;

Roads:

NW Camas Meadows Drive Extension:

NW Camas Meadows Drive right of way (ROW) currently exists and is 74 feet in width. The Parklands development is located north of and adjacent to this existing ROW and to date no actual street improvements have been constructed within this ROW. The applicant has no requirement to provide additional right of way for this particular roadway as sufficient ROW width currently exists.

The applicant's narrative at page 2 and 3 does not address street improvements associated with the extension of NW Camas Meadows Drive.

CMC 17.19.040 (B 1) requires appropriate half width street improvements. Staff finds that there is a nexus for these half width improvements based on the Traffic Impact Analysis dated November 18, 2015, submitted by H. Lee & Associates that indicates this project at buildout will generate 1,895 ADT with 197 new AM peak hour trips and 191 new PM peak hour trips.

Staff finds that the applicant shall be conditioned to construct a minimum 23 foot wide half width street improvement acceptable to the city prior to final acceptance of any phase of the development.

The improvements to NW Camas Meadows Drive are identified in the 2012 TIF Update as a TIF credit eligible improvement. As such the applicant will be reimbursed in accordance with the provisions of the 2012 TIF Update for the half width street improvements.

Interior private roads, gated entries and commercial lot access:

The applicant is proposing two entry points from NW Camas Meadows Drive into the project. One entry point will be located at or near the intersection of Payne Road and NW Camas Meadows Drive. This westerly private street will include a gated entry which is regulated in the code at CMC 12.36. This proposed private street is approximately 300 feet in length and is intended to serve 5 residential lots. This proposed private street meets the requirements of private street standard C of Table 17.19.040-1 which requires a minimum tract width of 42 feet with a minimum paved width of 28 feet with no parking allowed on one side of the street and one 5 foot wide detached sidewalk with a minimum 4.5 foot clear planter strip.

The second private street serving the site is located approximately 660' feet east of Payne Road and is also proposed with a gated entry. Both gates are proposed to be located north of the access drives and driveways that will serve the proposed commercial lots that front on NW Camas Meadows Drive. This second private street is approximately 1360 feet in length and serves approximately 24 lots. This private street as proposed meets the requirements of Private Street Standard D of Table 17.19.040-1 which requires a minimum tract width of 48 feet with a minimum paved width of 28 feet with no parking allowed on one side of the street and two 5 foot wide detached sidewalks with a minimum 4.5 foot clear planter strip.

From this second private street there is a third proposed private street that will serve the northeast corner of the site, which is located north of the onsite wetland complex. This private street narrows down to a 30 foot wide tract with one attached 5 foot wide sidewalk and a paved width of 20 feet in order to minimize wetland impacts at the wetland crossing. Staff supports the narrower section at the wetlands crossings as proposed. This private street is approximately 800 feet in overall length and is currently proposed with a tract width of 42 feet with a paved width of 28 feet and one 5 foot wide sidewalk that is detached except in the area of the wetland crossing. This street as proposed does not meet the minimum requirements of Table 17.19.040-1.

The applicant submitted a deviation request in accordance with the provisions of CMC 17.19.040 (B 10d) in an email dated May 23, 2016 and is requesting a recommendation from the City Engineer to deviate from the tract width and sidewalk requirements of private street standard D of Table 17.19.040-1 for this private street in its entirety with the exception of the wetland crossing as discussed above. Staff is not opposed to the deviation request and is recommending approval of the deviation request as proposed.

Each of these private streets ends with a cul-de-sac currently proposed with a minimum paved radius of 30 feet. CMC 17.19.040 (B 15) Turn-arounds, states that these turn-arounds should be consistent with the provisions of the Camas Design Standards Manual (CDSM). The CDSM at detail ST36 regulates turn-arounds and requires a minimum paved radius of 35 feet. The applicant indicates in the May 23, 2016 email that they will comply with this requirement.

Ingress and egress locations and widths for the commercial lots shall be reviewed at the time of site plan review approval for each commercial lot. Public safety, health and welfare will be considered in the final location and width of any commercial driveway.

Utilities, Street Lighting, Street Trees, and Other Improvements:

LED Street lighting will be installed along all street frontages within and adjacent to the proposed development phase or phases at the time of site improvements of said phase or phases.

CMC 17.19.030 (F 1) requires the applicant to install one 2 inch diameter tree in the front yard of each lot. The location of these trees should be shown on the final site landscaping plans along with any required landscaping along NW Camas Meadows Drive extension. All proposed landscaping and street tree plantings will need to be included with the final engineering plan submittal for the site improvements. A condition of approval to this effect is warranted.

Findings: Staff finds that the applicant can or will make adequate provisions for roads, utilities, street lighting, street trees, and other improvements that are consistent with the six-year street plan, the Camas Design Standard Manual and other state adopted standards and plans.

4. Provisions have been made for dedications, easements and reservations;

DISCUSSION: As proposed, the applicant has illustrated public and private rights of way, and easements associated with access, utilities and other provisions. As conditioned herein and proposed this section can be met.

FINDINGS: The applicant can or will make adequate provisions for appropriate street dedications, stormwater easements, access tracts, private rear yard drainage easements and open space dedications as noted in the application materials.

5. The design, shape and orientation of the proposed lots are appropriate to the proposed use.

Discussion: The applicant is proposing a total of 42 single family lots. The recorded Development Agreement (DA) contains a table that outlines the set dimensional standards for the master plan, which is exhibit B in the DA. This applies to all lots zoned R-15 and the residential lots that are within the MXPD overlay area. As proposed, all of the lots appear to meet the minimum standards listed in the master plan table, including the proposed building envelopes, setbacks, lot frontage, and lot depth/width. The dimensional standards table shall be included on the face of the plat.

The table contained in the agreement is as follows:

Development Standard	Single Family (R-15)	Single Family (BP)	Non-Single Family (BP)
A. New Lot Dimensions			
Minimum lot size (square feet)	15,000	15,000	8,000
Maximum lot size (square feet)	Note 1	Note 1	Note 1
Minimum lot width (feet)	80	80	80
Minimum lot depth (feet)	90	90	100
Maximum building lot coverage[2]	50% 60% with ADU	50% 60% with ADU	50%
Maximum building height (feet)	35	35	100
B. Setbacks			
Minimum front yard (feet)	25	25	15[4]
Minimum side yard and corner lot rear yard (feet)	10 5 (ADU or accessory buildings)	10 5 (ADU and accessory buildings)	15[4, 6]
Minimum side yard flanking a street (feet)	10	10	10[4]
Minimum rear yard (feet)	25 5 (ADU or	25 5 (ADU or accessory	50[3]

	accessory buildings)	buildings)	
Minimum lot frontage or access easement on a cul-de-sac or curve (feet)	40[5]	40[5]	N/A
Minimum flag lot width	20	20	N/A

Note 1: No Limitation.
Note 2: Includes all covered buildings and structures accepting therefrom accessory dwelling units (ADU's).
Note 3: May be reduced to ten feet if a transition element is utilized that includes natural vegetation for screening.
Note 4: Right of way to building face. Parking areas can be setback five feet from property line, per the landscaping plan contained within the approved master plan.
Note 5: Access to two lots or less may be designed and established as an easement rather than a tract.
Note 6: No commercial building may be located closer than 75 feet to a residential lot existing on the effective date of this Agreement.

Findings: As proposed and conditioned herein, this section can be met.

6. The subdivision complies with the relevant requirements of the Camas subdivision and zoning codes, and all other relevant local regulations;

DISCUSSION: The proposed 42 single family lots will be subject to the use table contained in the Camas Municipal Code for R-15 residential lots and as identified in the recorded development agreement. The four commercial lots created will be subject to the use table contained in the Camas Municipal Code for Business Park uses and as specified in the recorded development agreement. As proposed and conditioned throughout this report the applicant can comply with this section.

The applicant will be responsible for coordinating with any other local, state, and federal agency that may have regulatory authority over various aspects of this project.

Findings: Staff finds that the proposed subdivision does or can be conditioned to meet the relevant requirements of the subdivision and zoning codes.

7. Appropriate provisions are made to address all impacts identified by the transportation impact study;

Please refer to section three (3) above.

8. Appropriate provisions for maintenance of privately owned common facilities have been made;

DISCUSSION: The proposed project contains a number of private roads, tracts, and easements. Additionally there are private stormwater facilities, a proposed private trail and other amenities that will require maintenance. The applicant shall form a Homeowners Association or other acceptable mechanism for the perpetual maintenance of all privately owned improvements including the stormwater collection and detention system, landscaping and fencing improvements, the private roadway tracts, access gates, the private street lighting system, and all other private amenities contained in the development.

FINDINGS: As conditioned this section can be met.

9. Appropriate provisions, in accordance with RCW 58.17.110, are made for: The public health, safety, and general welfare and for such open spaces, drainage ways, streets, or roads, alleys or other public ways, transit stops, potable water supplies, sanitary wastes, parks and recreation, playgrounds, schools and school grounds and all other relevant facts, including sidewalks and *other planning features that assure safe walking conditions for students who only walk to and from school; and the public use and interest will be served by the platting of such subdivision and dedication.*

1. Appropriate provisions, in accordance with RCW 58.17.110, are made for:
    a. The public health, safety, and general welfare and for such open spaces, drainage ways, streets, or roads, alleys or other public ways, transit stops, potable water supplies, sanitary wastes, parks and recreation, playgrounds, schools and school grounds and all other relevant facts, including sidewalks and other planning features that assure safe conditions at school bus shelter/stops, and for students who walk to and from school.
    b. The public use and interest will be served by the platting of such subdivision and dedication.

FINDINGS: As discussed throughout this report, staff finds that the subdivision can be conditioned to provide the appropriate provisions for public health, safety, general welfare, and assure safe walking conditions for students.

10. The application and plans shall be consistent with the applicable regulations of the adopted comprehensive plans, shoreline master plan, state and local environmental acts and ordinances in accordance with RCW 36.70B.030.

FINDINGS: Staff discussed the compliance or non-compliance aspects of this proposal in regard to the comprehensive plan throughout this section. The property is not subject to the Shoreline Master Program. The environmental regulations will be discussed fully at Sections IV and V of this Report.

III. PHASING PLAN PER CMC17.11.040 (A - E)

DISCUSSION: The applicant may develop and record the subdivision in phases. Any phasing proposal shall be submitted for review at preliminary plat. Approval of the phasing plan shall be based upon making the following findings:
A. The phasing plan includes all land contained within the approved preliminary plat, including areas where off-site improvements are being made. **As proposed, this subsection can be met.**

B. The sequence and timing of development is identified on a map. **The applicant has identified the sequence of phasing as illustrated in exhibit 31.**

C. Each phase shall consist of a contiguous group of lots that meets all pertinent development standards on its own. The phase cannot rely on future phases for meeting any city codes with the exception of storm drainage facilities. Storm drainage must be adequate for each phase, and the stormwater plan must adequately meet the needs of the entire development. Storm drainage facility must be included in the first phase. **Phases 2R and 3R will already have full public and private infrastructure installed prior to the implementation of those phases, as proposed.**

D. Each phase provides adequate circulation and utilities. Public works has determined that all street and other public improvements, including but not limited to erosion control improvements, are assured. Deferment of some improvements may be allowed pursuant to CMC Chapter 17.21. **As mentioned previously, the applicant has proposed to install all public and private improvements that will serve phases 2R and 3R prior to their respective implementation.**

E. Specific improvements necessary for the entire development may be required to be completed with the first phase, regardless of phase design or completion schedule of future phases, e.g., storm pond must be completed regardless of area where storm pond is located. **The recorded DA does contain phasing standards as listed in Section 4.3 within the agreement. Specifically, the ten (10) lots within phase 2 shall be released upon the business park being graded, platted and ready for a prospective user to submit for site plan review. The final eight (8) lots within Phase 3 shall be released once building permit is acquired on either business park building 2, 3, 4 (4A), or 5 (4B).**

FINDINGS: The phasing plan of the development can meet the requirements as conditioned and is consistent with the phasing plan approved through the Development Agreement and Master Plan.

IV. CRITICAL AREAS REVIEW

Wetlands – CMC Chapter 16.53

The criteria for approval of a wetland permit can be found at CMC§16.53.050.

DISCUSSION: The project site has three identified wetlands on site. The applicant provided the city with a detailed critical areas report prepared by Ecological Land Services as is dated December of 2015 (Exhibit 34). The report specifies that the three wetlands (A, B and C) are hydrologically connected through a series of culverts and rated as one wetland unit based on the Washington State Department of Ecology's (DOE) rating forms. The wetland has been classified as having low to moderate habitat potential and given a rating of Category III, which was confirmed by DOE (Exhibit 35). According to Table 16.53.040-3, the base buffer width for the Category III wetland is 120' based on its rating and the high intensity use of a subdivision.

The applicant discusses their buffer reduction approach on page 6 of the Critical Areas Report. There are two subsections that allow for buffer width reduction: (CMC16.53.050(C)(1)(a)(i) & 16.53.050(C)(1)(a)(ii)). Specifically, the proposal is to reduce the buffer width to 50' using the criteria listed in CMC16.53.050(C)(1)(a)(ii), which states:

> "Measures to minimize the impacts of the land use adjacent to the wetlands are applied, such as infiltration of stormwater, retention of as much native vegetation and soils as possible, direction of noise and light away from the wetland, and other measures that may be suggested by a qualified wetland professional."

The applicant provided a list of ten (10) measures to minimize the impact on the adjacent wetland. As proposed in the applicant's critical areas report, the buffer impact can be mitigated through the measures provided. As such, this subsection can be met.

The applicant's wetland biologist does address section 16.53.050(C)(1)(a)(i) regarding a 100' wide relatively undisturbed vegetated corridor. The argument is made that this subsection is inapplicable due to several factors including existing site configuration, separate ownership issues with abutting properties, and overall distance separation from the Priority Habitat being over 1,000' away. Staff does support this finding and finds that the buffer reduction as proposed can meet this section. The applicant shall record a conservation covenant for the wetland and its associated buffer in a form approved by the City in accordance with CMC§16.53.040(C)(3).

The applicant is also proposing a natural surface pedestrian trail through the buffer area. The proposed trail can be allowed pursuant to CMC16.53.050(C)(5) if the applicant can demonstrate that the criteria is met. Prior to final engineering approval, the applicant shall provide an updated critical area report addressing the criteria for placing a natural surface trail within the buffer.

The applicant proposes to set aside the wetland and its associated buffer, but it is unclear if they will be contained in tracts. Preserved wetland areas and their associated buffers are required to be placed in tracts, as per CMC 16.51.240. A condition to this effect is warranted. Prior to final plat approval, private covenants will need to be submitted, and must include provisions for proper maintenance and protection of this tract. Further, CMC§16.51.210 allows the city to require adequate protective mechanisms. As such, the city may require permanent fencing and signs adjacent to the critical area tract to act as a clear demarcation between private and common spaces. There is a proposed natural path trail proposed within the buffer area. Clear separation and demarcation from the buffer/trail area and the actual wetland boundary shall be required. Clear demarcation along the trail lines shall be in place with signage along the boundaries between wetland boundaries, buffer and recreational open space. Staff recommends that signs and fencing be installed along the final boundaries between housing lots and wetland areas with their respective buffers and shall be reviewed during engineering review. A condition to this effect will be included with this report.

There are additional standards listed in CMC16.53.050.D where the code addresses sequencing.

- Avoidance of impacts. The applicant has avoided directly impacting any of the wetlands themselves and is only proposing to reduce the buffer width using prescriptions in the code. As noted earlier in this report the project proposal meets many of the comprehensive plan goals ranging from economic development goals, to housing, and environmental protection. The proposal is balancing comprehensive urban development policies with environmental projection.
- Minimize impacts. Through site design the applicant has been able to avoid direct impact to the wetland, but will need to seek a buffer reduction. As proposed and conditioned, the applicant can use mitigation design to help offset the reduced buffer area and pedestrian trail proposed.
- Compensate for wetland impacts that will occur. In concert with minimization, proposed and conditioned mitigation can compensate for the impact.

FINDINGS: Staff finds that the project can or will comply with this section as proposed and conditioned herein.

<u>Fish & Wildlife Habitat Conservation Areas – CMC Chapter 16.61</u>

Discussion: The performance standards for approval of Fish & Wildlife Habitat Conservation Area permits can be found at CMC§16.61.030

CMC 16.61.010 - Designation of fish and wildlife habitat conservation areas. The applicant provided a tree survey for the development area. There are four (4) Oregon White Oak trees identified for removal. They range in diameter from 8"-10" and all four will be removed. There is one 20" diameter Oregon White Oak located on proposed lot 11 that will be retained. The applicant shall provide protective fencing around the drip line of the 20" diameter Oregon White Oak. The protective barrier shall be installed prior to clearing and grading activities on site. A condition to this effect is warranted.

There are no stands of Oregon White Oaks within this development and the one significant Oregon White Oak on site will be retained. The applicant is proposing a mitigation approach to the four smaller White Oak trees that are to be removed at a rate of two new trees for each one removed for a total of eight (8) new 2' caliper White Oak trees. All mitigation trees will be planted within the buffer area. The eight mitigation trees shall be planted prior to final acceptance. A condition to this effect if warranted.

FINDINGS: **As conditioned herein, this section can be met.**

Archaeological Resource Preservation – CMC Chapter 16.31

The criteria for approval of archaeological review can be found at CMC§16.31.140.

DISCUSSION: The applicant provided an archeological survey that is consistent with CMC§16.31.120. The applicant coordinated with the Department of Archaeology and Historic Preservation (DAHP). No permits from DAHP will be required for this project (Exhibit 36). As such, this section can be met as proposed.

V. SENSITIVE AREAS AND OPEN SPACE (CMC18.31)

CMC§18.31.080 Tree Retention reads, "To the extent practical, existing healthy significant trees shall be retained. Preservation of groups of significant trees rather than individual trees shall be preferred. All grading shall take place outside the drip line of those significant trees to be retained except that such grading can occur without damaging the tree or trees."

DISCUSSION: Chapter 18.31 Sensitive Areas and Open Space does not include specific criteria to assist with a measure of the "extent practical". However, the courts have provided some direction since this code was adopted, which includes requiring a demonstration of efforts to best retain trees. The city also encourages a tree preservation strategy to be sustainable after homes are built, and not create any future tree hazards

FINDINGS: Staff finds that the application provides a practical retention plan whereby they propose to protect trees contained within the wetland and associated buffer. This section can be met as proposed.

VI. PUBLIC COMMENTS

At the writing of this report, the following comments were submitted and are included as exhibits.

- Email from David Lofstead regarding fencing (Exhibit 40).

VII. CONCLUSIONS

Based on the above findings and discussion provided in this report, staff concludes that the consolidated application for Parklands at Camas Meadows should be approved, because it does or can comply with the applicable standards.

VIII. RECOMMENDATIONS

Staff recommends APPROVAL of the consolidated preliminary plat application. The recommendation is based on the application meeting the minimum requirements of Camas Municipal Codes, the approved Master Plan and Development Agreement, and as conditioned as follows:

PROPOSED CONDITIONS

The following conditions are in addition to any conditions required from other permits or approvals issued to this project. Unless otherwise waived or modified in this decision, the development must comply with the minimum requirements of the Camas Municipal Code.

Standard Conditions of Approval

1. All construction plans will be prepared in accordance with City of Camas standards. The plans will be prepared by a licensed civil engineer in Washington State and submitted to the City for review and approval.
2. Underground (natural gas, CATV, power, street light and telephone) utility plans shall be submitted to the City for review and approval prior to approval of the construction plans.
3. The applicant will be required to purchase all permanent traffic control signs, street name signs, street lighting and traffic control markings and barriers for the improved subdivision.
4. A 3% construction plan review and inspection fee shall be required for this development. The fee will be based on an engineer's estimate or construction bid. The specific estimate will be submitted to the City for review and approval. The fee will be paid prior to the construction plans being signed and released to the applicant. Under no circumstances will the applicant be allowed to begin construction prior to approval of the construction plans.
5. Any entrance structures or signs proposed or required for this project will be reviewed and approved by the City. All design will be in accordance with applicable City codes. The maintenance of the entrance structure will be the responsibility of the homeowners.
6. A homeowner's association (HOA) is required for this development. The applicant shall furnish a copy of the CC&R's for the development to the City for review and approval. Specifically, the applicant shall make provisions in the CC&R's for maintenance of the storm drainage system, street lighting, fencing, landscaping, irrigation, parking areas, retaining walls, private roads and tracts or easements outside of the City's right of way if applicable.
7. In the event that any item of archaeological interest is uncovered during the course of a permitted ground disturbing action or activity, all ground disturbing activities shall immediately cease and the applicant shall notify the Public Works Department and DAHP.
8. Final plat and final as-built construction drawing submittals shall meet the requirements of the CMC 17.11.060, CMC 17.01.050 and the Camas Design Standards Manual for engineering as-built submittals.
9. The applicant shall remove all temporary erosion prevention and sediment control measures from the site at the end of the two-year warranty period, unless otherwise directed by the Public Works Director.
10. Building permits shall not be issued prior to the City's final acceptance of the improvements and the final plat is recorded.
11. An approved address sign, in accordance with the Camas Municipal Code, must be posted for each residence where the flag lot leaves the public road or access tract. CMC 17.19.030.D.5.d
12. Underground oil tank removal requires a permit with the fire marshal's office following if there are any discovered or known installations. IFC (International Fire Code) 3404.2.14
13. Any gates serving two or more homes is required to follow the gate code CMC 12.36
14. Prior to final engineering plan approval of any phase the applicant shall provide acceptable line sizing and fire flow calculations that support the proposed line sizing.
15. Prior to final engineering approval of any phase, the applicant shall demonstrate to the satisfaction of the city that the proposed direct release meets the criteria of 2.5.7 of the 2012 SMMWW, or provide an acceptable alternative regional stormwater treatment and flow control system as allowed in CMC 17.19.040 (C, 3a) that will serve both this project and the Village at Camas Meadows development south of the site, or provide a separate on-site stormwater treatment and flow control system to serve only the subject property.
16. If direct release of stormwater flows into LaCamas Lake is approved, prior to final plat approval of any phase the applicant shall ensure that an adequate and acceptable perpetual stormwater easement across the Camas Meadows Golf Course is in place and recorded with Clark County.

17. Stormwater runoff from the proposed lots and landscaped areas of the site shall be directed into the streets and/or into a stormwater treatment system that will provide adequate phosphorus removal from the yard and landscaped areas of the site prior to release into the wetlands.
18. Stormwater lines serving the site not located within the public right-of-way will shall be placed within private stormwater easements and shall be maintained by the homeowners association.
19. Existing water wells on-site shall be properly abandoned in accordance with State and County guidelines prior to final plat approval for the particular
phase that the well may be located in. Additionally, any water rights associated with the abandoned well shall be transferred to the City.
20. The applicant shall construct a minimum 23 foot wide half width street improvement on NW Camas Meadows Drive extension prior to final acceptance of any phase of the development.
21. Prior to final engineering plan approval for any phase the applicant shall submit an acceptable landscaping plan that details the location, number, plant species proposed, planting notes and associated details.
22. Prior to final engineering approval, the applicant shall provide updated critical area report addressing the criteria for placing a natural surface trail within the buffer.
23. Prior to final acceptance, the applicant shall install eight (8) 2" caliper Oak Mitigation trees in the wetland buffer.

Special Conditions of Approval

24. Accessory dwelling units shall not be precluded from CC&R's.
25. The wetlands on site shall be contained in separate tracts.
26. Continuous permanent fencing and/or barrier shall be placed along the wetland boundary.
27. Install permanent signage along the boundary of the wetland area that reads, "Wetland area – Leave in its natural state. It is illegal to cut, prune, or mow in this area. Call the City of Camas for Information." Signs must be permanently maintained along this boundary. If violations occur, the City may require continuous fencing to be installed at that time.
28. Wetland buffer signs shall be placed along the buffer lines where abutting residential lots.
29. The applicant shall record a conservation covenant for the wetland and its buffer area in a form approved by the City in accordance with CMC§16.53.040(C)(3).
30. The applicant shall coordinate and participate in the implementation of the T-1 connection prior to final plat approval for phase 3R, or as otherwise acceptable to the city.
31. Street names shall be reviewed and approved by the Building Department prior to final plat approval.
32. Automatic sprinklers installed per NFPA 13D or 13R shall be required in all new residential structures.
33. Provisions for parking enforcement acceptable to the Fire Marshal shall be included in the CC&R's at the time of final platting.
34. All building envelopes and setbacks shall be shown on the final plat.
35. Lots shall be numbered consecutively with each phase, with the numbers starting where the last phase ended.
36. Temporary construction fencing shall be provided around the drip line of any significant trees including the 20" oak to be retained and along the entire wetland buffer area. The temporary fencing shall be in place prior to any earthwork activities to remain in place until final acceptance of site improvements.

Proposed Plat Notes

1. A homeowner's association (H.O.A) will be required for this development. Copies of the CC&R's shall be submitted and on file with the City of Camas.
2. All costs associated with the installation of the step systems for individual lots will be the responsibility of said individual lot owners.
3. A right of entry is hereby granted to the City of Camas for the repair and maintenance of the step sewer system.
4. The adopted dimensional standards table contained in the recorded development agreement shall be placed on the face of the plat.
5. No further short platting or subdividing will be permitted once the final plat has been recorded.
6. A final occupancy permit will not be issued by the Building Department until all subdivision improvements are completed and accepted by the City.
7. The lots in this subdivision are subject to traffic impact fees, school impact fees, and park/open space impact fees. Each new dwelling unit will be subject to the payment of appropriate impact fees at the time of building permit issuance or as otherwise provided by the city.
8. Prior to the Building Department issuing a Certificate of Occupancy, each lot shall install a minimum of one 2" caliper tree to be located in the planter strip or front yard of each lot, as specified on the plat. Specified trees shall be maintained in good health, and damaged or dying trees shall be promptly replaced (within six months) by the homeowner.
9. Automatic fire sprinkler systems designed and installed in accordance with NFPA 13D are required in all structures.
10. Illegally parked vehicles may be subject to towing or other private parking enforcement measures in accordance with the provisions outlined in the HOA documents.
11. Should archaeological materials (e.g. cones, shell, stone tools, beads, ceramics, old bottles, hearth, etc.) be observed during project activities, all work in the immediate vicinity should stop and the State Department of Archaeology and Historic Preservation (360-586-3065), the City planning office, and the affected Tribe(s) should be contacted immediately. If any human remains are observed, all work should cease and the immediate area secured. Local law enforcement, the county medical examiner (360-397-8405), State Physical Anthropologist, Department of Archaeology and Historic Preservation (360-586-3534), the City planning office, and the affected Tribe(s) should be contacted immediately. Compliance with all applicable laws pertaining to archaeological resources (RCW 27.53, 27.44 and WAC 25-48) and human remains (RCW 68.50) is required. Failure to comply with this requirement could constitute a Class C Felony.

Exhibit No.	Exhibit List for SUB15-03 Parklands at Camas Meadows **Title/Description**
1	Application form
2	Pre-app notes (PA15-22)
3	Project Narrative
4	MX-PD Overlay map
5	Recorded Development Agreement
6	Developer's GIS Packet
7	SEPA Checklist
8	SEPA15-14 DNS January 12, 2016
9	Completeness Review letter
10	Notice of Application
11	Notice of Public Hearing
12	Certified Mailing Labels
13	Traffic Report
14	Revised Stormwater TIR
15	Appendix A
16	Appendix B
17	Appendix D
18	Appendix E
19	Appendix F
20	Preliminary Site Plan and Plat
21	Preliminary Residential Subdivision
22	Preliminary Stormwater Plan
23	Existing Conditions – no trees
24	Existing Conditions - Trees
25	Landscape Plans (several pages)
26	Tree Map/Survey
27	Deed and Legal Description
28	Right of way deviation request
29	Engineering Plan Correspondence
30	100 year flood plain map
31	Phasing Plan
32	Parklands Storm and composite engineering plans
33	Grading Plan
34	Wetland delineation and critical areas report
35	Certified mailing receipts for archeological report to tribes
36	Department of Historic Preservation letter
37	Stormwater review by city consultant, Otak
38	Initial staff response to deviation request
39	Department of Natural Resources Email
40	Public Comment email from Mr. Lofstead regarding fencing
41	Parklands Oak Tree Mitigation
42	
43	

EXHIBIT 1

City of Camas WASHINGTON

Community Development Department | Planning
616 NE Fourth Avenue | Camas, WA 98607
(360) 817-1568 | www.cityofcamas.us

General Application Form

Case Number: PA 15-22

Applicant Information

Applicant/Contact:: Parklands at Camas Meadows, LLC Phone: (360) 823-6222

Kevin DeFord

Address: 20705 SE Evergreen Hwy NGDevelopment@Gmail.com

Street Address E-mail Address

Camas WA 98607

City State ZIP Code

Property Information

Property Address: 6101 NW Nightshade St. 986031650 and 175948000

Street Address County Assessor # / Parcel #

Camas WA 98607

City State ZIP Code

Zoning District R-15 and BP Site Size 36.43 (-2 Parcels)

Description of Project

Brief description: Luxury Residential and Business Park, Trail System Throughout

Are you requesting a consolidated review per CMC 18.55.020(B)? YES ☐ NO ☐

Permits Requested: ☐ Type I ☐ Type II ☒ Type III ☐ Type IV, BOA, Other

Property Owner or Contract Purchaser

Owner's Name: DeFord Kevin Nex Generation LLC Phone: (360) 823 - 6222

Last First

Address: PO Box 61962

Street Address Apartment/Unit #

E mail Address: Vancouver WA 98666

City State Zip

Signature

I authorize the applicant to make this application. Further, I grant permission for city staff to conduct site inspections of the property.

Signature: [signature] Date: 6-11-15

Note: If multiple property owners are party to the application, an additional application form must be signed by each owner. If it is impractical to obtain a property owner signature, then a letter of authorization from the owner is required.

Date Submitted: Pre-Application Date:	
Staff: Related Cases #	**Validation of Fees**

Revised: 01/14/13

EXHIBIT 2

Pre-Application Meeting
Parklands MODEL
617 SE Everett Rd
Parcel #986031650 and #175948000
File PA 15-22

Wednesday July 8th, 2015
2:00 PM, Council Chambers
616 NE Fourth Avenue, Camas

Applicant / Contact:	**Applicant**: Parklands at Camas Meadows, LLC 20705 SE Evergreen Highway Camas, WA 98607	**Contact:** Kevin DeFord
Representing City of Camas:	Phil Bourquin, Community Development Director Steve Wall, Public Works Director Robert Maul, Planning Manager James Curuthers, City Engineer Wes Heigh, Engineering Bob Cunningham, Building Official	
Location:	617 SE Everett Road 986028-022, 178238-000	
Zoning:	R-15 (20.89 acres) BP (15.54 acres)	
Description:	Applicant is proposing to develop 36.43 acres into luxuray residential single family and business park.	

NOTICE: Notwithstanding any representation by City staff at a pre-application conference, staff is not authorized to waive any requirement of the City Code. Any omission or failure by staff to recite to an applicant all relevant applicable code requirements shall not constitute a waiver by the City of any standard or requirement. [CMC 18.55.060 (C)] This pre-application conference shall be valid for a period of 180 days from the date it is held. If no application is filed within 180 days of the conference or meeting, the applicant must schedule and attend another conference before the City will accept a permit application. [CMC 18.55.060 (D)] Any changes to the code or other applicable laws, which take effect between the pre-application conference and submittal of an application, shall be applicable. [CMC 18.55.060 (D)]**. A link to the Camas Municipal Code (CMC) can be found on the City of Camas website, http://www.cityofcamas.us/ on the main page under "Business and Development".**

Applicable requirements for the proposed development include Title 16 Environment, Title 17 Land Development, and Title 18 Zoning of the Camas Municipal Code ("CMC"), which can be found on the city website. Please note it remains the applicant's responsibility to review the CMC and address all applicable provisions. The following pre-application notes are based on the application materials and site plan submitted to the City on June 11th, 2015:

Concept: To establish employment uses as a primary purpose with some flexibility of integrating residential estate lots transitioning uses and densities between Camas Meadows Golf Course to the west, Lacamas Shores to the east, and future multi-family to the south.

In order to provide clarity in development goals, standards, vesting and to achieve a mutually desired outcome the parties wish to enter into a development agreement for the overall project site (R-15 and BP zones) and to consider applying a MXPD overlay zone over the area zoned BP.

Development Agreement

Specific Comments:

> "Development agreement" means a binding agreement between the city and a developer relative to a specific project and piece of property. The agreement may specify and further delineate, and may include, but is not limited to, development standards; vesting; development timelines; uses and use restrictions; integration within or outside of the subject development; construction of transportation, sewer and water facilities; and allocation of capacity for transportation, sewer and water facilities. The agreement shall clearly indicate the mix of uses and shall provide a general phasing schedule, as reviewed and approved by city council, so as to ensure that the commencement of construction of the commercial, industrial, and/or office uses occur within a reasonable time frame of the construction of the overall project.
>
> Amendments to an approved development agreement may only occur with the approval of the city council and the developer or its successor(s).

1. A Development Agreement will be required for the overall project area (areas zoned BP and R-15).

DA – Sections to be included

Development Standards:

A. R-15 portion of site: As per CMC 18.09.040 Table 2 (A) and no density transfers shall occur. No portion (area) of a newly created residential lot shall be extended into or include either a wetland or its required buffer. One oversized lot is allowed per the code. The density of the R-15 portion of the site shall be calculated independent of the overall site.

Per CMC17.19.040 (F)(2)The city council finds that the existing mature landscaping of trees, and shrubs provide oxygen, filter the air, contribute to soil conservation and control erosion, as well as provide the residents with aesthetic and historic benefits. For these reasons, the city encourages the retention of existing trees that are not already protected as significant trees under the Camas Municipal Code. CMC 17.030(A)(2) requires every reasonable effort shall be made to preserve existing significant trees and vegetation, and integrate them into the land use design. In consideration of these, Parties agree: 1) lots 7 and 8 (plan dated June 28, 2015) shall be eliminated and placed in an open space with the purpose of retaining healthy trees in a natural open space environment; The area of lots 15, 17, 18, 19 and 20 sloping north to the wetland tract and falling below the shown 202 elevation line shall be placed in an open space tract with the purpose of retaining existing trees tract MX residential:

B. Residential overall: The site is located in an area between Multifamily zoning to the south and larger lots in the Lacamas Shores neighborhood directly to the west. In order to provide for a transition area to mitigate impacts of increasing density near and adjacent to Lacamas Shores, the minimum average density of eight dwelling units per net acre of residentially developed area under 18.22.070 (A) will not be required. However, In order to facilitate alternatives in housing choices, ageing readiness and affordable housing within Camas, Parties agree that a minimum of four residential lots within the BP portion of the site shall be constructed with accessory dwelling units (ADU's) on the property concurrent with a primary dwelling. No residential lot subject to the DA shall be precluded from establishing ADU's. The dimensional standards applicable to residential lots that split the R-15 Zone and BP/MXPD shall be determined by that portion of the lot that contains greater than 50% of the land area in a specific zone.

C. MXPD Residential: Minimum lot size shall be 20,000 square feet. No density transfer will occur. No portion (area)of a newly created residential lot shall be extended into or include either a wetland or its required buffer. Minimum lot width will be 100 feet; Minimum Lot depth 110 feet. Lot width will be measured at the established front building line. Building envelopes shall be capable of siting a minimum 80' X 40' single story dwelling; Setbacks: a) Front- 18 feet for residence, garages 20 feet; Side yards: 12 feet one side and 7.5 any other side; Rear yards: 30 feet. Maximum lot coverage: 45% for single story and 35 For multistory (including daylight basements). Yards adjacent to Lacamas Shores shall maintain a 40 foot separation (setback) from the common boundary (side or year lot line). In order to facilitate alternatives in housing choices, ageing readiness and affordable housing within Camas, Parties agree that a minimum of four residential lots within the BP portion of the site shall be constructed with accessory dwelling units (ADU's) on the property concurrent with a primary dwelling.

D. Multifamily: Within the employment areas the City is open toallowing up to eight apartment/condo lofts on the 3rd and 4th stories only atop the commercial building component of project. This will need to be defined further.

E. Gated entries/roads. Comply with CMC 12.36.040 and exceed adopted road standards. A detailed and comprehensive streetscape plan including street light details, landscaping, gate design and entry landscape, meaningful sidewalk design, street crossing delineations (brick/stamped concrete, etc.) shall submitted to the City as part of the Master Plan. For continuity with other properties to the west that include 40 feet of landscaped frontages, the City will require a minimum of 30 feet (front yard) of landscaping along Camas Meadows Drive tapering to 40 feet at the western most 100 feet of the property to be installed with Phase I together with a meandering detached sidewalk. Landscape details including cross sections and profiles shall be submitted for approval as an exhibit to the DA. Phase I will include road construction of NW Camas Meadows Drive to Larkspur.

F. Fencing and walls: In addition to requirements of the Camas Municipal code governing walls and fences the developer will provide with the master plan a fencing or wall plan detail that will provide uniformity and continuity throughout the development for approval be the City. Integrating the developments into soft transitions between uses on site and adjacent sites are a priority and the promotion of a well-connected, walkable, natural and desirable setting. When necessary, consider wrought iron fencing together with landscaping for durability of materials and softness in transitions between uses both on and off the site.

G. Signage: Signage of employment uses shall be developed into a unified sign plan for the property and approved as part of the master plan. Integrating signage into the landscaping and streetscape versus standalone pole signs are preferred. Consider integrating rock or other natural features into entrance structures with signage for the entire project.

H. Employment: The Business Park and employment uses continue to be a priority of the City over residential development. The developer is asking to convert a portion of the BP land to residential development resulting in more residential development and less land available for employment or open spaces. Parties agree the site will be designed to accommodate a minimum of 116,000 square feet of building square footage on a minimum of 7.75 acres. Phase I will require site development and construction of a minimum 60,000 square feet of commercial/industrial building (subject to site plan and design review) [Buildings 5,6] prior to or concurrent with any infrastructure improvements associated with the residential portion of the site. Parties agree the City will not issue a building permit for any residential unit until the 60,000 square feet of commercial/industrial building is constructed and a tenant improvement permit is issued for at least 50% of the building area (32,000 square feet); Phase II will include a minimum 30,000 square feet of commercial/industrial building (subject to site plan and design review). Phase II shall further include site improvements (pad ready) to support the remaining portion of the total 140,000 square feet. All commercial buildings shall include retail continuity in overall design use of colors, windows and architectural treatments acceptable to the City and approved through the City Design Review process.

I. Phases. The master plan shall identify proposed development phases, probable sequence of future phases, estimated dates, and interim uses of the property awaiting development. In addition, the plan shall identify any proposed temporary uses, or locations of uses during construction periods. Clearing of the site shall be done so as to minimize soils disturbances and only after receiving land use approval of site plan review or preliminary plat approval for each phase and only after approval by the City of engineering and civil drawings for installation of required improvements with a given phase.

2. Development timelines: DA will have an 8 year life. Site plan and design review of the 60,000 square foot commercial/industrial building and supporting land shall be submitted to the City concurrently with a preliminary subdivision approval and within 6 months of the effective date of the DA. Timelines for future employment buildings to be spelled out. Residential improvements shall be installed and final plats recorded within the term of the DA.

3. Additional section to be included in the DA: Uses and use restrictions; integration within or outside of the subject development; construction of transportation, sewer and water facilities; and allocation of capacity for transportation, sewer and water facilities. The agreement shall clearly indicate the mix of uses and shall provide a general phasing schedule.

4. A Mixed Use Overlay under CMC 18.22 may be applied for only that portion of the site zoned BP. A couple of significant criteria to consider: *1. no more than fifty percent of the net acreage of the master plan shall be residential that is not otherwise contained within a mixed-use building [CMC18.22.050]. 2.*

MXPD code with Staff notes or concerns

18.22.010 - Purpose.

The city recognizes that opportunities for employment may be increased through the development of master-planned, mixed-use areas. Consistent with this, the city has created the mixed-use planned development zone (MXPD) to provide for a mix of compatible light industrial, service, office, retail, and residential uses. Standards for development in the mixed-use planned development zone are intended to achieve a pedestrian friendly, active, and interconnected environment with a diversity of uses.

Describe how employment opportunities being increased when jobs lands will be converted to residential?

How is a walled in gated residential neighborhood consistent with achieving a pedestrian friendly, active, and interconnected environment with diversity of uses? If the uses are compatible why the wall and gate?

18.22.030 "Master plan" as used in this chapter a master plan means a proposal for development that describes and illustrates the proposed project's physical layout; its uses; the conceptual location, size and capacity of the urban service infrastructure necessary to serve it; its provision for open spaces, landscaping, trails or other public or common amenities; its proposed building orientation; its internal transportation and pedestrian circulation plan; and the integration of utility, transportation, and pedestrian aspects of the project with surrounding properties.

1. The master plan goes into detail beyond just a site plan which is also defined in 18.22.030. Additionally, I it requires consideration of the project with surrounding uses!!!

18.22.040 - Allowed uses.

A. The mix of uses may include residential, commercial, retail, office, light industrial, public facilities, open space, wetland banks, parks, and schools, in stand alone or in multi-use buildings.

B. Residential uses are allowed either:

1. In buildings with ground floor retail shops or offices below the residential units; or

2. As single-family attached units, as provided for in Section 18.22.070(A) of this chapter.

C. Commercial and retail uses are permitted, but not required, on the ground floor of multi-use buildings throughout this district.

D. Uses as authorized under CMC Section 18.07.030 Table 1 for Community Commercial.

18.22.050 - Required mix of uses.

The master plan must provide a mix of uses. No single use shall comprise less than twenty-five percent of the development area (i.e., residential, commercial, industrial), and no more than fifty percent of the net acreage of the master plan shall be residential that is not otherwise contained within a mixed-use building. The remaining master plan may be a mix of employment uses as allowed in Section 18.22.040 of this chapter. The minimum use percentage shall not apply to public facilities, schools, parks, wetland banks, or open space.

18.22.060 - Process.

A. General. The applicant for a development in the MXPD zone shall be required to submit a proposed master plan, as defined in Section 18.22.030 of this chapter, and a proposed development agreement as authorized under RCW Chapter 36.70B.

B. Contents. The proposed master plan shall include the following information:

1. Boundaries. A legal description of the total site proposed for development is required.

2. Uses and Functions. The master plan must include a description of present uses, affiliated uses, and proposed uses. The description must include information about the general amount and type of functions of the use, the hours of operation, and the approximate number of member employees, visitors, and special events. For projects that include residential units, densities, number of units, and building heights must be indicated.

3. Critical Areas. All critical areas shall be identified on the master plan (that is available per Clark County GIS mapping and any other known sources, i.e. professional studies performed on the site, prior applications, etc.). Critical areas shall include, but are not limited to, wetlands, floodplains, fish and wildlife habitat areas, geologically hazardous areas, and aquifer recharge areas.

4. Transportation. The master plan shall include information on projected transportation impacts for each phase of the development. This includes the expected number of trips (peak and daily), an analysis of the impact of those trips on the adjacent street system, and the proposed mitigation measures to limit any projected negative impacts. Mitigation measures may include improvements to the street system, or specific programs to reduce traffic impacts, such as encouraging the use of public transit, carpool. A transportation impact study may be substituted for these requirements.

5. Circulation. The master plan shall address on-site and integration with off-site circulation of pedestrians, bicycles, and vehicles. All types of circulation on and off the site shall be depicted in their various connections throughout the project, and their linkages to the project and adjacent properties.

6. Phases. The master plan shall identify proposed development phases, probable sequence of future phases, estimated dates, and interim uses of the property awaiting development. In addition, the plan shall identify any proposed temporary uses, or locations of uses during construction periods.

7. Density. The master plan shall calculate the proposed residential density for the development, which shall include the number and types of dwelling units.

8. Conceptual Utility Plans. Utility plans should generally address stormwater treatment and detention areas on the site, existing utilities, proposed utilities, and where connections are being made to existing utilities.

C. Approval. The master plan and development agreement must be approved by the city council after a public hearing. Once approved, the applicant may submit individual site plans for various portions or phases of the master plan which will provide engineering and design detail, and which will demonstrate consistency with the originally approved master plan and other applicable engineering standards. Site plans shall comply with design review requirements in CMC

Chapter 18.19 Design Review of this code. It is the intent of this section that site plans shall not be required to reanalyze the environmental and other impacts of the site plan, which were previously analyzed in the master plan and development agreement processes.

D. Building Permits Required. Approval of a master plan and development agreement does not constitute approval to obtain building permits or begin construction of the project. Building permits shall be issued only after a site plan has been submitted demonstrating compliance with the master plan, development agreement and other applicable city standards, and has been approved by the city.

18.22.070 - Criteria for master plan approval.

The following criteria shall be utilized in reviewing a proposed master plan:

A. Residential Densities and Employment Targets. Unless otherwise provided for in a transition area to mitigate impacts of increasing density, the minimum average density of eight dwelling units per net acre of residentially developed area is required. The maximum average density shall be twenty-four dwelling units per net acre. For employment generating uses, the master plan shall provide an analysis of how many jobs will be produced, the timing of those jobs, and the phasing of the employment and non-employment portions of the proposal. For estimate purposes, the target employment figures shall generally be consistent to the number of jobs produced that would otherwise occur in commercial and industrial zoning districts. The minimum number of jobs should be no less than six jobs per developable acre for the nonresidential portion of the project. The city may authorize a development with less than six jobs per developable acre based upon a finding that appropriate measures have been taken to achieve six jobs per developable acre to the extent practicable. "Appropriate measures" may be demonstrated based upon the following:

1. The six jobs per developable acre cannot be achieved due to special circumstances relating to the size, shape, topography, location, or surroundings of the subject property;

2. The likely resultant jobs per developed acres ratio would not adversely affect the implementation of the comprehensive plan;

3. The proposed development would not commit or clearly trend the zoning district away from job creation.

B. Setback and Height Requirements. Building setbacks shall be established as part of the master planning process. Setbacks in all future site plans shall be consistent with those established in the master plan. Landscape and setback standards for areas adjacent to residentially zoned property shall meet or exceed those provided for in Table 18.22.080A. The applicant may propose standards that will control development of the future uses that are in addition to or substitute for the requirements of this chapter. These may be such things as height limits, setbacks, landscaping requirements, parking requirements, or signage.

C. Off-Street Parking and Loading. Off-street parking and loading shall be provided in accordance with CMC Chapter 18.11 Parking, Table 18.11-1, Table 18.11-2 and Table 18.11-3 of this Code.

D. Utilities. Utilities and other public services sufficient to serve the needs of the proposed development shall be made available, including open spaces, drainage ways, streets, alleys, other public ways, potable water, transit facilities, sanitary sewers, parks, playgrounds, sidewalks and other improvements that assure safe walking conditions for students who walk to and from school.

E. Environmental Impacts. The probable adverse environmental impacts of the proposed development, together with any practical means of mitigating adverse impacts, have been considered such that the proposal shall not have a probable significant adverse environmental impact upon the quality of the environment, in accordance with CMC Title 16 Environment and RCW Chapter 43.21C.

F. Access. The proposed development shall provide at least two access points (where a mixed-use planned development does not have access to a primary or secondary arterial) that distribute the traffic impacts to adjacent streets in an acceptable manner.

G. Professional Preparation. All plans and specifications required for the development shall be prepared and designed by engineers and/or architects licensed in the State of Washington.

H. Engineering Standards. The proposed development satisfies the standards and criteria as set forth in this chapter and all engineering design standards that are not proposed for modification.

I. Design Review. The proposed development satisfies the standards and criteria as set forth in the Building Design from Camas Design Review Manual: Gateways, Commercial, Mixed Use and Multi-Family Uses, unless otherwise proposed for modification.

Other Codes and processes

CMC 18.37 - Chapter 18.37 - BUSINESS PARK.. Please read and address all of the standards of this chapter. In some cases the DA will require standards that exceed those listed in this Chapter.

CMC 18.13 Landscaping

TITLE 17 regarding Subdivision and site development standards. CMC 17.11 and 17.19 both stand out for particular attention.

Title 16 – SEPA, Archaeological Predetermination Report, and critical area reviews are required.

Building Department **Bob Cunningham 360-817-1568**

- The structures will be reviewed under the most current building codes as adopted by The State of Washington.
- A code analysis and plans shall be prepared by an architect licensed by the State of Washington.
- The structural drawings and calculations shall be prepared and stamped by a Professional Engineer licensed by the State of Washington.
- Any fire suppression and or fire alarm systems shall be in accordance with IBC and other applicable codes standards and shall be reviewed by the Camas Fire Marshal's office.
- Civil plans to be on separate 24" x 36" sheets with City of Camas Engineering Division signature block
- System Development Charges and Impact fees shall be determined and assessed prior to permit issuance.

Engineering Department **Norm Wurzer 360-817-7235**

General:

- The application narrative shall specifically address the approval criteria CMC 17.11.030 (D) for the residential portion of the project and CMC 18.18.060 for the commercial or business park aspect of the project.
- Construction plans shall be prepared by a licensed Washington State engineer in accordance with City of Camas standards.
- Existing wells and septic tanks and septic drain fields shall be abandoned in accordance with state and county guide lines per CMC 17.19.020 (A3).
- In accordance with CMC 17.19.030 (E) and per the 2014 Parks, Recreation and Open Space (PROS) Comprehensive Plan provisions shall be made for Regional Trail T-1. Construction of this regional trail is Park Impact Fee creditable. Application materials will need to address the requirements of the current PROS plan at the time of submittal.
- A 3% plan review and inspection fee will be required per resolution number 1023. The fee will be based on an engineer's estimate or construction bid. The fee is due prior to approved construction drawings being released by the City.
- Regulations for installation of public improvements, improvement agreements, bonding, final platting and final acceptance can be found at CMC 17.21.
- Exception requests to the requirements of Title 17 shall meet the requirements of CMC 17.23.
- Critical areas (including wetland buffers) should be located within separate tracts or as provided in CMC 16.51.240 (A).
-

Traffic/Transportation:

- A traffic study will be required for this project in accordance with the City's adopted Traffic Impact Study Guidelines. The study shall include speed surveys, traffic counts, site distance evaluation, AM and PM peak volumes, trip distribution and assignment, signal warrants, turn pocket analysis, with and without project analysis for the current year, build out year and may include the future 5 year and 20 year analysis. Evaluation of additional off-site intersections will be required once trip generation and distribution information is determined. Contact the City Engineer for trip distribution acceptance and the identification of specific study intersections.

- If this project will generate more than 700 ADT the applicant will be required to provide acceptable traffic calming measures in accordance with the city's Neighborhood Traffic Manual.

Stormwater:

- Per CMC 14.02 stormwater treatment and runoff control shall be designed in accordance with the 2005 Stormwater Management Manual for Western Washington and the City of Camas Stormwater Design Standards Manual.
- Stormwater facilities shall be located and landscaped per CMC 17.19.030 (F6) and CMC 17.19.040 (C3a). Stormwater facilities should be located within a separate tract and can only be located within the outer portion of wetland buffers pursuant to the requirements of CMC 16.53.050 (C 3).
- Maintenance of the storm water facilities will be the responsibility of the Homeowners Association per CMC 17.19.040 (C3) for the residential portion of the stormwater control and the building or land owners for the industrial/commercial sites. As discussed with the City at the pre-application meeting, the City, at its sole discretion, may consider accepting ownership and maintenance of large, regional facilities that will serve a combination of multiple developments and public infrastructure.
- An erosion control bond will be required for all land disturbing activities of an acre or more per CMC 17.21.030.
- An NPDES permit will be required for this project per Washington Department of Ecology requirements if more than one acre of land will be disturbed.

Lots:

- Flag lots shall meet the requirements of CMC 17.19.030 (D5).
- Double frontage lots should be avoided if possible and provided with a minimum of 20 additional feet of lot depth per CMC 17.19.030 (D6).
- Street tree planting for each lot and landscaping of flag lots is required in accordance with CMC 17.19.030 (F).
- Proposed lot lines should be at right angles to the street or radial to curves per CMC 17.19.030 (D).
- Lot issues:
    - Lots 27, 28 and 29 should be no larger than 12,000 SF in size per CMC 18.09.080 (B) as these lots are adjacent to an R-10 zone.
    - The following lots do not have the required minimum 40' of lot frontage on a curve or cul-de-sac: Lots 2, 25 and 27.
    - Lot 39 appears to be a flag lot with an access easement which is contrary to the requirements of CMC 17.19.030 (D 5a) which states in part that flag lots shall serve no more than one lot.

Streets:

- The applicant will be responsible for all traffic control signs, street name signs, pavement markings and street lighting per CMC 17.19.030 (I) (J). As of October, 2014 LED street lighting is a requirement for all street lighting.
- The applicant will be responsible for the design and submittal of the utility plan showing the locations for underground power, telephone, gas, CATV, street lights and associated appurtenances.
- Gated entries are regulated under CMC 12.36 and require a permit through the Public Works Director and through the Fire Marshal's Office.
- Private streets if proposed will need to meet the provisions of CMC 17.19.040 (A). The current private street cul-de-sac dimensions do not meet the turnaround minimum ROW radius of 43' with a minimum paved width of 35'.
- Public street requirements are found in CMC 17.19.040 (B). For street grades, centerline curve radii, and curb return radii requirements see CMC 17.19.040 (B12).
- NW Camas Meadows Dr. is designated as a three lane arterial street and as such access spacing and intersection setbacks shall meet the requirements of the 2012 TIF Update. Minimum access spacing is 660'. The applicant will be required to minimize access points on CM Drive and will likely need an interior drive to access the individual businesses.
- The lane configuration of NW Camas Meadows Dr. shall meet the 3 lane arterial requirements of Standard Detail ST5 of the Camas Design Standards Manual (CDSM). As discussed at the pre-application meeting, the City may consider alternative cross sections to help blend this section of road with the existing Camas Meadows Drive provided all modal functions and goals of the cross section and goals of the City's are still met.
- NW Camas Meadows Drive improvements are TIF creditable up to the amounts shown in the City's most recent Traffic Impact Fee Update.
- ADA compliant pedestrian ramps and ADA compliant street crossings are required. To provide ADA compliant pedestrian ramps and street crossings careful evaluation of street profile grades and intersection site grading will be required.
- Half street improvements along the applicant's entire frontage on Camas Meadows Drive/Larkspur Street are required per CMC 17.19.040 (B). If full width street improvements are not made, the pavement width must be a minimum of 24 feet in accordance with CMC 17.19.040 (B 10e).

Utilities:

- Individual residential S.T.E.P. systems may be an acceptable option to the city rather than another pump station for the residential portion of the project.
- Per CMC 17.19.040 (C 2d) commercial or industrial units shall have privately owned and maintained sewer systems acceptable to the city. Systems shall be properly sized, installed and maintained by the business/building owner. Commercial uses should connect into the existing 10" diameter pressure sewer main located in Camas Meadows Drive and Payne Road. High head pumps and duplex pumping systems may be required.
- It appears feasible to install a STEF mainline in NW Camas Meadows Dr. and connect to the existing pump station near the CM clubhouse for the residential component of the development.
- There is an existing 12" diameter DIP water main located in the existing portion of Camas Meadows Drive and Payne Road. Minimum residential water system shall

consist of an 8” diameter D.I.P. water main and be consistent with the Camas Design Standards Manual (CDSM).

- The commercial water systems serving the business park shall be privately owned and maintained beyond the water meter. If an onsite fire line is required then a DDCV will be required at the ROW line. Irrigation systems will also require a separate meter and individual BFD.

BP Zone comments:

- Loading berths are required per Tables 18.11-2 & 18.11-3 of CMC 18.11 for the business park buildings.
- The BP uses are subject to Site Plan Review (CMC18.18) and Design Review (CMC18.19) requirements.
- Per CMC 18.19.050 (B 2a) on-site parking areas for the BP zone are to be located to the interior of the development.
- Per CMC 18.07.030 Table – 1, residential uses are prohibited in the BP zone.

Fire Department **Randy Miller 817-1561**

1. Multiple permits will be required with the Fire Marshall’s office. Please contact Randy Miller at 360-817-1561 or rmiller@cityofcamas.us.

Project Overview
The proposed Parklands At Camas Meadows combines a 20.9-acre parcel zoned R-15 with a 15.5 acre parcel zoned Business Park – BP. This mixed-use project proposes to subdivide the two properties into four commercial buildings totaling up to 140,000 square feet of business space, 42 single-family residential lots, and the potential for six Live-Work Style units. Due to the presence of wetlands, the subdivision proposes to apply the density transfer standards allowed by CMC 18.09.060(C). The commercial buildings will house a diversity of business operations that will create up to 300 jobs. For all of the larger detached single family lots, the average lot size will be greater than 15,000 square feet. The subdivision will create over 8 acres of preserved wetland plus more than 3 acres of wetland buffer open space. A natural surface walking trail will be constructed within the wetland buffer to provide a nature trail system for the project and the local area. Several new private internal roads will be constructed to serve the newly created lots. A minimum half-width road of NW Camas Meadows Drive will be constructed along the southern site boundary. A portion of an existing right-of-way of NW Camas Meadows Drive will need to be constructed to provide an access connection to the subdivision and BP prior to final plat. All lots will be connected to municipal water and sewer systems. Stormwater runoff from private roads generated by the new impervious surface will be collected and routed to a private stormwater facilities where it will be treated, detained and released or infiltrated where possible in accordance with City standards. A homeowners' association will be created for the maintenance of the private open space, trails and private stormwater facilities. Surface water from public roads, will most likely be routed to public stormwater facilities for treatment and conveyance. The subdivision will be developed in multiple independent phases as noted on the Prelim Plat and Site Plan.

Development Agreement
Parklands at Camas Meadows is subject to a Development Agreement (DA) due to the fact that the project is making use of Camas' Mixed-Use Planned Development (MXPD) code. Camas' Community Development Director has indicated that the DA will be constructed during the approval process. The DA will identify the development standards and conditions of approval for the entire site. The DA will also delineate, where appropriate, mutual benefits accruing to the applicant and City.

Open Space and Trail System
A four to six-foot wide natural surface trail will be constructed within an enhanced wetland buffer. The trail and the preserved wetland buffer will be protected and maintained under a conservation covenant dedicated to and maintained by a homeowners' association. The project also hopes to connect the trail to the public trail system where possible. If permitted by the City, any off-site connections may require obtaining and construction of missing trail segments by the City of Camas to connect this subdivision.

Existing Site Conditions
The project site is located north of future Camas Meadows Drive in, Camas, Washington, site is currently comprised of two parent parcels totaling approximately 35 acres. There are no existing residences on the site. The site contains slopes ranging from level to greater than 15%.

The portion of the site proposed for development is generally from 5% to 10% slope. The wetland areas will be preserved as open space. The site is partially treed, mostly in the wetland area that will be preserved as open space. There are three low functionality wetlands on site, classified as City of Camas Category 3 and Category 4. Soils on site are Hesson clay loam (HcE, 40%, HcD, 33%, HcF, 27%). A change in grade top of slope transects the site from northwest to southeast. Surrounding land uses are residential parcels and golf course. Access to the site is provided by Camas Meadows Drive, a public street.

Approval Criteria

Subdivisions in the City of Camas are regulated by Title 17 of the Camas Municipal Code (CMC). CMC 17.11.030(D) contains the criteria for preliminary plat approval. The approval criteria are listed below (*in italics*) along with a brief statement of how the proposed subdivision can comply.

The planning commission recommendation and city council approval on an application for preliminary plat approval shall be based on the following criteria:

1. The proposed subdivision is in conformance with the Camas comprehensive plan, parks and open space comprehensive plan, neighborhood traffic management plan, and any other city adopted plans;

The proposed subdivision is in conformance with all adopted City plans. The proposal complies with the applicable standards contained in the Camas Municipal Code, including use and density standards applicable to the R-15 zone.

2. Provisions have been made for water, storm drainage, erosion control and sanitary sewage disposal for the subdivision that are consistent with current standards and plans as adopted in the Camas Design Standard Manual;

The proposed subdivision will construct all the improvements necessary to connect the newly created lots to the municipal water and sanitary sewer systems. Storm drainage will be provided via private, on-site facilities, in accordance with City standards. Erosion control Best Management Practices will be used to minimize erosion potential during construction. All improvements will be consistent with the Camas Design Standard Manual.

3. Provisions have been made for road, utilities, street lighting, street trees and other improvements that are consistent with the six-year street plan, the Camas Design Standard Manual and other state adopted standards and plans;

The proposed subdivision proposes to construct several internal streets. All utilities will be provided to the newly created lots. Street lighting and street trees will be provided as required by the Camas Municipal Code. All construction will meet applicable standards.

4. Provisions have been made for dedications, easements and reservations;

Public right-of-way will be dedicated for the proposed internal streets. Easements will be established where necessary to provide vehicle access to individual lots and for pedestrian access to the open space and trail. Standard easements for utilities will also be established.

5. The design, shape and orientation of the proposed lots are appropriate to the proposed use. In addition to meeting the minimum lot size density requirement, each residential lot must provide a building envelope that allows a building that at least conforms to the developer's own building restrictions (CC and R's). Therefore, corner lots, lots with easements, or lots with environmental constraints may have to be larger than other lots in the subdivision;

All proposed lots have been designed to meet the dimensional standards contained in the Camas Municipal Code, with the application of the density transfer standards. Corner lots, lots encumbered by easements, and pie-shaped lots have all been designed in a way that provides a suitable building envelope for single-family homes, consistent with the R-15 zone.

6. The subdivision complies with the relevant requirements of the Camas subdivision and zoning codes, and all other relevant local regulations;

The discussion below details how the proposal complies with all applicable requirements contained in the Camas Municipal Code.

7. Appropriate provisions are made to address all impacts identified by the transportation impact study;

The proposed subdivision will construct internal streets that will provide adequate circulation within the subdivision and adequate access to individual lots. Traffic impacts identified in the traffic study shall be mitigated with appropriate mitigation measures.

8. Appropriate provisions for maintenance of privately owned common facilities have been made;

The open space, pedestrian trail and stormwater facilities are all proposed to be private. A homeowners' association will be established to maintain these facilities.

9. Appropriate provisions, in accordance with RCW 58.17.110, are made for:

a. The public health, safety, and general welfare and for such open spaces, drainage ways, streets, or roads, alleys or other public ways, transit stops, potable water supplies, sanitary wastes, parks and recreation, playgrounds, schools and school grounds and all other relevant facts, including sidewalks and other planning features that assure safe walking conditions for students who only walk to and from school, and

b. The public use and interest will be served by the platting of such subdivision and dedication;

The proposed subdivision complies with all applicable regulations that are intended to promote the public health, safety and general welfare. The subdivision is proposing to preserve 11.33 acres of open space. Storm drainage will be managed in accordance with applicable City regulations. Streets will be constructed in accordance with City standards in order to provide circulation within the project and to provide access to individual lots. There are no transit stops or routes within ¼ mile of project site; however, transit is available in the Camas city center. Improvements will be constructed to connect all lots to municipal water and sanitary sewer systems. Applicable park impact fees will be paid. This development will be subject to school impact fees.

Students in this area are bussed to school. Sidewalks will be constructed to provide safe walking conditions within the subdivision. Refer to project summary below.

10. The application and plans shall be consistent with the applicable regulations of the adopted comprehensive plans, shoreline master plan, state and local environmental acts and ordinances in accordance with RCW 36.70B.030.

RCW 36.70B intends to establish a consistent framework within which municipalities review proposals for conformance with applicable regulations. The regulations relating to land uses and intensity, infrastructure, and character of development are intended to ensure that any proposal meets the intent of local comprehensive plans, State-mandated regulations and environmental laws. The proposed subdivision has been designed to meet all applicable local standards and therefore should be considered to comply with all Statewide planning and environmental laws and goals.

A subdivider may choose to develop and record a subdivision in phases. CMC 17.11.040 contains approval criteria for proposed phasing plans:

A. The phasing plan includes all land contained within the approved preliminary plat, including areas where off-site improvements are being made.

The proposed phasing plan does incorporate all land within the proposed preliminary plat as well as any necessary off-site improvements.

B. The sequence and timing of development is identified on a map.

The preliminary plat and preliminary site plan identifies multiple independent phases that can be developed concurrently or separately depending on market conditions.

C. Each phase shall consist of a contiguous group of lots that meets all pertinent development standards on its own. The phase cannot rely on future phases for meeting any city codes with the exception of storm drainage facilities. Storm drainage must be adequate for each phase, and the stormwater plan must adequately meet the needs of the entire development. Storm drainage facility must be included in the first phase.

Each proposed phase consists of a contiguous group of lots, each group having all the necessary improvements required by City regulations. Storm drainage, water and sanitary facilities will be in place prior to recordation of initial phase. Each phase will be able to meet all applicable development standards on its own.

D. Each phase provides adequate circulation and utilities. Public works has determined that all street and other public improvements, including but not limited to erosion *control improvements, are assured. Deferment of some improvements may be allowed pursuant to CMC Chapter 17.21.*

Each phase will have all necessary infrastructure to ensure that each phase can function as an independent development, meeting all applicable development standards. Erosion control standards will be met with the construction of each phase.

E. As phases are completed, any changes to the phasing plan, shall be approved by the city council. If in the opinion of the planning manager, the changes are significant, the city planning manager may request a formal replat submittal to be reviewed by city council.

If any significant changes are proposed, they will obtain approval from the city council.

F. Specific improvements necessary for the entire development may be required to be completed with the first phase, regardless of phase design or completion schedule of future phases, i.e., storm pond must be completed prior to obtaining substantially complete for the first phase regardless of area where storm pond is located.

Each phase will have all necessary infrastructure to ensure that each phase can function as an independent development, meeting all applicable development standards. In this way, if a subsequent phase is not completed, the initial phase will still meet all applicable development standards.

Applicable City Ordinances

The following discussion outlines how the proposed subdivision complies with all the applicable standards contained in the Camas Municipal Code.

<u>18.07.040 Table 2- Residential and multifamily land uses</u>

The uses proposed for this subdivision (single-family detached homes, open space and trails) are permitted uses in the residential zones.

<u>18.09 R1 Density and Dimensions</u>

CMC 18.09.060(C) allows developments in residential zones to transfer density from areas on site that are identified as sensitive lands or are set aside as open space. The density that may be transferred is outlined in CMC 18.09.070 Table 1. CMC 18.09.080 allows lot sizes and

setbacks to be reduced by up to 30%. The in-process DA will outline any dimensional and code variations and changes.

17.19 Design and Improvement Standards

17.19.030(D)(2): Every lot within the subdivision will have 20' of frontage on a public or private road or will be provided with access via an easement.

17.19.030(D)(5): All access easements will be at least 20 feet wide and will serve no more than two lots.

17.19.030(E)(4): A natural surface trail will be constructed within an preserved wetland buffer. The trail and the enhanced wetland buffer under a conservation covenant will be dedicated to and maintained by a homeowners' association.

17.19.030(F)(1): Street trees shall be planted at a rate of one tree per lot.

17.19.030(F)(4): Storm drainage facilities shall be landscaped in accordance with the Camas Design Standards Manual.

Table 17.19-2: Subject to Engineering Department approval, neighborhood streets may be constructed with a 28-foot paved width, with parking restricted to one side only, within a 48-foot private right-of-way, provided that residences using this street are constructed with automatic fire sprinkler systems. This development is proposing to construct the internal streets to this standard.

17.19.040(B)(13): Sidewalks are proposed on both or one sides of all proposed internal roads.

17.19.040(C)(2): Sanitary sewer service will be provided to all lots.

17.19.040(C)(3): Stormwater will be treated, detained and released in accordance with the City's officially adopted stormwater standards as well as the applicable standards ser forth in the stormwater management for Puget Sound Basin manual. All stormwater facilities will be maintained by a homeowners' association. A Preliminary Stormwater Technical Information Report (TIR) has been prepared and is included with the preliminary plat application.

17.19.040(C)(4): Municipal water service will be provided to all lots. Fire hydrants will be installed and spaced according to City standards and the Uniform Fire Code. Residences within the subdivision will be constructed with automatic fire sprinkler systems.

18.31.100: A wetland/habitat assessment has been conducted for this site and is included with the preliminary plat application.

<u>18.31 Sensitive Areas and Open Space</u>
18.31.050:
A wetland delineation has been conducted for this site and is included with the preliminary plat application.

To help provide additional voluntary mitigation for the wetlands relocation, a natural surface trail will be constructed within an preserved wetland buffer. The project proposes to connect the trail to Camas Meadows Drive. The trail and the preserved wetland buffer will be dedicated to and maintained by a homeowners' association.

<u>16.05 Archaeological Resource Preservation</u>
An archaeological predetermination survey has been for this application and is included with the preliminary plat application. No significant resources were found and no further action was recommended.

<u>16.90 Geologically Hazardous Areas</u>
Geodesign Inc. has conducted a geotechnical site investigation for this site in accordance with CMC 16.90. The results of this investigation are contained in a report, that is included with the preliminary plat application. The report summarizes the initial geotechnical findings regarding subsurface conditions and stability of the project site and provides conceptual recommendations to enable a residential development. The geotechnical report recommends continuing geotechnical work to aid in the development of final design mitigation schemes.

Recommendations contained in the report relating to construction of this subdivision will be followed.

18.11 Parking
Each home will have two to four off-street parking spaces located in the driveways and/or garages.

Other Issues
Project Phasing

The site is planned to be divided into multiple phases as noted on the Subdivision and Site Plan. Due to the size and scope of the project and issues that will be completed, the phasing allows for efficient construction, geotechnical mitigation, and final platting consideration.

Phases may be constructed concurrently depending on the scale and timing of the construction.

Project Summary
The following facilities are adequate to serve the proposed subdivision before or concurrent with development of the preliminary plat:

1. ***Public and private streets and roads***

Several new internal streets will be constructed within the site boundary. The internal streets will be paved, 20 to 28 feet wide, with curb & gutter and five-foot detached or attached sidewalks on one or both sides, within a 30 to 48-foot public right-of-way. Parking will be restricted to one side only on to no parking on both sides of the section less than 28 feet wide.

2. ***Open spaces, parks, and recreation***

This development proposes to create 11.33 acres of open space. The open space will contain a natural surface trail. The open space and trail will be maintained by a homeowners' association.

3. ***Drainage***

Stormwater runoff will be collected and conveyed to on-site facilities and will be treated, detained and released in accordance with City standards. The private stormwater facilities will be maintained by a homeowners' association.

4. ***Access to mass transit where there is or will be such transit***

There are no transit routes or stops within ¼ mile of the site, although C-Tran bus service is available in the Camas city center.

5. ***Potable water supplies***

This development will construct all the improvements necessary to connect all lots to the municipal water system. Any existing wells on site will be properly abandoned.

6. ***Sanitary waste collection and treatment***

This development will construct all the improvements necessary to connect all lots to the municipal sanitary sewer system. Any existing septic systems on site will be properly abandoned.

7. Schools and educational services

The following are the schools that will serve the future residential homes:
Elementary: Grass Valley
Junior High: Skyridge Middle School
Senior High: Camas

Impact fees will be paid as required.

8. Pedestrian facilities, particularly for students who only walk to and from school

Sidewalks will be constructed along both sides of all internal streets and along the west side of the half-width road. Students in this area are bussed to school.

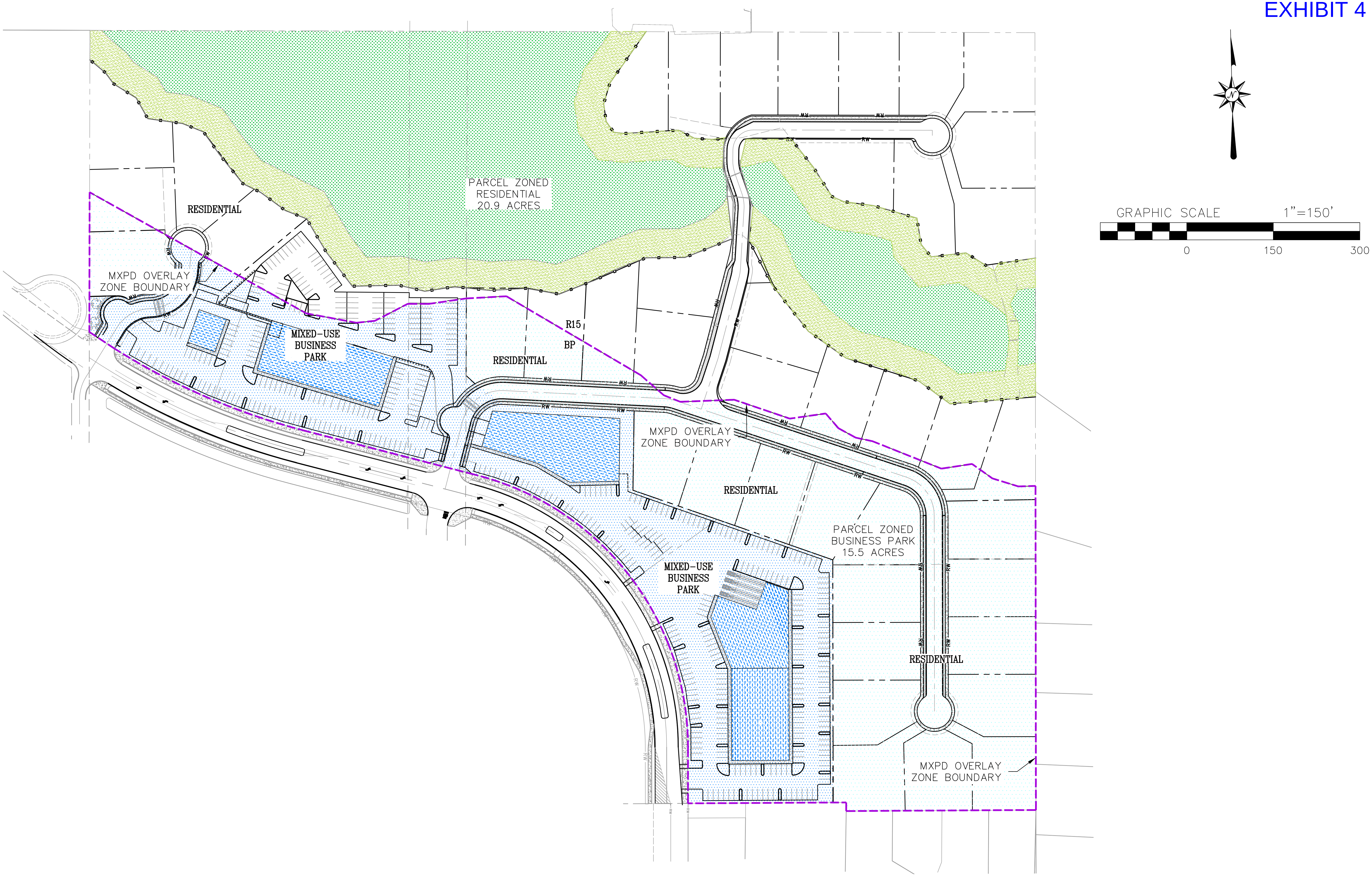
9. Fire prevention services

All proposed streets will meet fire marshal standards for width. Homes within this development are proposed to be constructed with automatic fire sprinkler systems. Fire hydrants will be provided within this development at the spacing required by City standards and the Uniform Fire Code.

Conclusion

The proposed Parklands Subdivision and Site Plan with in-process Development Agreement will meet or exceed all of the standards contained in the City of Camas land use ordinance, Title 17, with approval of the requested road modification. The proposed development satisfies the approval criteria contained in Title 17 as well as RCW 58.17. The preliminary plat application materials submitted for review will demonstrate that adequate provisions can be made for the public health, safety and general welfare, and for open spaces, drainage ways, streets, roads, alleys or other public ways, transit stops, potable water supplies, sanitary wastes, parks and recreation, playgrounds, schools and school grounds, and that the platting of the proposed subdivision will serve the public use and interest.

EXHIBIT 4



PROPOSED MXPD OVERLAY MAP

EXHIBIT 5

Clark County, Washington
Auditor's Office

Receipt: 463865

Product	Name	Extended
AGR	AGREEMENT	$111.00

Document# 5268706, RelatedtoRealEstate true, No Charge false, PhoneNumber 503-319-4021

Total	$111.00
Tender (Check)	$111.00

Check# 56060064, PaidBy AARON M BARR

Thank You 360-397-2208

Mon Mar 28 12:59:19 PDT 2016 MD

5268706 AGR
RecFee - $111.00 Pages: 39 - AARON BARR
Clark County, WA 03/28/2016 12:59

After recording, return to:

Aaron Barr
Parklands at Camas Meadows
1903 SE 12th Ave
Camas, WA 98607

Space Above for Recording Information Only

Parcel # 175948-000 # 21 SEC 28 T2NR3EWM
Parcel # 986031-650 # 68 SEC 28 T2NR3EWM

DEVELOPMENT AGREEMENT

This Development Agreement (the "Agreement") is made and entered into by and between the CITY OF CAMAS, a Washington Municipal Corporation (hereinafter referred to as the "City") and Parklands at Camas Meadows, LLC (hereinafter referred to as the "Owner") (and collectively referred to as "Parties").

RECITALS

WHEREAS, Owner owns or controls certain real property that is located within the City's municipal boundary and that is more fully described within the Master Plan and attached Exhibit "A", (hereinafter referred to as the "Property"); and,

WHEREAS, the City and the Owner recognize this area will develop with multiple uses and wish to provide predictability about the development standards that will apply to the Property over the course of its full development in order to increase efficient use of urban services and land, and provide compatibility amongst the various phases of the Property as they develop; and,

WHEREAS, the City is a Washington Municipal Corporation with land use planning and permitting authority over all land within its corporate limits; and,

WHEREAS, the City has established a Mixed Use Planned Development Overlay Zone (hereinafter referred to as "MXPD") applicable to a portion of the property; and,

WHEREAS, development of land under the MXPD requires approval of a Master Plan and Development Agreement; and

WHEREAS, the Washington State Legislature has authorized the execution of Development Agreements between local governments and a person having ownership or control of real property within its jurisdiction pursuant to RCW 36.70B.170(1); and,

WHEREAS, pursuant to RCW 36.70B.170, a Development Agreement may set forth the development standards and other provisions that shall apply to, govern and vest the development, use and mitigation of the development of real property for the duration specified in the agreement; which statute provides:

(1) A local government may enter into a Development Agreement with a person having ownership or control of real property within its jurisdiction. A city may enter into a development agreement for real property outside its boundaries as part of a proposed annexation or a service agreement. A development agreement must set forth the development standards and other provisions that shall apply to and govern and vest the development, use, and mitigation of the development of the real property for the duration specified in the agreement. A development agreement shall be consistent with applicable development regulations adopted by a local government planning under chapter 36.70A RCW; and

WHEREAS, the legislative findings supporting the enactment of this section provide:

> The legislature finds that the lack of certainty of the approval of development projects can result in a waste of public and private resources escalate housing costs for consumers and discourage the commitment to comprehensive planning that would make maximum efficient use of resources at the least economic cost to the public. Assurance to a development project applicant that upon government approval the project may proceed in accordance with existing policies and regulations, and subject to conditions of approval, all as set forth in a development agreement, will strengthen the public planning process, encourage private participation and comprehensive planning, and reduce the economic cost of development. Further, the lack of public facilities and services is a serious impediment to development of new housing and commercial uses. Project applicants and local governments may include provisions and agreements whereby applicants are reimbursed over time for financing public facilities. It is the intent of the legislature by RCW 36.70B.170 through 36.70B.210 to allow local governments and owners and developers of real property to enter into development agreements; and

WHEREAS, for the purposes of this Agreement, "Development Standards" includes, but is not limited to, all of the standards listed in RCW 36.70B.170(3); and,

NOW, THEREFORE, THE PARTIES HERETO AGREE AS FOLLOWS:

Section 1. Development Agreement. This Agreement is a Development Agreement to be implemented under the authority of and in accordance with RCW 36.70B.170 through RCW 36.70B.210. It shall become a contract between the Owner and the City upon its approval by ordinance or resolution following a public hearing as provided for in RCW 36.70B.170; and upon execution by all parties.

Section 2. Term of Agreement. This Agreement shall commence upon the Effective Date, and shall be valid for a period of Ten (10) years; unless extended or terminated by mutual consent of the Parties; provided however, if this Agreement or any initial land use applications related to the Property and filed within one year of the effective date of this Agreement, are appealed, the term of this Agreement shall be tolled for the time during which the appeal is pending or 18 months, whichever is less. The "Effective Date" shall be the date of recording, which shall occur within thirty days of the date of the adopting Resolution.

Section 3. Vesting. Any land use applications submitted with respect to the Property during the term of this Agreement, shall be vested to the following land use regulations and Development Standards in effect on the effective date of this Agreement CMC title 16.01-16.21; CMC 16.31; CMC Title 17 and CMC Title 18 (through Ordinance 15-017), unless otherwise provided for in this Agreement through Exhibit "B" Dimensional Standards or Exhibit "C" MXPD Employment Uses. Any land use approvals affecting the Property issued after the effective date of this Agreement shall remain in effect during the term of this Agreement; provided however, that preliminary plat approvals shall be valid for a period of seven years from the date of the approval, regardless of whether the end of such seven years occurs during or after the term of this Agreement. The vesting provided for under this Agreement shall not apply to System Development Charges, Impact Fees or application or review fees.

Section 4. Master Plan. Parties agree to incorporate by reference **Exhibit D** The Parklands at Camas Meadows Master Plan (Master Plan) dated ***January 14, 2016*** as the Master Plan for development of the Property. The Master Plan provides the Parties with predictability regarding the future development of the Property. Minimum dimensional standards that the Owner shall utilize for development under the Master Plan are provided for in Exhibit "B". Owner agrees to make best efforts to obtain permits and construct a natural loop path and wetland interpretive overlook within a public access easement, to be maintained by the Owner consistent with the Master Plan. The trail and overlook will be constructed concurrent with the subdivision improvements for the initial phase. Consistent with Camas Municipal Code (CMC) 18.09.060 D. the lot size, width, depth and setback standards applicable to the R-15 portion of the site as shown on Exhibit "B" are herein negotiated consistent with the preservation of open space and trail development. The property may be developed with a maximum 42 single family lots, maximum 24 residential units in Building 2 of the business park, and a minimum of 90,000 square feet of business park building space. A number of studies have been completed that aided in the master plan as well as subdivision application already submitted to the city. Those studies include:

Phase 1 Environmental Site Assessment, Columbia West Engineering, Inc., August 31, 2015

Existing Conditions & Boundary Survey – without Trees (Sheets 1 and 2), Minister-Glaeser Surveying, Inc., December 10, 2015.

Existing Conditions & Boundary Survey – with Trees (Sheets 1 and 2), Minister-Glaeser Surveying, Inc., December 10,2015.

City of Camas Archaeological Predetermination Survey of 542 NW 218th Ave, Camas, Washington, Applied Archaeological Research, Inc., March 17, 2015.

Parklands Executive Residential Subdivision And Parklands Business Park: Preliminary Stormwater Design Report (TIR), Kessi Consulting, January 24, 2016.

Parklands at Camas Meadows Traffic Impact Study, H. Lee & Associates, November 18, 2015

Wetland Delineation Report for Parklands at Camas Meadows Camas (Final Report), Washington, Ecological Land Services, Inc., December 15, 2015.

Geotechnical Site Investigation Parklands at Camas Meadows Camas, Washington, Columbia West Engineering, Inc., June 23, 2015.

Section 4.1 SEPA. The City issued a SEPA determination of nonsignificance regarding this Agreement and the Master Plan **(SEPA 15-14).** Impacts that are identified at future stages of the development that have been previously analyzed through this SEPA process shall not be re-analyzed, provided the future identified adverse impacts are substantially similar to and of the same or less intensity as those previously analyzed under this or other SEPA processes. Nothing in this Section shall preclude the City from requesting information on the potential adverse environmental impacts associated with a substantial change in the master plan that have not been previously analyzed as required under the State Environmental Policy Act.

Section 4.2 Flood Plain & Floodways. The Property includes land designated by the National Flood Insurance Programs (NFIP), Map Number 53011C0414D, with an effective date of September 5, 2012, as a Special Flood Hazard Area Subject To Inundation by the 1% Annual Chance Flood (Zone AE). Parties recognize the area under Zone AE are "frequently flooded areas" as defined in the Camas Municipal Code and as such no lot or portion of a newly created lot will be proposed, designed or platted to include any portion of the site Zoned AE under the aforementioned NFIP Map. All portions of the Property Zoned AE shall be placed in an Open Space tract at the time of plat approval.

Section 4.3 Phasing. Only the single family residential shall be required to build structures in phases. With the exception of the half-width street improvements along the entire frontage and all street-scaping per the submitted plan, which shall be completed prior to final platting of any residential lots, the Owner will have the ability to install roads, utilities, etc. as one complete project, provided a grading plan is submitted in advance to the City. The lots within the existing R-15 area shall be released upon subdivision approval. The ten (10) lots within Phase 2 shall be released upon the business park being graded, platted and ready for a prospective user to submit for site plan review. The final eight (8) lots within Phase 3 shall be released once building permit is acquired on either business park Building 2, 3, 4 (4A), or 5 (4B).

Section 4.4 Streetscape. Owner agrees to incorporate into its development application submittal package streetscape standards for primary streets within the Property addressing street specifications, tree spacing and species, sidewalk separation, trash receptacles, benches and other street amenities that will create an inviting, safe passage for not only vehicular but pedestrian and bicycle traffic. Streetscape standards will be consistent with the streetscape standards identified in the Master Plan. The Business Park Owners (or representative building association) are responsible to privately maintain all of the public streetscape and vegetation along their half street frontage of Camas Meadows Drive, including the pedestrian path and full width of any street center or median planter strips.

Section 4.5 NW Larkspur Street. All road barricades preventing circulation on NW Larkspur Street shall remain in place pending analysis of traffic and roadway conditions in the vicinity of the Property, and shall only be removed at the sole discretion of the City.

Section 5. Remedies. Should a disagreement arise between the City and Owner regarding the interpretation and application of this Agreement, the parties agree to attempt to resolve the disagreement by first meeting and conferring. If such meeting proves unsuccessful to resolve the dispute, the disagreement may be resolved by judicial action filed in the Clark County Superior Court.

Section 6. Performance. Failure by either party at any time to require performance by the other party of any of the provisions hereof shall in no way affect the parties' rights hereunder to enforce the same, nor shall any waiver by a party of the breach hereof be held to be a waiver of any succeeding breach or a waiver of this non-waiver clause.

Section 7. Venue. This Agreement shall be construed in accordance with and, governed by, the laws of the State of Washington. The parties agree to venue in the Superior Court for Clark County, State of Washington, to resolve any disputes that may arise under this Agreement.

Section 8. Severability. If any portion of this Agreement shall be invalid or unenforceable to any extent, the validity of the remaining provisions shall not be affected thereby.

Section 9. Inconsistencies. If any provisions of the Camas Municipal Code or Master Plan are deemed inconsistent with the provisions of this Agreement, the provisions of this Agreement shall prevail.

Section 10. Binding on Successors and Recording. The rights and obligations created by this Agreement are assignable and shall be binding upon and inure to the benefit of Owner, the City, and their respective heirs, successors and assigns. Only Owner and the City or their assigns shall have the right to enforce the terms of this Amendment. This Agreement shall be recorded against the real property indicated in the Master Plan with the Clark County Auditor.

Section 11. Recitals. Each of the recitals contained herein are intended to be, and are incorporated as, covenants between the parties and shall be so construed.

Section 12. Amendments. This Agreement may only be amended by mutual agreement of the parties. While nothing contained herein shall be construed to obligate either party to amend the Master Plan, it is recognized that future evolution of the City may warrant consideration of such issues. The City reserves authority to impose new or different regulations to the extent required by a serious threat to public health and safety pursuant to RCW 36.70B.

IN WITNESS WHEREOF, the parties hereto have caused this
to be executed as of the dates set forth below:

CITY OF CAMAS

By Scott [signature]
Title Mayor

PARKLANDS @ CAMAS MEADOWS, LLC

By [signature]
Title Manager

CHINOOK LAND OWNERS GROUP OF VANCOUVER, WASHINGTON, LLC

By James F McIntosh [signature]
Title GENERAL MANAGER

STATE OF WASHINGTON)
) ss.
County of Skamania)

I certify that I know or have satisfactory evidence that James McIntosh is the Person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute this instrument and acknowledged it as the **Development Agreement** of Parklands @ Camas Meadows, LLC to be free and voluntary act of such party for the uses and purposes mentioned in the instrument.

DATED: 3/25/16

Notary Public
State of Washington
SHELLEY R TURNER
My Appointment Expires Apr 23, 2018

Shelley R Turner
NOTARY PUBLIC for the State of Washington,
Residing in the County of Skamania / Carson
My Commission Expires: April 23, 2018

STATE OF WASHINGTON)
) ss.
County of Clark)

I certify that I know or have satisfactory evidence that Aaron Barr is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute this instrument and acknowledged it as the Development Agreement of Parklands @ Camas Meadows, LLC to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

DATED: March 24, ~~2015.~~ 2016

Notary Public
State of Washington
ROBYN O WESTON
MY COMMISSION EXPIRES
September 30, 2017

Robyn O. Weston
NOTARY PUBLIC for the State of Washington,
Residing in the County of Clark
My Commission Expires: 9302017

STATE OF WASHINGTON)
) ss.
County of Clark)

I certify that I know or have satisfactory evidence that Scott Higgins is the person who appeared before me, and said person acknowledged that he signed this instrument, on oath stated that he was authorized to execute this instrument and acknowledged it as the Mayor of the CITY OF CAMAS, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

DATED: March 21, 2016.

BERNIE BACON
Commission Expires
NOTARY
PUBLIC
SEPT. 18, 2019
STATE OF WASHINGTON

Bernie Bacon
NOTARY PUBLIC for the State of Washington,
Residing in the County of Clark
My Commission Expire 9/18/19

EXHIBIT A: PROPERTY DESCRIPTION

The project site is located just east of Camas Meadows Golf Course Club House and just north of Camas Meadows Drive, in Camas, Washington 98607, in the SE & SW ¼ of Sec. 28, T2N, R3E, W.M. The site is comprised of two (2) parent parcels plus the existing 74 foot wide public City ROW for Camas Meadows Drive. The abbreviated legal description for the two parcels is:

Parcel 175948-000
#21 SEC 28 T2NR3EWM 15.72A

Parcel 986031-650
#68 SEC 28 T2NR3EWM 20.97A

EXHIBIT "B" DIMENSIONAL STANDARDS

The master plan community will implement the following development standards that provide for flexibility in creating a high quality design. The master plan includes 42 executive single-family lots, 24 mixed-use living units on upper stories of Building #2, and at least 90,000 square feet of business space.

Development Standard	**Single Family (R-15)**	**Single Family (BP)**	**Non-Single Family (BP)**
A. New Lot Dimensions			
Minimum lot size (square feet)	15,000	15,000	8,000
Maximum lot size (square feet)	Note 1	Note 1	Note 1
Minimum lot width (feet)	80	80	80
Minimum lot depth (feet)	90	90	100
Maximum building lot coverage[2]	50% 60% with ADU	50% 60% with ADU	50%
Maximum building height (feet)	35	35	100
B. Setbacks			
Minimum front yard (feet)	25	25	15[4]
Minimum side yard and corner lot rear yard (feet)	10 5 (ADU or accessory buildings)	10 5 (ADU and accessory buildings)	15[4, 6]
Minimum side yard flanking a street (feet)	10	10	10[4]
Minimum rear yard (feet)	25 5 (ADU or accessory buildings)	25 5 (ADU or accessory buildings)	50[3]
Minimum lot frontage or access easement on a cul-de-sac or curve (feet)	40[5]	40[5]	N/A
Minimum flag lot width	20	20	N/A

Note 1: No Limitation.

Note 2: Includes all covered buildings and structures accepting therefrom accessory dwelling units (ADU's).

Note 3: May be reduced to ten feet if a transition element is utilized that includes natural vegetation for screening.

Note 4: Right of way to building face. Parking areas can be setback five feet from property line, per the landscaping plan contained within the approved master plan.

Note 5: Access to two lots or less may be designed and established as an easement rather than a tract.

Note 6: No commercial building may be located closer than 75 feet to a residential lot existing on the effective date of this Agreement.

EXHIBIT "C" MXPD EMPLOYMENT USES

The following are a list of permitted uses within the MXPD Employment area. Similar uses are permitted in the zone district at the discretion of the community development director. Unless otherwise listed or permitted as a similar use, a use shall be prohibited or subject to amendment of the Development Agreement.

Uses
Antique shop
Appliance sales and service
Bakery (wholesale)
Bakery (retail)
Banks, savings and loan
Barber and beauty shops
Book store
Bowling alley/billiards
Building, hardware and garden supply store
Cabinet and carpentry shop
Candy; confectionery store
Cart vendors
Clothing store
Coffee shop, cafe or kiosk
Convention center
Day care center
Day care
Delicatessen (deli)
Department store
Electric vehicle battery charging station and rapid charging stations
Equipment rental
Event center
Fitness center/sports club
Funeral home/crematorium
Florist shop
Food delivery business
Furniture store
Grocery, neighborhood, small or large scale
Hospital, emergency care

Uses
Hotel, motel
Laundry/dry cleaning (retail)
Laundry (self-serve)
Liquor store
Machine shop
Medical or dental clinics (outpatient)
Nursery, plant
Nursing, rest, convalescent, retirement home, memory care, assisted living
Office supply store
Pawnshop
Parcel freight depots
Pet shops
Pharmacy
Photographic/electronics store
Printing, binding, blue printing
Professional or Business office(s)
Public agency
Recycling collection point
Research facility
Restaurant
Restaurant, fast food
Roadside produce stand
Second-hand/consignment store
Shoe repair and sales
Specialty goods production (e.g. brew pub; does not include marijuana).
Taverns, pubs, bars
Theater, except drive-in
Veterinary clinic
Warehousing, bulk retail
Manufacturing and/or processing of the following:
Cotton, wool, other fibrous material
Food production or treatment
Foundry

Uses
Furniture manufacturing
Metal fabrication and assembly
Signs or other advertising structures (Billboards prohibited)
Electronic equipment
Industrial Uses:
High-tech industry
Manufacturing of miscellaneous goods (e.g. medical, musical instruments, toys, vehicle parts)
Optical goods
Packaging of prepared materials
Scientific and precision instruments
Recreational or Organizational Uses:
Auditorium
Community club
Church
Golf course/driving range
Library
Open space
Park or playground
Sports fields
Trails
Educational Uses:
College/university
Junior or senior high school
Trade, technical or business college
Residential flats, apartments or condos (up to 24 units on third floor and above of Building #2 only; bottom two floors commercial or light industrial employment uses only)
Electrical vehicle infrastructure
Facilities, minor public
Temporary Uses (as per Camas Municipal Code)

EXHIBIT D: PARKLANDS AT CAMAS MEADOWS MXPD MASTER PLAN

PROJECT NARRATIVE

The proposed Parklands at Camas Meadows combines a 20.9-acre site parcel zoned single-family 15,000 square foot lots (R-15) with a 15.5-acre parcel zoned Business Park (BP). A feasible, high quality development can be achieved by joining the two properties into a single master plan community. Leaving the two parcels to develop separately would result in a lower quality residential neighborhood with very little market interest in the business park, as the infrastructure costs would make commercial development prohibitive.

This mixed-use master plan development proposes to subdivide the business park into five commercial buildings totaling at least 90,000 square feet of business space, 24 living units integrated into one of the commercial buildings, and 18 single-family residential lots. The R-15 property will provide another 24 single-family lots, while preserving 11 acres of natural open space and buffers. A natural surface walking trail may be constructed within the wetland buffer to provide a nature trail system for the project and the community. All single-family lots will be integrated into a single gated neighborhood providing high-end executive living. The single-family lots will have a minimum size of 15,000 square feet.

The commercial buildings will house a diversity of business operations that are anticipated to create at least 300 jobs. Building 1 has approximately 3,000 square foot floor plate with the potential for a second or third floor and a drive-thru. Building 2 is a minimum 19,000 square feet per floor, with two floors of commercial space, 24 residential living units above the commercial space. Building 3 is approximately 20,000 square feet with tuck under parking on the north side. Building 4 (areas A & B) is approximately 31,000 square feet per floor, if constructed as a single building, with the opportunity of loading bays for potential distribution center users. The applicants envision an artisan market that would occur on weekends during late spring through early fall.

Several new private internal roads will be constructed to serve the newly created lots. A half-width road of NW Camas Meadows Drive will be extended from the existing cul-de-sac to the eastern property line of the PP&L easement along the southern site boundary.

All lots will be connected to municipal water and sewer systems. Storm water runoff from the new impervious surface will be collected and routed to a regional storm water facility where it will be treated and released or infiltrated where possible in accordance with City standards.

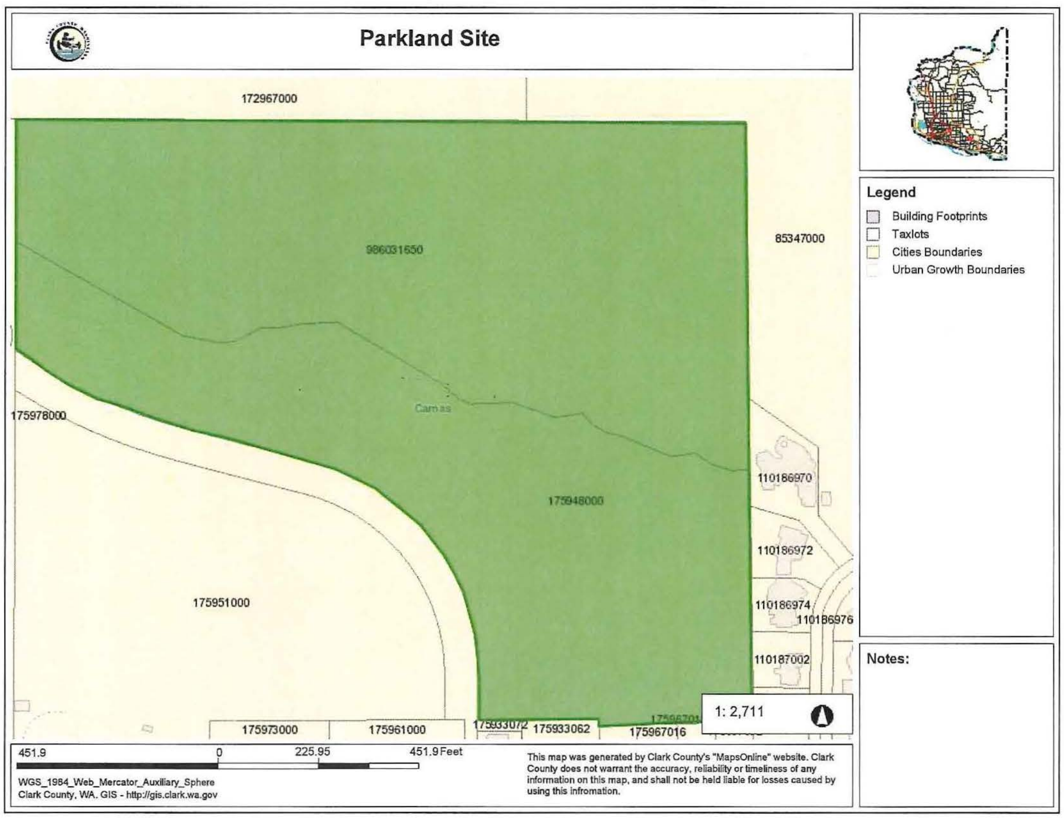
The subdivision will be developed in multiple independent phases as noted on the Site Plan.

LEGAL DESCRIPTION

The project site is located just east of Camas Meadows Golf Course Club House and just north of Camas Meadows Drive, in Camas, Washington 98607, in the SE & SW ¼ of Sec. 28, T2N, R3E, W.M. The site is comprised of two (2) parent parcels plus the existing 74 foot wide public City ROW for Camas Meadows Drive. The abbreviated legal description for the two parcels is:

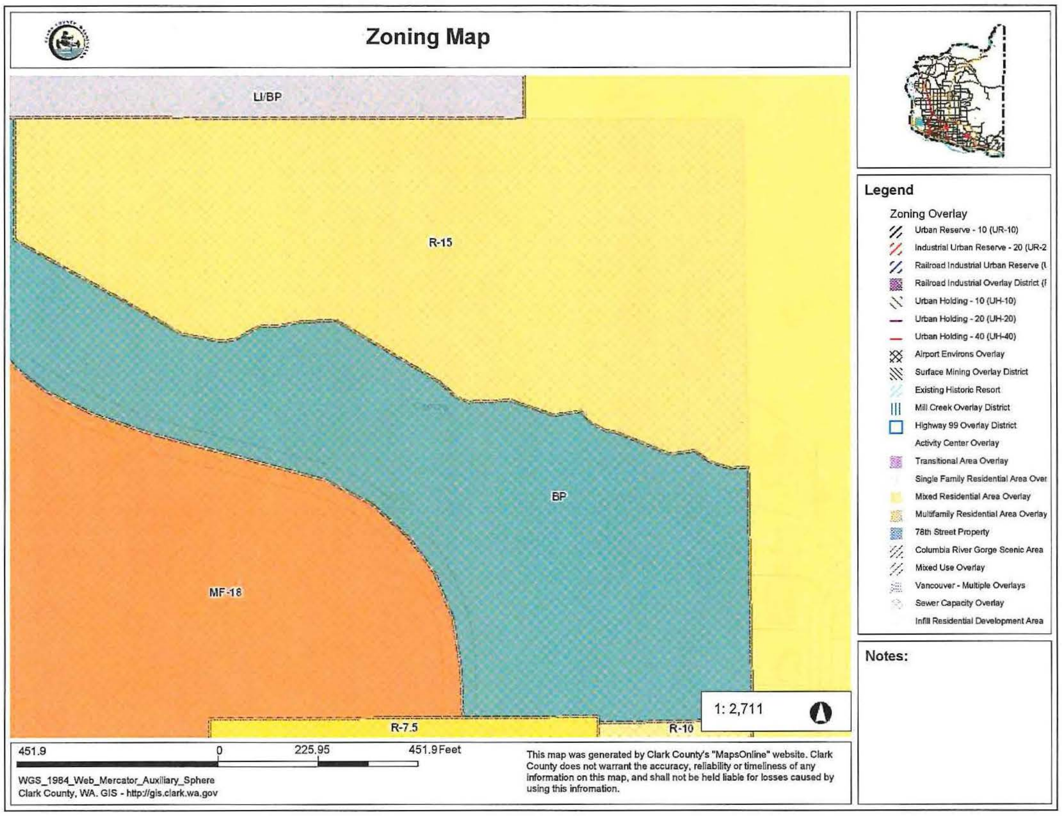
Parcel 175948-000
#21 SEC 28 T2NR3EWM 15.72A

Parcel 986031-650
#68 SEC 28 T2NR3EWM 20.97A



EXISTING LAND USES & ON-SITE STRUCTURES

Neither of the two parcels have any existing structures. Tax parcel 986031-650 is zoned single-family 15,000 square foot lots (R-15). Tax parcel 175948-000 is zoned Business Park (BP).



SITE MAP SHOWING EXISTING CONDITIONS

The subject site has both topography and wetland areas that will be incorporated into the development. The BP parcel has slopes that fall 30 feet across the property with the highest point along Camas Meadows Drive extension (south property line). The slopes are not steep enough to be considered "Critical". Nevertheless, developing commercial buildings within varying grades is financially infeasible. There is a flat 3.5 acre area in the southeast portion of the site. However this area abuts an existing residential neighborhood that could require a substantial setback to mitigate the introduction of a higher intensity use. This would likely further reduce the buildable area to less than three (3.0) acres and result in only one commercial building with no more than a 30,000 square foot floor plate. This is substantially less than the proposed plan. By approving the proposed mixed-use master plan, the new single family lots within the BP area create a transition between the new development and the existing neighborhood as well as produce the financial resources to develop the rest of the BP area into commercial buildings, thereby maximizing the job creation opportunities. At least 90,000 square feet of building space is intended under the proposed master plan.

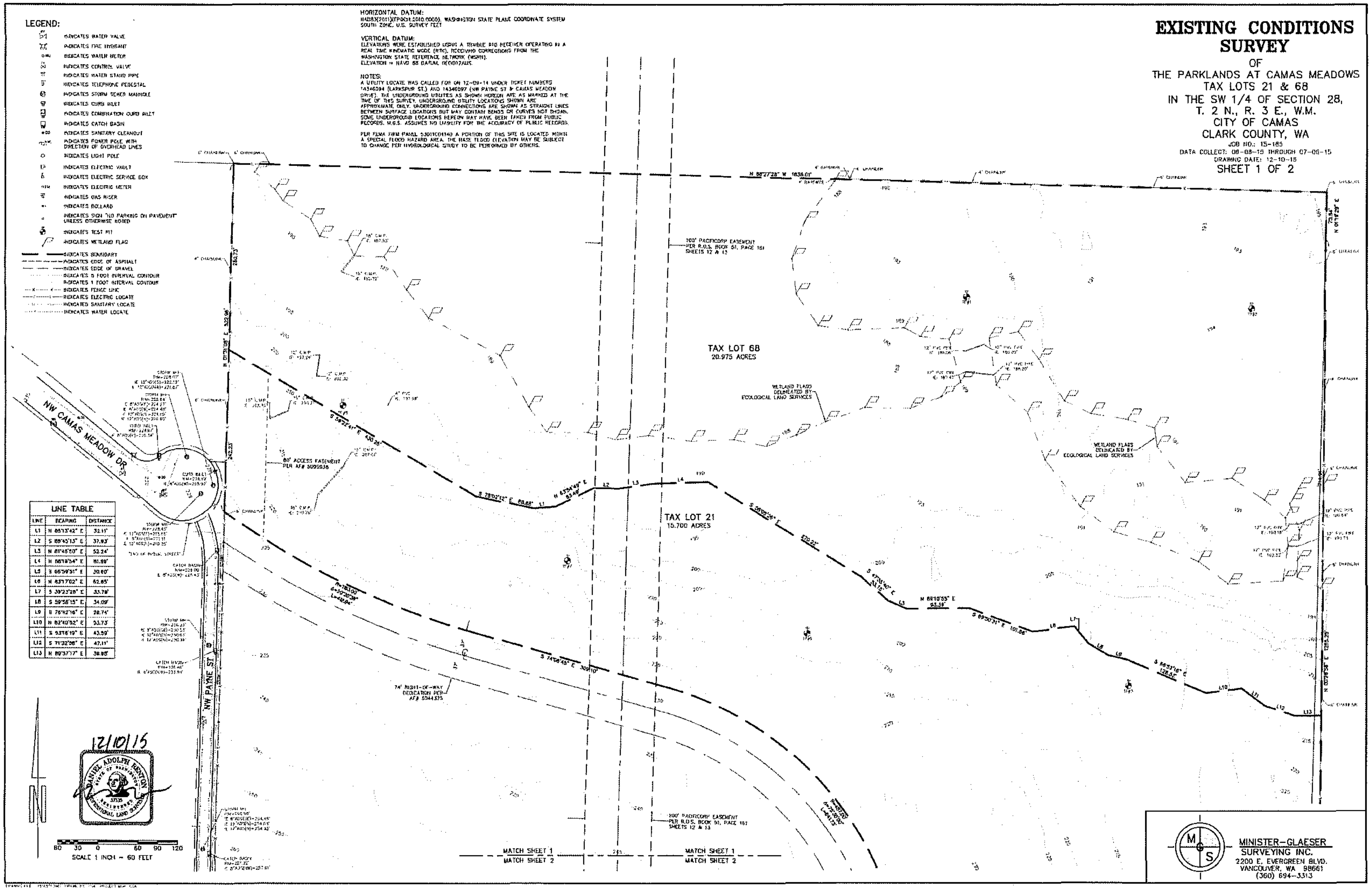
The 20.9-acre R1-15 single-family site has an 11-acre wetland (including 50 foot buffer). A wetland determination and mitigation study has been completed by ELS for the wetland and buffers as shown on the plan. The applicant is proposing to enhance the wetland and buffer areas. Due to the level of enhancement proposed, the required buffer between the proposed development areas and the wetland itself will be 50 feet.

With more than half the parcel impacted by the wetland, the only feasible option to develop the parcel is either integrate the site with the BP parcel or develop as a smaller lot Planned Residential Development (PRD); as a PRD, the site could be developed with over 60 housing units. The applicant has chosen to proceed with maintaining large executive lots and integrate the wetland as a centerpiece into the master plan community as well as a backdrop to the business park. Without the wetland, the site could be developed with approximately 45 lots, after accounting for roads and infrastructure. The proposed master plan has 42 large executive lots.

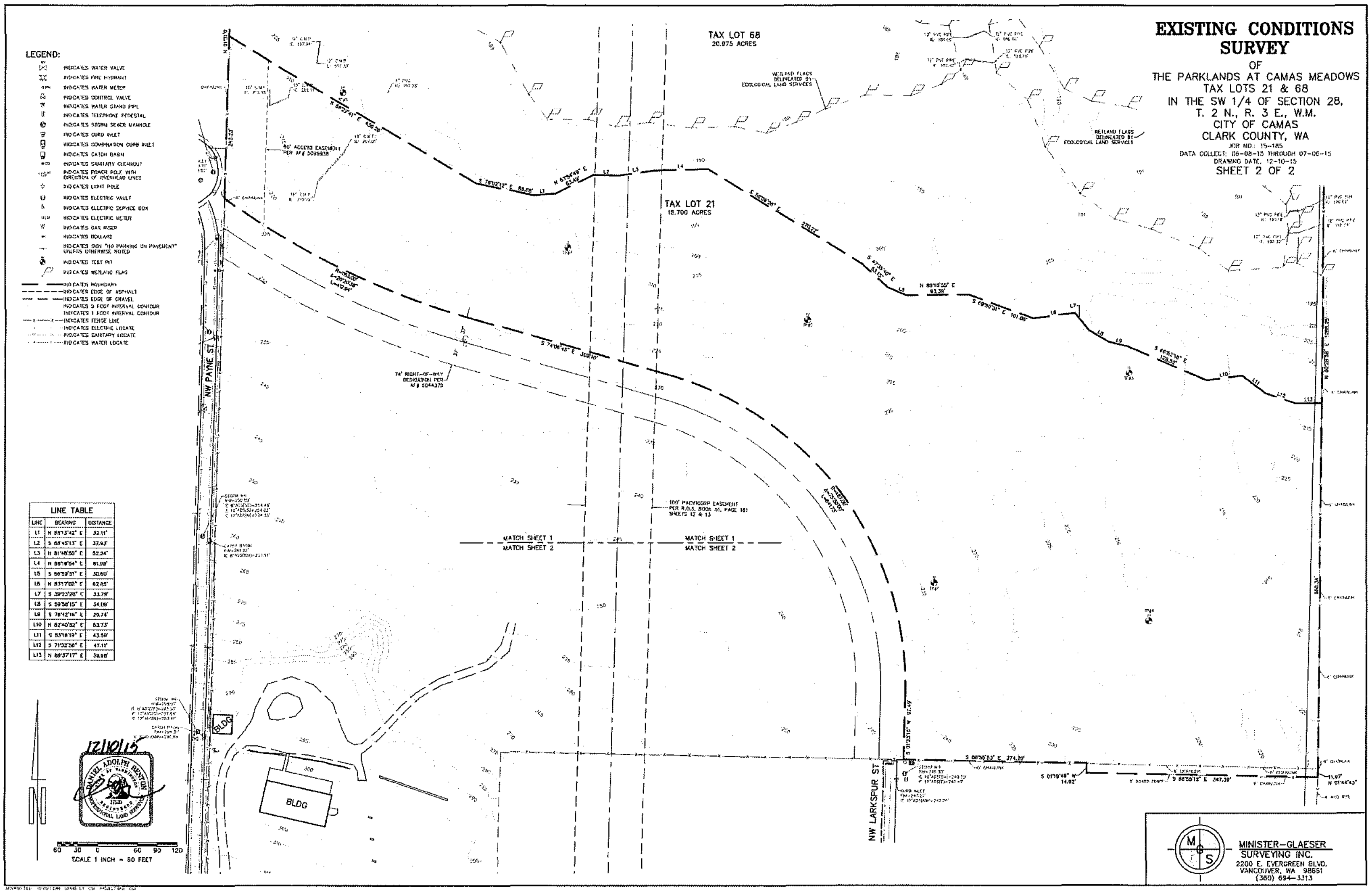
The Existing Conditions Survey is presented on pages 13-14.

Planning Solutions completed a tree survey of both parcels identifying all trees outside of the wetland. The site has historically been a part of an archery club, where sportsmen and hunters could hone in their bow skills. The trees have always been managed (i.e. cut, thinned, etc.) by the archery club. Development of the site will require extensive grading and the placement of roads and structures that will require removal of trees within the development area. Tree replanting will occur along streetscapes, parking lots, landscaping, wetland, wetland buffer, and open space. The following map depicts the trees currently onsite and those that will be removed to accommodate the planned structures.

The Tree Survey Maps are contained on pages 15-17.

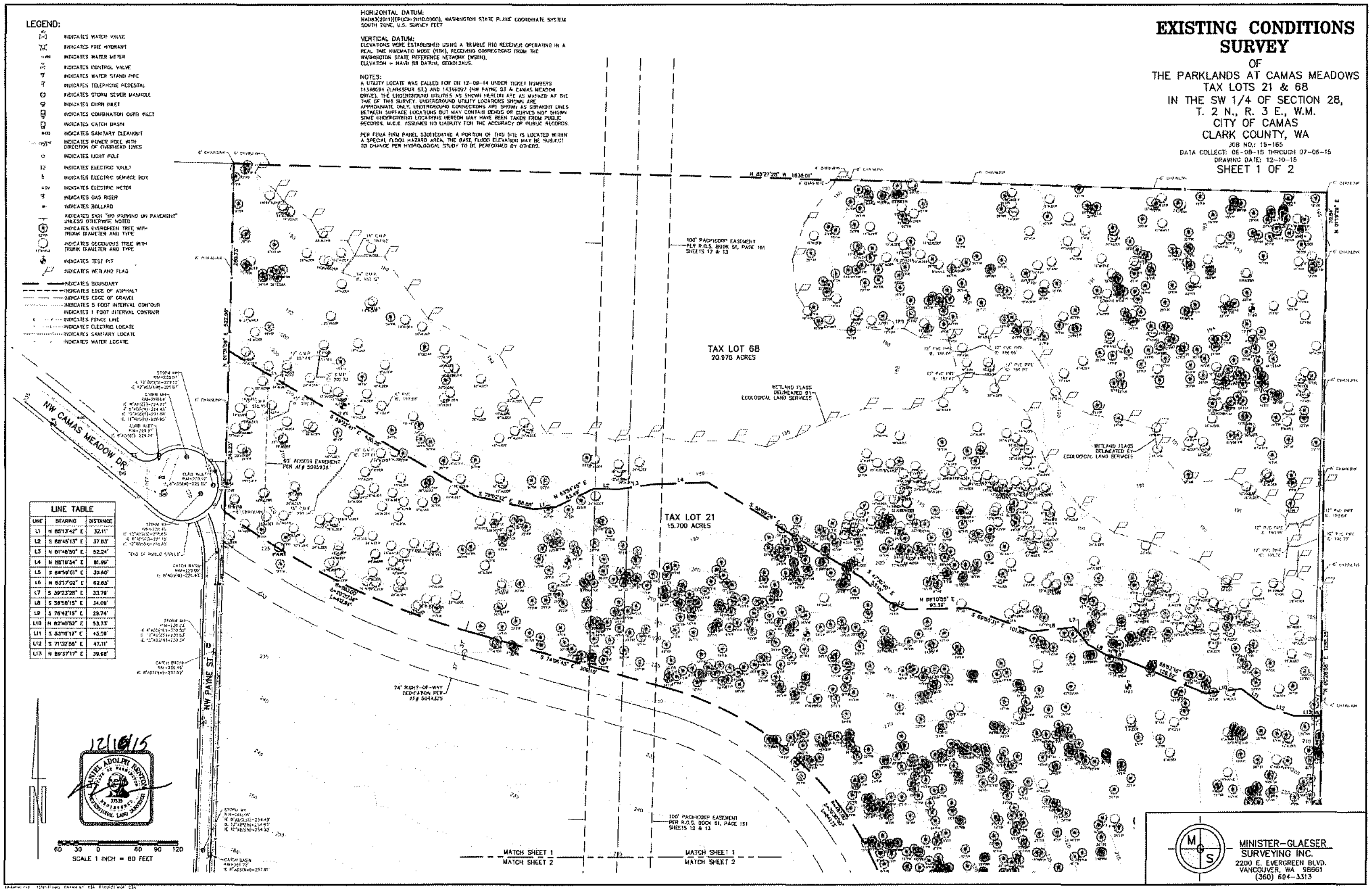


LINE TABLE		
LINE	BEARING	DISTANCE
L1	N 85°13'42" E	32.11'
L2	S 88°45'13" E	37.93'
L3	N 81°46'50" E	52.24'
L4	N 88°19'54" E	81.89'
L5	S 65°59'51" E	30.60'
L6	N 83°17'02" E	62.65'
L7	S 39°23'28" E	33.78'
L8	S 59°56'15" E	34.09'
L9	S 76°42'16" E	28.74'
L10	N 82°40'52" E	33.73'
L11	S 93°16'19" E	43.59'
L12	S 71°32'58" E	47.11'
L13	N 89°37'17" E	39.95'



LINE TABLE

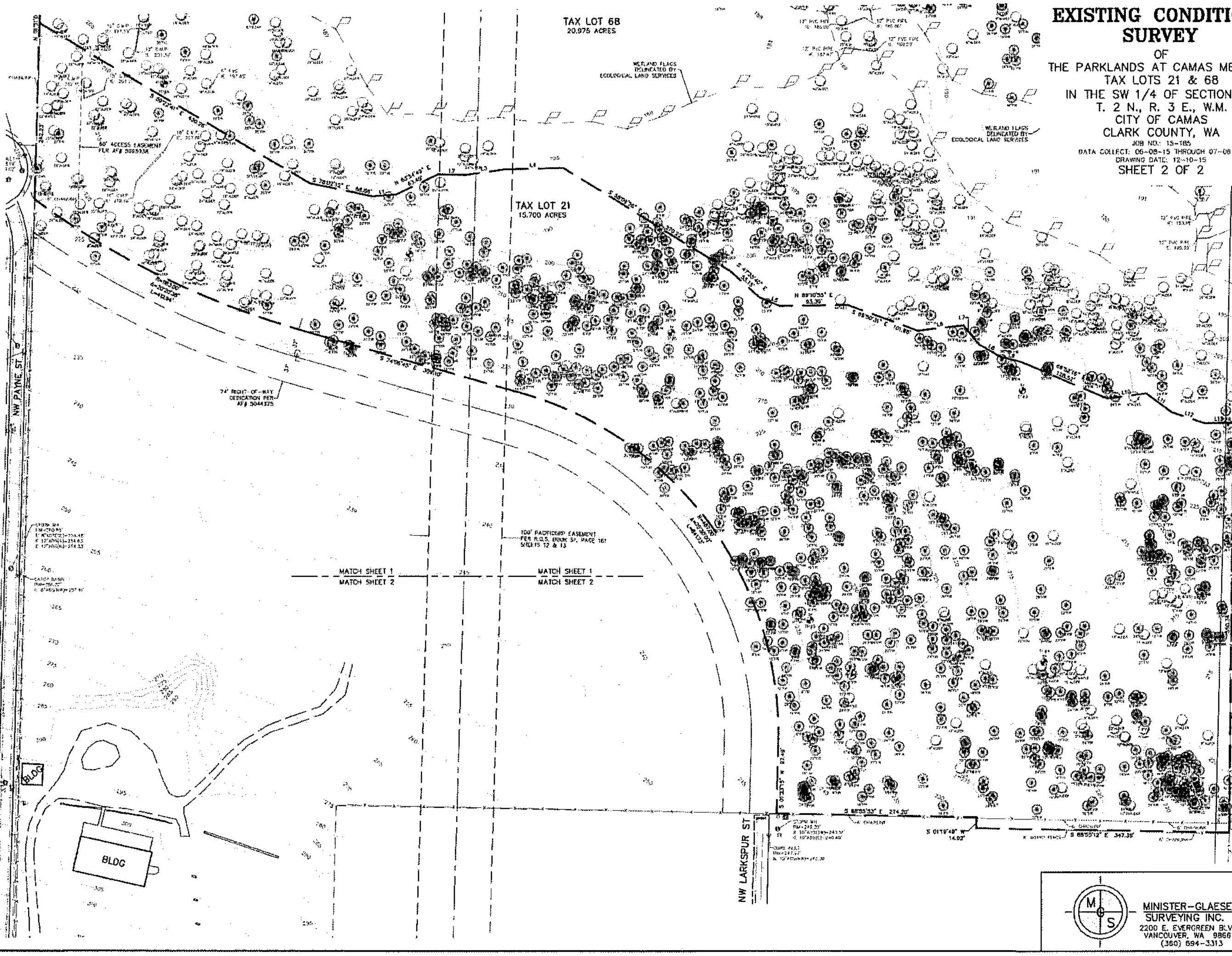
LINE	BEARING	DISTANCE
L1	N 88°13'42" E	32.11'
L2	S 68°45'13" E	37.95'
L3	N 81°48'50" E	52.24'
L4	N 86°19'54" E	81.08'
L5	S 56°59'51" E	30.60'
L6	N 83°17'02" E	62.85'
L7	S 39°23'26" E	33.79'
L8	S 59°58'15" E	34.09'
L9	S 76°42'16" E	29.74'
L10	N 82°40'52" E	53.73'
L11	S 53°16'19" E	43.59'
L12	S 71°32'36" E	47.11'
L13	N 89°37'17" E	39.98'



LINE TABLE		
LINE	BEARING	DISTANCE
L1	N 65°13'42" E	32.11'
L2	S 88°45'13" E	37.03'
L3	N 61°48'50" E	52.24'
L4	N 88°10'54" E	81.99'
L5	S 64°59'01" E	30.60'
L6	N 63°37'02" E	62.65'
L7	S 39°23'28" E	33.79'
L8	S 58°58'15" E	34.09'
L9	S 76°42'18" E	29.74'
L10	N 82°40'52" E	53.73'
L11	S 53°10'19" E	43.50'
L12	S 71°32'56" E	47.11'
L13	N 89°37'17" E	39.98'

EXISTING CONDITIONS SURVEY

OF
THE PARKLANDS AT CAMAS MEADOWS
TAX LOTS 21 & 68
IN THE SW 1/4 OF SECTION 28,
T. 2 N., R. 3 E., W.M.
CITY OF CAMAS
CLARK COUNTY, WA
JOB NO.: 15-185
DATA COLLECT: 06-08-15 THROUGH 07-08-15
DRAWING DATE: 12-10-15
SHEET 2 OF 2



LEGEND:

- INDICATES WATER VALVE
- INDICATES FIRE HYDRANT
- INDICATES WATER METER
- INDICATES CONTROL VALVE
- INDICATES WATER STAND PIPE
- INDICATES TELEPHONE PEDESTAL
- INDICATES STORM SEWER MANHOLE
- INDICATES CURB INLET
- INDICATES COMBINATION CURB INLET
- INDICATES CATCH BASIN
- INDICATES SANITARY CLEANOUT
- INDICATES POWER POLE WITH DIRECTION OF OVERHEAD LINES
- INDICATES LIGHT POLE
- INDICATES ELECTRIC VAULT
- INDICATES ELECTRIC SERVICE BOX
- INDICATES ELECTRIC METER
- INDICATES GAS RISER
- INDICATES BOLLARD
- INDICATES SIGN "NO PARKING ON PAVEMENT" UNLESS OTHERWISE NOTED
- INDICATES EVERGREEN TREE WITH TRUNK DIAMETER AND TYPE
- INDICATES DECIDUOUS TREE WITH TRUNK DIAMETER AND TYPE
- INDICATES TEST PIT
- INDICATES WETLAND FLAG
- INDICATES BOUNDARY
- INDICATES EDGE OF ASPHALT
- INDICATES EDGE OF GRAVEL
- INDICATES 5 FOOT INTERVAL CONTOUR
- INDICATES 1 FOOT INTERVAL CONTOUR
- INDICATES FENCE LINE
- INDICATES ELECTRIC LOCATE
- INDICATES SANITARY LOCATE
- INDICATES WATER LOCATE

LINE TABLE

LINE	BEARING	DISTANCE
L1	N 65°13'42" E	32.11'
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L9	S 76°42'16" E	29.74'
L10	N 82°40'52" E	53.73'
L11	S 53°10'19" E	43.56'
L12	S 71°32'36" E	47.11'
L13	N 89°37'17" E	39.98'

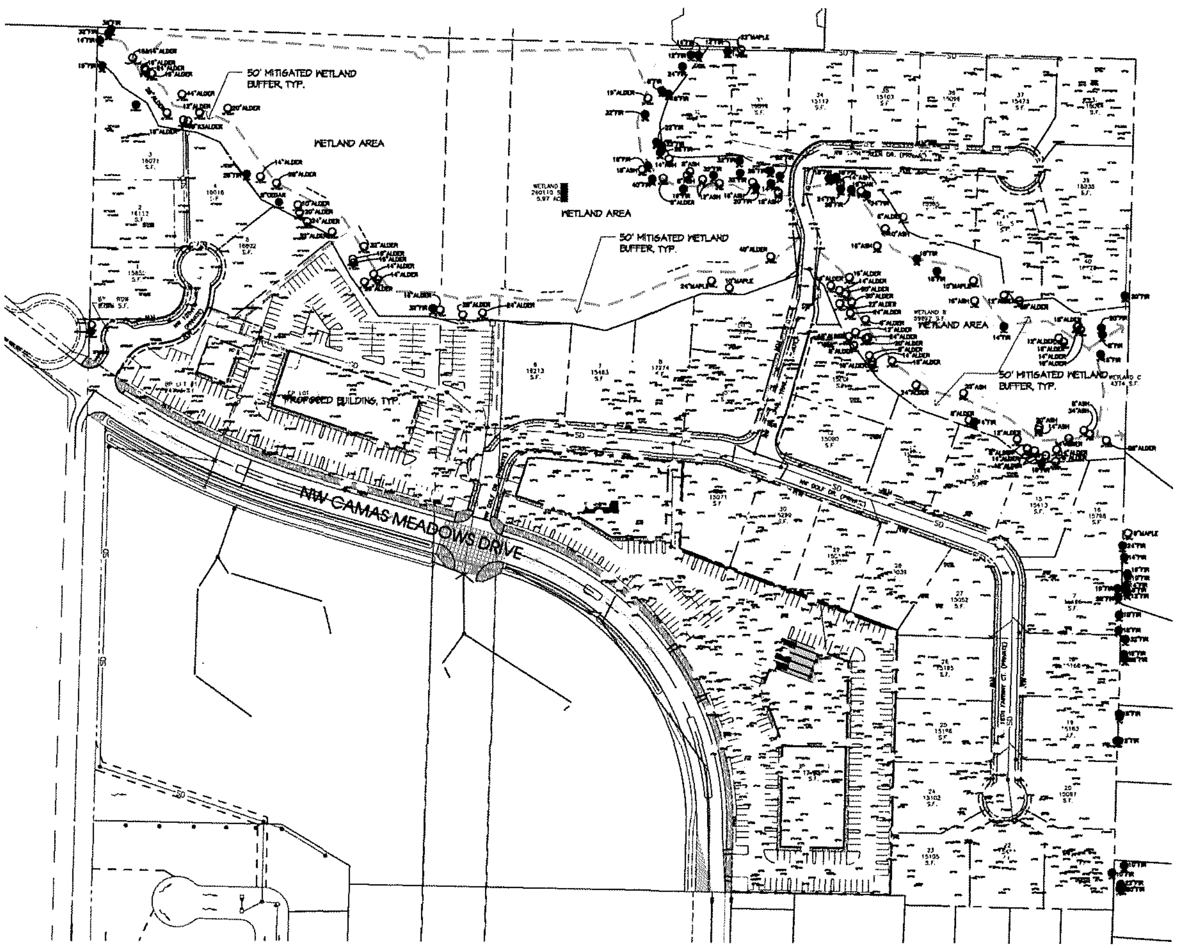
N

12/10/15

DANIEL ADOLPH RENTON

60 30 0 60 90 120
SCALE 1 INCH = 60 FEET

MINISTER-GLAESER
SURVEYING INC.
2200 E. EVERGREEN BLVD.
VANCOUVER, WA 98661
(360) 694-3313



SYMBOL LEGEND	
SYMBOL	DESCRIPTION
● ○	EXISTING TREE TO BE RETAINED
	EXISTING TREE TO BE REMOVED, REFER TO TREE SURVEY FOR SPECIES AND SIZES.

TREE LOCATIONS AND SIZES HAVE BEEN OBTAINED FROM AN EXISTING CONDITIONS SURVEY PROVIDED BY M&G SURVEYING.

SURVEYOR TO LOCATE TREES ALONG PROPERTY LINE. NO TREE WITH ANY PORTION OF THE TREE TRUNK ON NEIGHBORING PROPERTY OR OFF-SITE SHALL BE CUT DOWN WITHOUT CONSENT OF CO-TENANT NEIGHBOR.

ALL TREES WITHIN WETLAND AREAS (NOT SHOWN) SHALL BE RETAINED.

TREE PROTECTION STANDARDS

WHERE NOTED BELOW THE CRITICAL ROOT ZONE SHALL BE DEFINED AS A RADIUS AROUND EACH TREE EQUAL TO ONE FOOT OF RADIUS PER 1 INCH OF TREE DBH (DIA. AT BREAST HEIGHT).

A. PLACING MATERIALS NEAR TREES. NO PERSON MAY CONDUCT ANY ACTIVITY WITHIN THE PROTECTED AREA OF ANY TREE DESIGNATED TO REMAIN, INCLUDING, BUT NOT LIMITED TO, PARKING EQUIPMENT, PLACING SOLVENTS, STORING BUILDING MATERIAL AND SOIL DEPOSITS, DUMPING CONCRETE WASHOUT AND LOCATING BURN HOLES.
B. ATTACHMENT TO TREES. DURING CONSTRUCTION, NO PERSON SHALL ATTACH ANY OBJECT TO ANY TREE DESIGNATED FOR PROTECTION.
C. PROTECTIVE BARRIER. BEFORE DEVELOPMENT, LAND CLEARING, FILLING OR ANY LAND ALTERATION, THE APPLICANT:
   1. SHALL ERECT AND MAINTAIN READILY VISIBLE PROTECTIVE TREE FENCING ALONG THE OUTER EDGE AND COMPLETELY SURROUNDING THE PROTECTED AREA OF ALL PROTECTED TREES OR GROUPS OF TREES. FENCES SHALL BE CONSTRUCTED OF CHAIN LINK OR OTHER APPROVED MATERIAL AND AT LEAST FOUR FEET HIGH, UNLESS OTHER TYPE OF FENCING IS AUTHORIZED BY THE CITY OF CAMAS.
   2. MAY BE REQUIRED TO COVER, WITH MULCH TO A DEPTH OF AT LEAST SIX (6) INCHES OR WITH PLYWOOD OR SIMILAR MATERIAL, THE AREAS ADJOINING THE CRITICAL ROOT ZONE OF A TREE IN ORDER TO PROTECT ROOTS FROM DAMAGE CAUSED BY HEAVY EQUIPMENT.
   3. SHALL PROHIBIT EXCAVATION OR COMPACTION OF EARTH OR OTHER POTENTIALLY DAMAGING ACTIVITIES WITHIN THE BARRIERS.
   4. MAY BE REQUIRED TO MINIMIZE ROOT DAMAGE BY EXCAVATING A TWO (2) FOOT DEEP TRENCH TO CLEANLY SEVER THE ROOTS OF TREES TO BE RETAINED.
   5. SHALL MAINTAIN THE PROTECTIVE BARRIERS IN PLACE UNTIL THE CITY OF CAMAS AUTHORIZES THEIR REMOVAL OR A FINAL CERTIFICATE OF OCCUPANCY IS ISSUED, WHICHEVER OCCURS FIRST.
   6. SHALL ENSURE THAT ANY LANDSCAPING DONE IN THE PROTECTED ZONE SUBSEQUENT TO THE REMOVAL OF THE BARRIERS SHALL BE ACCOMPLISHED WITH LIGHT MACHINERY OR HAND LABOR.

D. GRADE
   1. THE GRADE SHALL NOT BE ELEVATED OR REDUCED WITHIN THE CRITICAL ROOT ZONE OF TREES TO BE PRESERVED WITHOUT THE CITY OF CAMAS' AUTHORIZATION. COVERAGE OF UP TO ONE HALF OF THE AREA OF THE TREE'S CRITICAL ROOT ZONE WITH LIGHT SOILS (NO CLAY) TO THE MINIMUM DEPTH NECESSARY TO CARRY OUT GRADING OR OR LANDSCAPE PLANS, IF IT WILL NOT IMPERIL THE SURVIVAL OF THE TREE MAY BE ALLOWED. AERATION DEVICES MAY BE REQUIRED TO ENSURE THE TREE'S SURVIVAL.
   2. IF THE GRADE ADJACENT TO A PRESERVED TREE IS RAISED SUCH THAT IT COULD SLOUGH OR ERODE INTO THE TREE'S CRITICAL ROOT ZONE, IT SHALL BE PERMANENTLY STABILIZED TO PREVENT SUFFOCATION OF THE ROOTS.
   3. THE APPLICANT SHALL NOT INSTALL AN IMPERVIOUS SURFACE WITHIN THE CRITICAL ROOT ZONE OF ANY TREE TO BE RETAINED.
   4. TO THE GREATEST EXTENT PRACTICAL, UTILITY TRENCHES SHALL BE LOCATED OUTSIDE OF THE CRITICAL ROOT ZONE OF TREES TO BE RETAINED.
   5. TREES AND OTHER VEGETATION TO BE RETAINED SHALL BE PROTECTED FROM EROSION AND SEDIMENTATION. CLEARING OPERATIONS SHALL BE CONDUCTED SO AS TO EXPOSE THE SMALLEST PRACTICAL AREA OF SOIL TO EROSION FOR THE LEAST POSSIBLE TIME. TO CONTROL EROSION, SHRUBS, GROUND COVER AND STUMPS SHALL BE MAINTAINED ON THE INDIVIDUAL LOTS, WHERE FEASIBLE. WHERE NOT FEASIBLE APPROPRIATE EROSION CONTROL PRACTICES SHALL BE IMPLEMENTED.

E. DIRECTIONAL FELLING. DIRECTIONAL FELLING OF TREES SHALL BE USED TO AVOID DAMAGE TO TREE DESIGNATED FOR RETENTION.
F. AS RESULT OF FURTHER REVIEW, SOME EXISTING TREES MARKED FOR PRESERVATION MAY NEED TO BE REMOVED TO ACCOMMODATE FINAL GRADING PLANS AND STORMWATER FACILITIES. IN THE EVENT IT BECOMES NECESSARY TO REMOVE A TREE THAT IS PROPOSED TO BE RETAINED, APPROVAL SHALL BE OBTAINED FROM THE CITY OF CAMAS AND ADDITIONAL MITIGATION TREES MAY BE REQUIRED.

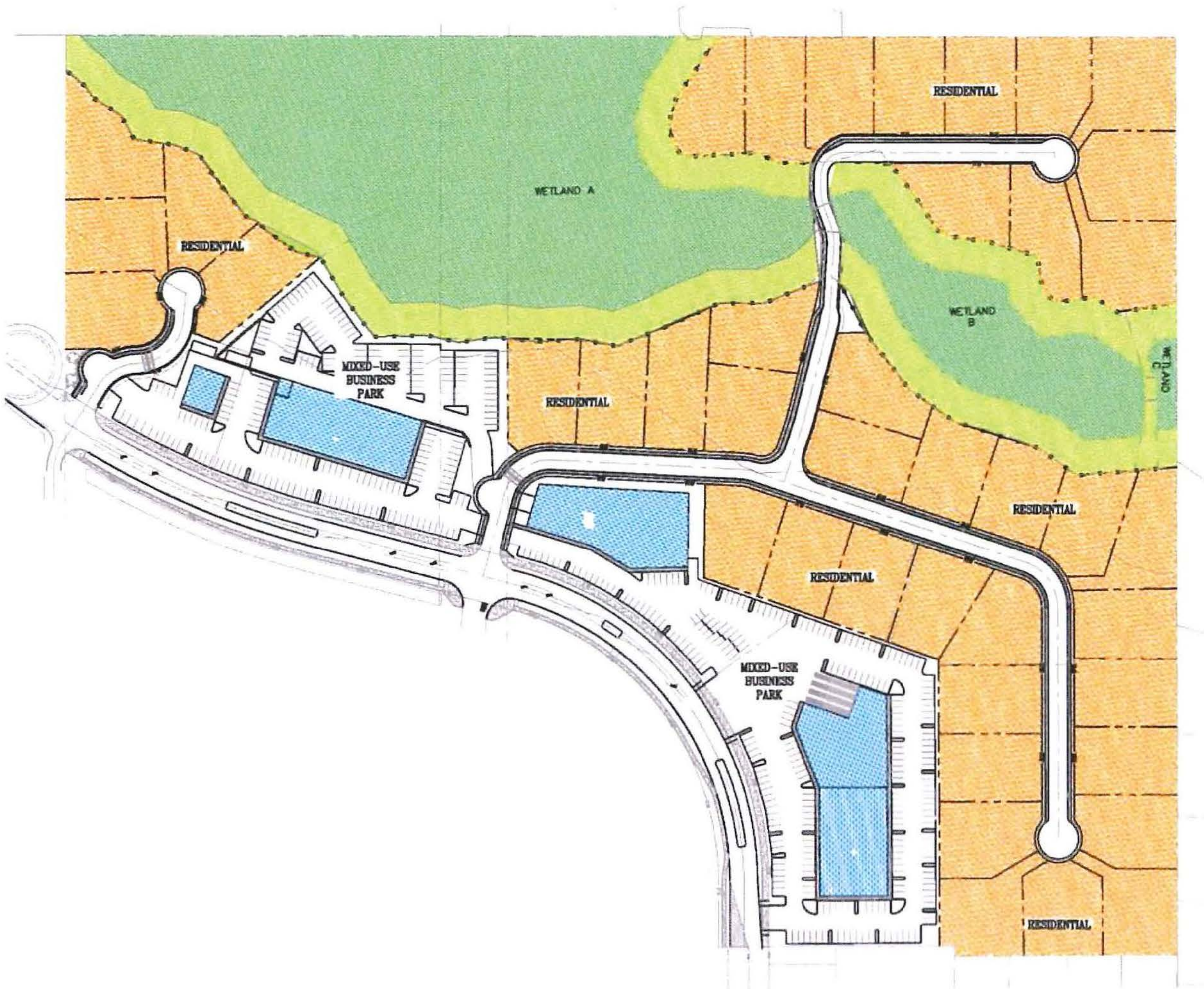
TREE PRESERVATION NARRATIVE

ALL TREES WITHIN THE WETLAND & WETLAND BUFFER AREAS AS WELL AS THE PROJECT PERIMETER ARE PROPOSED TO BE RETAINED.

TREES ARE PROPOSED TO BE REMOVED CONFLICT WITH STREET IMPROVEMENTS, SITE GRADINGS, UTILITIES, AND BUILDING ENVELOPES.

PROPOSED LAND USES & STRUCTURES

This master plan proposes 42 large single family lots developed in 3 phases, four industrial/commercial buildings totaling at least 50,400 square feet, a 39,600 square foot commercial building with 24 living units above. The following map depicts the single family area versus mixed-use business park.



The following map depicts approximate locations (or building envelops) for the business park and single family structures. Note: the 24 mixed-use living units are incorporated into Building #2 of the business park.

PROPOSED RESIDENTIAL UNITS & DEVELOPMENT STANDARDS

The master plan community will implement the following development standards that provide for flexibility in creating a high quality design. As noted in earlier sections, the master plan includes 42 executive single-family lots, 24 mixed-use living units on upper stories of Building #2, and at least 90,000 square feet of business space.

Development Standard	Single Family (R1-15)	Single Family (BP)	Non-Single Family (BP)
A. New Lot Dimensions			
Minimum lot size (square feet)	15,000	15,000	8,000
Maximum lot size (square feet)	Note 1	Note 1	Note 1
Minimum lot width (feet)	80	80	80
Minimum lot depth (feet)	90	90	100
Maximum building lot coverage[2]	50% 60% with ADU	50% 60% with ADU	50%
Maximum building height (feet)	35	35	100
B. Setbacks			
Minimum front yard (feet)	25	25	15[4]
Minimum side yard and corner lot rear yard (feet)	10 5 (ADU or accessory buildings)	10 5 (ADU and accessory buildings)	15[4]
Minimum side yard flanking a street (feet)	10	10	10[4]
Minimum rear yard (feet)	25 5 (ADU or accessory buildings)	25 5 (ADU or accessory buildings)	50[3]
Minimum lot frontage or access easement on a cul-de-sac or curve (feet)	40[5]	40[5]	N/A
Minimum flag lot width	20	20	N/A

Note 1: No Limitation.

Note 2: Includes all covered buildings and structures accepting there from accessory dwelling units (ADU's).

Note 3: Maybe reduced to ten feet if a transition element is utilized that includes natural vegetation for screening.

Note 4: Right of way to building face. Parking areas can be setback five feet from property line, per the landscaping plan contained within the approved master plan.

Note 5: Access to two lots or less may be designed and established as an easement rather than a tract.

The following are a list of permitted uses within the MXPD Employment area. Similar uses are permitted in the zone district at the discretion of the community development director. Unless otherwise listed or permitted as a similar use, a use shall be prohibited or subject to amendment of the Development Agreement.

Uses
Antique shop
Appliance sales and service
Bakery (wholesale)
Bakery (retail)
Banks, savings and loan
Barber and beauty shops
Book store
Bowling alley/billiards
Building, hardware and garden supply store
Cabinet and carpentry shop
Candy; confectionery store
Cart vendors
Clothing store
Coffee shop, cafe or kiosk
Convention center
Day care center
Day care
Delicatessen (deli)
Department store
Electric vehicle battery charging station and rapid charging stations
Equipment rental
Event center
Fitness center/sports club
Funeral home/crematorium
Florist shop
Food delivery business
Furniture store

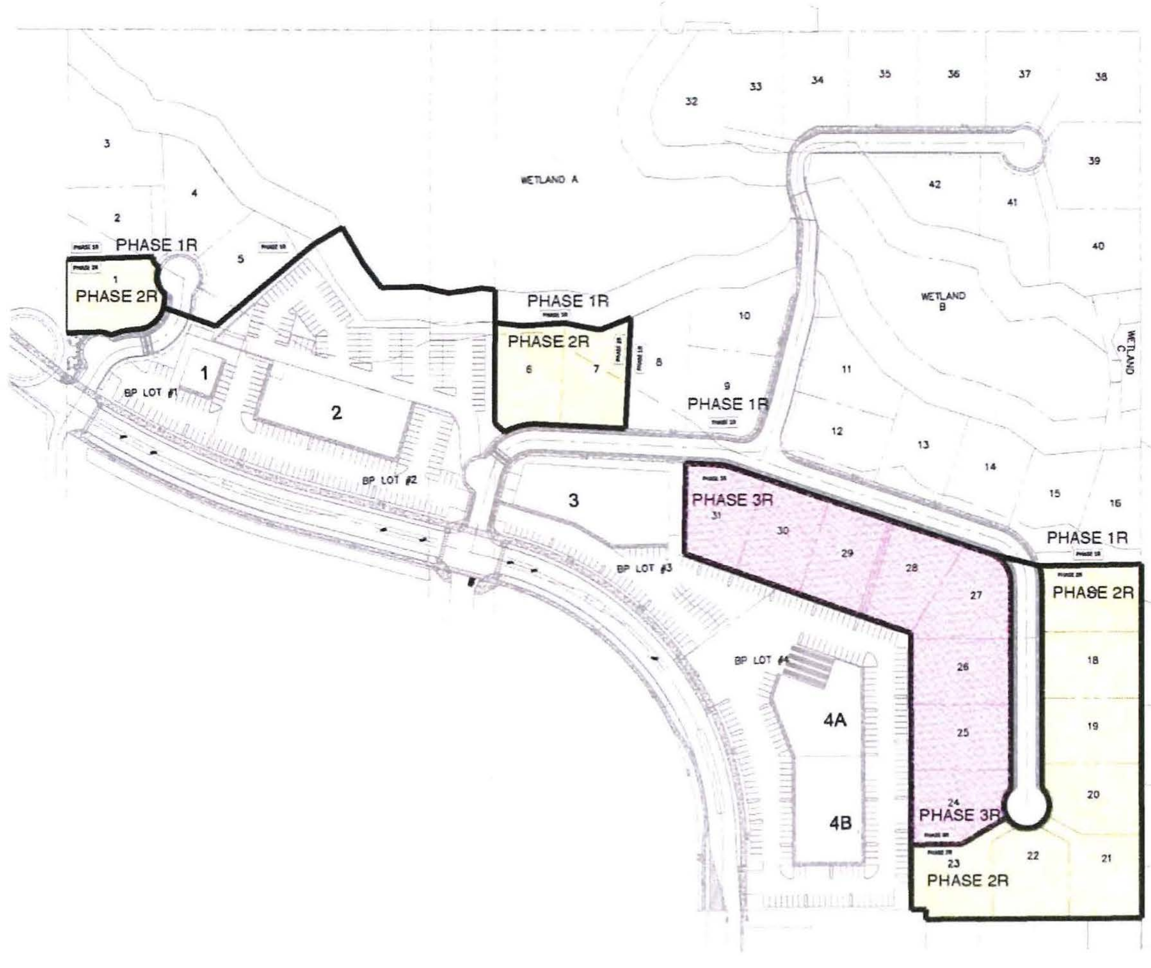
Uses
Grocery, neighborhood, small or large scale
Hospital, emergency care
Hotel, motel
Laundry/dry cleaning (retail)
Laundry (self-serve)
Liquor store
Machine shop
Medical or dental clinics (outpatient)
Nursery, plant
Nursing, rest, convalescent, retirement home, memory care, assisted living
Office supply store
Pawnshop
Parcel freight depots
Pet shops
Pharmacy
Photographic/electronics store
Printing, binding, blue printing
Professional or Business office(s)
Public agency
Recycling collection point
Research facility
Restaurant
Restaurant, fast food
Roadside produce stand
Second-hand/consignment store
Shoe repair and sales
Specialty goods production (e.g. brew pub; does not include marijuana).
Taverns, pubs, bars
Theater, except drive-in
Veterinary clinic
Warehousing, bulk retail

Uses
Manufacturing and/or processing of the following:
Cotton, wool, other fibrous material
Food production or treatment
Foundry
Furniture manufacturing
Metal fabrication and assembly
Signs or other advertising structures (Billboards prohibited)
Electronic equipment
Industrial Uses:
High-tech industry
Manufacturing of miscellaneous goods (e.g. medical, musical instruments, toys, vehicle parts)
Optical goods
Packaging of prepared materials
Scientific and precision instruments
Recreational or Organizational Uses:
Auditorium
Community club
Church
Golf course/driving range
Library
Open space
Park or playground
Sports fields
Trails
Educational Uses:
College/university
Junior or senior high school
Trade, technical or business college
Residential flats, apartments or condos (up to 24 units on third floor and above of Building #2 only; bottom two floors commercial or light industrial employment uses only)
Electrical vehicle infrastructure

Uses
Facilities, minor public
Temporary Uses (as per Camas Municipal Code)

REQUIRED DEVELOPMENT PHASES

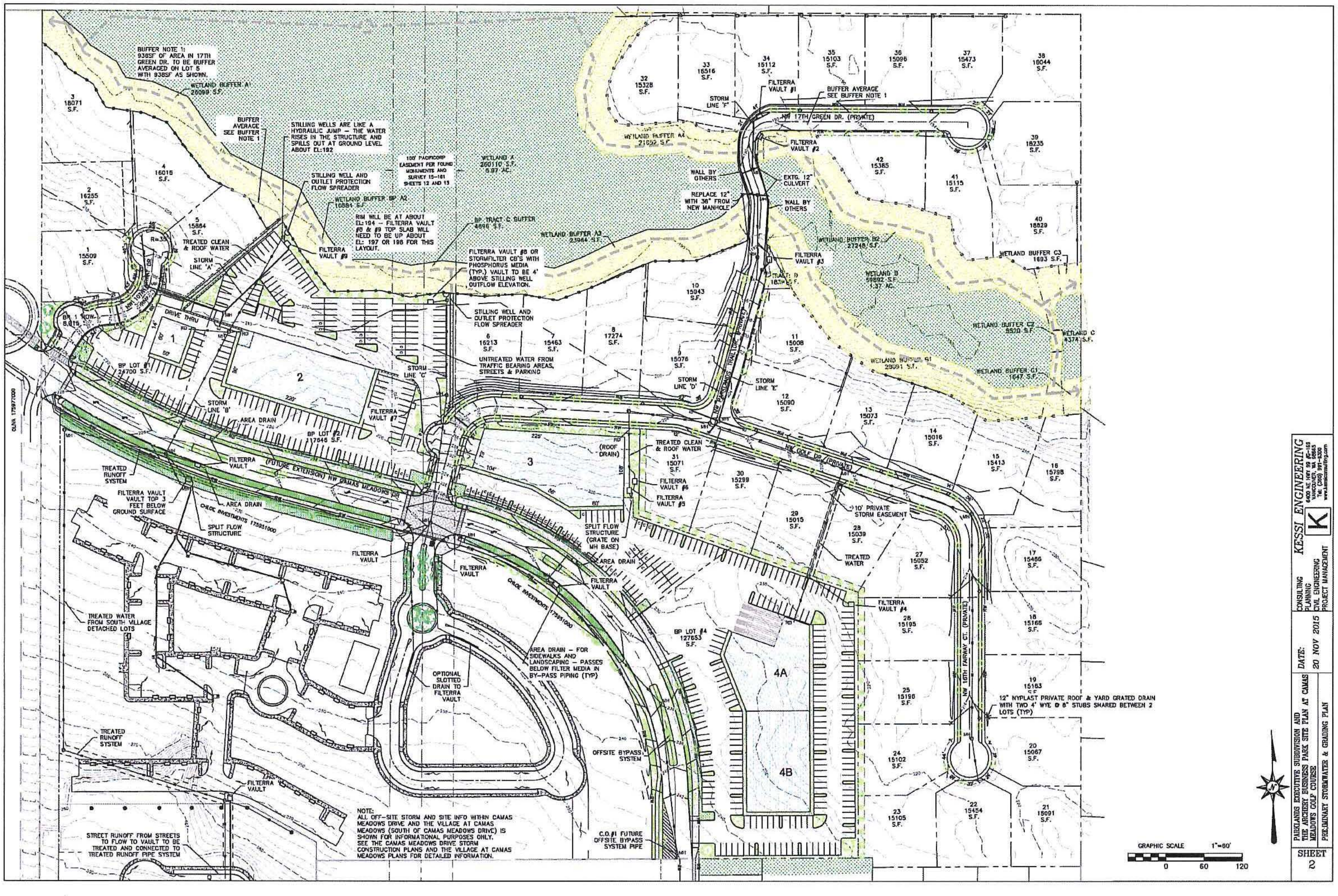
Only the single family residential shall be required to build structures in phases. The applicant will have the ability to install roads, utilities, etc. as one complete project, provided a grading plan is submitted in advance to the City. The lots within the existing R-15 area shall be released upon subdivision approval. The ten (10) lots within Phase 2 shall be released upon the business park being graded, platted and ready for a prospective user to submit for site plan review. The final eight (8) lots within Phase 3 shall be released once building permit is acquired on either business park Building 2, 3, 4 (4A), or 5 (4B). The following map delineates each phase of the single-family development:



STREETS, TRAILS, COMMON AREAS & PARKING SITE PLAN

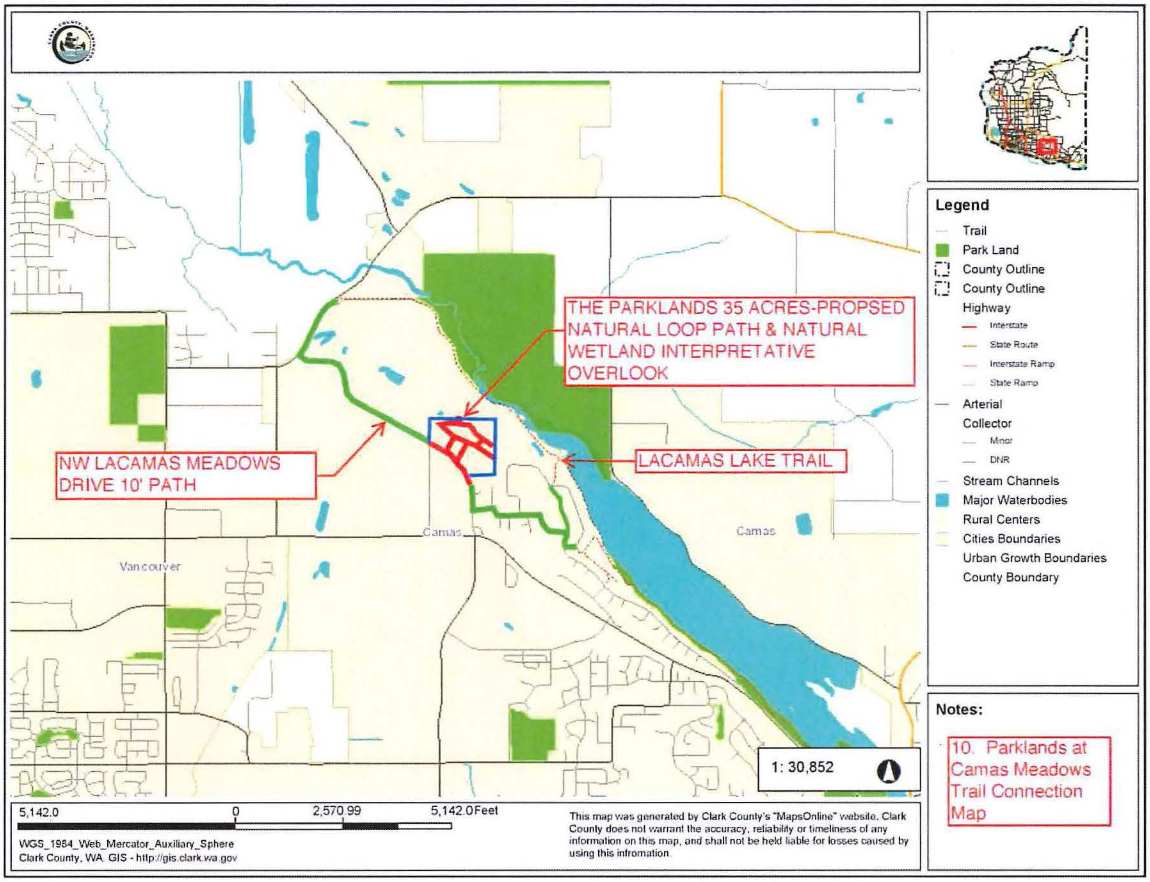
The following map delineates the location of all areas to be conveyed, dedicated, or maintained as public vs. private including streets, utilities, parking areas, pedestrian walkways/trails, open space/natural areas, wetlands (including buffer), and landscaping.

Exhibit D: Parklands at Camas Meadows MXPD Master Plan


KESSI ENGINEERING
PARKLANDS EXECUTIVE SUBDIVISION AND THE ARCHERY BUSINESS PARK SITE PLAN AT CAMAS MEADOWS GOLF COURSE
PRELIMINARY STORMWATER & GRADING PLAN
DATE: 20 NOV 2015
SHEET 2

MAP OF OPEN SPACE NETWORK

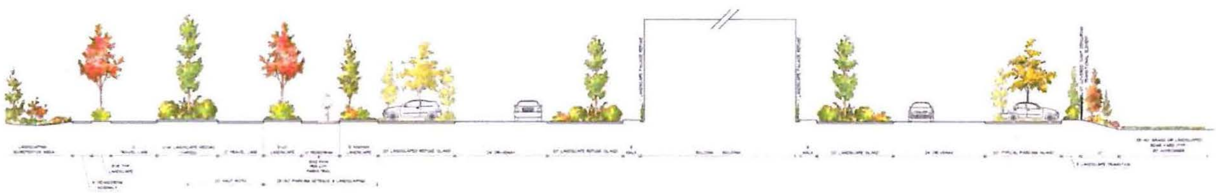
The following map depicts the connectivity of the open space and 3.5 acre trail network with existing set aside network. The purpose is to show how the master plan community fits within the context of the larger Camas Area.



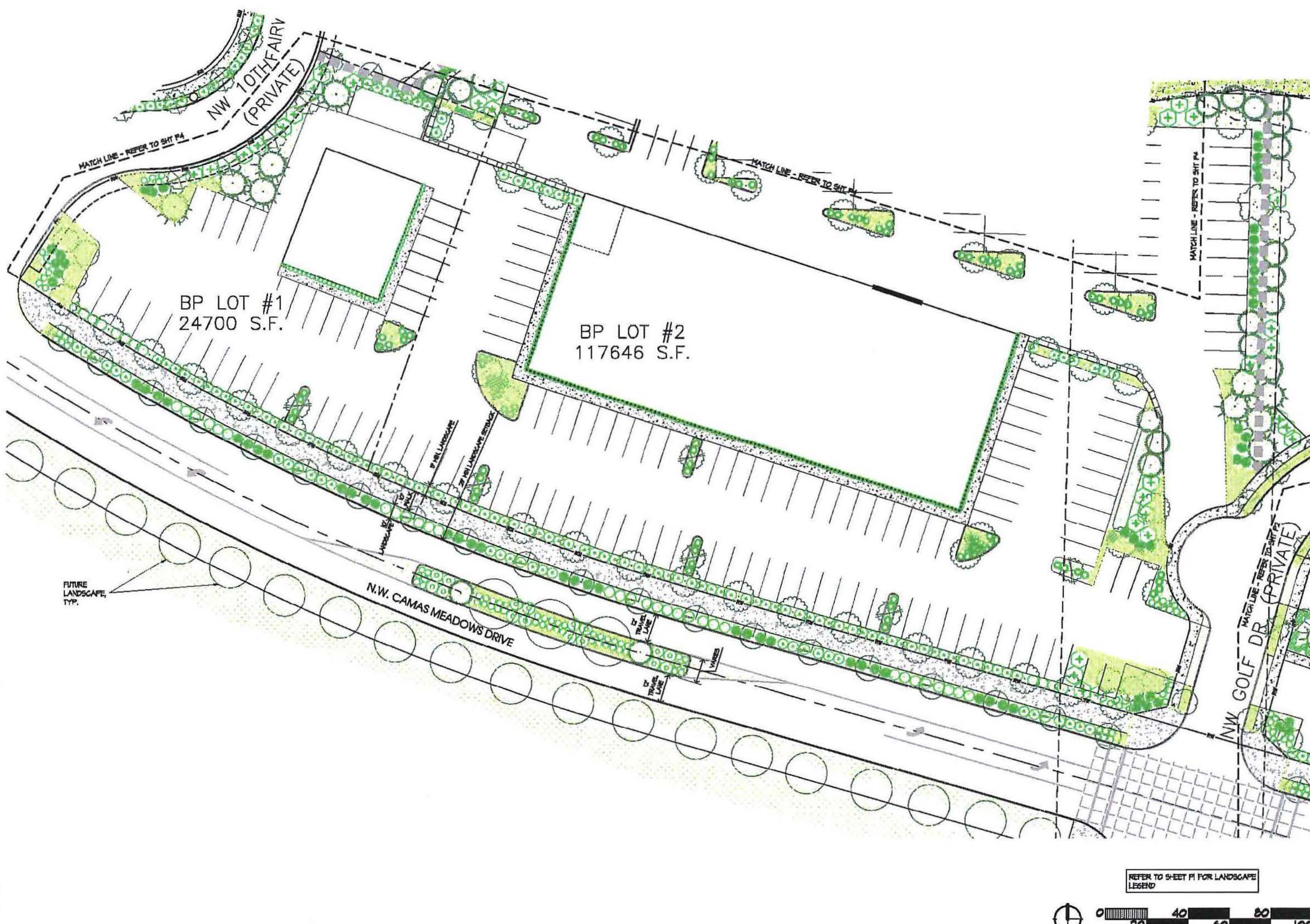
LANDSCAPING PLAN

The following landscaping plan is drawn to scale and demonstrates compliance with CMC Chapter 18.13. The landscape plan provides a rendering of the proposed streetscape along the extension of Camas Meadows Drive, landscaping to occur along all streets, within designated parking areas, and transition element areas. Also provided is a rendering of the proposed transition element.

ELEVATION A
NOT TO SCALE



SECTION A-A
NOT TO SCALE



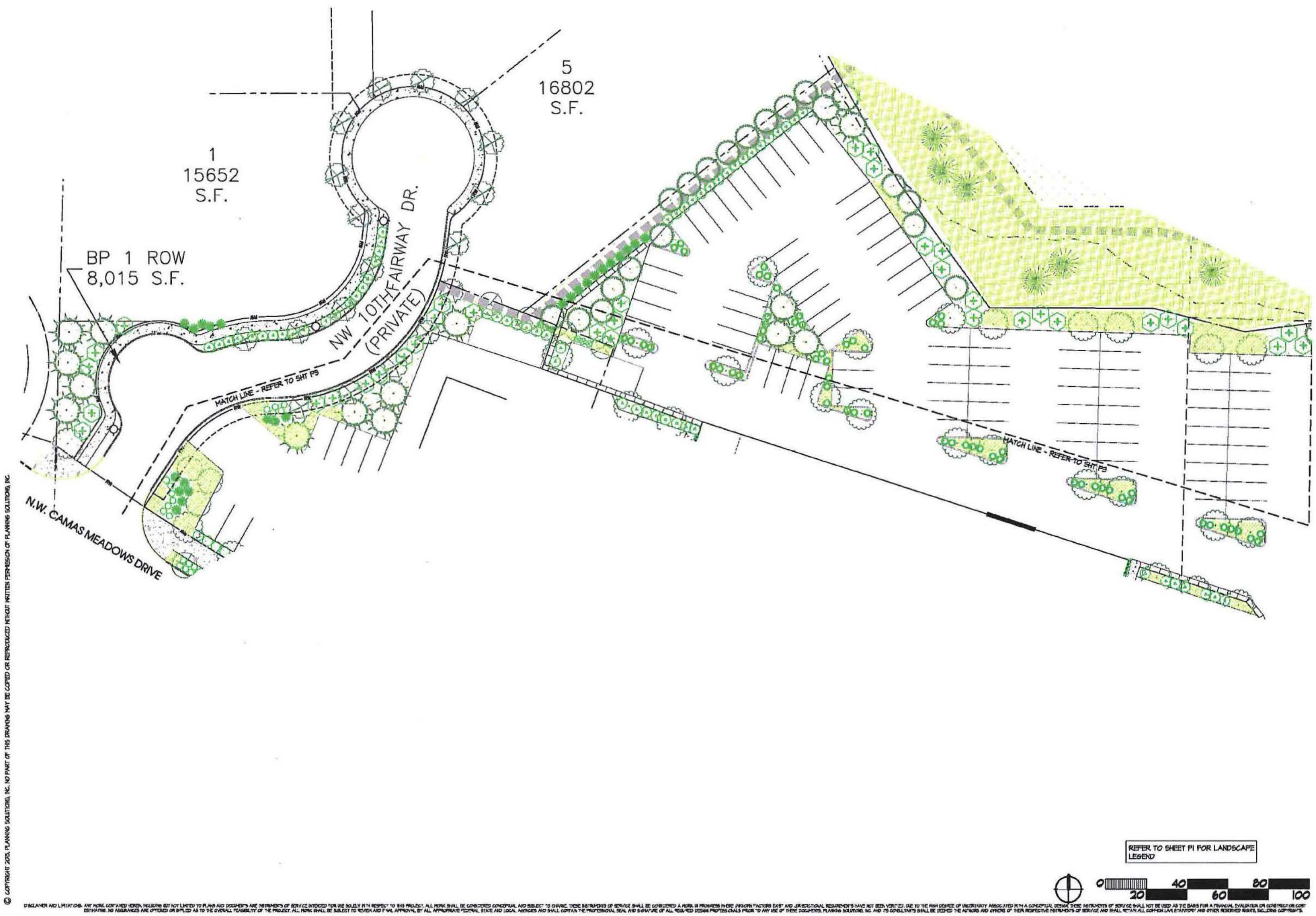
Planning Solutions, Inc.
Creating Solutions to Complex Issues
4400 NE 77th Avenue
Suite 275
VANCOUVER, WA 98662

PRELIMINARY

The Archery @ Camas Meadows
NW Camas Meadows Drive
Camas, Washington

SHEET NAME:
LANDSCAPE PLAN

SHEET #:
P3
SHEET 3 OF 5



Planning Solutions, Inc.

Creating Solutions to Complex Issues

4400 NE 77th Avenue
Suite 275
VANCOUVER, WA 98662
www.planningsolutionsinc.com

PRELIMINARY
NOT FOR CONSTRUCTION
SUBJECT TO APPROVAL

The Archery @ Camas Meadows

NW Camas Meadows Drive
Camas, Washington

DRAWN: HA/CB	CHECKED: CB
SCALE: 1" = 20'-0"	DATE: 8.2015
JOB #: 15-1544	
ISSUED FOR: PLR	
REVISIONS:	

SHEET NAME:
LANDSCAPE PLAN

SHEET #:
P4
SHEET 4 OF 5

0 20 40 60 80 100

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Suite 275
VANCOUVER, WA 98662
www.planningsolutionsinc.com

PRELIMINARY
NOT FOR CONSTRUCTION
SUBJECT TO APPROVAL

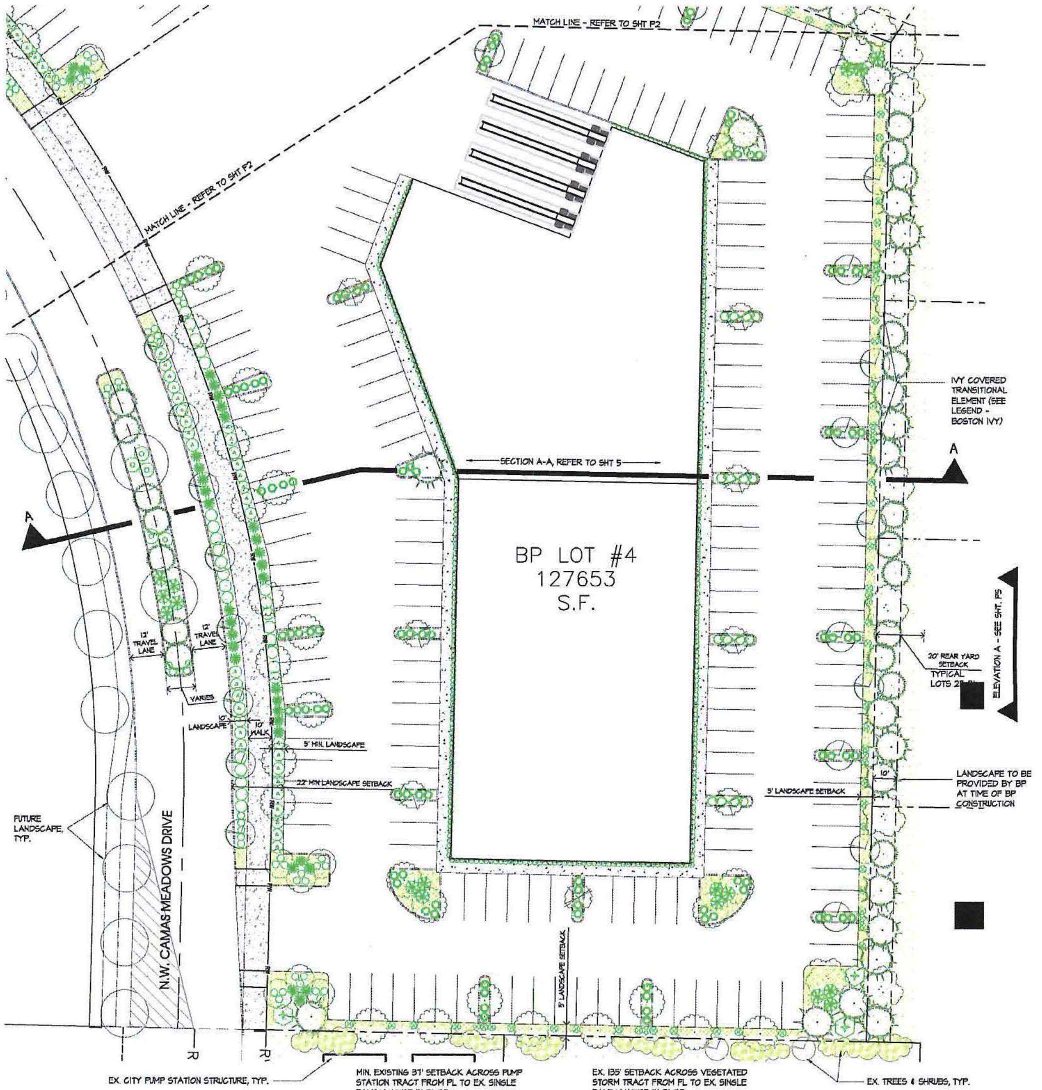
The Archery @ Camas Meadows

NW Camas Meadows Drive
Camas, Washington

DRAWN: HA/CB	CHECKED: CB
SCALE: 1" = 20'-0"	DATE: 11.2015
JOB #: 15-1544	
ISSUED FOR: PLR	
REVISIONS:	

SHEET NAME:
LANDSCAPE PLAN

SHEET #:
P2
SHEET 2 OF 5



TREE LEGEND

SYMBOL	BOTANICAL / COMMON NAME	SIZE	QUANTITY	NATIVE
	CORNUS ALTERNIFOLIA 'ARGENTEA' / AGRENTEA DOGWOOD	2" Cal. Min.	6	✓
	LIRIODENDRON TULIPIFERA 'FASTIGIATA' / TULIP TREE - FASTIGIATE	6' ht. Min.	60	
	CALOCEDRUS DECURRENS / INCENSE CEDAR	6' ht. Min.	76	✓
	QUERCUS ROBUR 'FASTIGIATA' / COLUMNAR ENGLISH OAK	2" Cal. Min.	47	
	THUJA PLICATA 'HOGAN' / HOGAN WESTERN RED CEDAR	6' ht. Min.	72	✓
	ACER CIRCINATUM / VINE MAPLE	6' ht. Min.	23	✓
	ACER PLATANOIDES 'CRIMSON SENTRY' / CRIMSON SENTRY MAPLE	2" Cal. Min.	19	
	PYRUS CALLERYANA 'CAPITAL' / CAPITAL PEAR	2" Cal. Min.	57	
	CORNUS FLORIDA / EASTERN DOGWOOD	2" Cal. Min.	24	✓

SHRUB & GROUND COVER LEGEND*

SYMBOL	BOTANICAL / COMMON NAME	SIZE	QUANTITY	
	ILEX X MESERVEAE 'BLUE GIRL' / BLUE GIRL MESERVE HYBRID HOLLY	2 GAL. min.	84	
	ILEX X MESERVEAE 'BLUE BOY' / BLUE BOY MESERVE HYBRID HOLLY	2 GAL. min.	293	
	CORNUS ALBA 'BAILHALO' / IVORY HALO DOGWOOD	2 GAL. min.	140	✓
	CORNUS SERICEA 'KELSEYI' / KELSEY'S DWARF RED TWIG DOGWOOD	2 GAL. min.	167	
	PHYSOCARPUS CAPITATUS / PACIFIC NINEBARK	2 GAL. min.	54	✓
	SYMPHORICARPOS ALBUS / NATIVE SNOWBERRY	2 GAL. min.	23	✓
	RIBES SANGUINEUM / RED FLOWERING CURRANT	2 GAL. min.	24	✓
	MAHONIA REPENS / CREEPING MAHONIA	1 GAL. min.	239	✓
	THUJA OCCIDENTALIS 'SMARAGD' / EMERALD GREEN ARBORVITAE	5' TALL min.	178	
	GAULTHERIA SHALLON / SALAL	2 GAL.	16	✓
	ACCENT SHRUB TBD	1 GAL.	12' O.C.	
SYMBOL NOT SHOWN (ON FENCE BETWEEN RES & BP)	PARTHENOCISSUS TRICUSPIDATA / BOSTON IVY	1 GAL.	10' O.C.	
GROUNDCOVER & ORNAMENTAL GRASSES				
	ARCTOSTAPHYLOS UVA URSI 'MASS.' MASSACHUSETTS KINNICKINNICK	1 GAL. min.	30" O.C. max.	✓
SYMBOL NOT SHOWN (IN MEDIAN)	FRAGARIA CHILOENSIS / BEACH STRAWBERRY	1 GAL. min.	24" O.C. max.	✓

* QUANTITIES NOTED ARE FOR ENTIRE PROJECT. FINAL SPECIES & QUANTITIES TO BE DETERMINED AT FINAL DESIGN

Planning Solutions, Inc.
Creating Solutions to Complex Issues
4400 NE 77th Avenue
Suite 275
VANCOUVER, WA 98662
www.planningsolutionsinc.com

PRELIMINARY
NOT FOR CONSTRUCTION
SUBJECT TO APPROVAL

The Archery @ Camas Meadows

NW Camas Meadows Drive
Camas, Washington

DRAWN: HA/CB	CHECKED: CB
SCALE: 1" = 20'-0"	DATE: 11.20.15
JOB #: 15-1344	
ISSUED FOR: PLR	
REVISIONS:	

SHEET NAME:
LANDSCAPE PLAN

SHEET #:
P1
SHEET 1 OF 5

EXHIBIT 6

DEVELOPER'S

G I S

P A C K E T

Produced By:
Clark County Geographic Information System

For:
Kessi Engineering & Consulting
(360) 991-9300

Subject Property Account Number(s):

175948000
986031650

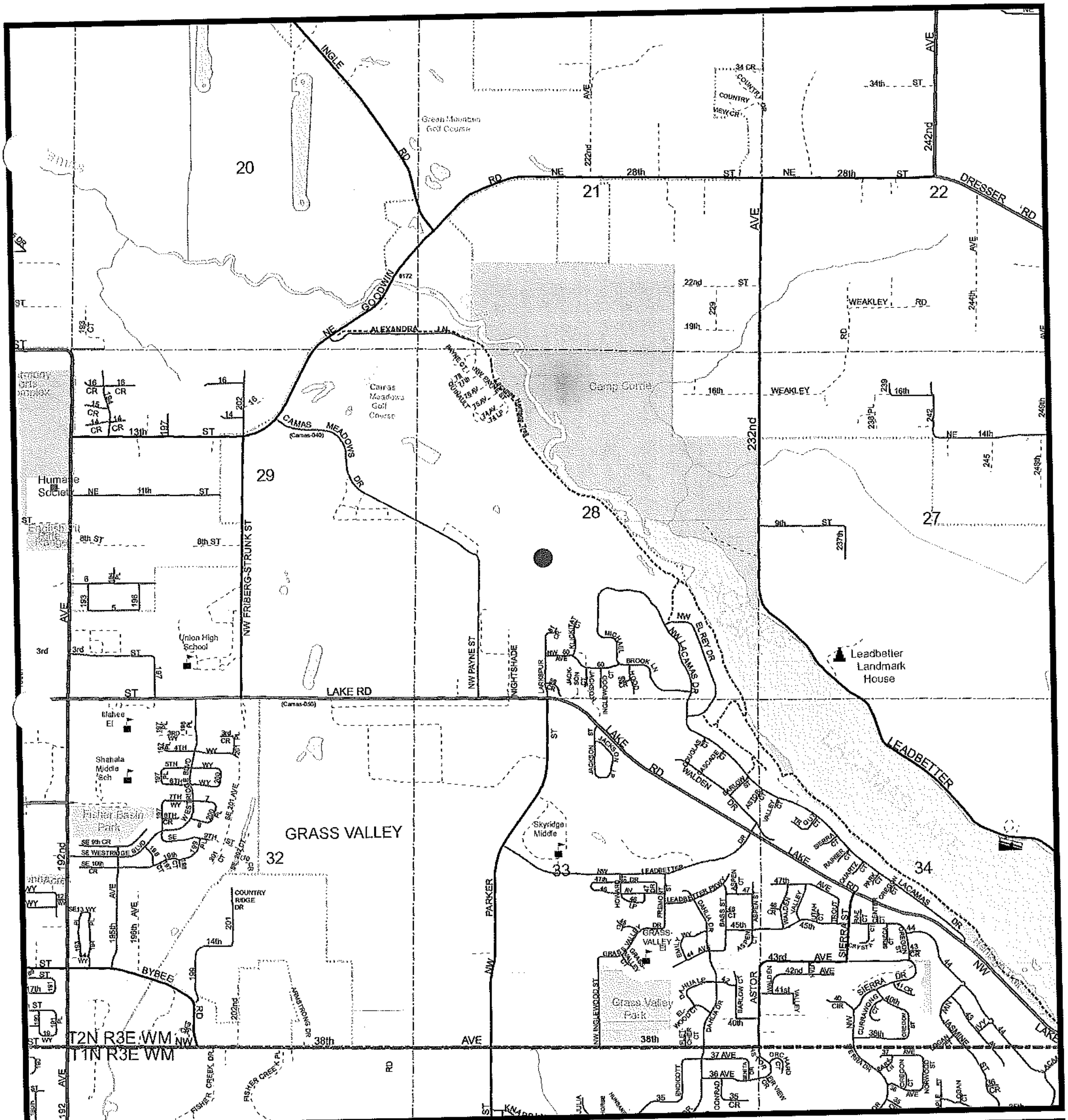
PDF # 136898

Printed: February 04, 2015

Expires: February 04, 2016

proud past, promising future
CLARK COUNTY
WASHINGTON

Table of Contents



General Location Map

Account No: 175948000, 986031650
Owner: CHINOOK LAND OWNERS GROUP LLC
Address: 1400 NW 63RD ST
C/S/Z: VANCOUVER, WA 98663

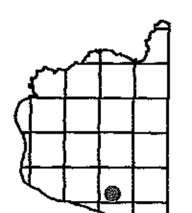
Printed on: February 04, 2015

CLARK COUNTY, WASHINGTON
Geographic Information System

1:24,000

0 0.1 0.2 0.3 0.4 0.5 Miles

Subject Property Location



Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Property Information Fact Sheet

Mailing Information:
Account No.: 175948000, 986031650
Owner: CHINOOK LAND OWNERS GROUP LLC
Address: 1400 NW 63RD ST
C/S/Z: VANCOUVER, WA 98663
Assessed Parcel Size: 36.43 Ac
Property Type: UNUSED LAND TIMBERED.

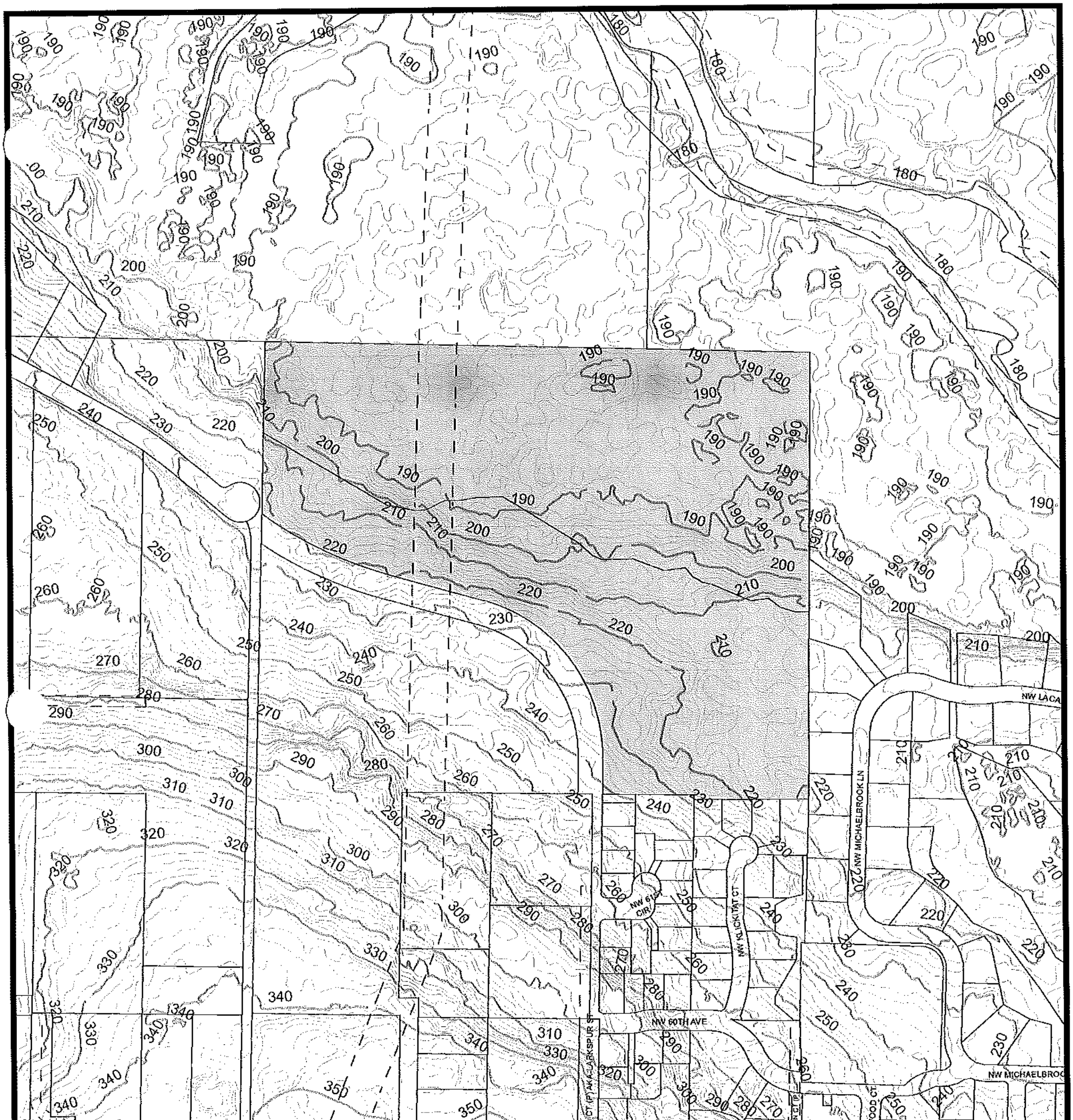
PARCEL LOCATION FINDINGS:

Quarter Section(s): SE 1/4,S28,T2N,R3E,
SW 1/4,S28,T2N,R3E
Municipal Jurisdiction: Camas
Urban Growth Area: Camas
Zoning: BP, R-15
Zoning Overlay: PlannedIndustrialDevelopmentOverlay
Comprehensive Plan Designation: IND,
SFL
Columbia River Gorge NSA: No Mapping Indicators
Building Moratorium: No Mapping Indicators

Late-Comer Area: No Mapping Indicators
Trans. Impact Fee Area: Camas
Park Impact Fee District: No Mapping Indicators
Neighborhood Association: No Mapping Indicators
School District: Camas
Elementary School: Grass Valley
Junior High School: Skyridge Middle
Senior High School: Camas
Fire District: Camas Washougal FD
Sewer District: Camas
Water District: None
Wildland: No Mapping Indicators
Historic Sites: No Mapping Indicators

ENVIRONMENTAL CONSTRAINTS:

Soil Type(s): CvA, 21.3% of parcel
HcB, 2.1%
HcD, 67.0%
HcE, 0.4%
LeB, 9.2%
Hydric Soils: Hydric, 21.3% of parcel
Non-Hydric, 78.7%
Flood Zone Designation: 500 Year Flood Area,
Floodway Fringe,
Outside Flood Area
CARA: Category 2 Recharge Areas
Liquefaction Susceptibility: Very Low
NEHRP: C
Slope: 0 - 5 percent, 56.2% of parcel
10 - 15 percent, 12.5%
15 - 25 percent, 2.9%
5 - 10 percent, 28.4%
Landslide Hazards: Slopes > 15%
Slope Stability: No Mapping Indicators
Priority Habitat and Species Areas: Riparian Habitat Conservation Area,
Species
Priority Species Area Buffer: WDFW Priority Species Buffer
Priority Habitat Area Buffer: No Mapping Indicators
Archeological Predictive: High, 85.2% of parcel
Moderate-High, 14.8%
Archeological Site Buffers: Mapping Indicators Found



CLARK COUNTY, WASHINGTON
Geographic Information System

1:4,800

0 190 380 570 Feet

Elevation Contours

Account No: 175948000, 986031650
Owner: CHINOOK LAND OWNERS GROUP LLC
Address: 1400 NW 63RD ST
C/S/Z: VANCOUVER, WA 98663

- Proposed Development Area
- Public Road
- Transportation or Major Utility Easement
- 2' Elevation Contour

Printed on: February 04, 2015

Printed on: February 04, 2015

2014 Aerial Photography

Account No: 175948000, 986031650

Owner: CHINOOK LAND OWNERS GROUP LLC

Address: 1400 NW 63RD ST

C/S/Z: VANCOUVER, WA 98663

CLARK COUNTY, WASHINGTON

Geographic Information System

N

1:4,800

0 200 400 600 Feet

Proposed Development Area

23120	23121	23122
23129	23128	23127
23132	23133	23134

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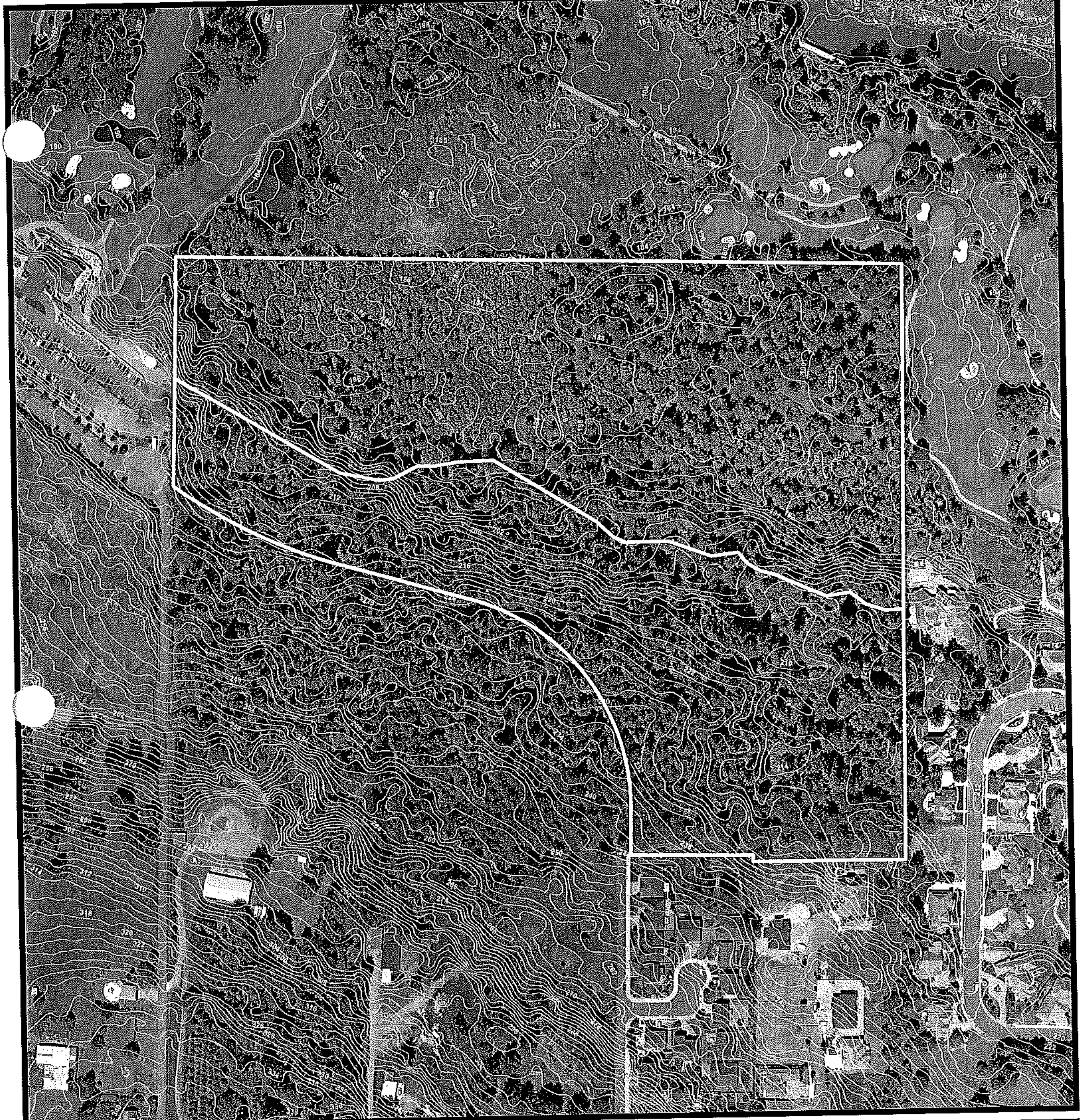

CLARK COUNTY, WASHINGTON

Geographic Information System

1:3,600

0 150 300 450 Feet

2014 Aerial Photography with Contours

Account No: 175948000, 986031650

Owner: CHINOOK LAND OWNERS GROUP LLC

Address: 1400 NW 63RD ST

C/S/Z: VANCOUVER, WA 98663

Proposed Development Area

2' Elevation Contours

Printed on: February 04, 2015

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23129	23126	23127
23132	23133	23134

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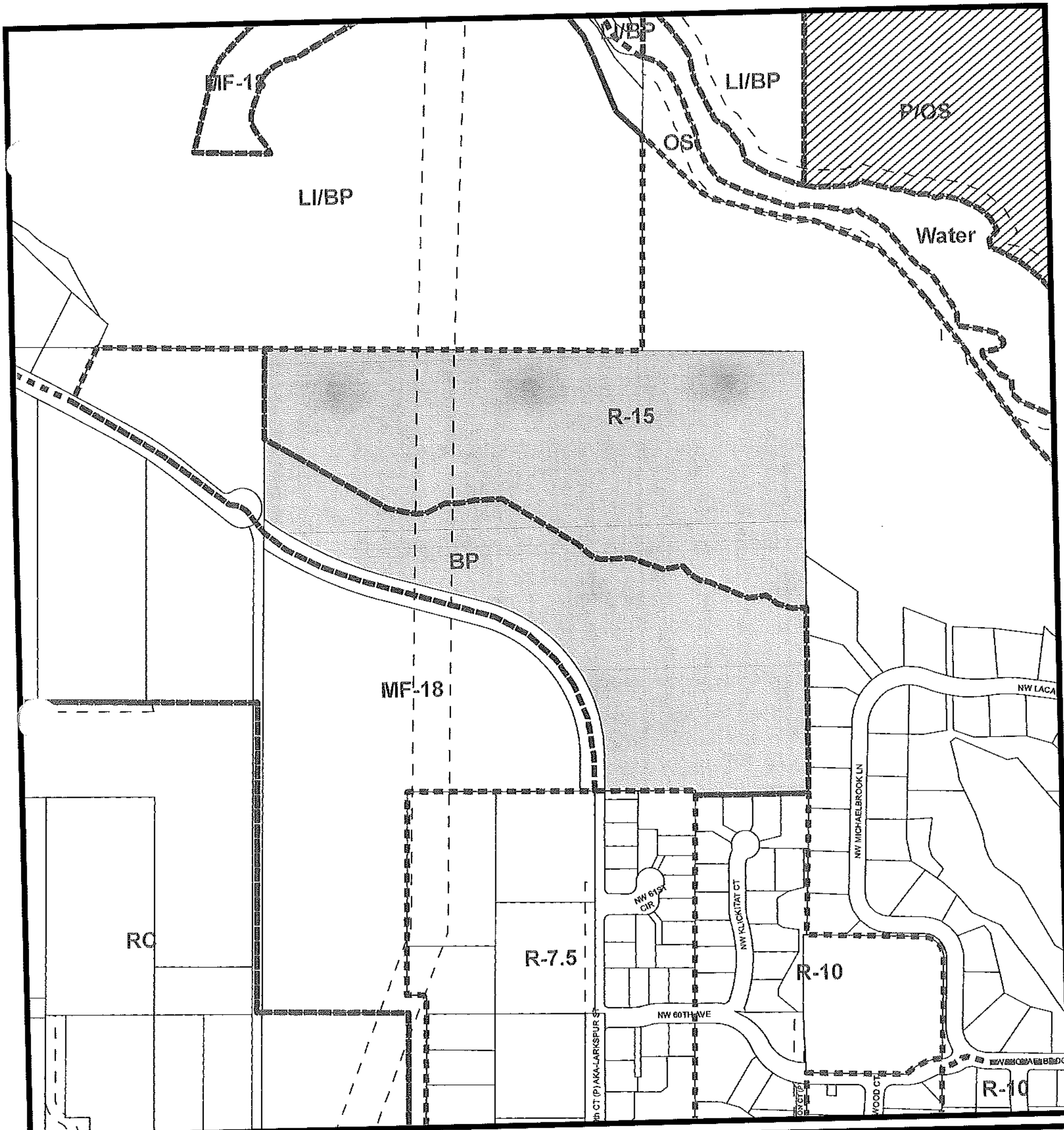

Zoning Designation

Account No: 175948000, 986031650
Owner: CHINOOK LAND OWNERS GROUP LLC
Address: 1400 NW 63RD ST
C/S/Z: VANCOUVER, WA 98663

CLARK COUNTY, WASHINGTON
Geographic Information System

1:4,800

0 200 400 600 Feet

Subject Parcel
Public Road
Transportation or Major Utility Easement
Zoning Boundary
Urban Holding - 10 (UH-10)
Urban Holding - 20 (UH-20)
Urban Holding - 40 (UH-40)
Surface Mining Overlay District

Printed on: February 04, 2015

23120	23121	23122
23129	23128	23127
23132	23133	23134

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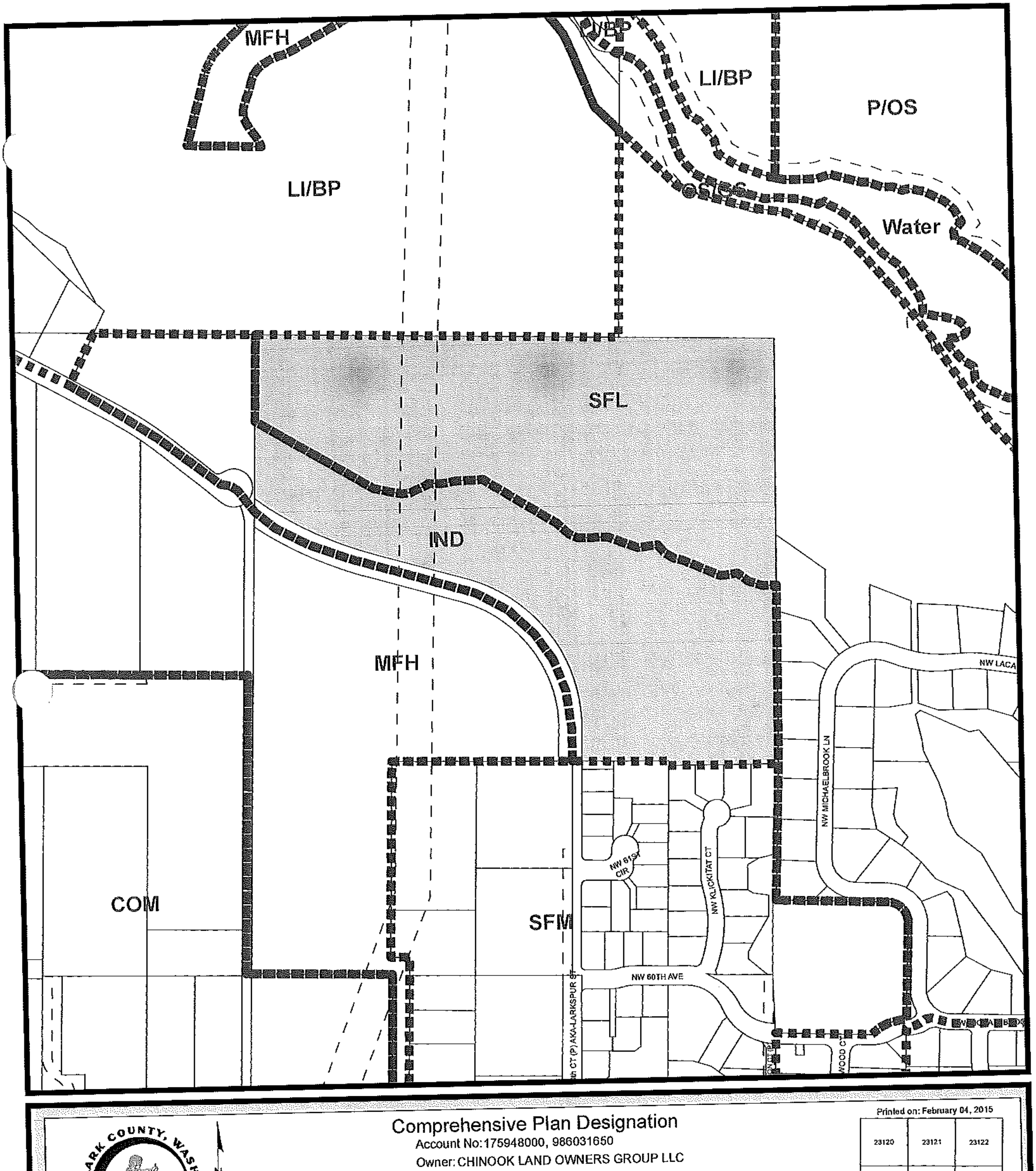

CLARK COUNTY, WASHINGTON

Geographic Information System

1:4,800

0 200 400 600 Feet

Comprehensive Plan Designation

Account No: 175948000, 986031650

Owner: CHINOOK LAND OWNERS GROUP LLC

Address: 1400 NW 63RD ST

C/S/Z: VANCOUVER, WA 98663

- Subject Parcel
- Public Road
- Transportation or Major Utility Easement
- Comprehensive Plan Boundary
- Urban Reserve
- Industrial Reserve
- Railroad Industrial Reserve
- Mining
- Rural Center Mixed Use
- Columbia River Gorge Scenic Area

Printed on: February 04, 2015

23120	23121	23122
23129	23128	23127
23132	23133	23134

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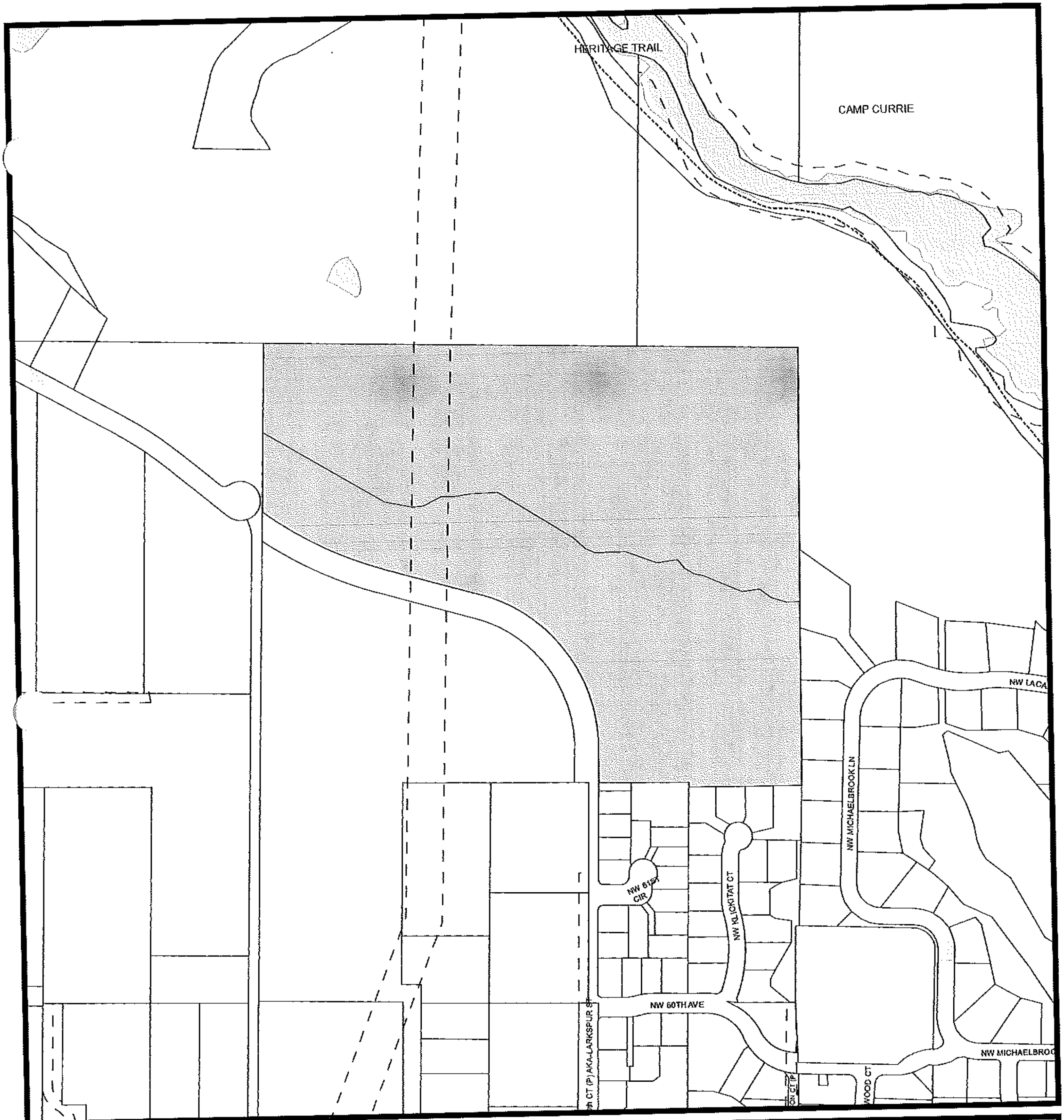

CLARK COUNTY, WASHINGTON

Geographic Information System

1:4,800

0 190 380 570 Feet

Arterials C-Tran Routes Parks & Trails

Account No: 175948000, 986031650

Owner: CHINOOK LAND OWNERS GROUP LLC

Address: 1400 NW 63RD ST

C/S/Z: VANCOUVER, WA 98663

Subject Parcel
Public Road
Transportation or Major Utility Easement
Parks
Trails

C-Tran Route
Principal Arterial
Minor Arterial
Collector
Rural Major Collector

Rural Minor Collector
Scenic Highway
State Route
Proposed

Printed on: February 04, 2015

23120	23121	23122
23129	23128	23127
23132	23133	23134

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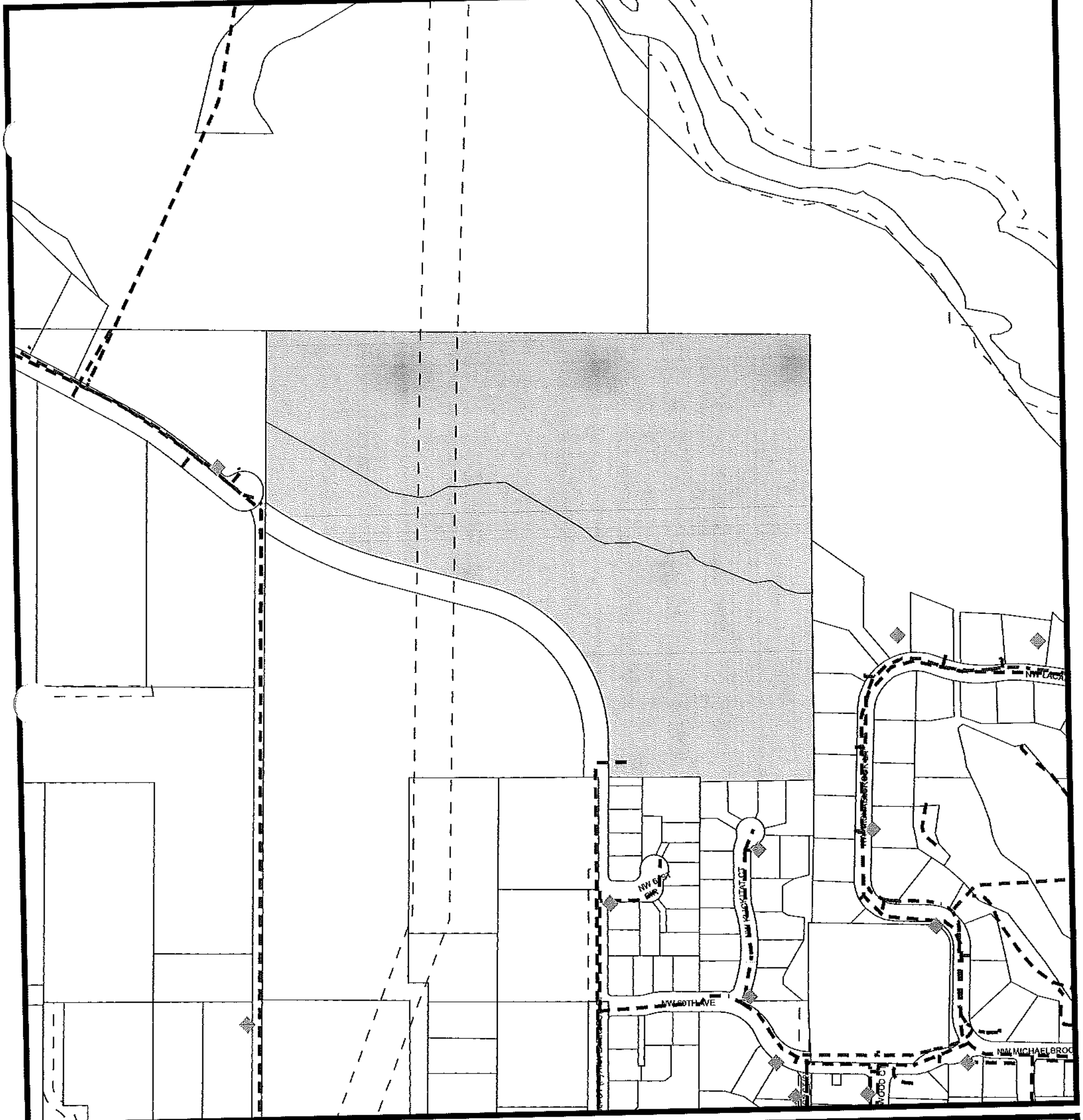

Geographic Information System

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0 190 380 570 Feet

Water Sewer and Storm Systems

Account No: 175948000, 986031650

Owner: CHINOOK LAND OWNERS GROUP LLC

Address: 1400 NW 63RD ST

C/S/Z: VANCOUVER, WA 98663

- Subject Parcel
- Public Road
- Transportation or Major Utility Easement
- Storm Water Lines
- Water Lines
- Sewer Lines
- 1-year Wellhead ZOC
- 5-year Wellhead ZOC
- 10-year Wellhead ZOC
- Hydrants

Printed on: February 04, 2015

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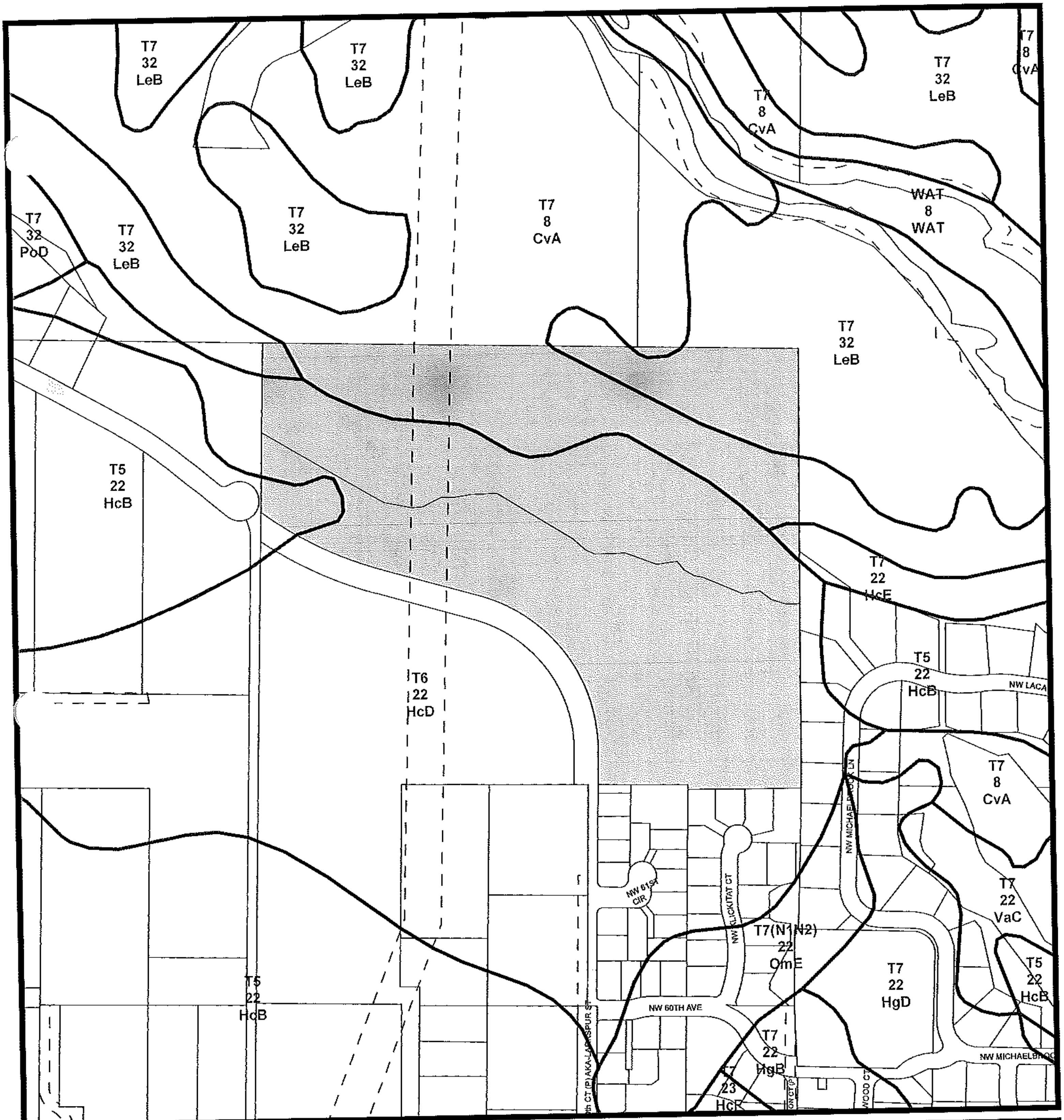
23129	23128	23127
23132	23133	23134



Soil Types

Account No: 175948000, 986031650

Owner: CHINOOK LAND OWNERS GROUP LLC

Address: 1400 NW 63RD ST

C/S/Z: VANCOUVER, WA 98663

CLARK COUNTY, WASHINGTON

Geographic Information System

1:4,800

0 190 380 570 Feet

N

Subject Parcel

Public Road

Transportation or Major Utility Easement

Soil Type Boundary

Printed on: February 04, 2015

23120	23121	23122
23129	23128	23127
23132	23133	23134

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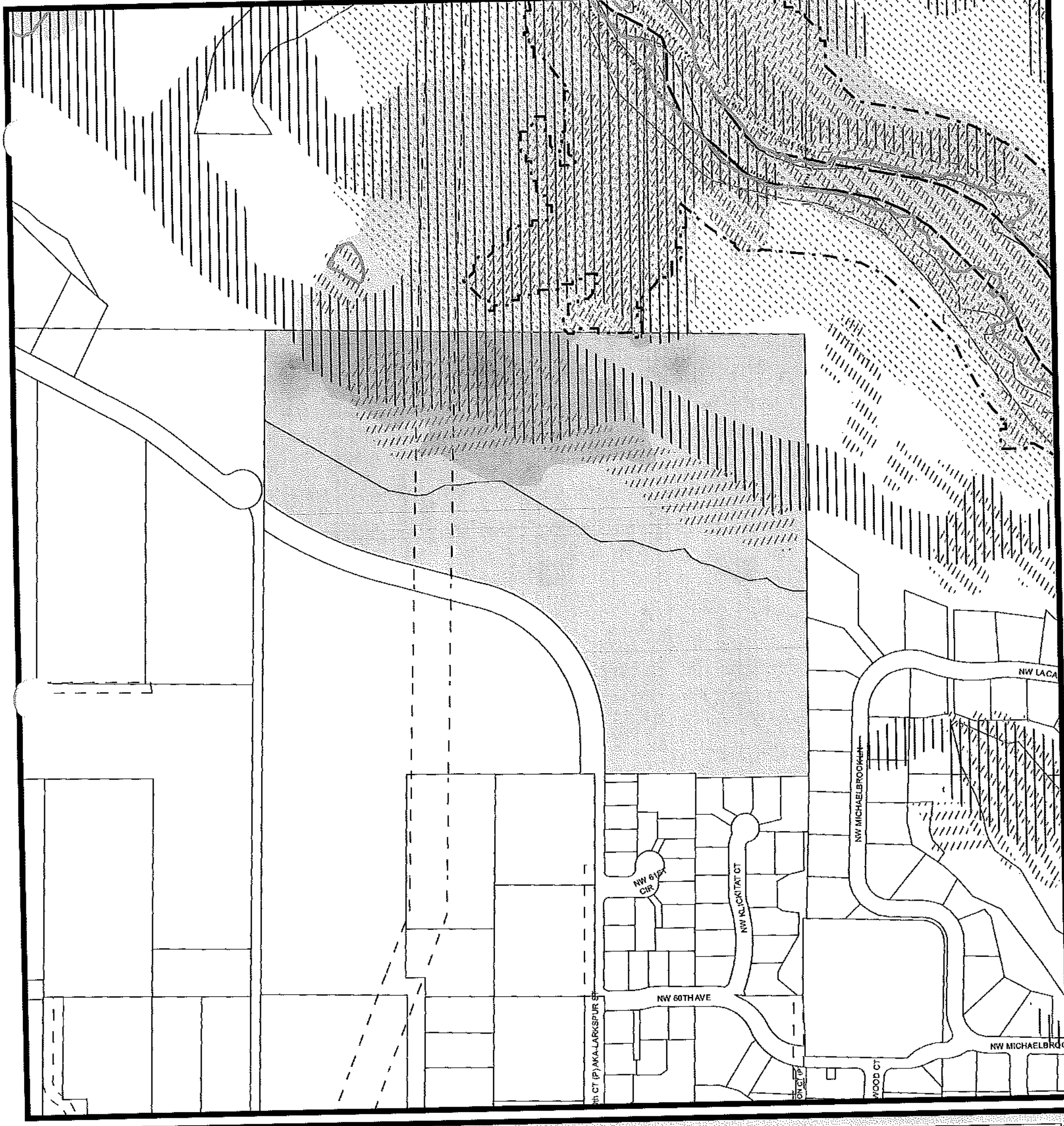


Printed on: February 04, 2015

23120	23121	23122
23129	23128	23127
23132	23133	23134

Environmental Constraints I

Account No: 175948000, 986031650

Owner: CHINOOK LAND OWNERS GROUP LLC

Address: 1400 NW 63RD ST

C/S/Z: VANCOUVER, WA 98663

CLARK COUNTY, WASHINGTON

Geographic Information System

1:4,800

0 190 380 570 Feet

- Subject Parcel
- Public Road
- Transportation or Major Utility Easement
- Hydric Soils
- Wetland Inventory
- Non-riparian Habitat or Species Area
- CARA Category 1
- 100 year Floodplains
- Floodway
- Shorelines
- Stream

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

NOTICE: DEVELOPER'S PACKETS CONTAIN THE UPDATED SHORELINE DESIGNATION MAP LAYER

Mapping of Shoreline Master Program (SMP) Shoreline Designations (SDs)

Clark County jurisdictions formed a coalition and worked together, with oversight from the Washington State Department of Ecology, to update their local SMPs and Shoreline Designation (SD) Maps. Updated shoreline designations have been mapped countywide and are now shown in Developer's Packets. However, because the coalition jurisdictions are proceeding individually toward local adoption and Ecology approval of their SMPs and SD Maps, their SD Maps will become effective at different times throughout the rest of 2012 and into 2013. Therefore, it is important to understand that some projects fall under the new designations and some are still regulated based on prior designations.

Interim and newly adopted Shorelines Master Program (SMP) Shoreline Designation (SD) Map layers can be viewed in MapsOnline until the SMP update process for Clark County jurisdictions is complete. The interim map layer entitled *Interim Shoreline Designations* applies to projects in jurisdictions where the newly adopted SD Maps are not yet effective. The *Shoreline Designation* map layer applies to jurisdictions where the newly adopted SD maps have become effective.

It is important to review the SMP status for the jurisdiction in which your project is located to determine which map layer and shoreline designations apply.

The appropriate shoreline map layer and a link to each jurisdiction's SMP website is listed below:

Clark County - As of September 12, 2012, newly adopted shoreline designations are represented in the Shoreline Designations map layer in Developer's Packets

http://www.clark.wa.gov/planning/land_use/shoreline.html

Vancouver and Camas – As of September 24, 2012, new SMP designations took effect for both Camas and Vancouver. New Shoreline Designations are represented in Developer's Packets.

Vancouver - http://www.cityofvancouver.us/environmentalOrd.asp?menuid=10463&submenuid=10487

Camas - http://www.ci.camas.wa.us/index.php/planning/planningcurrentissues

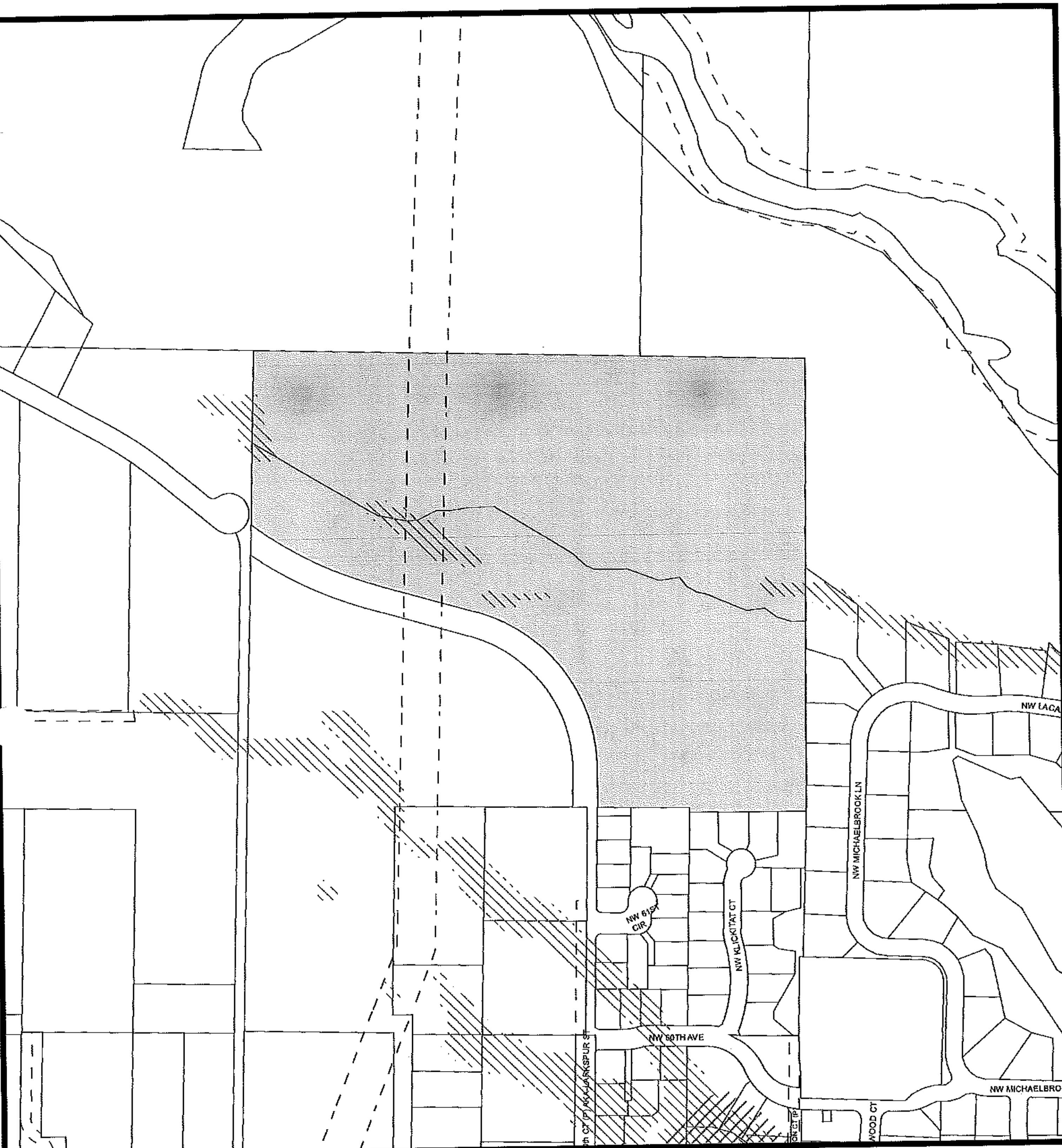
Other jurisdictions – Refer to the Interim Shoreline Designations map layer in MapsOnline until the updated Shoreline Designation Map becomes effective, at which time the Shoreline Designations map layer will take effect.

Battle Ground - http://www.cityofbg.org/index.aspx?nid=374

La Center - http://www.ci.lacenter.wa.us/city_departments/city_planner.html

Ridgefield - http://www.ci.ridgefield.wa.us/resources/documents/SMPAdoptedApril122012.pdf

Washougal - http://www.cityofwashougal.us/city-services/community-development2/planning-division2/services/shoreline-master-program-update.html



Environmental Constraints II

Account No: 175948000, 986031650
Owner: CHINOOK LAND OWNERS GROUP LLC
Address: 1400 NW 63RD ST
C/S/Z: VANCOUVER, WA 98663

CLARK COUNTY, WASHINGTON
Geographic Information System

1:4,800

0 190 380 570 Feet

- Subject Parcel
- Public Road
- Transportation or Major Utility Easement
- Slopes > 15%
- Potentially Unstable Slope
- Historic or Active Landslide
- Severe Erosion Hazard Areas
- CCHR Historic Site
- NRHP Historic Site
- INV Historic Site

Printed on: February 04, 2015

23120	23121	23122
23129	23128	23127
23132	23133	23134

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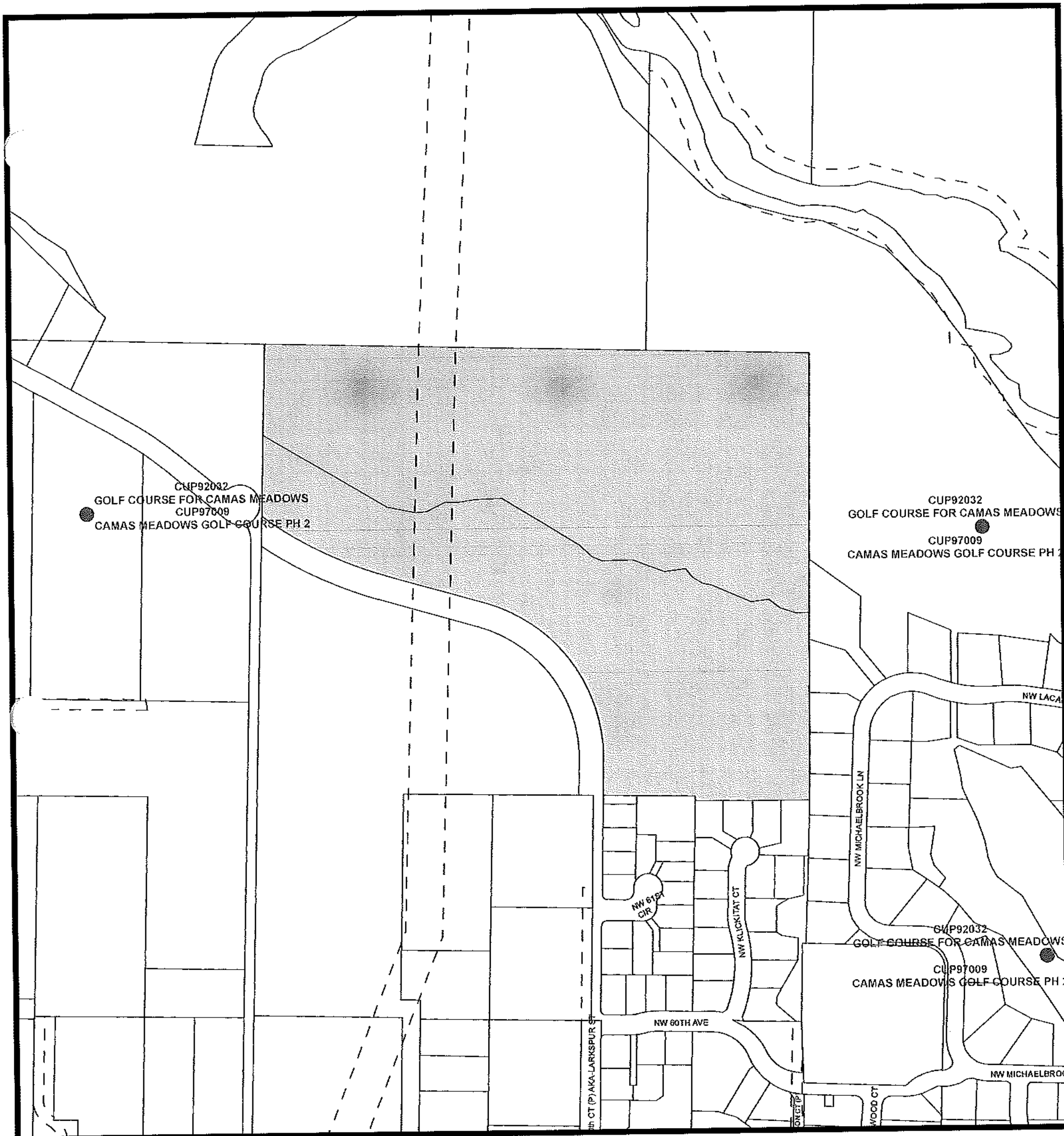

Adjacent Development

Account No: 175948000, 986031650
Owner: CHINOOK LAND OWNERS GROUP LLC
Address: 1400 NW 63RD ST
C/S/Z: VANCOUVER, WA 98663

Proposed Development Area
Public Road
Transportation or Major Utility Easement

CLARK COUNTY, WASHINGTON
Department of Assessment and GIS
1:4,800

0 200 400 600 Feet

Printed on: February 04, 2015

23120	23121	23122
23129	23128	23127
23132	23133	23134

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EXHIBIT 7

SEPA Environmental Checklist
Washington Administrative Code (WAC) 197-11-060

Purpose of Checklist:
The State Environmental Policy Act (SEPA), chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

Instructions for Applicants:
This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer or if a question does not apply to your proposal, write "do not know" or "does not apply". Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Use of checklist for non-project proposals:
Complete this checklist for non-project proposals, even though questions may be answered "does not apply". IN ADDITION, complete the **SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (PART D)**.

For non-project actions, the references in the checklist to the words "project", "applicant", and "property or site" should be read as "proposal", "proposer", and "affected geographic area", respectively.

A. BACKGROUND

1. Name of proposed project, if applicable:
   Parklands at Camas Meadows

2. Name of applicant:
   Parklands at Camas Meadows, LLC.

3. Address and telephone number of applicant and contact person:
   20705 SE Evergreen Highway, Camas, WA 98607; James Kessi (360) 991-9300

4. Date checklist prepared:
   January 2016

5. Agency requesting checklist:
   City of Camas

6. Proposed timing or schedule (including phasing, if applicable):
   Construction of the first phase to begin as soon as land use approval is obtained and weather permits, in 2016. The second and subsequent phases will be completed as soon after that as feasible based on weather and market conditions.

7. Do you have any plans for future additions, expansion or further activity related to or connected with this proposal? If yes, explain.
   Multiple phases are proposed with this project. No plans for future additions are known at this time. Any further activity would also be subject to a Master Plan and Development Agreement with the City. If any adjacent parcels may develop in the future, it would be under a separate land use applications.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.
   An archaeological pre-determination recommending no further action, tree survey, wetland delineation and habitat assessment, geotechnical site investigation, floodway elevation survey, have been completed for this project. An NPDES permit will be required prior to construction. Also a Phase I Environmental Site Assessment will be completed in 2015.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.
   None known at this time

10. List any government approvals or permits that will be needed for your proposal, if known. ***1)Mixed Use Plan Development overlay zone over 15.7 acres of the site; 2)Development Agreement to include a Master Plan; 3)Subdivision preliminary and final plat with concurrent critical areas review; 4)Site Plan and Design Review of employment or mixed use portions of the project; 5)Grading permit, logging forest practices act compliance, and NPDES permit; 6) Engineering construction plan review (civil drawings) and approval; and 7)building permits.***

11. Give a brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)
    The total combined site area is a 15.7 acre parcel zoned BP plus a 20.98 acre parcel zoned R-15 for about 36.7 total acres. In addition, there exists an adjacent existing 74 foot wide

public ROW area of about 2.4 acres for future Camas Meadows Drive, a planned City arterial street project. The project will include and be responsible for the construction of 1/2 width street improvements of NW Camas Meadows Dr connecting NW Camas Meadows Dr to the west with the existing Larkspur (1/2 width road frontage).

The proposed single-family detached residential subdivision part of the project will create up to 42 single-family detached executive residential lots of at least 15,000 sf in size, in up to three phases. The project will enter into a formalized Master Plan and Development Agreement with the City to incorporate and address site and development and standards issues and requirements.

The proposed Business Park portion area will buildout the BP portion of the project in up to 4 or more independent phases as the master plan will be approved as part of the DA, the lots created through the subdivision and may be adjusted through boundary line adjustments.

11 acres or 30% of the total site area will be preserved as open space wetland and wetland buffer. In addition up to 6000 lineal feet of a natural surface pedestrian trail system is proposed to be constructed on-site, in the buffer, and possibly an elevated boardwalk crossing the wetland. Internal private streets will be constructed with water, storm, and sanitary sewer service and all associated utilities will be provided to all lots and buildings. Stormwater runoff will be managed in a combination of public and private facilities throughout the site. Grading of the site will also be required.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.
The project site is located just east of Camas Meadows Golf Course Club House and just north of Camas Meadows Drive, in Camas, Washington 98607, in the SE & SW ¼ of Sec. 28, T2N, R3E, W.M. The site is comprised of 2 parent parcels plus the existing 74 foot wide public City ROW for Camas Meadows Drive: 175948-000 & 986031-650. See attached site plan.

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (underline one): Flat, rolling, hilly, steep slopes, mountainous, other
The terrain is flat, rolling and hilly with a few limited areas of steeper slopes. The site is vegetated with shrubs and mostly forested in parts.

b. What is the steepest slope on the site (approximate percent slope)?
Most of the site is less than 10% slope or less. The steepest natural slope in limited areas is from 25 to 30%.
According to GIS, the site slopes are
0 to 5% slope is about 56% of the site
5 to 10% slope is about 28% of the site
10 to 15% slope is about 12% of the site

15 to 25% slope is about 3% of the site

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.
According to Clark County GIS, soils on site are Cove and Hesson clay loams, and Lauren Series (CvA, 31% HcB, 2%, HcD, 67%, HcE, 0.7%, LeB 9%).

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.
The site is stable and there are no indications of unstable soils. Refer to the geotechnical site investigation report for more information.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.
The preliminary estimate if for up to one hundred fifty thousand cubic yards of grading, cut, and fill for the construction of the site pads, streets, and buildable lots. Engineered, structural fill and crushed aggregate from a local rock pit or quarry will be the source imported material.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.
Erosion on the site can occur when the ground is disturbed and not protected. Erosion control measures, such as silt fences, and wood grinding filtration berms and inlet protection, jute matting, straw ground cover, cover crop planting, and appropriate erosion control techniques will be employed to minimize that possibility. An erosion control plan will be included in the construction plans to be submitted for the approval by the City.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? ***For the residential portion up to about fifty percent of the site is expected to be impervious. For the business park portion, about eighty percent of the site is expected to be impervious. 30% of the entire site will remain as permanently protected vegetated pervious open space wetland and wetland buffer area – both vegetated and planted with trees.***

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:
Tree removal, clearing, and grading will occur during extended periods of dry weather and in accordance with City standards. Erosion control measures such as silt fences, and diversion ditches, straw as ground cover, and wood grinding filtration berms along the buffers and low points will be incorporated as necessary and appropriate. The retention of as much on site vegetation as feasible will also help reduce erosion during construction. Specific erosion control responsibilities and record-keeping requirements will be assigned to the construction contractor. A site specific SWPPP (Stormwater Pollution Prevention Plan) will also prepared for the site to help identify the most appropriate erosion control Best Management Practices (BMPs) for the site.

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2. Air

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, and industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities, if known.
Typical automobile, truck, and equipment emissions will occur during construction. Dust will occur during construction when weather is dry, but will be controlled as necessary by watering and other measures. After completion of the project, only those emissions associated with typical commercial business park building uses and residential subdivision uses will occur.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.
None known.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:
Standard emission control for equipment. Watering as necessary to control dust during construction. Trees and shrubs will be planted on the site and within the wetland buffer and for landscaping as part of site plan construction.

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3. Water

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.
There are wetlands on site as noted in the Wetland Delineation Report. There two existing roads with culverts crossing the wetlands. The wetlands all eventually drain directly approximately one thousand feet to the northeast into Lacamas Lake. Lacamas Lake ultimately drains into the Washougal River which flows into the Columbia River.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.
Yes, project construction will occur within 200 feet of the wetlands and possible shorelines. If the optional elevated boardwalk is installed, it will cross the wetland. See site plan.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetland, and indicate the area of the site that would be affected. Indicate the source of fill material.
No dredge fill is anticipated in a surface water or wetland, however, there may be up to one-tenth of an acre of total fill if needed as part of the proposed buffer mitigation project. In addition, one square foot concrete block pier pilings (less than one thousand square feet total) may need to be placed in the wetland if the optional elevated boardwalk is installed, it will cross the wetland.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose and approximate quantities, if known.
No withdrawals are anticipated, however, a portion of the site's stormwater flow may be diverted to the wetlands as part of the overall stormwater control facilities system plan to help keep the wetland and wetland vegetation property hydrated and for water hydrology benefits. The system will be consistent with City and DOE requirements.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.
A portion of the site lies within the 100-year floodplain as noted on the site plan and consistent with FEMA Map Number 53011C0414D as a Special Flood Hazard Area subject to inundation by the 1%Annual Flood Chance (Zone AE).

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No waste materials to surface waters are proposed. All stormwater runoff will be collected, treated and released as required prior to release to the existing natural low areas, in accordance with City standards.

b. Ground:

1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose and approximate quantities, if known.
No groundwater will be withdrawn. Stormwater runoff will be collected, treated and released prior to release to natural drainages, in accordance with City standards.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: domestic sewage; industrial; containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) is expected to serve.
No septic systems are proposed. All new site construction waste will be collected and conveyed to the public municipal sanitary wastewater treatment plant

c. Water Runoff (including storm water):

I) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.
Stormwater runoff will be collected, treated and released prior to release to natural drainages, in accordance with City and agency standards. See 3.a.1 above for more details.

2) Could waste materials enter ground or surface waters? If so, generally describe.
All traffic bearing ***stormwater runoff streets will be collected, treated and released prior to release to natural drainages, in accordance with City and agency standards. It is unlikely that significant waste material related to residential and site development runoff from rooftops and yards will enter ground or surface water since it is required to receive water quality treatment.***

d. Proposed measures to reduce or control surface, ground and runoff water impacts, if any:
Stormwater runoff will be collected, treated and released prior to release to natural drainages, in accordance with City standards.

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4. Plants

a. Check or underline types of vegetation found on the site:

____ deciduous tree: **alder**, **maple**, **ash**, **cottonwood**, **Oregon white oak**, aspen, other
____ evergreen tree: **fir**, **cedar**, pine, other
____ shrubs: **Sword Fern**, **Himalayan Blackberry**, **Salmon Berry**, **Indian Plum**, **Snow Berry**, **Trailing Blackberry**, **Western Salal**, **ferns**
____ grass: **common grass species**
____ pasture
____ crop or grain
____ wet soil plants: cattail, **buttercup**, **bullrush**, **skunk cabbage**, other
____ other types of vegetation

b. What kind and amount of vegetation will be removed or altered?
Vegetation will be removed from areas to be graded for streets and homes. Vegetation will

be left in place in protected open spaces and wetlands. Buffers will be mitigated, planted and enhanced with native vegetation.

c. List threatened or endangered species known to be on or near the site. ***White Oak but will not be impacted by any proposed for develoment.***

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:
Vegetation will be preserved in established open spaces. Native vegetation will be planted to enhance existing wetlands and buffers. Over 30% of the entire site will be covered by a conservation easement and will be protected as permanent open space.

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5. Animals

a. Underline any birds and animals which have been observed on or near the site or are known to be on or near the site:

birds: hawk, **heron**, eagle, **songbirds**, other: ***other birds common to the northwest.***
mammals: **deer**, bear, elk, beaver, **raccoon**, **opossum** other: ***other small mammals common to the northwest.***
fish: bass, salmon, trout, herring, shellfish, other:______ **None known or observed.**

b. List any threatened or endangered species known to be on or near the site.
None known.

c. Is the site part of a migration route? If so, explain.
The site does lie within the Pacific Flyway, as does much of the western parts of Washington, Oregon and California.

d. Proposed measures to preserve or enhance wildlife, if any:
Preservation of open space, enhancement of existing wetlands and buffers. Vegetation will be preserved in established open spaces. Native vegetation will be planted to enhance existing wetlands and buffers. Over 30% of the entire site will be covered by a conservation easement and will be protected as permanent open space.

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6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.
The completed project will use energy sources including electricity, natural gas to supply the normal energy needs associated with lighting, heating, office equipment, etc. for homes and businesses. Solar energy and green building materials will be an option for encouraged for use in the Business Park area and allowed for use in the subdivision HOA's.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.
Not known. With the removal of some of the taller trees, potential solar use may be enhanced on adjacent properties.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any.
The new homes will meet all current Washington State energy codes and energy efficient appliances, HVAC systems, and green building materials will be promoted to help reduce overall usage. Some low impact development standards may be implemented on portions of the project.

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill or hazardous waste, that could occur as a result of this proposal? If so, describe.
None are expected.

1) Describe special emergency services that might be required.
No special emergency services are expected other than typical fire, ambulance, and emergency response service.

2) Proposed measures to reduce or control environmental health hazards, if any:
No measures are proposed, other than those normally associated with typical urban construction operations and site occupation.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?
No existing noise is expected to impact the project, other than existing traffic noise.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.
The use of equipment and activities producing intermittent or repetitive noise commonly associated site improvements r exterior new home construction will not occur before 7am or after 7pm Monday-Friday; before 7 am or after 5pm on Saturdays; and anytime on sundays or the following holidays: New Years Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, or Christmas Day. Typical noise associated with residential houses and commercial buildings, and associated adjacent street traffic will occur in the long term.

3) Proposed measures to reduce or control noise impacts, if any:
Mufflers on equipment as required. Construction will occur during normal working hours. Local noise regulations will be followed both during and after construction.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?
The site and the property to the south have been used as an archery club site for the past decades. Surrounding properties to the east are currently in use as R-15 zoned residential parcels, and to the south are currently in use as R1-10 and R1-7.5 zoned residential parcels, to the north are wetlands and to the west and northeast are golf course and are currently uses or are undeveloped.

b. Has the site been used for agriculture? If so, describe.
No.

c. Describe any structures on the site.
None.

d. Will any structures be demolished? If so, what?
No.

e. What is the current zoning classification of the site?
R-15 (single-family residential) and BP (Business Park) with a Planned Industrial Development Overlay and/or Master Plan-Development Agreement.

f. What is the current comprehensive plan designation of the site?
SFL/UL (single family urban low-density residential) and BP- Business Park with a Planned Industrial Development Overlay and/or Master Plan-Development Agreement.

g. If applicable, what is the current shoreline master program designation of the site?
N/A.

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.
According to Clark County GIS, parts of the site are mapped as potential erosion hazard areas, potentially unstable slopes greater than 15%, wetlands, Riparian Habitat, Priority Species buffer areas, shorelines, floodway fringe.

i. Approximately how many people would reside or work in the completed project?
Assuming 42 single family detached units in the subdivision area plus a potential of up to 24 attached living units in the BP area results in approximately 180 people would reside in the completed project (assume 2.7 people per unit over 66 units). Assuming up to 148,000 square feet of business park space plus a future possible potential of 40,000 square feet of additional BP, approximately 50 to 200 people could work in the completed project

j. Approximately how many people would the completed project displace?
None, as there are no existing residences on the site.

k. Proposed measures to avoid or reduce displacement impacts, if any:
None proposed. N/A

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:
Proposal will comply with all applicable land use regulations and standards including those related to land uses and density in compliance with the local agency regulations.

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle or low-income housing.
Up to 42 middle to high income homes will be provided on single family detached lots, plus 24 attached low, middle or high income living units depending on the final uses.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.
No existing residences will be eliminated.

c. Proposed measures to reduce or control housing impacts, if any:
Attached units may be provided in the BP area and Accessory Dwelling Units will be allowed use in the subdivision HOA's to help control housing impacts.

10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?
The proposed homes will be approximately up to 35 feet in height and will be built with modern commonly used exterior siding materials such as wood, stone, stone veneer, concrete, or cement-fiber-board. There is no height limitation in for Business Park zoning.

b. What views in the immediate vicinity would be altered or obstructed?
No views will be altered or obstructed in the residential portion; however, any multi-story business park buildings could impact views as there is no height limitation in the Business Park zoning code. The proposed building heights are lower than the existing trees heights which currently block any views.

c. Proposed measures to reduce or control aesthetic impacts, if any:
Drought tolerant and native landscaping and trees will be provided where possible on the site. Attractive, modern and conventional exterior siding, natural materials that comply with local regulations will be used for structure construction.

11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
Light and glare will come from typical home and commercial building exterior lighting and street lights, when it gets dark.

b. Could light or glare from the finished project be a safety hazard or interfere with views?
Not expected.

c. What existing off-site sources of light or glare may affect your proposal?
None

d. Proposed measures to reduce or control light and glare impacts, if any:
Home and commercial building exterior lighting and street lights are to be directed downward to reduce upward light glare as required by local standards. LED and energy efficient lighting will be promoted for use or as required by local standards. Commercial and mixed use buildings will be constructed with nonglazing and non-reflective materials.

12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?
In the immediate vicinity, Lacamas Lake Trail is to the north. There is also a 10 foot wide pedestrian/bike trail currently along the north side of Camas Meadows Drive to the west of the site, that 10 foot wide will be extended along the Camas Meadows Drive along the project's site frontage as part of construction. Camas Meadows 18-hole Championship Public Golf Course is adjacent and borders the site to the west, north and northeast.

b. Would the proposed project displace any existing recreational uses? If so, describe.
No existing recreational uses will be displaced except for the defunct archery trail.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:
In addition to the proposed 10 foot wide pedestrian/bike trail that will be extended along the Camas Meadows Drive along the project's site frontage, there is a proposed natural surface trail that will loop around the site through the on-site buffer. Park Impact Fees (PIFs) will also be paid as part of this development to the local agency.

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13. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state or local preservation registers known to be on or next to the site? If so, generally describe.
None known.

b. Generally describe any landmarks or evidence of historic, archaeological, scientific or cultural importance known to be on or next to the site.
None known.

c. Proposed measures to reduce or control impacts, if any:
An Archaeological pre-determination was conducted on the site and it recommended that no further investigation was necessary for the site. For future protection, all final construction plans will have the State required Archaeological Reporting & Procedural regulations put on the front of the construction plans, in the event any future historic cultural finds are encountered during construction.

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14. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.
Access to the site is currently provided by NW Camas Meadows Drive/NW Larkspur, a public street. A 1/2 width roadway connection fronting the property between NW Camas Meadows Dr and NW Larkspur will be constructed with this project.

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?
None known.

c. How many parking spaces would the completed project have? How many would the project eliminate?
At least 168 off-street single family detached residential parking spaces will be provided (minimum two in each single family driveway and two in garage for each home), not including additional on-street parking. For the BP portion, at least 300 off-street private parking spaces will be provided. In addition, any upper level living units may utilize additional tuck under or underground parking to supplement parking spaces with an estimated one parking stall per unit. No parking spaces will be eliminated.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

The proposal will construct several new internal streets, driveways, and parking lots which will be private and at least a half-width street (within the existing public ROW) of NW Camas Meadows Drive connection, which will be public. Connection between NW Camas Meadows Drive and NW Larkspur will serve the site frontage, (also known as Road 3 on the Camas 6 year street plan.)

e. Will the project use (or occur in the immediate vicinity of) water, rail or air transportation? If so, generally describe.
No

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

The proposed completed development is expected to generate up to 1,895 net new daily trips (ADT), 197 net new A.M. peak hour trips, and 191 net new P.M. peak hour trips. Refer to the project traffic study for more detailed trip information and estimates.

g. Proposed measures to reduce or control transportation impacts, if any:
The proposal will construct several new internal streets, driveways, and parking lots which will be private and at least a half-width street (within the existing public ROW) of NW Camas Meadows Drive connection and to NW Larkspur, which will be public to accommodate the proposed traffic impacts. In addition, Traffic Impact Fees (TIFs) will also be paid as part of this development to the local agency for each structure at the time of building permit.

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15. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.
The proposed project will result in a slight proportional increase in the need for fire, police, emergency services, and schools, for the new houses and new businesses.

Proposed measures to reduce or control direct impacts on public services, if any:
New construction and structures will be assessed increased property taxes which are used to help fund additional public services. To help address proportional impacts to public services, Traffic Impact Fees, Park Impact and School Impact fees, water SDC connection fees, and sanitary SDC connection fees will be paid for each new residence building permit on a lot and/or commercial building permit to help offset costs with needed additional associated public services.

These fees and does not include any of the other direct project costs paid by the developer for the construction, labor, or the materials for any of the sanitary sewer, water mains, electric lines, sales taxes, streets, stormwater facilities. Once these improvements are completed by the developer and approved for acceptance by the local agency, these improvements are donated by the developer to each agency for the benefit, use, and ownership by the public.

16. **Utilities**

a. Underline utilities currently available at the site: **electricity**, **natural gas**, **water**, **refuse service**, **telephone**, **sanitary sewer**, septic system, other.

b. Describe the utilities that are proposed for the project, the utility providing the service and the general construction activities on the site or in the immediate vicinity, which might be needed.
Water & sewer: City of Camas
Electricity: Clark Public Utilities
Natural Gas: Northwest Natural Gas,
Telephone/Cable: Qwest, CenturyLink, Verizon, Xfinity, or whatever the current local provider is at the time of construction

C. Signature

Under the penalty of perjury, the above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: ______________________

Name of signee Kevin C. DeFord

Position and Agency/Organization Member / Manager

Date Submitted: January 8, 2016

D. SEPA SUPPLEMENTAL SHEET FOR NON-PROJECT ACTIONS

(Do not use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of elements of the environment. When answering these questions, be aware of the extent of the proposal, or the types of activities likely to result from the proposal. Would these affect the item at a greater intensity or at a faster rate than if the proposal were not implemented? Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage or release of toxic or hazardous substances; or production of noise?

   Proposed measures to avoid or reduce such increases are:

2. How would the proposal be likely to affect plants, animals, fish or marine life?

   Proposed measures to protect or conserve plants, animals, fish or marine life are:

3. How would the proposal be likely to deplete energy or natural resources?

   Proposed measure to protect or conserve energy and natural resources are:

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains or prime farmlands?

   Proposed measures to protect such resources or to avoid or reduce impacts are:

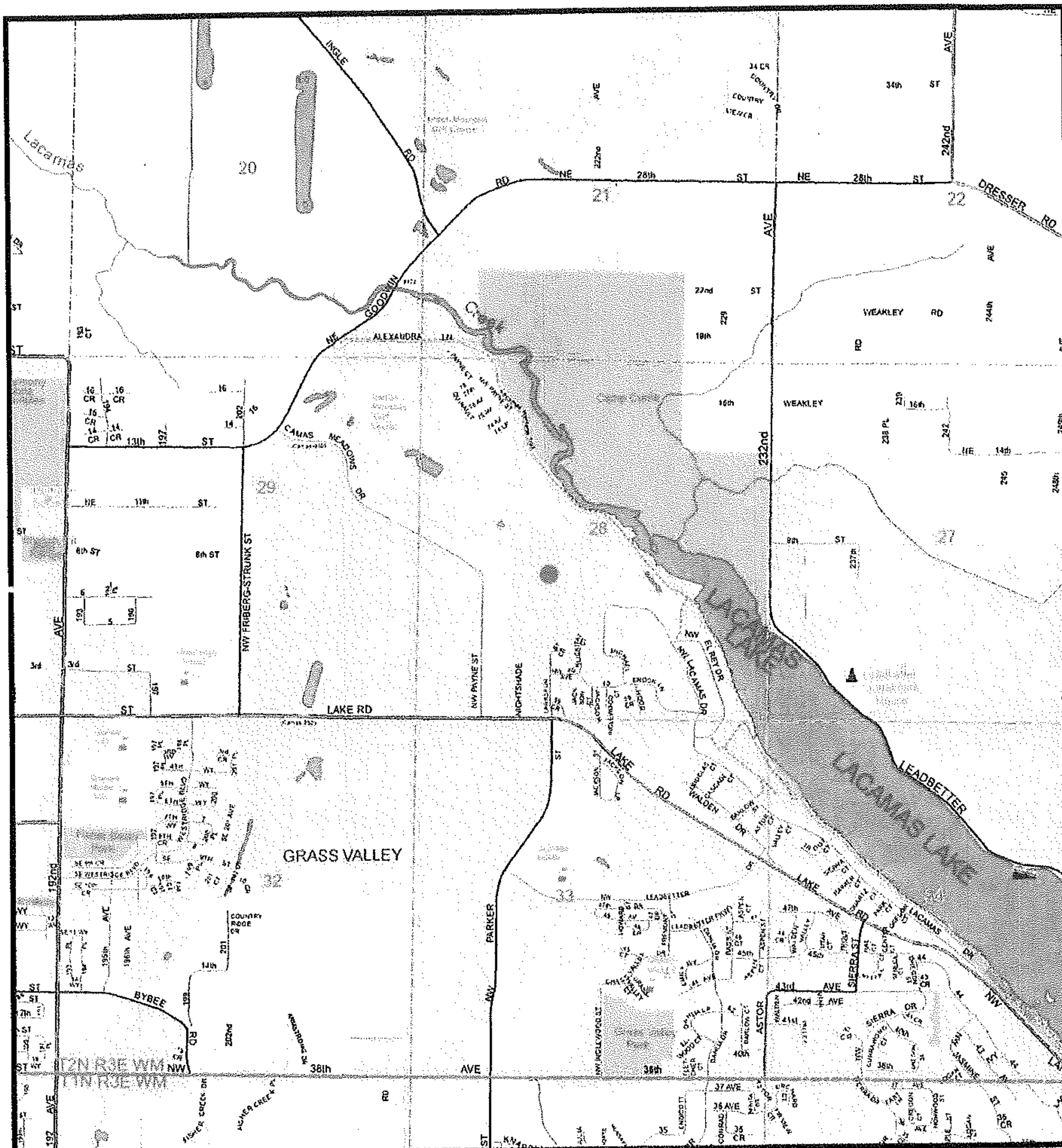
5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

   Proposed measures to avoid or reduce shoreline and land use impacts are:

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

   Proposed measures to reduce or respond to such demand(s) are:

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for protection of the environment. one



General Location Map

Printed on: February 04, 2015

Account No: 175948000, 986031650
Owner: CHINOOK LAND OWNERS GROUP LLC
Address: 1400 NW 63RD ST
C/S/Z: VANCOUVER, WA 98663

CLARK COUNTY, WASHINGTON

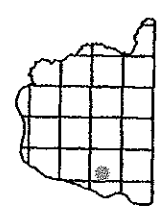
Geographic Information System

1:24,000

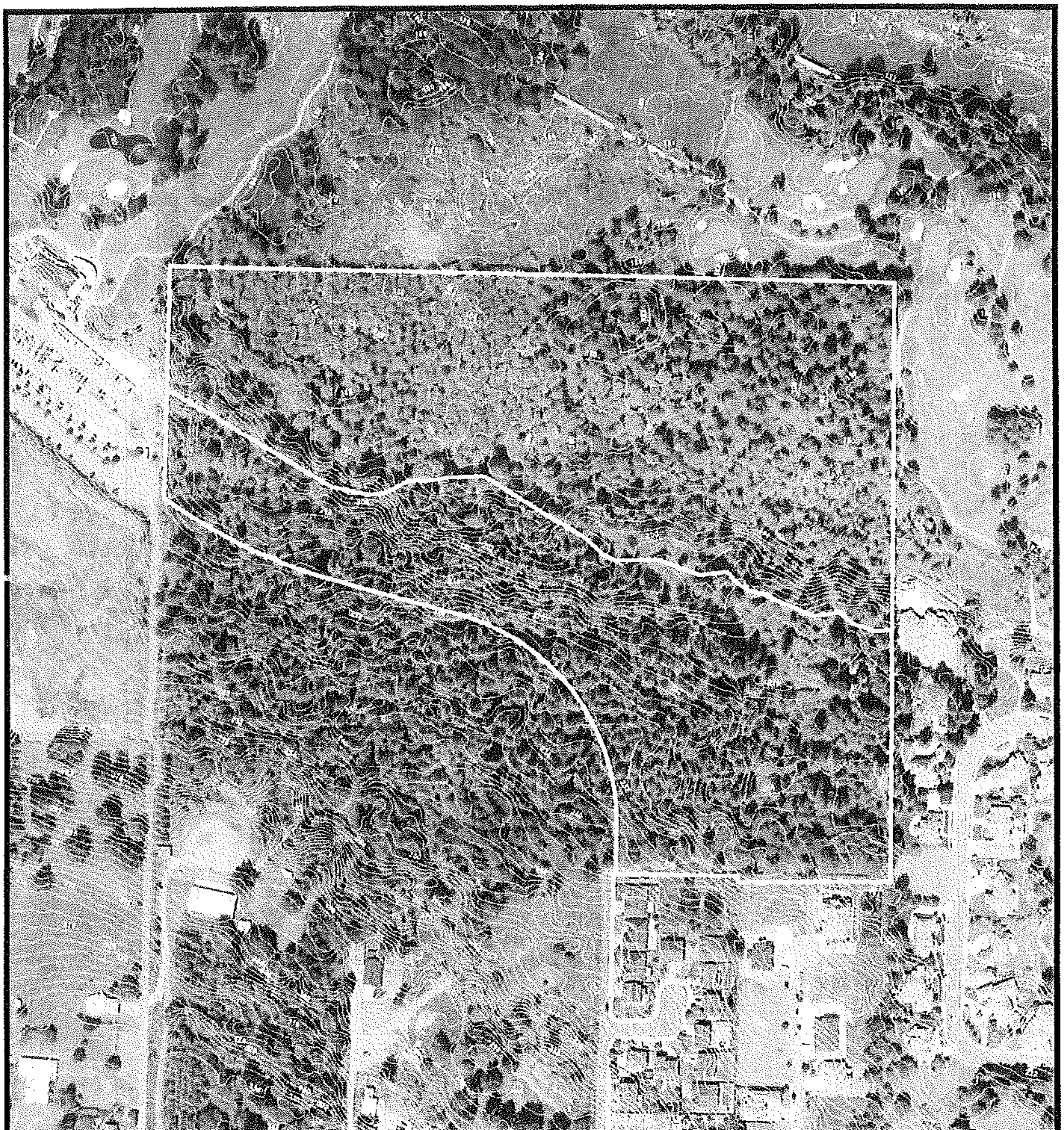
0 0.1 0.2 0.3 0.4 0.5 Miles

N

Subject Property Location



Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.



2014 Aerial Photography with Contours

Account No: 175948000, 986031650
Owner: CHINOOK LAND OWNERS GROUP LLC
Address: 1400 NW 63RD ST .
C/S/Z: VANCOUVER, WA 98663

Proposed Development Area
2' Elevation Contours

CLARK COUNTY, WASHINGTON
Geographic Information System

N

1:3,600

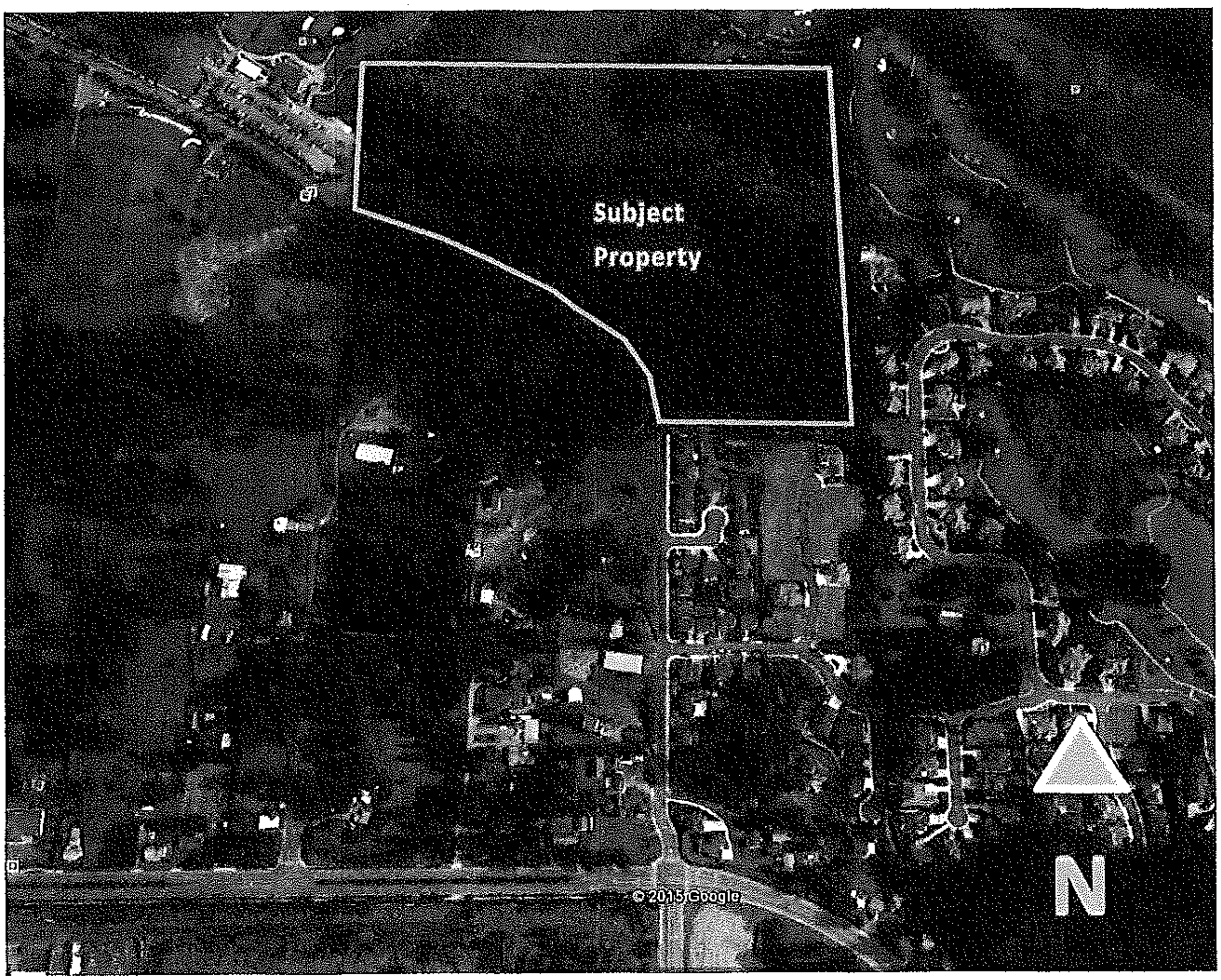
0 150 300 450 Feet

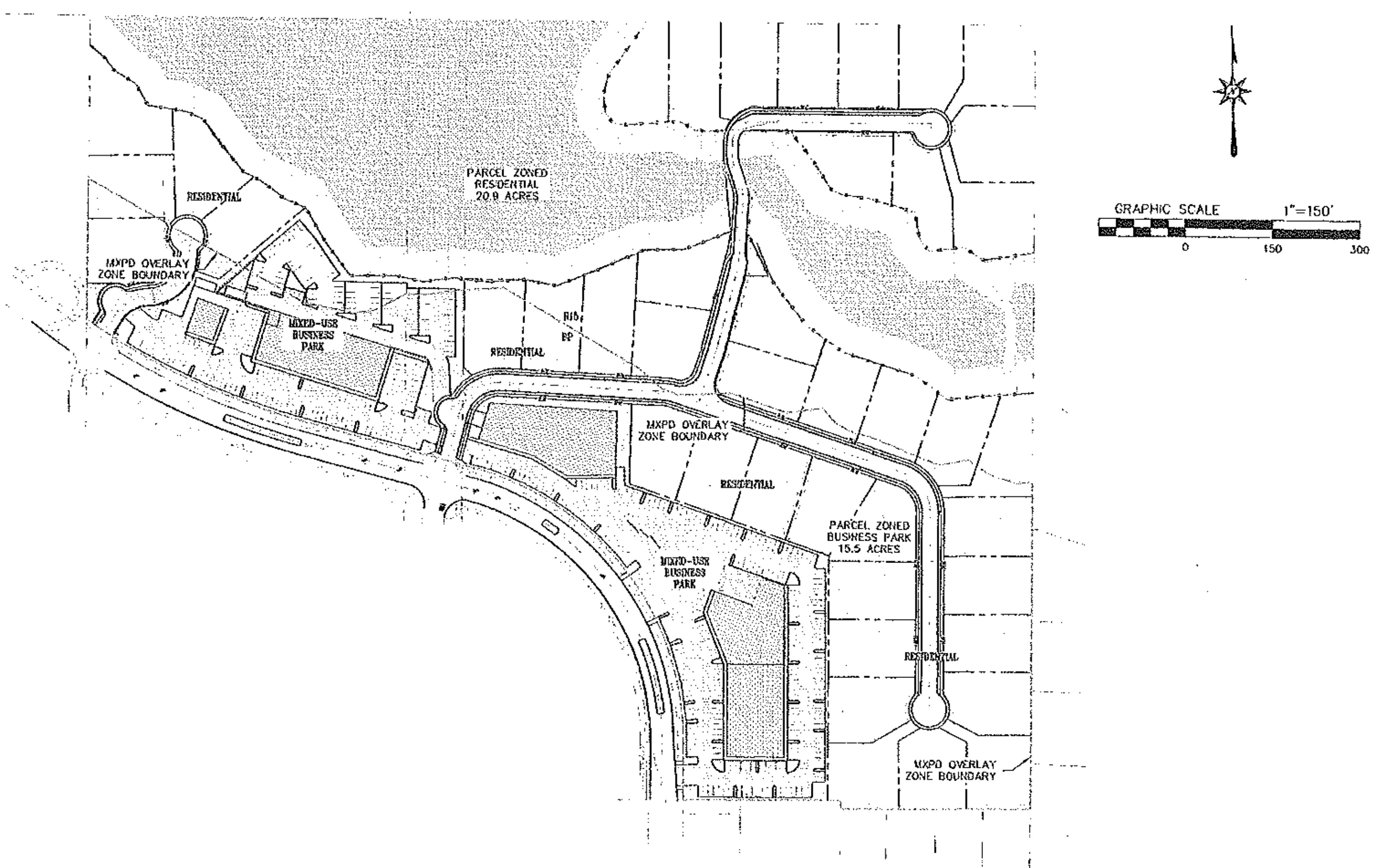
Printed on: February 04, 2015

23120	23121	23122
23129	23128	23127
23132	23133	23134

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Parklands At Camas Meadows – General Location Map





PROPOSED MXPD OVERLAY MAP

EXHIBIT 8

City of Camas WASHINGTON

COMMUNITY DEVELOPMENT DEPARTMENT

Date Published: January 12, 2016

To Whom It May Concern:

Please find enclosed a Determination of Non-Significance (DNS) for the **Parklands at Camas Meadows (SEPA15-14)** that was issued pursuant to the State Environmental Policy Act (SEPA) Rules, Chapter 197-11, Washington Administrative Code. The enclosed review comments reflect evaluation of the environmental checklist by the lead agency as required by WAC 197-11-330(1)(a)(i).

Written comments may be submitted on this determination within fourteen (14) days of its issuance, after which the DNS will be reconsidered in light of the comments received.

Please address all correspondence to:

City of Camas, SEPA Official
Community Development Department
616 NE Fourth Avenue
Camas, Washington 98607
communitydevelopment@cityofcamas.us

Distribution:

Applicant
Bureau of Indian Affairs
C-Tran
Camas School District
Camas City Administrator, Peter Capell
Camas Building Official, Bob Cunningham
Camas Community Development Director, Phil Bourquin
Camas Engineering Department Managers
Camas Fire Department, Randy Miller
Camas Finance Director, Cathy Huber Nickerson
Camas Mayor and City Council Members
Camas Parks and Recreation, Jerry Acheson
Camas Planning Commission Members
Camas Planning Manager and Staff
Camas Police Chief, Mitch Lackey
Camas Public Works Director, Steven Wall
Camas Public Library
Camas Shoreline Management Review Committee
Chinook Indian Nation
Cultural Resource Program, Cowlitz Indian Tribe
Cultural Resource Program, Yakama Indian Nation
Cultural Resource Program, Yakama Indian Nation
Clark County Department of Environmental Services
Clark County Public Works – Development Engineering Program
Clark County Department of Transportation
Clark County Natural Resources Council
Clark Public Utilities
Department of Ecology
Department of Fish and Wildlife
Department of Natural Resources, SEPA Center
Post Record Publications
Southwest Clean Air Agency
US Army Corps of Engineers
Vancouver-Clark Parks and Recreation
Washington Office of Archaeology & Historic Preservation
Washington State Department of Transportation
Washington State Parks and Recreation Commission, Environmental Program
Property Owners within 300 feet

City of Camas WASHINGTON

State Environmental Policy Act
Determination of Non-Significance

CASE NO: **SEPA15-14 Parklands at Camas Meadows**

APPLICANT: Parklands at Camas Meadows LLC
20705 SE Evergreen Highway
Camas, WA 98607

REQUEST: Mixed Use Development of approximately 36.7 acres including up to 42 single family residential units, four or more employment based buildings (147,800 -198,000 square feet) with associated parking and up to a 24 living units or hotel units atop, open spaces and trails, and road construction connecting NW Camas Meadows Drive to NW Larkspur.

LOCATION: The project site is located approximately 2/10ths of a mile east of the Camas Meadows Golf Course Clubhouse and northeast of the intersection of NW Payne Road and NW Camas Meadows Drive intersection. The property is further located just north of the NW Larkspur Road dead end.

LEGAL DESCRIPTION: SE and SW ¼ of Section 28, Township 2 North, Range 3 East of the Willamette Meridian. Clark County Parcel ID 175948-000 & 986031-650 and adjacent right of way.

SEPA DETERMINATION: Determination of Non-Significance (DNS)

COMMENT DEADLINE: Tuesday, January 26, 2016, at 5:00 p.m.

As lead agency under the State Environmental Policy Act (SEPA) Rules [Chapter 197-11, Washington Administrative Code (WAC)], the City of Camas must determine if there are possible significant adverse environmental impacts associated with this proposal. The options include the following:

- DS = Determination of Significance (The impacts cannot be mitigated through conditions of approval and, therefore, requiring the preparation of an Environmental Impact Statement (EIS).

- MDNS = Mitigated Determination of Non-Significance (The impacts can be addressed through conditions of approval), or;

- DNS = Determination of Non-Significance (The impacts can be addressed by applying the Camas Municipal Code).

Determination of Non-Significance (DNS). The City of Camas, as lead agency for review of this proposal, has determined that this proposal does not have a probable significant adverse impact on the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.031. This decision was made after review of a completed environmental checklist, and other information on file with the City of Camas.

Date of Publication & Comment Period

Publication date of this DNS is **January 12, 2016** and is issued under WAC 197-11-340. The lead agency will not act on this proposal until the close of the 14-day comment period which ends on **January 26, 2016**. Comments may be sent by email to communitydevelopment@cityofcamas.us.

SEPA Appeal Process:

An appeal of any aspect of this decision, including the SEPA determination and any required mitigation, must be filed with the Community Development Department within fourteen (14) calendar days from the date of the decision notice. The letter of appeal should contain the following information.

1. The case number designated by the City of Camas and the name of the applicant; and,
2. The name and signature of each person or group (petitioners) and a statement showing that each petitioner is entitled to file an appeal as described under Section 16.31.060 of the Camas Municipal Code. If multiple parties file a single petition for review, the petition shall designate one party as the contact representative with the City Planner. All contact with the City Planner regarding the petition, including notice, shall be with this contact person.

The appeal request and appropriate fee of **$350** must be submitted to the Community Development Department between 8:00 a.m., and 5:00 p.m., Monday through Friday, at the address listed below:

Appeal to the City of Camas SEPA Official
Community Development Department
616 NE Fourth Avenue
Camas, Washington 98607

Staff Contact: Phil Bourquin (360)817-1568
Responsible Official: Robert Maul (360) 817-1568

Robert Maul, Planning Manager and Responsible Official	**January 12, 2016** **Date**

EXHIBIT 9

City of Camas WASHINGTON

COMMUNITY DEVELOPMENT DEPARTMENT
616 NE 4th Avenue
Camas, WA 98607
www.ci.camas.wa.us

March 25, 2016

Kevin DeFord
Nex Generation, LLC
PO Box 61962
Vancouver, WA98666

RE: Parklands at Camas Meadows (SUB15-03)

Dear Mr. DeFord,

This letter is to inform you that your subdivision application for the Parklands at Camas Meadows project is deemed Technically Complete, as per Camas Municipal Code (CMC) 18.55.130. Your original application package for the Mixed Use Planned Development Overlay (MXPD), which included the subdivision, was submitted on August 31st, 2015. Now that the MXPD overlay and associated Development Agreement have been finalized, as of March 21st, 2016, the subdivision process may now proceed.

If you have any questions, please contact me at (360) 817-7255.

Respectfully,

Robert Maul
Planning Manager

Cc: Phil Bourquin, Community Development Director
Wes Heigh, Project Manager

EXHIBIT 10

Mailed to attached parties on
April 26, 2016 - pb, jc, & rm

City of Camas WASHINGTON

Community Development Department

Notice of Application

Parklands at Camas Meadows Subdivision (File No. SUB15-03)

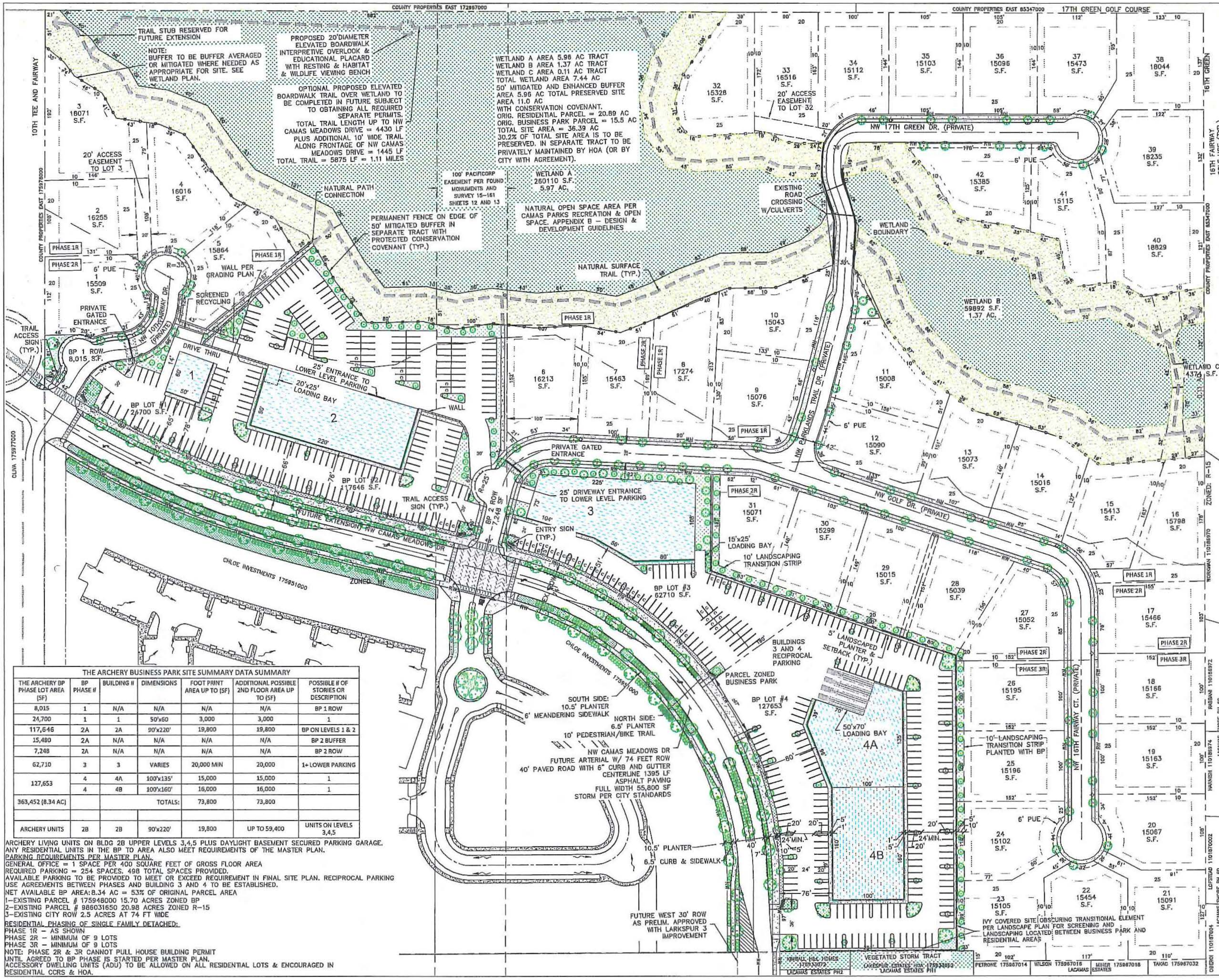
"NOTICE IS HEREBY GIVEN" that an application for "The Parklands at Camas Meadows" has been submitted for subdivision approval. The site consists of four or five commercial buildings, 24 living units integrated into one of the commercial buildings, and 42 single-family residential lots that are accessed from NW Camas Meadows Drive. A portion of the site will be preserved as critical areas open space and an extensive pedestrian soft surface trail system is planned for throughout the site. Parking areas are provided for north and south of the commercial buildings with possible tuck under parking for the upper level living units. This action will be for the land division only. Subsequent site plan approval will be required at a later date for the commercial/apartment component. The subdivision application was deemed complete on March 21st, 2016. A public hearing is required for the Subdivision, and will be scheduled at a later time. A separate public notice will be mailed to all property owners within 300-feet of the subject development and published in the Post Record, at least 15 days prior to the scheduled hearing.

LOCATION: The 15.5 acre site has a an R-15 and Mixed Use Planned Development Overlay zoning designation and is located approximately 2/10ths of a mile east of the Camas Meadows Golf Course Clubhouse and northeast of the intersection of NW Payne Road and NW Camas Meadows Drive intersection. The property is further located just north of the NW Larkspur Road dead end. SE and SW ¼ of Section 28, Township 2 North, Range 3 East of the Willamette Meridian. Clark County Parcel ID 175948-000 & 986031-650 and adjacent right of way.

APPLICATION MATERIALS: The application included the following: project narrative; existing conditions plan; preliminary plan set; preliminary storm water report, traffic report, critical areas report, tree survey & landscape plan, State Environmental Policy Act (SEPA) checklist; and other required submittal documents. These documents are available for viewing at the Community Development Department (616 NE 4th Avenue, Camas, WA) during regular business hours Monday – Friday 8am-5pm.

Questions/Comments: For questions related to this application, please contact Robert Maul, Planning Manager, at (360) 817-1568 ext. 4255 or by email at communitydevelopment@cityofcamas.us.

Published in the Post Record on April 26th, 2016 Legal Publication # 559090
Posted at the Camas Post Office, Camas City Hall, Camas Library, City of Camas web site at: http://www.cityofcamas.us
Mailed to property owners within 300-feet on April 26, 2016



THE ARCHERY BUSINESS PARK SITE SUMMARY DATA SUMMARY						
THE ARCHERY BP PHASE LOT AREA (SF)	BP PHASE #	BUILDING #	DIMENSIONS	FOOT PRINT AREA UP TO (SF)	ADDITIONAL POSSIBLE 2ND FLOOR AREA UP TO (SF)	POSSIBLE # OF STORIES OR DESCRIPTION
8,015	1	N/A	N/A	N/A	N/A	BP 1 ROW
24,700	1	1	50'x60	3,000	3,000	1
117,646	2A	2A	90'x220'	19,800	19,800	BP ON LEVELS 1 & 2
15,480	2A	N/A	N/A	N/A	N/A	BP 2 BUFFER
7,248	2A	N/A	N/A	N/A	N/A	BP 2 ROW
62,710	3	3	VARIES	20,000 MIN	20,000	1+ LOWER PARKING
127,653	4	4A	100'x135'	15,000	15,000	1
	4	4B	100'x160'	16,000	16,000	1
363,452 (8.34 AC)			TOTALS:	73,800	73,800	
ARCHERY UNITS	2B	2B	90'x220'	19,800	UP TO 59,400	UNITS ON LEVELS 3,4,5

ARCHERY LIVING UNITS ON BLDG 2B UPPER LEVELS 3,4,5 PLUS DAYLIGHT BASEMENT SECURED PARKING GARAGE.
ANY RESIDENTIAL UNITS IN THE BP TO AREA ALSO MEET REQUIREMENTS OF THE MASTER PLAN.

PARKING REQUIREMENTS PER MASTER PLAN.
GENERAL OFFICE = 1 SPACE PER 400 SQUARE FEET OF GROSS FLOOR AREA
REQUIRED PARKING = 254 SPACES. 498 TOTAL SPACES PROVIDED.
AVAILABLE PARKING TO BE PROVIDED TO MEET OR EXCEED REQUIREMENT IN FINAL SITE PLAN. RECIPROCAL PARKING USE AGREEMENTS BETWEEN PHASES AND BUILDING 3 AND 4 TO BE ESTABLISHED.
NET AVAILABLE BP AREA: 8.34 AC = 53% OF ORIGINAL PARCEL AREA
1–EXISTING PARCEL # 175948000 15.70 ACRES ZONED BP
2–EXISTING PARCEL # 986031650 20.98 ACRES ZONED R–15
3–EXISTING CITY ROW 2.5 ACRES AT 74 FT WIDE

RESIDENTIAL PHASING OF SINGLE FAMILY DETACHED:
PHASE 1R – AS SHOWN
PHASE 2R – MINIMUM OF 9 LOTS
PHASE 3R – MINIMUM OF 9 LOTS
NOTE: PHASE 2R & 3R CANNOT PULL HOUSE BUILDING PERMIT UNTIL AGREED TO BP PHASE IS STARTED PER MASTER PLAN.
ACCESSORY DWELLING UNITS (ADU) TO BE ALLOWED ON ALL RESIDENTIAL LOTS & ENCOURAGED IN RESIDENTIAL CCRS & HOA.

DEVELOPER & APPLICANT:
PARKLANDS AT CAMAS MEADOWS LLC
KEVIN DEFORD 360–823–6222 ngdelopment@gmail.com
AARON BARR 503–319–4021 abarrmail@gmail.com
20705 SE EVERGREEN HWY CAMAS, WA 98607

FOR ALL LOTS WITH ACCESS EASEMENTS NOTE:
PER TABLE 17.19.040–1 FOOT NOTE 2, SHARED ACCESS TO 1 OR 2 LOTS = 20' WIDE PRIVATE EASEMENT WITH 12'–20' PAVED, NO PARKING AND ALL LOTS SPRINKLERED.

BOUNDARIES:
BOUNDARIES ARE BASED ON SURVEY FROM MGS AND WETLAND BOUNDARY FROM ECOLOGICAL LAND SERVICES,INC. FINAL BOUNDARIES AND LOT LINES MAY CHANGE SLIGHTLY PRIOR TO FINAL ENGINEERING AND FINAL PLAT.

PRELIMINARY PLAT AND BINDING SITE PLAN:
REFER TO MASTER PLAN AND DEVELOPMENT AGREEMENT D.A. FOR PROJECT SPECIFIC RESIDENTIAL AND BUSINESS PARK DEVELOPMENT STANDARDS TABLE.

PRIVATE STREET PER PVT2
30' PRIVATE R/W
20' PAVED ROAD WITH CURB AND GUTTER
NO PARKING BOTH SIDES
5' ATTACHED SIDEWALK WEST SIDE
CENTERLINE 240 LF
NW PARKLANDS TRAIL DR ASPHALT PAVING = 4,927 SF
PER TABLE 17.19.040–1–B TO MINIMIZE BUFFER IMPACTS, MINIMIZE STREET WIDTH & ATTACH SIDEWALK, ALL LOTS SPRINKLERED AS > 100' IN LENGTH.

PRIVATE STREET PER PVT3
42' PRIVATE TRACT R/W
28' PAVED ROAD WITH CURB AND GUTTER
5' DETACHED SIDEWALK ONE SIDE
NW 10TH FAIRWAY DR ASPHALT PAVING = 11,151 SF
NW PARKLANDS TRAIL DR ASPHALT PAVING = 6,541 SF
NW 17TH GREEN DR ASPHALT PAVING = 10,815 SF
NO PARKING ONE SIDE

PRIVATE STREET PER PVT4
48' PRIVATE R/W
28' PAVED ROAD WITH CURB AND GUTTER
5' PLANTER BOTH SIDES
5' DETACHED SIDEWALK BOTH SIDES
CENTERLINE 1480 LF
NW 16TH FAIRWAY CT ASPHALT PAVING = 11,194 SF
NW GOLF DR ASPHALT PAVING = 28,860 SF

ALL CUL–DE–SAC TURNAROUNDS PER ST36 FOR SPRINKLERED DEVELOPMENT WITH 30' PAVED & 5' ATTACHED SIDEWALK WITH OUTER SIDEWALK TURNAROUND RADIUS BULB = 35'
35' RADIUS CUL–DE–SAC BULB
30' PAVED CUL–DE–SAC BULB

EXISTING CONDITION NOTES:
NO EXISTING STRUCTURES ONSITE.
EXISTING FIRE HYDRANT LOCATION:
200' WEST OF SITE ON NW CAMAS MEADOWS DR.
375' SOUTH OF SITE ON NW LAKESPUR ST.

GRADING NOTES:
SEE THE GRADING PLAN FOR PROPOSED ONSITE GRADING.

STREET NOTES:
STREET LIGHTS AND STREET TREES TO BE DESIGNED BY OTHERS PRIOR TO FINAL PLAT.

✧ STREET LIGHTS
PROPOSED ENTRY SIGN LOCATIONS
▪ TRAIL ACCESS SIGNAGE

GRAPHIC SCALE 1"=60'
0 60 120

KESSI ENGINEERING
6400 NE HWY 99 #G-169
VANCOUVER, WA 98665
Tel: (360) 991-9300
www.kessiconsulting.com
CONSULTING
PLANNING
CIVIL ENGINEERING
PROJECT MANAGEMENT

DATE: 07 DEC 2015

PARKLANDS EXECUTIVE SUBDIVISION AND THE ARCHERY BUSINESS PARK SITE PLAN AT CAMAS MEADOWS GOLF COURSE
PRELIMINARY PLAT & SITE PLAN WITH MASTER PLAN

SHEET 1

Lacamas Shores
Homeowners Association
Po Box 751
Camas, WA 98607

Far From Par LLC
504 NE 5th Ave
Camas, WA 98607

Dup
Larkspur Estates
Homeowners Association
4317 NE Thurston Way #100
Vancouver, WA 98662

Larkspur Estates
Homeowners Association
4317 NE Thurston Way #100
Vancouver, WA 98662

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Vancouver, WA 98662

Larkspur Estates
Homeowners Association
4317 NE Thurston Way #100
Vancouver, WA 98662

Kimball Hill Homes Washington Inc
5999 New Wilke Rd #203
Rolling Meadows, IL 60008

Steven & Janice Oliva
915 W 11th St
Vancouver, WA 98660

Kluka Partnership
7021 NW Friberg Strunk St
Camas, WA 98607

Dup
Kluka Partnership
7021 NW Friberg Strunk St
Camas, WA 98607

Lacamas Grove
Homeowner Association
6228 NW El Rey Dr
Camas, WA 98607

Lacamas Grove
Homeowner Association
6228 NW El Rey Dr
Camas, WA 98607

Harry & James Friberg
2501 NW 37th Ave
Camas, WA 98607

City Of Camas
616 NE 4th Ave
Camas, WA 98607

Lofts At Camas Meadows
Phase LLC
2300 E 3rd Loop #100
Vancouver, WA 98661

Far From Par LLC
504 NE 5th Ave
Camas, WA 98607

Dup
Steven & Janice Oliva
915 W 11th St
Vancouver, WA 98660

Chinook Land Owners Group LLC
1400 NW 63rd St
Vancouver, WA 98663

Chinook Land Owners Group LLC
6101 NW Nightshade St
Camas, WA 98607

Rian & Donna Sherwood
3520 NW 59th Cir
Camas, WA 98607

Ming Xie
777 Comet Dr
Foster City, CA 94404

Lii Cherng Leu
3539 NW 59th Cir
Camas, WA 98607

Matt Mandrones
3600 NW 59th Cir
Camas, WA 98607

Kevin & Jamie Smithline
3443 NW 60th Ave
Camas, WA 98607

Jennifer Schodowski
3444 NW 60th Ave
Camas, WA 98607

John Gerardo
3535 NW 60th Ave
Camas, WA 98607

Andrew Mitchell
3536 NW 60th Ave
Camas, WA 98607

Dominic Susi 3540 NW 60th Ave Camas, WA 98607	Alex & Jennifer Johnson 3541 NW 60th Ave Camas, WA 98607	Nirav & Sheela Sheth 3552 NW 60th Ave Camas, WA 98607
Chad & Lori Lackland 3553 NW 60th Ave Camas, WA 98607	Anthony & Shannon Adams 3602 NW 60th Ave Camas, WA 98607	Nathan & Catherine Strader Po Box 457 Camas, WA 98607
Zhongde Yan 43632 Altamura Ct Temecula, CA 92592	Yu-Chi Lin 3518 NW 61st Cir Camas, WA 98607	James Tearney 3521 NW 61st Cir Camas, WA 98607
Shawn P S & Stephanie Moncrieff 3524 NW 61st Cir Camas, WA 98607	Kuflom Abbay 3530 NW 61st Cir Camas, WA 98607	James & Angela Kendall 3538 NW 61st Cir Camas, WA 98607
Jen-Ho Chang 2514 NE 172nd Ave Vancouver, WA 98684	Raymond Gary Dubois 3544 NW 61st Cir Camas, WA 98607	Eric & Susan Greif 3550 NW 61st Cir Camas, WA 98607
Shahid Alam 3608 NW 61st Cir Camas, WA 98607	County Properties East LLC 4600 NW Camas Meadows Dr #200 Camas, WA 98607	Christine & Marc Reimer 5823 NW Inglewood Ct Camas, WA 98607
Andrew & Brenda Hiegel 5826 NW Inglewood Ct Camas, WA 98607	Bryan & Elizabeth Grant 5827 NW Inglewood Ct Camas, WA 98607	Marvin & Laurie Serhan 5835 NW Inglewood Ct Camas, WA 98607
Philip & Nancy Heil 5903 NW Inglewood Ct Camas, WA 98607	Ryan & Summer Silva 5915 NW Inglewood Ct Camas, WA 98607	Frank & Ursula Hood 5933 NW Inglewood Ct Camas, WA 98607
Ronald Juve 5831 NW Jackson Ct Camas, WA 98607	George Iv & Alexandra Korum 5905 NW Jackson Ct Camas, WA 98607	Clifton George Mallett 5915 NW Jackson Ct Camas, WA 98607
Michael & Raina McSherry 5931 NW Jackson Ct Camas, WA 98607	Gary Dedmore 6010 NW Jackson St Camas, WA 98607	John & Wu-Shaun Shih 6012 NW Klickitat Ct Camas, WA 98607

Tracy Gonia
6013 NW Klickitat Ct
Camas, WA 98607

~~Bryan & Rachel Williams~~
~~6110 NW Klickitat Ct~~
~~Camas, WA 98607~~

Robert Fullerton
6115 NW Klickitat Ct
Camas, WA 98607

Asia Citi Limited
13215 SE Mill Plain Blvd #C8
Vancouver, WA 98684

~~Simon Antony & Tania Ward~~
~~6127 NW Klickitat Ct~~
~~Camas, WA 98607~~

Greg & Janelle Pierson
6139 NW Klickitat Ct
Camas, WA 98607

Eric & Andrea Hieronymus
6140 NW Klickitat Ct
Camas, WA 98607

~~Joel Jonathan Levine~~
~~600 SE 177th Ave #94~~
~~Vancouver, WA 98683~~

Felix Tai
6210 NW Klickitat Ct
Camas, WA 98607

Joy & Ryan Erickson
6221 NW Klickitat Ct
Camas, WA 98607

Michael Takac
6228 NW Klickitat Ct
Camas, WA 98607

Duplicate
~~Petrone~~
~~6229 NW Klickitat Ct~~
~~Camas, WA 98607~~

Michael Takac
6230 NW Klickitat Ct
Camas, WA 98607

Solarus 0301 LLC
Po Box 871478
Vancouver, WA 98687

~~Carl David Wilson~~
~~6231 NW Klickitat Ct~~
~~Camas, WA 98607~~

Robert Miner
6234 NW Klickitat Ct
Camas, WA 98607

Lance & Teresa Barrett
3318 NW Lacamas Dr
Camas, WA 98607

~~Michael & Carol Workman~~
~~1405 SE 164th Ave #100~~
~~Vancouver, WA 98683~~

Safder & Aisha Rabbani
3343 NW Lacamas Dr
Camas, WA 98607

Michael & Linda Harnish
3367 NW Lacamas Dr
Camas, WA 98607

Sarah Dedmore
3401 NW Lake Rd
Camas, WA 98607

Carl Bartkowski
9803 NE 339th St
La Center, WA 98629

Carl Little
3443 NW Lake Rd
Camas, WA 98607

Jerry & Marlene Walters
3515 NW Lake Rd
Camas, WA 98607

Bharwinder Singh
908 NW 35th Ave
Camas, WA 98607

Kluka Partnership
3937 NW Lake Rd
Camas, WA 98607

Long Lake Commercial LLC
515 NW Saltzman Rd
Portland, OR 97229

Long Lake Commercial LLC
515 NW Saltzman Rd
Portland, OR 97229

~~Long Lake Commercial LLC~~
~~515 NW Saltzman Rd~~
~~Portland, OR 97229~~

Kluka Partnership
7021 NW Friberg Strunk St
Camas, WA 98607

Jerry Jewell 4245 NW Lake Rd Camas, WA 98607	Mason Sports LLC 4325 NW Lake Rd Camas, WA 98607	Lake Road Storage LLC 17310 SE 23rd Way Vancouver, WA 98683
Sergey & Svetlana Tupikov 2016 NW 7th Ave Camas, WA 98607	Christopher Lap 5920 NW Larkspur St Camas, WA 98607	Jay & Vicki Ponce 5955 NW Larkspur St Camas, WA 98607
~~Sergey & Svetlana Tupikov 2016 NW 7th Ave Camas, WA 98607~~	Shaun & Christina Flynn 6040 NW Larkspur St Camas, WA 98607	Mark & Melissa Castle 6110 NW Larkspur St Camas, WA 98607
Yi Chun Jiang 3610 NE 174th Ave Vancouver, WA 98682	Selvaraj & Beatriz Ramachandran 6136 NW Larkspur St Camas, WA 98607	Timothy & Dianne Johnson 6160 NW Larkspur St Camas, WA 98607
Gerald Jenkins Po Box 335 Amboy, WA 98601	Richard Winston & Jane Smith 6141 NW Michaelbrook Ln Camas, WA 98607	Ronald & Margaret Mygrant 6075 Riverside Dr Redding, CA 96001
Craig & Michelle Hersh 6215 NW Michaelbrook Ln Camas, WA 98607	Kevin McCaffrey 6232 NW Michaelbrook Ln Camas, WA 98607	Joseph & Nancy Broz 6237 NW Michaelbrook Ln Camas, WA 98607
Douglas & Susan Deibele 6312 NW Michaelbrook Ln Camas, WA 98607	Kenneth & Sharyn Oler 6334 NW Michaelbrook Ln Camas, WA 98607	Devinder & Arvinder Oberoi 20525 SE Deerfern Loop Camas, WA 98607
David & Diana Lofstead 6339 NW Michaelbrook Ln Camas, WA 98607	Earl Shuler 5820 NW Nightshade St Camas, WA 98607	Teresa & David Murray 5930 NW Nightshade St Camas, WA 98607
William & Sue Derrey 6008 NW Nightshade St Camas, WA 98607	Robert & April Treacy 253 N Grey Rd Grandview, WA 98930	Loran A P Eckard Jr. 6100 NW Nightshade St Camas, WA 98607
~~Chloe Investments LLC 3905 SE 154th Ct Vancouver, WA 98683~~	~~Dominic Susi 3540 NW 60th Ave Camas, WA 98607~~	Rod Schwiebert 6041 NW Payne St Camas, WA 98607

~~Gary Knopp~~
~~6201 NW Payne St~~
~~Camas, WA 98607~~

~~Steven & Janice Oliva~~
~~915 W 11th St~~
~~Vancouver, WA 98660~~

Wafertech, LLC
5509 NW Parker St
Vancouver, WA 98607

stewart title®

Prepared For:

Heather DeFord
Cascade Sotheby's International Realty
400 E Mill Plain Blvd, #105
Vancouver, WA 98660

Today's Date:

3/17/2016

NOTE:

6101 NW Nightshade St-300 Ft Radius
Set 1 of 3

We appreciate this opportunity to be of service to you.
If you have any questions regarding this report, please call:

Stewart Title Customer Resources

CUSTOMER RESOURCES
Phone: 503.290.5555
Email: customerresources@stewart.com

County Properties East LLC
4600 NW Camas Meadows Dr
#200
Camas, WA 98607

Lacamas Shores
Homeowners Association
Po Box 751
Camas, WA 98607

Dup
~~Larkspur Estates~~
~~Homeowners Association~~
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Petrone
6229 NW Klickitat Ct
Camas, WA 98607

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6230 NW Klickitat Ct
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Carl David Wilson
6231 NW Klickitat Ct
Camas, WA 98607

Robert Miner 6234 NW Klickitat Ct Camas, WA 98607	Mason & Ashley Walker 3240 NW Lacamas Dr Camas, WA 98607	Stephen & Karla Dearborn 3245 NW Lacamas Dr Camas, WA 98607
Lance & Teresa Barrett 3318 NW Lacamas Dr Camas, WA 98607	Michael & Carol Workman 1405 SE 164th Ave #100 Vancouver, WA 98683	Safder & Aisha Rabbani 3343 NW Lacamas Dr Camas, WA 98607
Michael & Linda Harnish 3367 NW Lacamas Dr Camas, WA 98607	Sergey & Svetlana Tupikov 2016 NW 7th Ave Camas, WA 98607	Shaun & Christina Flynn 6040 NW Larkspur St Camas, WA 98607
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Chloe Investments LLC 3905 SE 154th Ct Vancouver, WA 98683	Dominic Susi 3540 NW 60th Ave Camas, WA 98607	Gary Knopp 6201 NW Payne St Camas, WA 98607
Steven & Janice Oliva 915 W 11th St Vancouver, WA 98660		

stewart title®

Prepared For:

Heather DeFord
Cascade Sotheby's International Realty
400 E Mill Plain Blvd, #105
Vancouver, WA 98660

Today's Date:

3/17/2016

NOTE:

175948 000 & 986031 650-300 Ft Radius (03-17-16)
Set 1 of 3

We appreciate this opportunity to be of service to you.
If you have any questions regarding this report, please call:

Stewart Title Customer Resources

CUSTOMER RESOURCES
Phone: 503.290.5555
Email: customerresources@stewart.com

EXHIBIT 11

Community Development Department

Notice of Public Hearing

Parklands at Camas Meadows Subdivision (File No. SUB15-03)

"NOTICE IS HEREBY GIVEN" that a public hearing will be held for preliminary plat approval for "The Parklands at Camas Meadows." The proposed action is for a land division for 42 single-family residential lots that are accessed from NW Camas Meadows Drive. A portion of the site will be preserved as critical areas open space and an extensive pedestrian soft surface trail system is planned for throughout the site. There is an approved master plan that includes commercial space, but subsequent site plan approval will be required at a later date for the commercial/apartment component. The subdivision application was deemed complete on March 21st, 2016.

LOCATION: The total site area is approximately 35+ acres. The site is zoned R-15 on roughly 20 acres and the balance is zoned Business Park with a Mixed Use Planned Development Overlay zoning designation and is located approximately 2/10ths of a mile east of the Camas Meadows Golf Course Clubhouse and northeast of the intersection of NW Payne Road and NW Camas Meadows Drive intersection. The property is further located just north of the NW Larkspur Road dead end and more specifically as Clark County Parcel ID No.'s 175948-000 & 986031-650 and adjacent right of way. (SE and SW ¼ of Section 28, Township 2 North, Range 3 East of the Willamette Meridian).

PUBLIC HEARING:

The Parklands at Camas Meadows Subdivision will be considered at a public hearing on June 16th, 2016 at 7:00 p.m., or soon thereafter, before the Hearing Examiner in the City Council Chambers, 616 NE 4th Avenue, Camas, WA.

APPLICATION MATERIALS: The application included the following: project narrative; existing conditions plan; preliminary plan set; preliminary storm water report, traffic report, critical areas report, tree survey & landscape plan, State Environmental Policy Act (SEPA) checklist; and other required submittal documents. These documents are available for viewing at the Community Development Department (616 NE 4th Avenue, Camas, WA) during regular business hours Monday – Friday 8am-5pm.

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Posted at the Camas Post Office, Camas City Hall, Camas Library, City of Camas web site at: http://www.cityofcamas.us
Mailed to property owners within 300-feet on May 31st, 2016

MORE INFORMATION: The meeting agenda and supporting documents will be available for review on the city's website at the "Minutes, Agenda & Videos" link within the drop-down menu that is labeled "Your Government" or at http://www.ci.camas.wa.us/index.php/yourgovernment/minuteagendavideo.

Questions/Comments:

The public hearing will follow the quasi-judicial process described with Camas Municipal Code 18.55.180. Comments related to this development may be submitted as follows: (1) in person by testifying at the public hearing; (2) by regular mail to Robert Maul, Camas Planning Manager at 616 Ne 4th Avenue, Camas, WA; (3) by phone at (360) 817-1568, ext. 4255; or (4) by email at communitydevelopment@cityofcamas.us. If anyone prefers to submit written comments for staff to submit on their behalf at the hearing, those comments must be received by the City Clerk at 616 NE 4th Avenue, Camas WA 98607, **prior to** 5:00 p.m. on June 16, 2016, to be entered into the record of the hearing. For questions related to this application, please contact Robert Maul, Planning Manager, at (360) 817-1568 ext. 4255 or by email at communitydevelopment@cityofcamas.us.

Participate: All citizens are entitled to have equal access to the services, benefits and programs of the City of Camas. Please contact the City Clerk at (360) 834-6864 for special accommodations if needed. The City will provide translators for non-English speaking persons who request assistance at least three working days prior to a public meeting or hearing.

EXHIBIT 12

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Prepared For:

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Cascade Sotheby's International Realty
400 E Mill Plain Blvd, #105
Vancouver, WA 98660

Today's Date:

3/17/2016

NOTE:

175948 000 & 986031 650-300 Ft Radius (03-17-16)
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Craig & Michelle Hersh 6215 NW Michaelbrook Ln Camas, WA 98607	Kevin McCaffrey 6232 NW Michaelbrook Ln Camas, WA 98607	Joseph & Nancy Broz 6237 NW Michaelbrook Ln Camas, WA 98607
Douglas & Susan Deibele 6312 NW Michaelbrook Ln Camas, WA 98607	Kenneth & Sharyn Oler 6334 NW Michaelbrook Ln Camas, WA 98607	Devinder & Arvinder Oberoi 20525 SE Deerfern Loop Camas, WA 98607
David & Diana Lofstead 6339 NW Michaelbrook Ln Camas, WA 98607	Earl Shuler 5820 NW Nightshade St Camas, WA 98607	Teresa & David Murray 5930 NW Nightshade St Camas, WA 98607
William & Sue Derrey 6008 NW Nightshade St Camas, WA 98607	Robert & April Treacy 253 N Grey Rd Grandview, WA 98930	Loran A P Eckard Jr. 6100 NW Nightshade St Camas, WA 98607
Chloe Investments LLC 3905 SE 154th Ct Vancouver, WA 98683	Dominic Susi 3540 NW 60th Ave Camas, WA 98607	Rod Schwiebert 6041 NW Payne St Camas, WA 98607

Gary Knopp
6201 NW Payne St
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915 W 11th St
Vancouver, WA 98660

Wafertech, LLC
5509 NW Parker St
Vancouver, WA 98607

EXHIBIT 13

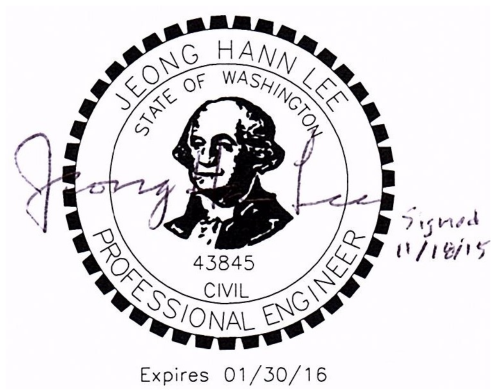
Revised Report

Parklands at Camas Meadows
Revised Traffic Impact Study

November 18, 2015

H. Lee & Associates

PARKLANDS AT CAMAS MEADOWS
REVISED TRAFFIC IMPACT STUDY



Prepared for:

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November 18, 2015

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SECTION I
STUDY SUMMARY

INTRODUCTION

The project site is comprised of the tax lots 175948-000 and 986031-650 and is located at 542 NW 218th Street in Camas, Washington. Figure 1 shows the project vicinity.

Project Description

The proposed project is a business park with four buildings comprised of up to 141,600 square feet in space, a 3,000 square foot coffee shop with a drive through, and a 3,000 square foot high quality restaurant. Also, there are two residential components of the proposed project which includes 42 single family residential lots and 24 residential condominium units. Access will be provided by the extension of NW Camas Meadows Drive to the east, which will connect to NW Larkspur Street. Figure 2 shows the project site plan. Initial construction is expected to begin in 2016 with full occupancy by 2020.

Scope of Traffic Impact Study

The scope of the traffic impact study was developed from known City of Camas and City of Vancouver traffic study requirements. From this information, the following intersections listed below were analyzed:

- NE 13th Street/NE 192nd Avenue
- SE 1st Street/NE & SE 192nd Avenue
- NW Lake Road/NW Parker Street/NW Larkspur Street
- NW Parker Street/NW 38th Avenue
- SE Brady Road/SE 192nd Avenue
- NE Goodwin Road/NE Ingle Road
- NE Goodwin Road/NW Camas Meadows Drive
- NW Parker Street/NW Pacific Rim Boulevard/NW Pacific Rim Drive
- NW Brady Road/NW 16th Avenue
- NW & SE Brady Road/NW McIntosh Road
- NW Payne Street/NW Lake Road

The remainder of this report presents the following analysis:

- Existing traffic conditions in the project study area.

- 2020 “Without Project” condition to establish the baseline condition by which the project impacts could be determined.

- Trip generation estimates for the proposed development.

- 2020 “With Project” condition to determine project traffic impacts.

SUMMARY OF FINDINGS

Findings

The following are the findings from the traffic analysis:

- The proposed development is expected to generate 1,895 net new daily, 197 net new A.M. peak hour (146 in, 51 out), and 191 net new P.M. peak hour (67 in, 124 out) trips.

- The TMZ corridors within the City of Vancouver impacted by 5 or more P.M. peak hour trips as shown below.

TMZ Corridor	Limits of TMZ Corridor	P.M. Peak Hour Trip Impact
18th Street	112th Avenue – 138th Avenue	0
18th Street	138th Avenue – 162nd Avenue	0
28th Street	112th Avenue – 138th Avenue	0
28th Street	138th Avenue – 162nd Avenue	0
112th Avenue	Mill Plain Blvd – 28th Street	0
112th Avenue	28th Street – 51st Street	0
136th Avenue	Mill Plain Blvd – 28th Street	0
138th Avenue	28th Street – Fourth Plain Blvd	0
162nd Avenue	1st Street – Fourth Plain Blvd	0
164th Avenue	SR 14 – 1st Street	0
192nd Avenue	SR 14 – 18th Street	150
Andresen Road	Mill Plain Blvd – SR 500	0
Andresen Road	SR 500 – 78th Street	0
Burton Road	Andresen Road – 112th Avenue	0
Fourth Plain Blvd	Port – I-5	0
Fourth Plain Blvd	I-5 – Stapleton Road	0
Fourth Plain Blvd	Stapleton Road to I-205	0
Fourth Plain Blvd	117th Avenue – 162nd Avenue	0
Mill Plain Blvd	I-5 – Andresen Road	0
Mill Plain Blvd	Andresen Road – I-205	0
Mill Plain Blvd	I-205 – 136th Avenue	0
Mill Plain Blvd	136th Avenue – 164th Avenue	0
Mill Plain Blvd	164th Avenue – 192nd Avenue	0
St. James/St. Johns Road	Fourth Plain – 78th Street	0

- Per conversations with Olson Engineering, Inc. pertaining to the Green Mountain Development, the NE Goodwin Road/NE Ingle Road intersection will be converted to a signalized intersection with additional eastbound and westbound left turn lanes. The NE Goodwin Road/NE Ingle Road intersection was analyzed in the 2020 "Without Project" and “With Project” condition based on those improvements.

The 2015 existing and 2020 "Without Project" levels of service at the southbound approach of the NW Payne Street/NW Lake Road intersection are operating at LOS D and E, respectively. With the extension of NW Camas Meadows Drive to NW Larkspur Street and the resulting trip diversion, the level of service is projected to be LOS B in the 2020 "With Project" condition.

- NE 13th Street/NE 192nd Avenue
  The southbound left turn movement in the 2020 “With Project” A.M. peak hour condition exceeds the available storage by 19 feet. This is less than one car length and is not significantly over the available storage. The southbound left turn movement LOS and v/c ratio meet the City of Vancouver standards so no mitigation is necessary. The city should monitor this condition periodically to see if it becomes an operations issue.

- SE Brady Road/NE 192nd Avenue
  The westbound left turn movement in the 2020 “With Project” A.M. and P.M. peak hour conditions exceed the available storage by 241 and 59 feet, respectively. This queue exceeding the available storage may be partially mitigated by reallocating some of the green time from the eastbound through phase to the westbound left turn phase. Reallocating the green time from NE 192nd Avenue to the westbound left movement from SE Brady Road can reduce the excessive queues along SE Brady Road. Since overall levels of service is relatively low (LOS C in the A.M. peak and LOS B in the P.M peak), it is likely that green time from NE 192nd Avenue can be reallocated to SE Brady Road. The westbound left turn movement LOS and v/c ratio meet the City of Vancouver standards so no mitigation is necessary. The City of Vancouver should monitor this movement periodically to see if it becomes a traffic operations issue.

- All of the study intersections are projected to operate at acceptable levels of service for the 2020 “With Project” condition.

Recommendations

- Based on the traffic impact analysis documented in this report, no off-site mitigation would be needed with the build out of the proposed project.

- Because the NW Camas Meadows Drive extension will be constructed for the Parklands at Camas Meadows project, the access intersections sight distances shall be verified later in the final engineering and construction stages of development.

Parklands at Camas Meadows TIA
Camas, WA

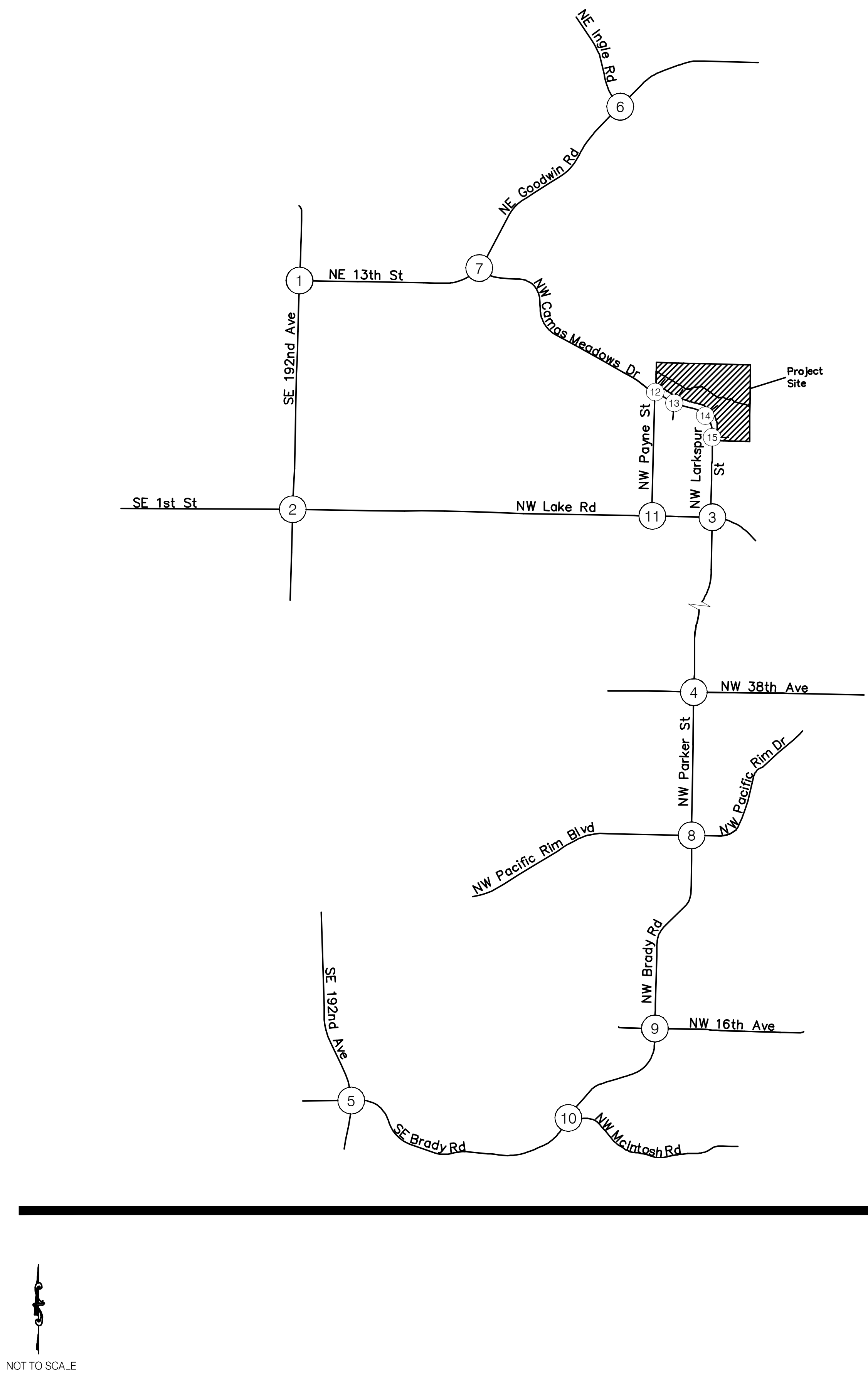
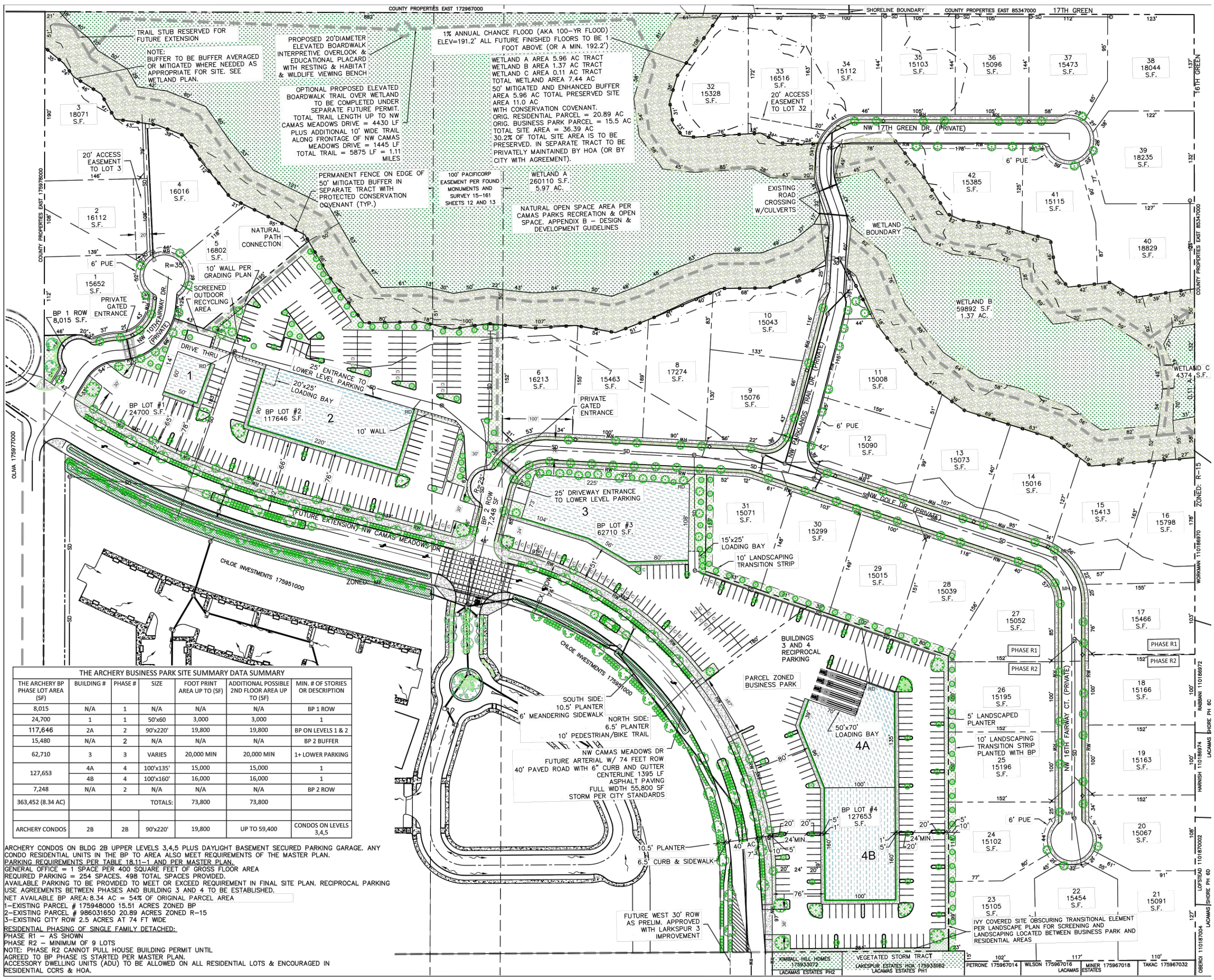


FIGURE 1
Site Vicinity Map



THE ARCHERY BUSINESS PARK SITE SUMMARY DATA SUMMARY						
THE ARCHERY BP PHASE LOT AREA (SF)	BUILDING #	PHASE #	SIZE	FOOT PRINT AREA UP TO (SF)	ADDITIONAL POSSIBLE 2ND FLOOR AREA UP TO (SF)	MIN. # OF STORIES OR DESCRIPTION
8,015	N/A	1	N/A	N/A	N/A	BP 1 ROW
24,700	1	1	50'x60	3,000	3,000	1
117,646	2A	2	90'x220'	19,800	19,800	BP ON LEVELS 1 & 2
15,480	N/A	2	N/A	N/A	N/A	BP 2 BUFFER
62,710	3	3	VARIES	20,000 MIN	20,000 MIN	1+ LOWER PARKING
127,653	4A	4	100'x135'	15,000	15,000	1
	4B	4	100'x160'	16,000	16,000	1
7,248	N/A	2	N/A	N/A	N/A	BP 2 ROW
363,452 (8.34 AC)			TOTALS:	73,800	73,800	
ARCHERY CONDOS	2B	2B	90'x220'	19,800	UP TO 59,400	CONDOS ON LEVELS 3,4,5

ARCHERY CONDOS ON BLDG 2B UPPER LEVELS 3,4,5 PLUS DAYLIGHT BASEMENT SECURED PARKING GARAGE. ANY CONDO RESIDENTIAL UNITS IN THE BP TO AREA ALSO MEET REQUIREMENTS OF THE MASTER PLAN.
PARKING REQUIREMENTS PER TABLE 18.11-1 AND PER MASTER PLAN.
GENERAL OFFICE = 1 SPACE PER 400 SQUARE FEET OF GROSS FLOOR AREA
REQUIRED PARKING = 254 SPACES. 498 TOTAL SPACES PROVIDED.
AVAILABLE PARKING TO BE PROVIDED TO MEET OR EXCEED REQUIREMENT IN FINAL SITE PLAN. RECIPROCAL PARKING USE AGREEMENTS BETWEEN PHASES AND BUILDING 3 AND 4 TO BE ESTABLISHED.
NET AVAILABLE BP AREA: 8.34 AC = 54% OF ORIGINAL PARCEL AREA
1-EXISTING PARCEL # 175948000 15.51 ACRES ZONED BP
2-EXISTING PARCEL # 986031650 20.89 ACRES ZONED R-15
3-EXISTING CITY ROW 2.5 ACRES AT 74 FT WIDE

RESIDENTIAL PHASING OF SINGLE FAMILY DETACHED:
PHASE R1 - AS SHOWN
PHASE R2 - MINIMUM OF 9 LOTS
NOTE: PHASE R2 CANNOT PULL HOUSE BUILDING PERMIT UNTIL AGREED TO BP PHASE IS STARTED PER MASTER PLAN.
ACCESSORY DWELLING UNITS (ADU) TO BE ALLOWED ON ALL RESIDENTIAL LOTS & ENCOURAGED IN RESIDENTIAL CCRS & HOA.

FIGURE 2
Site Plan

NOT TO SCALE

SECTION II
EXISTING CONDITIONS

SITE CONDITION AND ADJACENT LAND USE

The proposed project site is comprised of the following two tax lots: 175948-000 and 986031-650. The proposed site is vacant. Camas Meadows Golf Course exists to the west, north and east. Residential uses exist to the east and south of the project site.

TRANSPORTATION FACILITIES

The following provides a description of the existing street system in the study area.

SE 1st Street: SE 1st Street is classified as a principal arterial east of SE 164th Avenue. West of SE 164th Avenue, SE 1st Street is a collector arterial. Between SE 192nd Avenue and SE 202nd Avenue, the roadway is comprised of four lanes with a center median, additional turn lanes at major intersections, bike lanes and sidewalks. West of SE 192nd Avenue, the roadway is comprised of two-lanes with additional turn lanes at major intersections. Intermittent sidewalks exist along both sides of the roadway. The posted speed limit is 40 mph.

NE 13th Street: NE 13th Street is classified as a collector arterial roadway. The roadway is comprised of two lanes. Intermittent sidewalks exist on the north side of the roadway. The posted speed limit is 35 mph.

NW 16th Avenue: NW 16th Avenue is classified as a collector roadway. The roadway is comprised of two to three lanes. West of NW Parker Street, sidewalks exist on the south side of the roadway. East of NW Parker Street sidewalks and bike lanes exist on both sides of the roadway. The posted speed limit is 35 mph.

NW 38th Avenue: NW 38th Avenue is classified as an arterial roadway. The roadway is comprised of two to three lanes. Intermittent sidewalks and bike lanes exist on both sides of the roadway. The posted speed limit is 35 mph.

NE & SE 192nd Avenue: NE 192nd Avenue is classified as a principal arterial roadway. North of NE 3rd Street, the roadway is comprised of two lanes and additional turn lanes at major intersections. South of NE 3rd Street, the roadway is comprised of four lanes with a center median and additional turn lanes at major intersections. Bike lanes and sidewalks exist on both sides of the roadway. The posted speed limit is 40 mph.

NW & SE Brady Road: NW & SE Brady Road is a two lane arterial roadway with medians and additional turn pockets at major intersections. The posted speed limit is 40 mph from SE 192nd Avenue to NW McIntosh Road. North of McIntosh Road the speed limit changes to 35 mph. Intermittent sidewalks and bike lanes exist along both sides of the roadway.

NW Parker Street: NW Parker Street is classified as an arterial roadway. Between NW 24th Avenue and NW 38th Avenue the roadway is comprised of four lanes and a center median with additional turn pockets at major intersections. Other sections of the roadway are comprised of two to three lanes with a center median and additional turn pockets at major intersections. Sidewalks and bike lanes exist on both sides of the roadway. The posted speed limit is 35 mph.

NW Pacific Rim Boulevard: NW Pacific Rim Boulevard is classified as an arterial roadway. The roadway is comprised of four to five lanes with an intermittent center median and additional turn pockets at major intersections. Sidewalks and bike lanes exist on both sides of the roadway. The posted speed limit is 35 mph.

NW Pacific Rim Drive: NW Pacific Rim Drive is classified as a collector roadway. The roadway is comprised of two lanes. Sidewalks exist on both sides of the roadway. The posted speed limit is 25 mph.

NW Lake Road: NW Lake Road is classified as an arterial roadway. The roadway is comprised of four to five lanes with an intermittent center median and additional turn pockets at major intersections. Sidewalks and bike lanes exist on both sides of the roadway. The posted speed limit is 40 mph west of NW Parker Street and 35 mph east of NW Parker Street.

NW Larkspur Street: NW Larkspur Street is classified as an arterial roadway. The roadway is comprised of two lanes with additional turn pockets at major intersections. Intermittent sidewalks exist along the west side of the roadway and continuous sidewalks exist along the east side of the roadway. There is no posted speed limit but it is assumed to be 25 mph.

NW Camas Meadows Drive: NW Camas Meadows Drive is classified as an arterial roadway. The roadway is comprised of two to three lanes. Sidewalks exist on both sides of the roadway. The posted speed limit is 35 mph.

NW McIntosh Road: NW McIntosh Road is classified as an arterial roadway. The roadway is comprised of two lanes. Intermittent sidewalks exist along both sides of the roadway. The posted speed limit is 35 mph.

NE Ingle Road: NE Ingle Road is classified as a collector roadway. The roadway is comprised of two lanes with additional turn pockets at major intersections. The posted speed limit is 35 mph.

NE Goodwin Road: NE Goodwin Road is classified as an arterial roadway. The roadway is comprised of two lanes. The posted speed limit is 50 mph.

NW Payne Street: NE Payne Street is classified as a private roadway. The roadway is comprised of two lanes and has no posted speed limit.

The scope of the traffic impact study was developed from known City of Camas and City of Vancouver traffic study requirements. From this information, the following intersections listed below were analyzed:

- NE 13th Street/NE 192nd Avenue
- SE 1st Street/NE & SE 192nd Avenue
- NW Lake Road/NW Parker Street/NW Larkspur Street
- NW Parker Street/NW 38th Avenue
- SE Brady Road/SE 192nd Avenue
- NE Goodwin Road/NE Ingle Road
- NE Goodwin Road/NW Camas Meadows Drive
- NW Parker Street/NW Pacific Rim Boulevard/NW Pacific Rim Drive
- NW Brady Road/NW 16th Avenue
- NW & SE Brady Road/NW McIntosh Road
- NW Payne Street/NW Lake Road

The following study area intersections are signalized:

- NE 13th Street/NE 192nd Avenue
- SE 1st Street/NE & SE 192nd Avenue
- NW Lake Road/NW Parker Street/NW Larkspur Street
- NW Parker Street/NW 38th Avenue
- SE Brady Road/SE 192nd Avenue

The following study area intersections are all-way-stop controlled:

- NW Parker Street/NW Pacific Rim Boulevard/NW Pacific Rim Drive
- NW Brady Road/NW 16th Avenue

The remainder of the study area intersections are unsignalized and operate under stop sign control. Figure 3 shows the existing lane configurations and traffic control at these intersections.

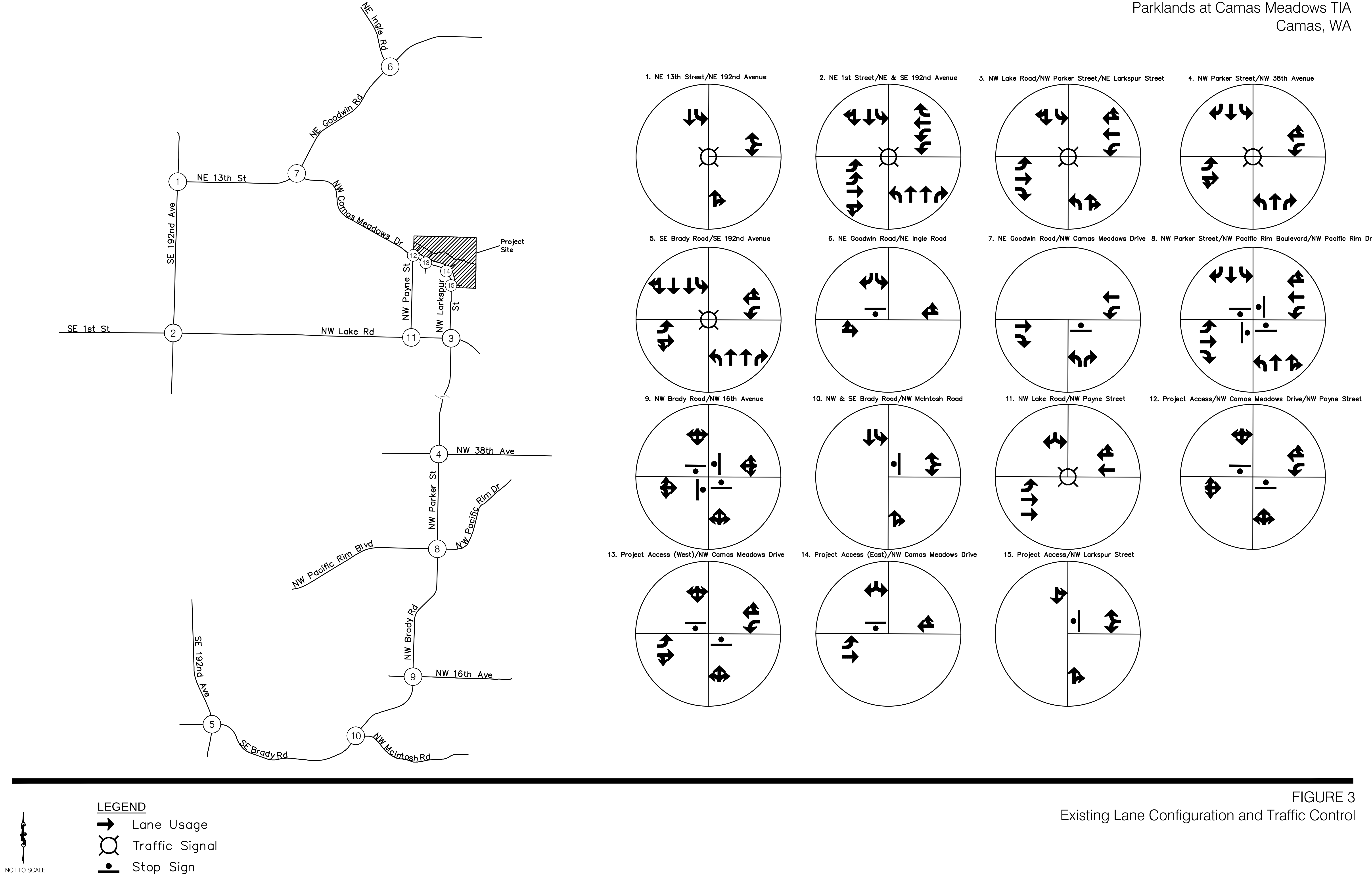


FIGURE 3
Existing Lane Configuration and Traffic Control

EXISTING TRAFFIC VOLUMES

A.M. and P.M. peak hour traffic counts were obtained at the study area intersections by H. Lee & Associates in January, April, June and July 2015. Below is a detailed list of when the traffic counts were conducted at the study area intersections.

- NE 13th St/NE 192nd Av – January 7 & 20, 2015 for A.M. and P.M. peak hours, respectively
- SE 1st St/NE & SE 192nd Av – April 1, 2015 for A.M. peak hour and January 15, 2015 for P.M. peak hour
- NW Lake R/NW Parker St/NW Larkspur St – June 9 & 10, 2015 for A.M. and P.M. peak hours, respectively
- NW Parker St/NW 38th Av – June 9, 2015 for both A.M. and P.M. peak hours
- SE Brady Rd/SE 192nd Av – June 9, 2015 for both A.M. and P.M. peak hours
- NE Goodwin Rd/NE Ingle Rd – June 10, 2015 for both A.M. and P.M. peak hours
- NE Goodwin Rd/NW Camas Meadows Dr – June 9, 2015 both A.M. and P.M. peak hours
- NW Parker St/NW Pacific Rim Blvd/NW Pacific Rim Dr – June 9 & 10, 2015 for A.M. and P.M. peak hours, respectively
- NW Brady Rd/NW 16th Av – June 11, 2015 for both A.M. and P.M. peak hours
- NW & SE Brady Rd/NW McIntosh Rd – June 9, 2015 for both A.M. and P.M. peak hours
- NW Payne St/NW Lake Rd – July 7, 2015 for both A.M. and P.M. peak hours

The existing A.M. and P.M. peak hour turning movement traffic counts are presented in Figure 4 and can be referenced in Appendix A. ADT's were collected at NW Payne Street, NW Larkspur Street and NW Camas Meadows Drive and can be referenced in Appendix A. Speed studies were also conducted at NW Camas Meadows Drive and NW Larkspur Street which can also be referenced in Appendix A.

EXISTING LEVEL OF SERVICE

Based on the traffic volumes presented in Figure 4, peak hour traffic operations were analyzed at the intersections identified above using the methodologies outlined in the 2010 Highway Capacity Manual (HCM). According to the HCM, there are six levels of service (LOS) by which the operational performance of an intersection may be described. These levels of service range between LOS "A" which indicates a relatively free-flowing condition and LOS "F" which indicates operational breakdown. LOS D is the City of Camas' adopted level of service standard for arterial/collector intersections. For non-arterial/collector intersections, LOS C is the adopted level of service standard.

The minimum level of service standard in the City of Vancouver can be referenced from Vancouver Municipal Code (VMC) Section 11.90.020(e) which states:

2) A proposed development that adds at least five (5) net new peak hour trips to a failing intersection approach within the required traffic impact analysis area may be denied based upon any of the following.

   a) For signalized intersections, when off-site intersection conditions are at a level of service "F";
   b) For signalized intersections, when the level of service is "E" and the volume to capacity ratio is greater than 0.95;
   c) For unsignalized intersections, when the volume to capacity ratio for any lane on any approach is greater than 0.95;
   d) When significant traffic hazards would be caused or materially aggravated by the proposed development;
   e) Notwithstanding a through d of this subsection, traffic impacts to intersections on Corridors Built to Ultimate Capacity shall be evaluated against the level of service standards identified in an adopted Corridor Management Plan.

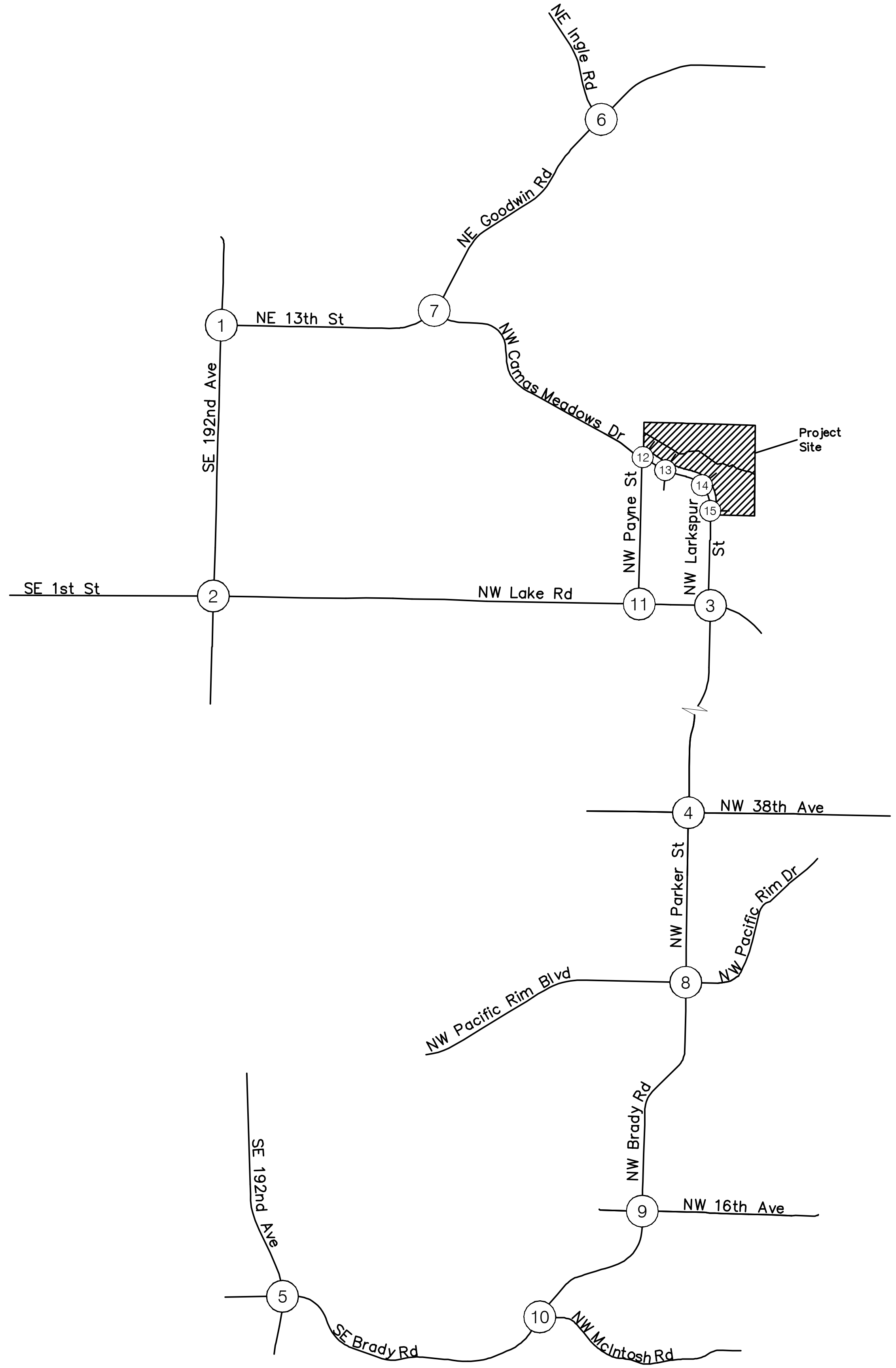
3) A proposed development that is subject to denial pursuant to this section may be approved subject to conditions of approval that address the impact of traffic generated by the proposed development. Proposed developments shall not be required to address an impact unless that impact causes the volume to capacity ratio on a lane of a failing intersection approach to exceed 0.95.

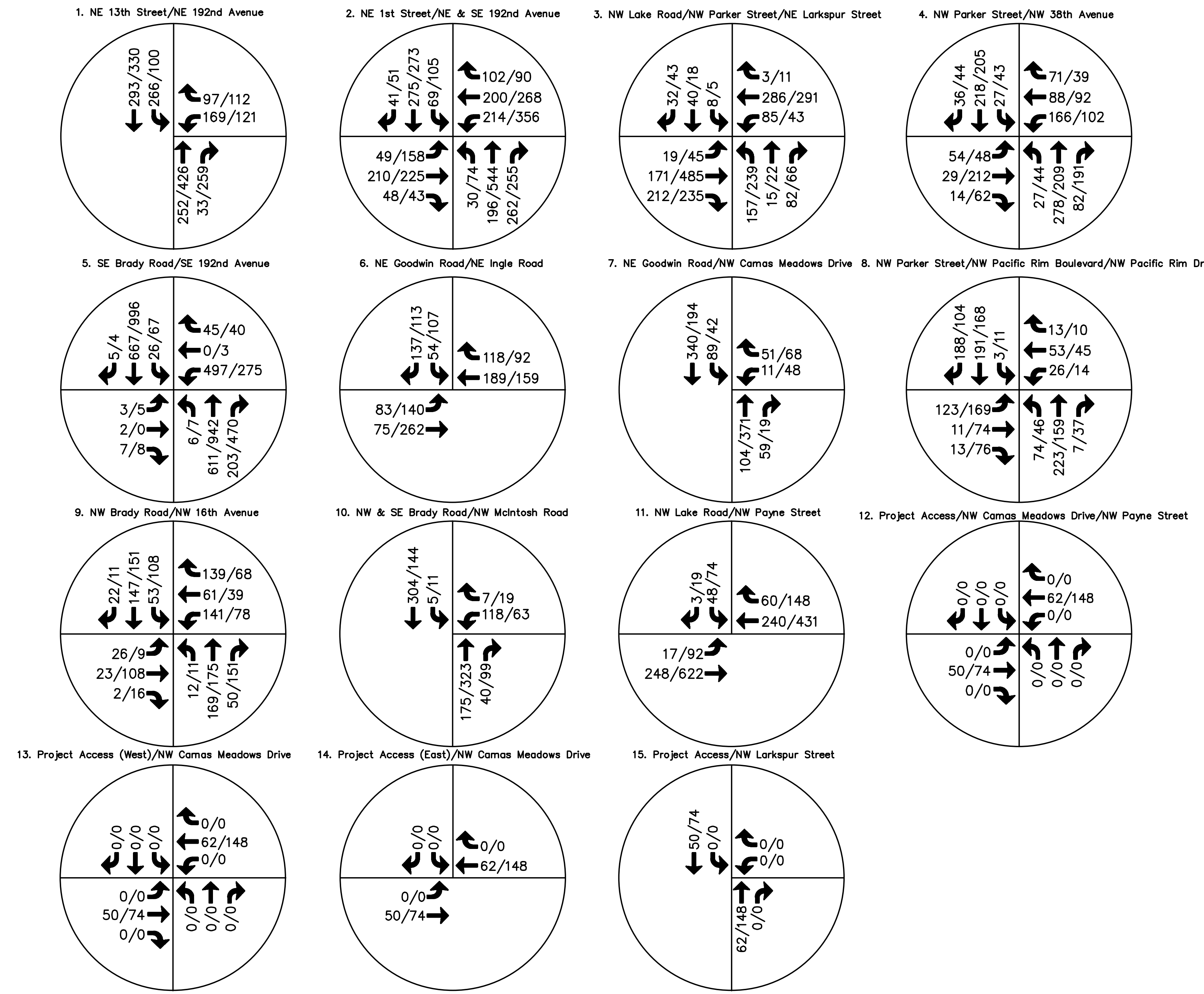
The City of Vancouver requires that the HCM levels of service be calculated by a software package called Synchro. All levels of service calculations have been conducted in Synchro.

Existing A.M. and P.M. peak hour levels of service are summarized in Table 1A for the City of Camas study area intersections. As indicated in Table 1A, all City of Cams study area intersections are currently operating at LOS C or better with the exception of NW Payne Street/NW Lake Road intersection where the southbound approach is operating at LOS D. Appendix C contains the LOS worksheets for the 2015 Existing Conditions.

Existing A.M. and P.M. peak hour levels of service are summarized in Table 1B for the City of Vancouver study area intersections. As shown in Table 1B, the signalized study area intersections are operating at an acceptable level of service of LOS D or better. All levels of service calculations have been conducted in Synchro and the actual signal timing was utilized. The signal timing cards can be referenced in Appendix B. The LOS calculation worksheets can be referenced in Appendix C.

Parklands at Camas Meadows TIA
Camas, WA





LEGEND

128/200 A.M./P.M. Peak Hour Traffic Volume

NOT TO SCALE

FIGURE 4
2015 Existing A.M. and P.M. Peak Hour Traffic Volumes

315021.0Figures.Dwg

Table 1A. 2015 Existing Levels of Service at City of Camas Intersections

	A.M. Peak Hour			P.M. Peak Hour		
Signalized Intersection	LOS	Average Delay (sec)	V/C Ratio	LOS	Average Delay (sec)	V/C Ratio
NW Lake Road/NW Parker Street/NW Larkspur Road	B	15.5	0.48	B	16.1	0.52
NW Parker Street/NW 38th Avenue	B	16.3	0.58	B	15.8	0.54
All Way Stop Intersections						
NW Parker St/NW Pacific Rim Blvd/NW Pacific Rim Dr	B	13.1	0.35	B	12.4	0.30
NW Brady Road/NW 16th Avenue	B	15.0	0.51	B	12.5	0.42
Unsignalized Intersection						
NE Goodwin Road/NE Ingle Road						
Eastbound Left	A	8.3	0.08	A	8.1	0.11
Southbound Left	A	14.1	0.13	C	22.2	0.35
Southbound Right	B	11.0	0.20	B	10.1	0.14
NE Goodwin Road/NW Camas Meadows Drive						
Westbound Left	C	15.3	0.04	C	16.9	0.16
Westbound Right	A	9.1	0.06	B	11.6	0.13
Southbound Left	A	7.7	0.07	A	8.4	0.04
NW & SE Brady Road/NW McIntosh Road						
Westbound Left	C	16.5	0.31	C	16.1	0.20
Westbound Right	A	9.5	0.01	B	11.4	0.04
Southbound Left	A	7.8	0.01	A	8.5	0.01
NW Lake Road/NW Payne Street						
Eastbound Left	A	8.0	0.02	A	9.2	0.11
Southbound Approach	B	12.6	0.11	D	34.6	0.46

Table 1B. 2015 Existing Levels of Service at City of Vancouver Intersections

	A.M. Peak Hour			P.M. Peak Hour		
Signalized Intersection	LOS	Average Delay (sec)	V/C Ratio	LOS	Average Delay (sec)	V/C Ratio
NE 13th Street/NE 192nd Avenue						
Westbound Approach	C	34.5	0.67	D	44.3	0.73
Northbound Approach	C	33.6	0.67	C	25.6	0.77
Southbound Approach	C	21.6	0.47	B	16.3	0.34
SE 1st Street/NE & SE 192nd Avenue						
Eastbound Approach	D	37.1	0.54	D	42.3	0.51
Westbound Approach	C	33.8	0.53	D	45.5	0.68
Northbound Approach	B	12.3	0.25	C	20.0	0.36
Southbound Approach	C	22.3	0.29	C	27.8	0.31
SE Brady Road/SE 192nd Avenue						
Eastbound Approach	C	30.3	0.09	B	15.2	0.03
Westbound Approach	E	59.0	0.90	C	34.5	0.61
Northbound Approach	B	12.0	0.33	B	13.6	0.51
Southbound Approach	B	14.1	0.38	B	14.2	0.49

Table 2 shows the 95th percentile queue for the major movements at the study area intersections. These 95th percentile queues were obtained from the Synchro level of service output and can be referenced in Appendix C. As shown in Table 2, all of the 95th percentile queues are within the available storage areas with the exception of the westbound left turn movement at the SE 192nd Avenue/SE Brady Road intersection in the A.M. peak hour. The westbound left movement at the SE 192nd Avenue/ SE Brady Road intersection has a 95th percentile queue of 584 feet in the A.M. peak hour. The available storage for the westbound left movement is only 320 feet. This queue exceeding the available storage may be partially mitigated by reallocating some of the green time from the eastbound through phase to the westbound left turn phase. Reallocating the green time for the eastbound and westbound directions of travel should minimize the impacts to the signal coordination along NE 192nd Avenue. Also, since the level of service and v/c standards are not exceeded, no mitigation of this condition should be required. The City of Vancouver should monitor this movement periodically to see if it becomes a traffic operations issue.

Table 2. 95th Percentile Queuing at Study Area Intersections for 2015 Existing Conditions

Signalized Intersection	A.M. Peak Hour Queue[1]	P.M. Peak Hour Queue[1]	Available Storage	Storage Exceeded?
NE 13th St/NE 192nd Ave				
Westbound Approach	262 feet	218 feet	continuous	No
Northbound Approach	282 feet	683 feet	continuous	No
Southbound Left	276 feet	123 feet	377 feet	No
Southbound Through	142 feet	137 feet	continuous	No
SE 1st St/NE & SE 192nd Ave				
Eastbound Left	32 feet	82 feet	285 feet	No
Eastbound Through	101 feet	116 feet	continuous	No
Westbound Left	100 feet	165 feet	345 feet	No
Westbound Through	172 feet	254 feet	continuous	No
Westbound Right	25 feet	31 feet	continuous	No
Northbound Left	44 feet	93 feet	195 feet	No
Northbound Through	79 feet	202 feet	continuous	No
Northbound Right	30 feet	37 feet	230 feet	No
Southbound Left	79 feet	122 feet	295 feet	No
Southbound Through	111 feet	111 feet	continuous	No
NW Lake Rd/NW Parker St/NW Larkspur Rd				
Eastbound Left	30 feet	58 feet	215 feet	No
Eastbound Through	134 feet	353 feet	continuous	No
Eastbound Right	25 feet	19 feet	185 feet	No
Westbound Left	85 feet	73 feet	continuous	No
Westbound Through	93 feet	97 feet	continuous	No
Northbound Left	126 feet	195 feet	350 feet	No
Northbound Through/Right	26 feet	41 feet	continuous	No
Southbound Left	25 feet	25 feet	150 feet	No
Southbound Through/Right	54 feet	47 feet	continuous	No

Table 2. 95th Percentile Queuing at Study Area Intersections for 2015 Existing Conditions Continued

Signalized Intersection	A.M. Peak Hour Queue[1]	P.M. Peak Hour Queue[1]	Available Storage	Storage Exceeded?
NW Parker St/NW 38th Ave				
Eastbound Left	46 feet	46 feet	250 feet	No
Eastbound Through/Right	27 feet	144 feet	continuous	No
Westbound Left	144 feet	100 feet	200 feet	No
Westbound Through/Right	71 feet	64 feet	continuous	No
Northbound Left	31 feet	46 feet	180 feet	No
Northbound Through	161 feet	122 feet	continuous	No
Northbound Right	25 feet	31 feet	continuous	No
Southbound Left	31 feet	44 feet	295 feet	No
Southbound Through	125 feet	120 feet	continuous	No
Southbound Right	25 feet	25 feet	190 feet	No
SE Brady Road/SE 192nd Avenue				
Eastbound Left	25 feet	25 feet	180 feet	No
Eastbound Through/Right	25 feet	25 feet	continuous	No
Westbound Left	584 feet	251 feet	320 feet	Yes
Westbound Through/Right	25 feet	29 feet	continuous	No
Northbound Left	25 feet	25 feet	325 feet	No
Northbound Through	204 feet	346 feet	continuous	No
Northbound Right	25 feet	32 feet	205 feet	No
Southbound Left	41 feet	81 feet	175 feet	No
Southbound Through	214 feet	334 feet	continuous	No
Southbound Right	25 feet	25 feet	205 feet	No
NE Goodwin Road/NE Ingle Road				
Eastbound Left	25 feet	25 feet	continuous	No
Southbound Left	25 feet	38 feet	140	No
Southbound Right	25 feet	25 feet	continuous	No
All Way Stop Intersections				
NW Parker St/NW Pacific Rim Blvd/NW Pacific Rim Dr				
Eastbound Left	38 feet	53 feet	180 feet	No
Eastbound Through	25 feet	25 feet	continuous	No
Eastbound Right	25 feet	25 feet	continuous	No
Westbound Left	25 feet	25 feet	115 feet	No
Westbound Through	25 feet	25 feet	continuous	No
Northbound Left	25 feet	25 feet	188 feet	No
Northbound Through	40 feet	25 feet	continuous	No
Southbound Left	25 feet	25 feet	190 feet	No
Southbound Through	58 feet	48 feet	continuous	No
Southbound Right	25 feet	25 feet	continuous	No
NW Brady Road/NW 16th Avenue				
Eastbound Approach	25 feet	25 feet	continuous	No
Westbound Approach	113 feet	35 feet	continuous	No
Northbound Approach	58 feet	73 feet	continuous	No
Southbound Approach	55 feet	58 feet	continuous	No
NE Goodwin Road/NW Camas Meadows Drive				
Westbound Left	25 feet	25 feet	140 feet	No
Westbound Right	25 feet	25 feet	continuous	No
Southbound Left	25 feet	25 feet	85 feet	No

[1]Future available storage to be determined with Green Mountain Development Traffic Study.

Table 2. 95th Percentile Queuing at Study Area Intersections for 2015 Existing Conditions Continued

Unsignalized Intersection	A.M. Peak Hour Queue[1]	P.M. Peak Hour Queue[1]	Available Storage	Storage Exceeded?
NW & SE Brady Road/NW McIntosh Road				
Westbound Left	53 feet	25 feet	continuous	No
Westbound Right	25 feet	25 feet	continuous	No
Southbound Left	25 feet	25 feet	105 feet	No
NW Lake Road/NW Payne Street				
Eastbound Left	25 feet	25 feet	230 feet	No
Southbound Through/Right	25 feet	55 feet	continuous	No

[1]Future available storage to be determined with Green Mountain Development Traffic Study.

ACCIDENT HISTORY

Accident data was obtained from the Washington State Department of Transportation (WSDOT) for the five year period between January 1, 2010 and December 31, 2014. The data includes total accidents and accidents by severity (i.e. fatal, injury or property damage only). This accident data is summarized in Table 3. Appendix D contains the accident data.

Table 3. Summary of Traffic Accident History in Study Area

Intersection	Average Annual Accidents				acc/mev[2]
	PDO[1]	Injury	Fatal	Total	
NE 13th Street/NE 192nd Avenue	0.8	0.8	0.0	1.6	0.26
SE 1st Street/NE & SE 192nd Avenue	0.2	1.6	0.0	1.8	0.16
NW Lake Road/NW Parker Street/NW Larkspur Street	0.6	0.0	0.0	0.6	0.09
NW Parker Street/NW 38th Avenue	1.0	0.8	0.0	1.8	0.31
SE Brady Road/SE 192nd Avenue	1.0	0.2	0.0	1.2	0.09
NE Goodwin Road/NE Ingle Road	1.2	0.6	0.0	1.8	0.45
NE Goodwin Road/NW Camas Meadows Drive	0.0	0.2	0.0	0.2	0.06
NW Parker St/NW Pacific Rim Blvd/NW Pacific Rim Dr	0.8	0.0	0.0	0.8	0.19
NW Brady Road/NW 16th Avenue	0.6	0.2	0.0	0.8	0.19
NW & SE Brady Road/NW McIntosh Road	0.2	0.0	0.0	0.2	0.67
NW Payne Street/NW Lake Road	0.0	0.2	0.0	0.2	0.03

[1] PDO = property damage only
[2] acc/mev = accidents per million entering vehicles

As shown in Table 3, all of the study area intersections have an accident rate of less than 1.00 accidents per million entering vehicles. Generally, an accident rate of less than 1.00 accidents per million entering vehicles is considered acceptable and does not warrant further analysis.

EXISTING PUBLIC TRANSIT SERVICE

C-Tran provides public transit service in the City of Camas and the City of Vancouver. Currently there is no transit service in the project vicinity.

Route #38 Mill Plain/192nd provides the nearest service to the project site, Route #38 provides services along NE 3rd Street. Route #38 Mill Plain/192nd provides service to and from Downtown Vancouver, Hudson Bay High School, Kaiser Clinic Vancouver, ML King Elementary School, Town Plaza, Peace Health SW WA Medical Center, Kaiser Clinic Cascade Park, Vancouver Clinic, Clark College, 192nd Avenue, Shahala Middle School, and Union High School along Mill Plain Boulevard, Grand Boulevard, Andresen Road, NE 112th Avenue, NE 136th Avenue, SE 164th Avenue, SE 192nd Avenue, and SE 1st Street. On weekdays, Route #38, provides services from 4:45 A.M. to 12:44 P.M. in approximately 15 to 40 minute headways. Route #38 does not provide Saturday or Sunday services.

NON-MOTORIZED TRANSPORTATION

There are sidewalks along the north side of NW Camas Meadows Drive and the east side of NW Larkspur Street in the project vicinity.

PLANNED TRANSPORTATION IMPROVEMENTS

There are twenty-one known transportation improvement projects planned by the City of Camas in the project vicinity based on the City of Camas' 2015-2020 Six Year Transportation Program. These projects are listed below. The project number is the priority number based upon the Six Year Transportation Improvement Program list.

- #2 - NW Brady Road from NW 16th Avenue to NW 25th Avenue
  This improvement project is to widen NW Brady Road and to build bike lanes. The project budget is estimated at $5,800,000 and is to be funded in federal, state, and local dollars. Right of way acquisition is planned for July 2015. Construction is scheduled for June 2016.

- #3 - NW Camas Meadows Drive from NW Payne Street to NW 60th Avenue
  This improvement project is the construction of a new roadway. The project budget is estimated at $3,360,000 and is to be funded in state and local dollars. Preliminary engineering is scheduled to start in July 2016. Right of way acquisition is planned for July 2017. Construction is scheduled for June 2018.

- #4 – NW Larkspur Street from NW Lake Road to NW 60th Avenue
  This improvement project is to widen NW Larkspur Street and to build sidewalks. The project budget is estimated at $1,070,000 and is to be funded in state and local dollar. Preliminary engineering is scheduled to start in July 2016. Right of way acquisition is planned for July 2017. Construction is scheduled for June 2018.

- #5 - NW 38th Avenue from NW Parker Street to Grass Valley Park
  This improvement project is to widen NW 38th Avenue and to build bike lanes. The project budget is estimated at $3,380,000 and is to be funded in federal and local dollars. Preliminary engineering is scheduled for 2018.

- #8 – NW Pacific Rim Boulevard at SE Payne Road
  A traffic signal is planned to be installed in 2018. The estimated cost of this traffic signal is $290,000 and is to be funded in local dollars.

- #9 – NE Goodwin Road/NE 28th Street from NW Camas Meadows to NE 232nd Avenue
  This improvement project is to widen NE Goodwin Road to five lanes with bike lanes west of NE Ingle Road and to widen the roadway to three lanes with bike lanes east of NE Ingle Road. The estimated project budget is $20,000,000 and is to be funded in federal, state, and local dollars. Preliminary engineering is scheduled to begin in 2019.

- #19 – NW 18th Avenue from NW Whitman Street to NW Brady Road
  This improvement project is the construction of a new roadway and includes bike lanes. The estimated project cost for the preliminary engineering is $5,000. No other project cost have been developed. Preliminary engineering is scheduled to begin in 2020.

- #20 – NW 18th Avenue from NW Whitman Street to West City Limits
  This improvement project is to widen NW 18th Avenue and building bike lanes. The estimated project cost for the preliminary engineering is $5,000. No other project cost have been developed. Preliminary engineering is scheduled to begin in 2020.

- #23 – NW Friberg Street/NW Strunk Road to NW Larkspur Street
  This improvement project is the new construction of a roadway. The estimated project budget for preliminary engineering is $5,000. No other project costs have been developed. The preliminary engineering is scheduled to start in 2020.

- #24 – NW Payne Street from NW Lake Road to NW Camas Meadows
  This improvement project is to widen NW Payne Street. The estimated project budget for preliminary engineering is $5,000. No other project costs have been developed. The preliminary engineering is scheduled to start in 2020.

- #25 – North Dwyer Creek Master Plan Street "A" from NW Lake Road to NW Camas Meadows Drive
  This improvement project is the new construction of a roadway. The estimated project budget for preliminary engineering is $5,000. No other project costs have been developed. The preliminary engineering is scheduled to start in 2020.

- #26 – NW McIntosh Road from NW Brady Road to NW 11th Avenue
  This improvement project is to widen NW McIntosh Road and to build bike lanes. The estimated project budget for preliminary engineering is $5,000. No other project costs have been developed. The preliminary engineering is scheduled to start in 2019.

- #29 – NE 18th Street from NE 192nd Avenue to NE Goodwin Road
  This improvement project is the new construction of a roadway with a potential alternate alignment. The estimated project budget for preliminary engineering is $5,000. No other project costs have been developed. The preliminary engineering is scheduled to start in 2020.

- #31 – NW Camas Meadows Drive from NE 13th Street to NE 18th Street
  This improvement project is the new construction of a roadway with a potential alternate alignment. The estimated project budget for preliminary engineering is $5,000. No other project costs have been developed. The preliminary engineering is scheduled to start in 2020.

- #35 – NE Ingle Road Extension from NE Goodwin Road to NE 232nd Avenue
  This improvement project is the new construction of a roadway, which would extend NE Ingle Road from NE Goodwin Road to NE 232nd Avenue. The estimated project budget for preliminary engineering is $5,000. No other project costs have been developed. The preliminary engineering is scheduled to start in 2020.

- #38 – NW Pacific Rim Boulevard at SE Payne Road
  A traffic signal is planned to be installed in 2016. The estimated cost of this traffic signal is $270,000.

- #36 – NW Brady Road at NW 16th Avenue
  A traffic signal is planned to be installed in 2019. The estimated cost of this traffic signal is $290,000.

- #38 – NW Goodwin Road at NW Camas Meadows Drive
  A traffic signal is planned to be installed in 2019. The estimated cost of this traffic signal is $290,000

- #39 – NW Pacific Rim Boulevard at NW Parker Street
  A traffic signal is planned at this intersection. Preliminary engineering is expected to begin in 2020. The project budget for preliminary engineering is $5,000.

- #43 – NE Goodwin Road at NE Ingle Road
  A traffic signal is planned at this intersection. Preliminary engineering is expected to begin in 2020. The project budget for preliminary engineering is $5,000.

- #55 – NW 18th Avenue from SE 201st Avenue to NW Beech Street
  A shared pedestrian path is planned along NW 18th Street from SE 201st Avenue to NW Beech Street. The estimated cost of this project is $250,000. The project is scheduled to begin in 2014.

A review of the City of Vancouver's Six Year TIP, 2015-2020, revealed that there are no funded projects in the study area.

The following transportation improvement projects are partially funded:

- SE 1st Street - SE 164th Avenue to SE 192nd Avenue
  The existing two lane roadway will be upgraded to urban standards. The roadway will be improved to a three and five lane principal arterial (one or two lanes in each direction plus a center turn lane). The roadway cross section will vary per segment. Street upgrades include sidewalks, bike lanes, street lights, and sound walls at required locations. The total project cost is estimated at $16,270,000. PSE and ROW phases of the project are only partially funded. No funding has been secured for construction. This project is currently in the design phase. Start of construction is not known yet because funding is not secure.

The following transportation improvement projects are unfunded:

- NE 192nd Avenue - SE 1st Street to NE 18th Street
  The existing two lane roadway will be upgraded to a five lane principal arterial with bike lanes, sidewalks, and street lights. The total project cost is estimated at $4,215,763. The start of construction is not known yet because funding is not secure.

- NE 9th Street - NE 172nd Avenue to NE 192nd Avenue
  This project is the construction of a new urban collector (one lane each direction plus a center turn lane) that includes sidewalks, bike lanes, and street lights. This planned roadway is in conjunction with the Section 30 Sub Area Plan concept. The total project cost is unknown at this time.

SECTION III
TRAFFIC IMPACT ANALYSIS

ANALYSIS METHODOLOGY

The traffic impacts generated by the proposed Parklands at Camas Meadows during the A.M. and P.M. peak hour were analyzed as follows:

- For the City of Camas study area intersections, 2020 "Without Project" traffic volumes were established as the future baseline condition for the traffic analysis and to define a baseline by which project impacts could be determined. The 2020 "Without Project" condition traffic volumes were derived by adding "in-process" traffic volumes from fourteen previously approved developments yet to be built to the 2015 existing traffic volumes.

  For the City of Vancouver study area intersections, 2020 "Without Project" traffic volumes were established as the future baseline condition for the traffic analysis and to define a baseline by which project impacts could be determined. The 2020 "Without Project" condition traffic volumes were derived by using a 2.0 percent annual, compounded growth factor.

- A.M., P.M., and daily trip generation were estimated for the proposed development using the rates in "Trip Generation, 9th Edition," (Institute of Transportation Engineers, 2012).

- Trip distribution of site-generated traffic was developed from existing count information as well as logical travel paths to the major transportation facilities.

- Predicted A.M. and P.M. peak hour site-generated traffic from the proposed development was assigned to the roadway network and added to the 2020 "Without Project" traffic volumes to develop the 2020 "With Project" traffic volumes.

A detailed discussion of the methodology summarized above and the analysis results are contained in the remainder of this section.

2020 "WITHOUT PROJECT" TRAFFIC VOLUMES AND LEVELS OF SERVICE

The 2020 "Without Project" condition was analyzed as the future baseline condition for the traffic analysis and to define a baseline by which project impacts could be determined.

For the City of Camas study area intersections, the 2020 "Without Project" condition traffic volumes were derived by adding traffic generated by fourteen "in process" developments which are approved but not built to the existing traffic counts. The "in-process" traffic information was obtained from City of Camas staff. The fourteen "in process" developments are as follows:

- Alpha Tec
- Belz Place Development
- Bishop Subdivision
- Brady Road Subdivision
- C J Dens Subdivision
- Deerhaven Subdivision
- Fisher Creek Campus, Bldg 3
- Fisher Creek Campus, Bldg 4
- Green Mountain Mixed Use PRD
- Millshore Downs Development
- North Hills Subdivision
- Parker Village Subdivision
- Stoneleaf Subdivision
- Summit at Columbia Vista Subdivision

The 2020 "Without Project" traffic volumes for the City of Vancouver study area intersections were derived by using a 2.0 percent annual, compounded growth factor. The growth factor obtained from the City of Vancouver Traffic Study Guidelines, January 2012.

Figure 5 shows the 2020 "Without Project" traffic volumes for all of the study intersections.

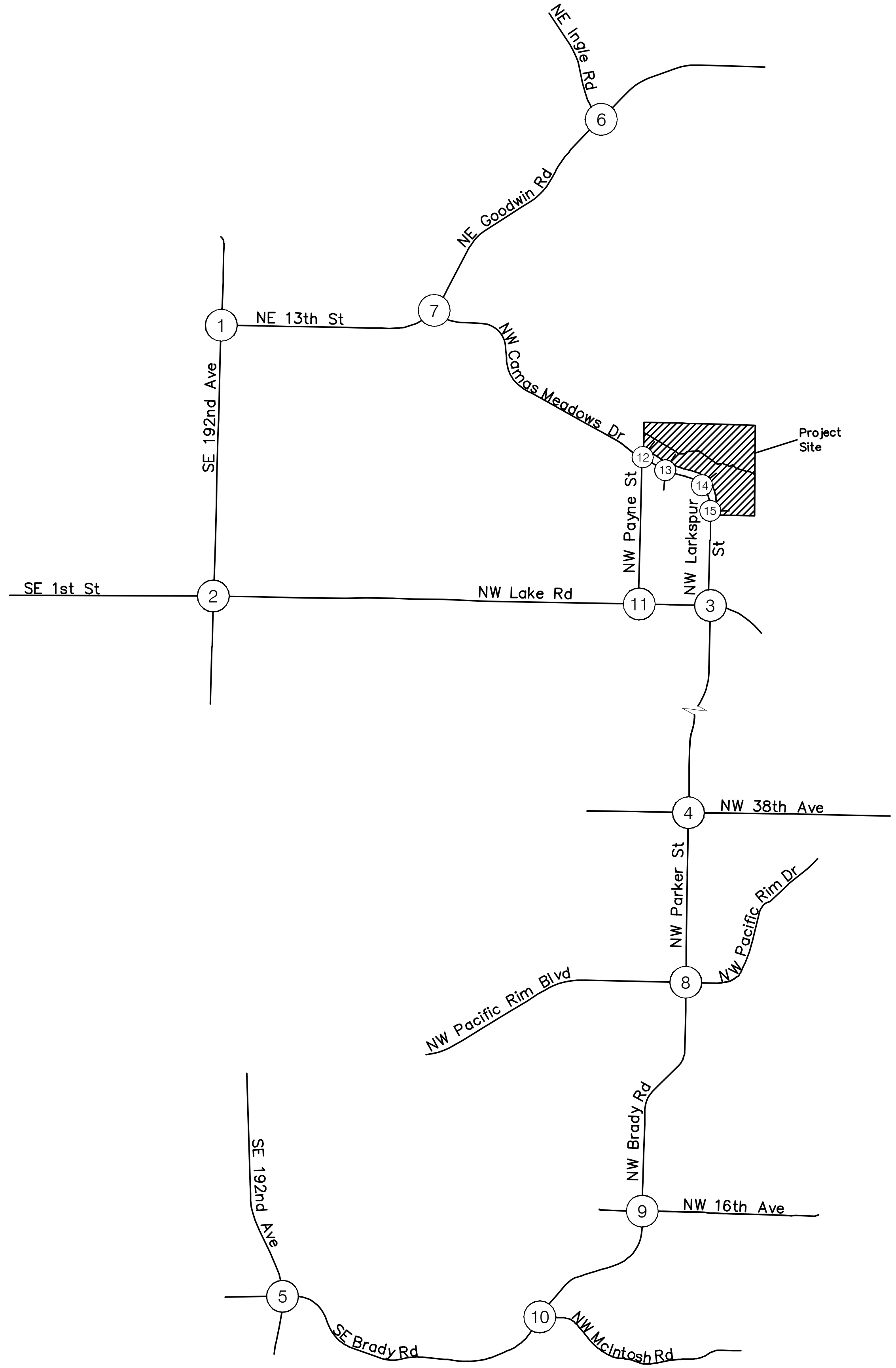
Levels of service were calculated at the study area intersections with 2020 "Without Project" traffic volumes and the existing lane configurations shown earlier in Figure 3. The results of the analysis are shown in Table 4A and 4B for all the study area intersections. The levels of service calculation worksheets can be referenced in Appendix E.

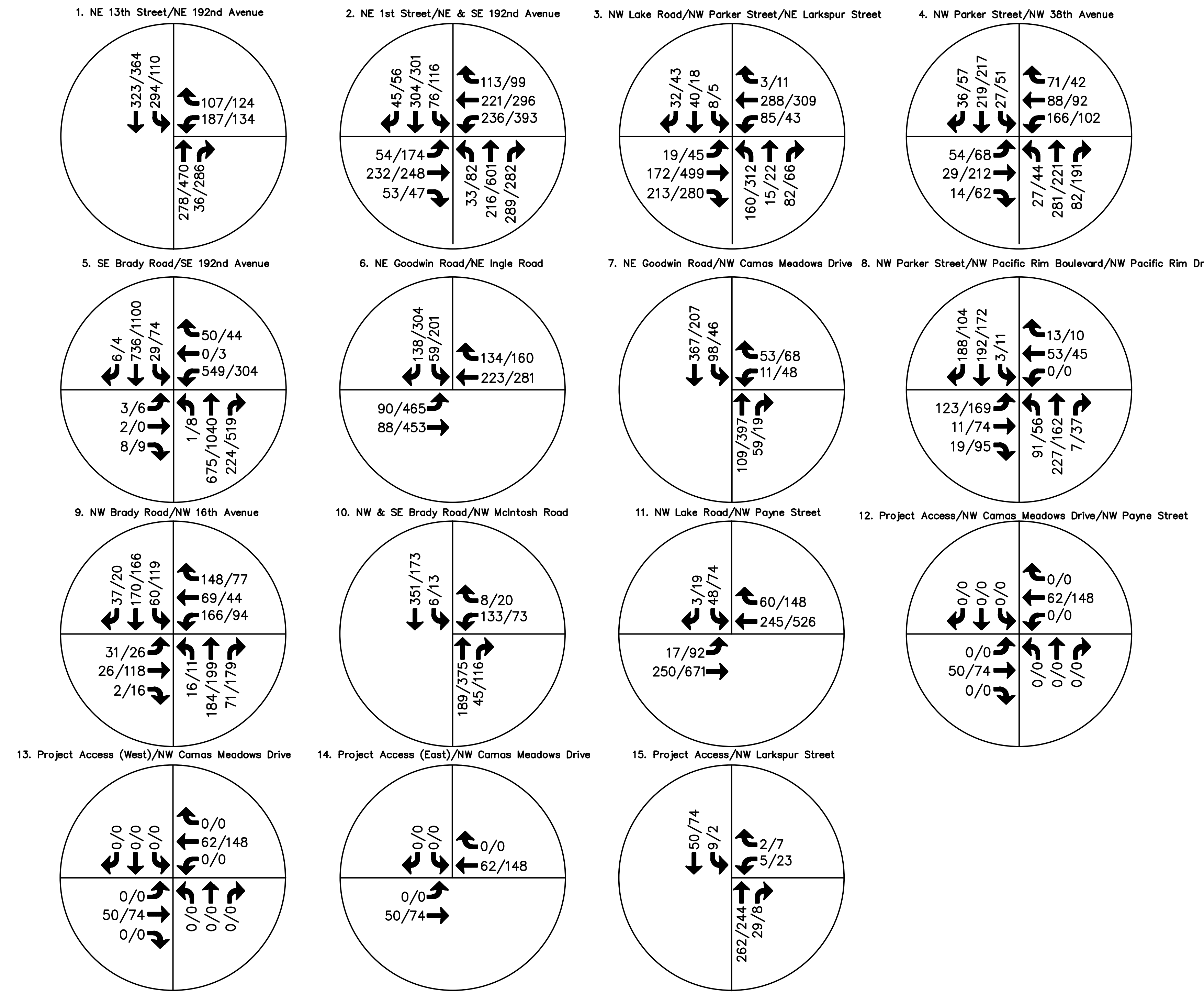
Per conversations with Olson Engineering, Inc. pertaining to the Green Mountain Development, the NE Goodwin Road/NE Ingle Road intersection will be converted to a signalized intersection with additional eastbound and westbound left turn lanes. The NE Goodwin Road/NE Ingle Road intersection was analyzed in the 2020 "Without Project" condition based on those improvements.

As shown in Table 4A, all City of Camas intersections are projected to operate at LOS C or better in the 2020 "Without Project" condition (which meets the City of Camas' standards) with the exception of NW Payne Street/NW Lake Road intersection where the southbound approach is projected to operate at LOS E.

As shown in Table 4B, all City of Vancouver intersection approaches are projected to operate at an acceptable level of service of LOS D or better except the westbound approach at SE 192nd Avenue/SE Brady Road intersection which is projected to operate at LOS F.

Parklands at Camas Meadows TIA
Camas, WA





LEGEND
128/200 A.M./P.M. Peak Hour Traffic Volume

NOT TO SCALE

FIGURE 5
2020 "Without Project"
A.M. and P.M. Peak Hour Traffic Volumes

315021.0Figures.Dwg

Table 4A. 2020 "Without Project" Levels of Service at City of Camas Intersections

Signalized Intersection	A.M. Peak Hour LOS	A.M. Peak Hour Average Delay (sec)	A.M. Peak Hour V/C Ratio	P.M. Peak Hour LOS	P.M. Peak Hour Average Delay (sec)	P.M. Peak Hour V/C Ratio
NW Lake Road/NW Parker Street/NW Larkspur Road	B	15.5	0.49	B	17.9	0.56
NW Parker Street/NW 38th Avenue	B	16.3	0.58	B	16.2	0.54
NE Goodwin Road/NE Ingle Road	A	8.3	0.40	B	14.8	0.56
All Way Stop Intersections						
NW Parker St/NW Pacific Rim Blvd/NW Pacific Rim Dr	B	13.4	0.36	B	12.6	0.30
NW Brady Road/NW 16th Avenue	C	21.4	0.63	C	15.9	0.52
Unsignalized Intersection						
NE Goodwin Road/NW Camas Meadows Drive						
Westbound Left	C	16.2	0.04	C	18.1	0.17
Westbound Right	A	9.2	0.07	B	11.9	0.13
Southbound Left	A	7.7	0.08	A	8.5	0.05
NW & SE Brady Road/NW McIntosh Road						
Westbound Left	C	19.4	0.39	C	19.4	0.27
Westbound Right	A	9.6	0.01	B	12.1	0.05
Southbound Left	A	7.8	0.01	A	8.8	0.02
NW Lake Road/NW Payne Street						
Eastbound Left	A	8.0	0.02	A	9.7	0.12
Southbound Approach	B	12.7	0.11	E	48.0	0.57

Table 4B. 2020 "Without Project" Levels of Service at City of Vancouver Intersections

Signalized Intersection	A.M. Peak Hour LOS	A.M. Peak Hour Average Delay (sec)	A.M. Peak Hour V/C Ratio	P.M. Peak Hour LOS	P.M. Peak Hour Average Delay (sec)	P.M. Peak Hour V/C Ratio
NE 13th Street/NE 192nd Avenue						
Westbound Approach	D	38.9	0.73	D	45.8	0.76
Northbound Approach	D	38.0	0.72	C	34.2	0.87
Southbound Approach	C	24.4	0.51	B	17.4	0.37
SE 1st Street/NE & SE 192nd Avenue						
Eastbound Approach	D	36.8	0.55	D	42.3	0.53
Westbound Approach	C	34.0	0.57	D	47.5	0.72
Northbound Approach	B	13.5	0.29	C	21.7	0.42
Southbound Approach	C	23.9	0.33	C	29.6	0.35
SE Brady Road/SE 192nd Avenue						
Eastbound Approach	C	29.6	0.10	B	15.9	0.03
Westbound Approach	F	84.7	0.99	D	35.0	0.63
Northbound Approach	B	12.4	0.36	B	15.4	0.58
Southbound Approach	B	14.6	0.42	B	15.7	0.56

Table 5 shows the 95th percentile queue for the major movements at the study area intersections for the 2020 "Without Project" conditions. These 95th percentile queues were obtained from the Synchro level of service output and can be referenced in Appendix E. As shown in Table 8, all of the 95th percentile queues are within the available storage areas with the exception of the westbound left turn movement at the SE 192nd Avenue/SE Brady Road intersection in the A.M. peak hour. The westbound left movement at the SE 192nd Avenue/ SE Brady Road intersection has a 95th percentile queue of 666 feet in the A.M. peak hour. The available storage for the westbound left movement is only 320 feet. This queue exceeding the available storage may be partially mitigated by reallocating some of the green time from the eastbound through phase to the westbound left turn phase. Reallocating the green time for the eastbound and westbound directions of travel should minimize the impacts to the signal coordination along NE 192nd Avenue. The City of Vancouver should monitor this movement periodically to see if it becomes a traffic operations issue.

Table 5. 95th Percentile Queuing at Study Area Intersections for 2020 "Without Project"

Signalized Intersection	A.M. Peak Hour Queue[1]	P.M. Peak Hour Queue[1]	Available Storage	Storage Exceeded?
NE 13th St/NE 192nd Ave				
Westbound Approach	303 feet	247 feet	continuous	No
Northbound Approach	327 feet	849feet	continuous	No
Southbound Left	335 feet	137 feet	377 feet	No
Southbound Through	175 feet	166 feet	continuous	No
SE 1st St/NE & SE 192nd Ave				
Eastbound Left	34 feet	89 feet	285 feet	No
Eastbound Through	108 feet	128 feet	continuous	No
Westbound Left	109 feet	181 feet	345 feet	No
Westbound Through	186 feet	304 feet	continuous	No
Westbound Right	25 feet	32 feet	continuous	No
Northbound Left	47 feet	100 feet	195 feet	No
Northbound Through	86 feet	225 feet	continuous	No
Northbound Right	51 feet	61 feet	230 feet	No
Southbound Left	88 feet	134 feet	295 feet	No
Southbound Through	128 feet	123 feet	continuous	No
NW Lake Rd/NW Parker St/NW Larkspur Rd				
Eastbound Left	30 feet	58 feet	215 feet	No
Eastbound Through	134 feet	366 feet	continuous	No
Eastbound Right	25 feet	25 feet	185 feet	No
Westbound Left	85 feet	73 feet	continuous	No
Westbound Through	94 feet	103 feet	continuous	No
Northbound Left	128 feet	279 feet	350 feet	No
Northbound Through/Right	27 feet	41 feet	continuous	No
Southbound Left	25 feet	25 feet	150 feet	No
Southbound Through/Right	54 feet	47 feet	continuous	No

Table 5. 95th Percentile Queuing at Study Area Intersections for 2020 "Without Project" Continued

Signalized Intersection	A.M. Peak Hour Queue[1]	P.M. Peak Hour Queue[1]	Available Storage	Storage Exceeded?
NW Parker St/NW 38th Ave				
Eastbound Left	46 feet	59 feet	250 feet	No
Eastbound Through/Right	27 feet	144 feet	continuous	No
Westbound Left	144 feet	100 feet	200 feet	No
Westbound Through/Right	71 feet	65 feet	continuous	No
Northbound Left	31 feet	46 feet	180 feet	No
Northbound Through	163 feet	129 feet	continuous	No
Northbound Right	25 feet	31 feet	continuous	No
Southbound Left	31 feet	57 feet	295 feet	No
Southbound Through	126 feet	127 feet	continuous	No
Southbound Right	25 feet	25 feet	190 feet	No
SE Brady Road/SE 192nd Avenue				
Eastbound Left	25 feet	25 feet	180 feet	No
Eastbound Through/Right	25 feet	25 feet	continuous	No
Westbound Left	666 feet	311 feet	320 feet	Yes
Westbound Through/Right	25 feet	31 feet	continuous	No
Northbound Left	25 feet	25 feet	325 feet	No
Northbound Through	231 feet	398 feet	continuous	No
Northbound Right	25 feet	33 feet	205 feet	No
Southbound Left	45 feet	87 feet	175 feet	No
Southbound Through	242 feet	385 feet	continuous	No
Southbound Right	25 feet	25 feet	205 feet	No
NE Goodwin Road/NE Ingle Road				
Eastbound Left	53 feet	347 feet	TBD[1]	No[1]
Eastbound Through	25 feet	131 feet	TBD[1]	No[1]
Westbound Through/	100 feet	160 feet	TBD[1]	No[1]
Westbound Right	25 feet	28 feet	TBD[1]	No[1]
Southbound Left	40 feet	116 feet	TBD[1]	No[1]
Southbound Right	25 feet	32 feet	TBD[1]	No[1]
All Way Stop Intersections				
NW Parker St/NW Pacific Rim Blvd/NW Pacific Rim Dr				
Eastbound Left	40 feet	53 feet	180 feet	No
Eastbound Through	25 feet	25 feet	continuous	No
Eastbound Right	25 feet	25 feet	continuous	No
Westbound Left	25 feet	25 feet	115 feet	No
Westbound Through	25 feet	25 feet	continuous	No
Northbound Left	25 feet	25 feet	188 feet	No
Northbound Through	43 feet	33 feet	continuous	No
Southbound Left	25 feet	25 feet	190 feet	No
Southbound Through	60 feet	25 feet	continuous	No
Southbound Right	25 feet	25 feet	continuous	No
NW Brady Road/NW 16th Avenue				
Eastbound Approach	25 feet	33 feet	continuous	No
Westbound Approach	185 feet	50 feet	continuous	No
Northbound Approach	93 feet	118 feet	continuous	No
Southbound Approach	93 feet	83 feet	continuous	No

[1]Future available storage to be determined with Green Mountain Development Traffic Study.

Table 5. 95th Percentile Queuing at Study Area Intersections for 2020 "Without Project" Continued

Unsignalized Intersection	A.M. Peak Hour Queue[1]	P.M. Peak Hour Queue[1]	Available Storage	Storage Exceeded?
NE Goodwin Road/NW Camas Meadows Drive				
Westbound Left	25 feet	25 feet	140 feet	No
Westbound Right	25 feet	25 feet	continuous	No
Southbound Left	25 feet	25 feet	85 feet	No
NW & SE Brady Road/NW McIntosh Road				
Westbound Left	45 feet	28 feet	continuous	No
Westbound Right	25 feet	25 feet	continuous	No
Southbound Left	25 feet	25 feet	105 feet	No
NW Lake Road/NW Payne Street				
Eastbound Left	25 feet	25 feet	230 feet	No
Southbound Left/Right	25 feet	75 feet	continuous	No

DEVELOPMENT PLANS

As stated in the previous section, the proposed project is a business park with four buildings comprised of up to 141,600 square feet in space, a 3,000 square foot coffee shop with a drive through, and a 3,000 square foot high quality restaurant. Also, there are two residential components of the proposed project which includes 42 single family residential lots and 24 residential condominium units. Access will be provided by the extension of NW Camas Meadows Drive to the east, which will connect to NW Larkspur Street. As previously shown, Figure 2 shows the project site plan. Initial construction is expected to begin in 2016 with full occupancy by 2020.

TRIP GENERATION

Estimates of daily, A.M. peak hour, and P.M. peak hour trips generated by the proposed project were developed from rates published in "Trip Generation, 9th Edition" (Institute of Transportation Engineers, 2012). The proposed development is expected to generate 5,026 gross new daily trips, 545 gross new A.M. peak hour (329 in, 216 out), and 382 net new P.M. peak hour (159 in, 223 out) trips. Of these gross new trips, there are 119 daily, 0 A.M. peak hour (0 in, 0 out), and 10 P.M. peak hour (5 in, 5 out) pass-by trips. The proposed project is expected to generate 4,907 net new daily trips, 545 net new A.M. peak hour trips (329 in, 216 out), and 372 net new P.M. peak hour trips (154 in, 218 out). Table 6 summarizes the trip generation for Parklands at Camas Meadows subdivision and business park development.

Table 6. Trip Generation Summary for Parklands at Camas Meadows

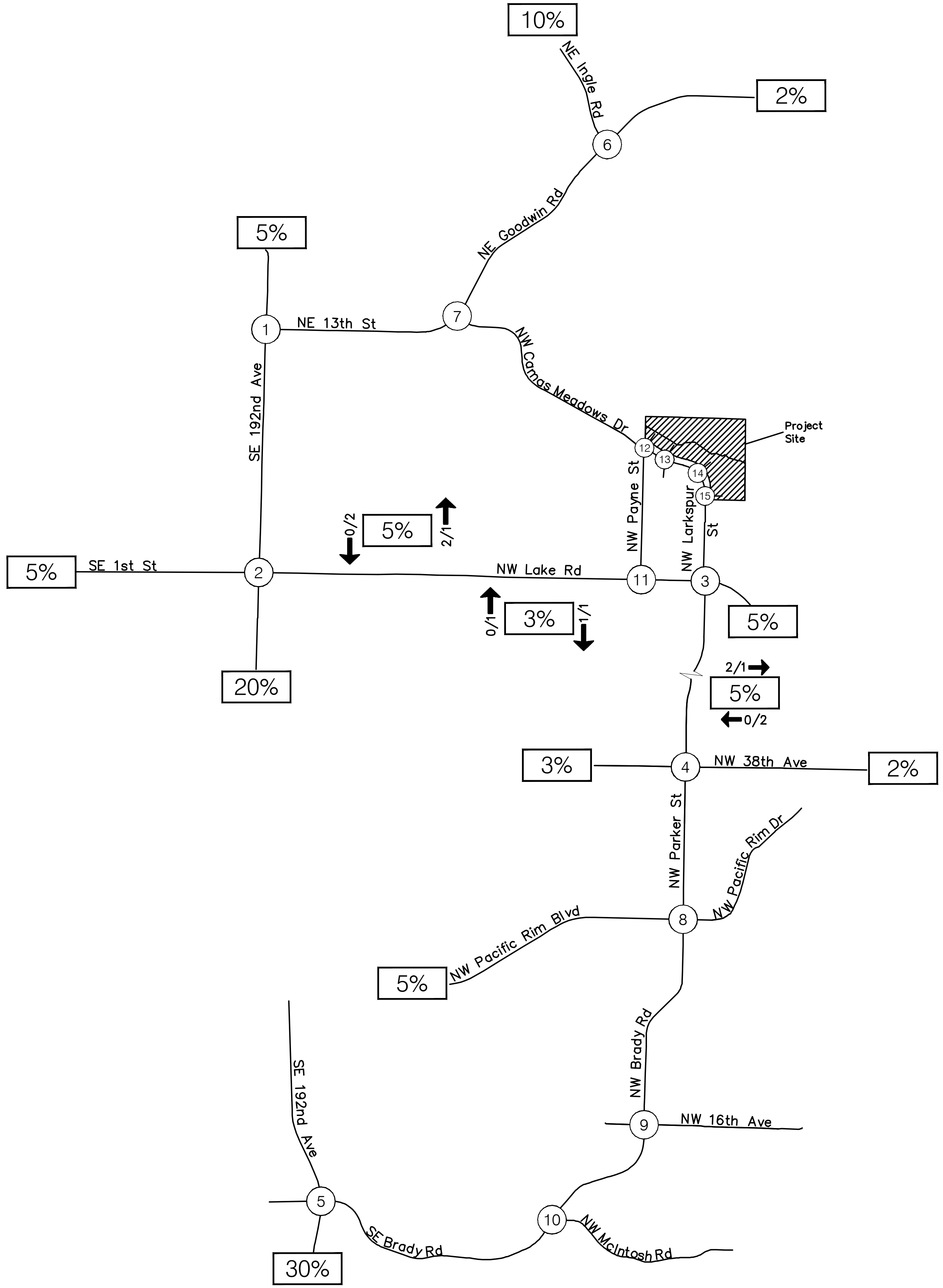
	Average	A.M. Peak			P.M. Peak		
	Daily	In	Out	Total	In	Out	Total
Trip Generation for Building #1							
Coffee Shop with Drive Through (ITE Code 937) – 3 ksf							
Rate per 1,000 square feet (ksf)	818.58	51.30	49.28	100.58	21.40	21.40	42.80
Net Trips	2,456	154	148	302	64	64	128
Business Park (ITE Code 770) – 3 ksf							
Rate per 1,000 square feet (ksf)	12.44	1.19	0.21	1.40	0.33	0.93	1.26
Net Trips	37	3	1	4	1	3	4
Net Total – Building #1	2,493	157	149	306	65	67	132
Trip Generation for Building #2							
Quality Restaurant (ITE Code 931) – 3 ksf							
Rate per 1,000 square feet (ksf)	89.95	0.40	0.41	0.81	5.02	2.47	7.49
Gross Trips	270	1	1	2	15	7	22
Pass-by Trips – 44%	-119	-	-	-	-5	-5	-10
Net Trips for Quality Restaurant	151	1	1	2	10	2	12
Business Park (ITE Code 770) – 36.6 ksf							
Rate per 1,000 square feet (ksf)	12.44	1.19	0.21	1.40	0.33	0.93	1.26
Net Trips	455	43	8	51	12	34	46
Residential Condo/Townhouse (ITE Code 230) – 24 residential units							
Rate per dwelling unit	5.81	0.07	0.37	0.44	0.35	0.17	0.52
Net Trips	139	2	9	11	8	4	12
Net Total – Building #2	745	46	18	64	30	40	70
Trip Generation for Building #3							
Business Park (ITE Code 770) – 40.0 ksf							
Rate per 1,000 square feet (ksf)	12.44	1.19	0.21	1.40	0.33	0.93	1.26
Net Total – Building #3	498	48	8	56	13	37	50
Trip Generation for Building #4a							
Business Park (ITE Code 770) – 30.0 ksf							
Rate per 1,000 square feet (ksf)	12.44	1.19	0.21	1.40	0.33	0.93	1.26
Net Total – Building #4a	373	36	6	42	10	28	38
Trip Generation for Building #4b							
Business Park (ITE Code 770) – 32.0 ksf							
Rate per 1,000 square feet (ksf)	12.44	1.19	0.21	1.40	0.33	0.93	1.26
Net Total – Building #4b	398	38	7	45	10	30	40
Single Family Residential (ITE Code 210)							
Rate per dwelling unit	9.52	0.19	0.56	0.75	0.63	0.37	1.00
Net Trips – 42 units	400	4	28	32	26	16	42
Summary							
Gross Total Trips	5,026	329	216	545	159	223	382
Pass-by Trips	-119	0	0	0	-5	-5	-10
Net New Trips	4,907	329	216	545	154	218	372

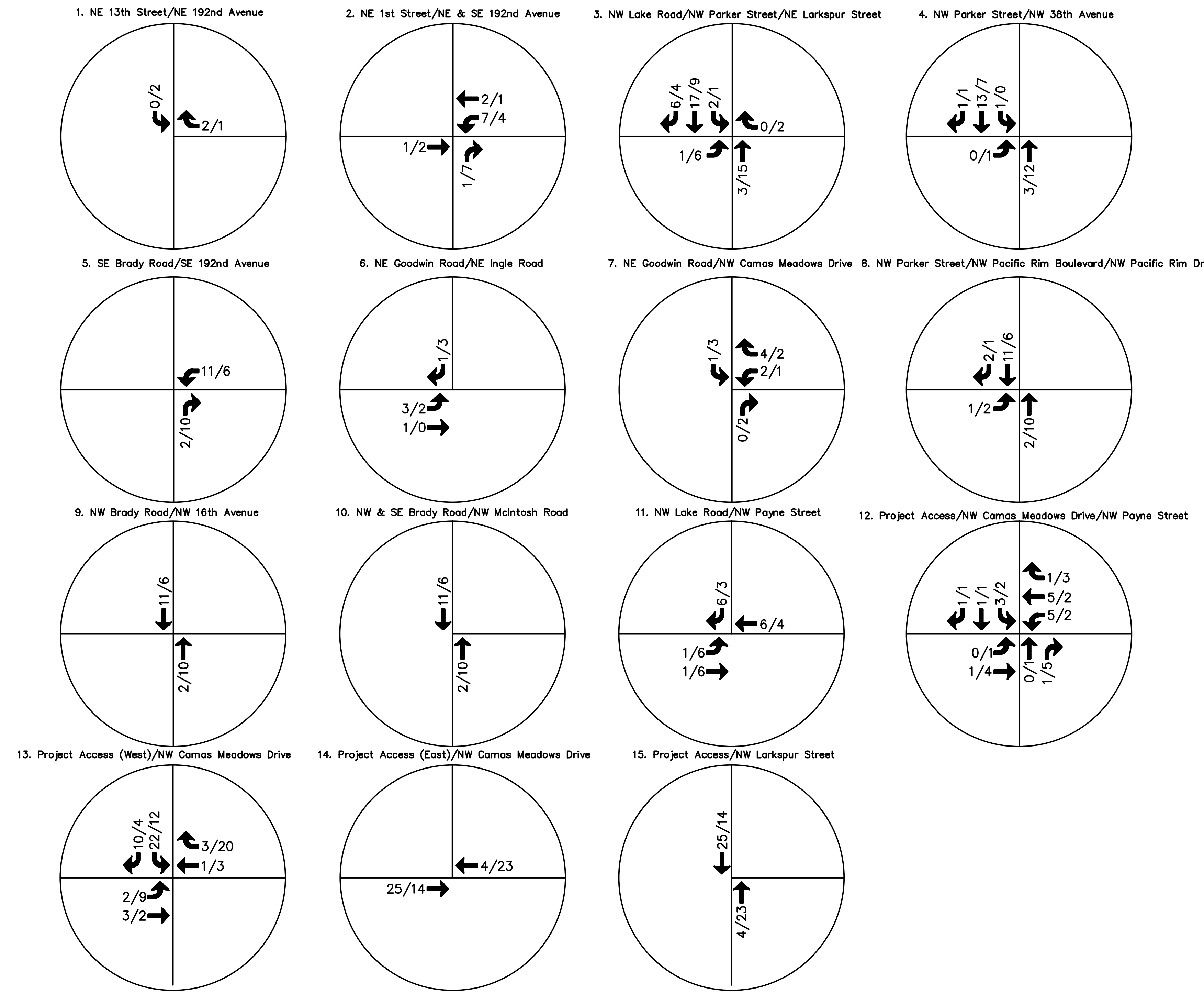
TRIP DISTRIBUTION AND ASSIGNMENT

Separate trip distribution patterns were developed for the residential, business park, and coffee shop/restaurant uses. The residential trip distribution pattern was based on primarily commute patterns, school locations, and shopping center locations. The business park trip distribution pattern was based on logical travel paths to major travel corridors and residential areas where employees may reside. Figure 6a shows the resulting trip distribution pattern and assignment of project generated trips for the residential uses. Figure 6b shows the resulting trip distribution pattern and assignment of project generated trips for the coffee shop/quality restaurant uses. Figure 6c shows the pass-by trip distribution and assignment of the quality restaurant use. Figure 6d shows the resulting trip distribution pattern and assignment of project generated trips for the business park use. Figure 6e shows the trip assignment of all the project-generated trips. Table 7 summarizes project-generated P.M. peak hour trip impact to each of the City of Vancouver's TMZ corridors.

Table 7. TMZ Corridor Project Trip Impact

TMZ Corridor	Limits of TMZ Corridor	P.M. Peak Hour Trip Impact
18th Street	112th Avenue – 138th Avenue	0
18th Street	138th Avenue – 162nd Avenue	0
28th Street	112th Avenue – 138th Avenue	0
28th Street	138th Avenue – 162nd Avenue	0
112th Avenue	Mill Plain Blvd – 28th Street	0
112th Avenue	28th Street – 51st Street	0
136th Avenue	Mill Plain Blvd – 28th Street	0
138th Avenue	28th Street – Fourth Plain Blvd	0
162nd Avenue	1st Street – Fourth Plain Blvd	0
164th Avenue	SR 14 – 1st Street	0
192nd Avenue	SR 14 – 18th Street	150
Andresen Road	Mill Plain Blvd – SR 500	0
Andresen Road	SR 500 – 78th Street	0
Burton Road	Andresen Road – 112th Avenue	0
Fourth Plain Blvd	Port – I-5	0
Fourth Plain Blvd	I-5 – Stapleton Road	0
Fourth Plain Blvd	Stapleton Road to I-205	0
Fourth Plain Blvd	117th Avenue – 162nd Avenue	0
Mill Plain Blvd	I-5 – Andresen Road	0
Mill Plain Blvd	Andresen Road – I-205	0
Mill Plain Blvd	I-205 – 136th Avenue	0
Mill Plain Blvd	136th Avenue – 164th Avenue	0
Mill Plain Blvd	164th Avenue – 192nd Avenue	0
St. James/St. Johns Road	Fourth Plain – 78th Street	0





LEGEND

128/200 A.M./P.M. Peak Hour Traffic Volume

10% A.M. and P.M. Peak Hour Trip Distribution

NOT TO SCALE

FIGURE 6a
"Residential"
Trip Distribution and Assignment
Traffic Volumes

315021.0Figures.Dwg

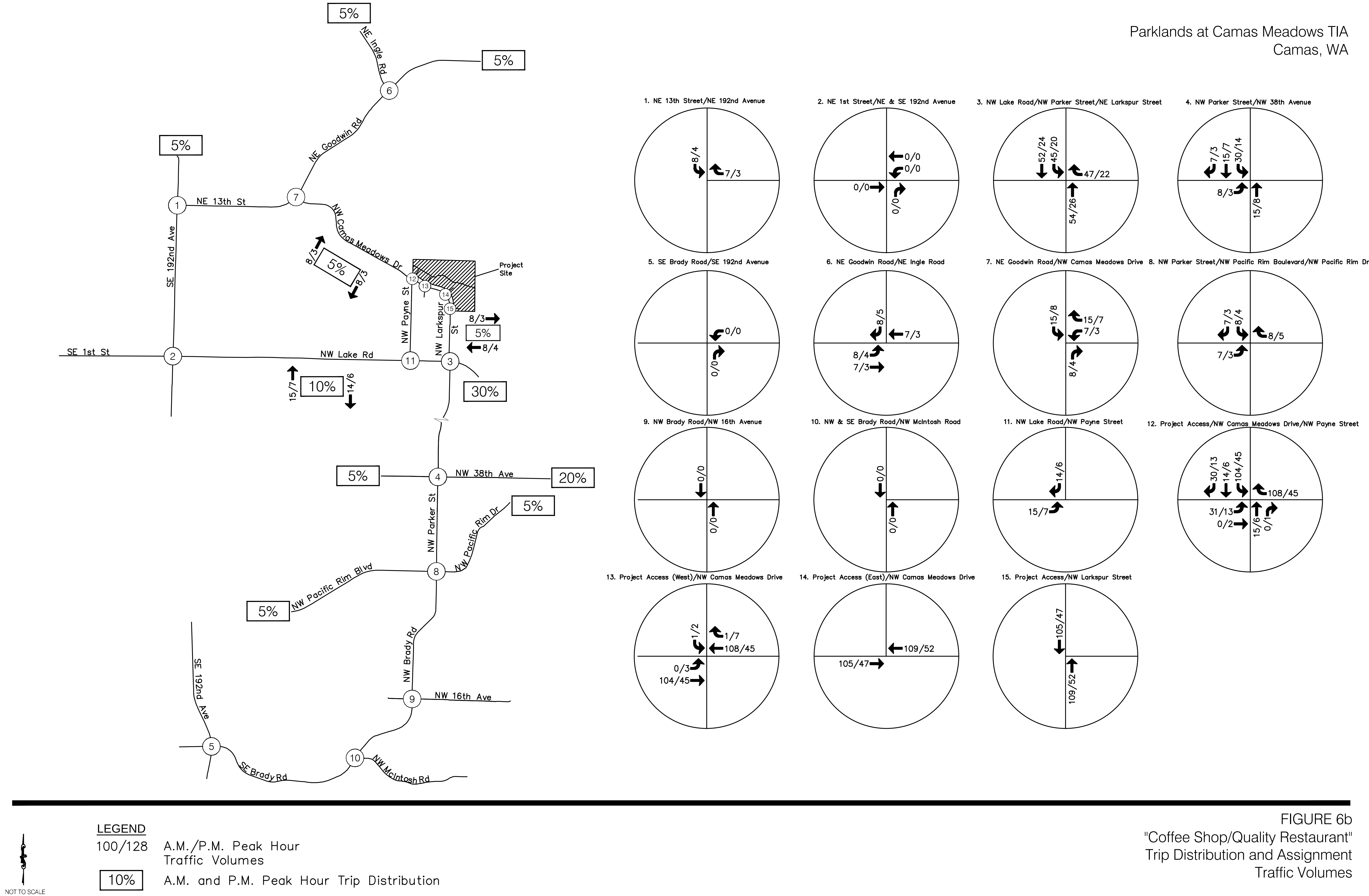


FIGURE 6b
"Coffee Shop/Quality Restaurant"
Trip Distribution and Assignment
Traffic Volumes

Parklands at Camas Meadows TIA
Camas, WA

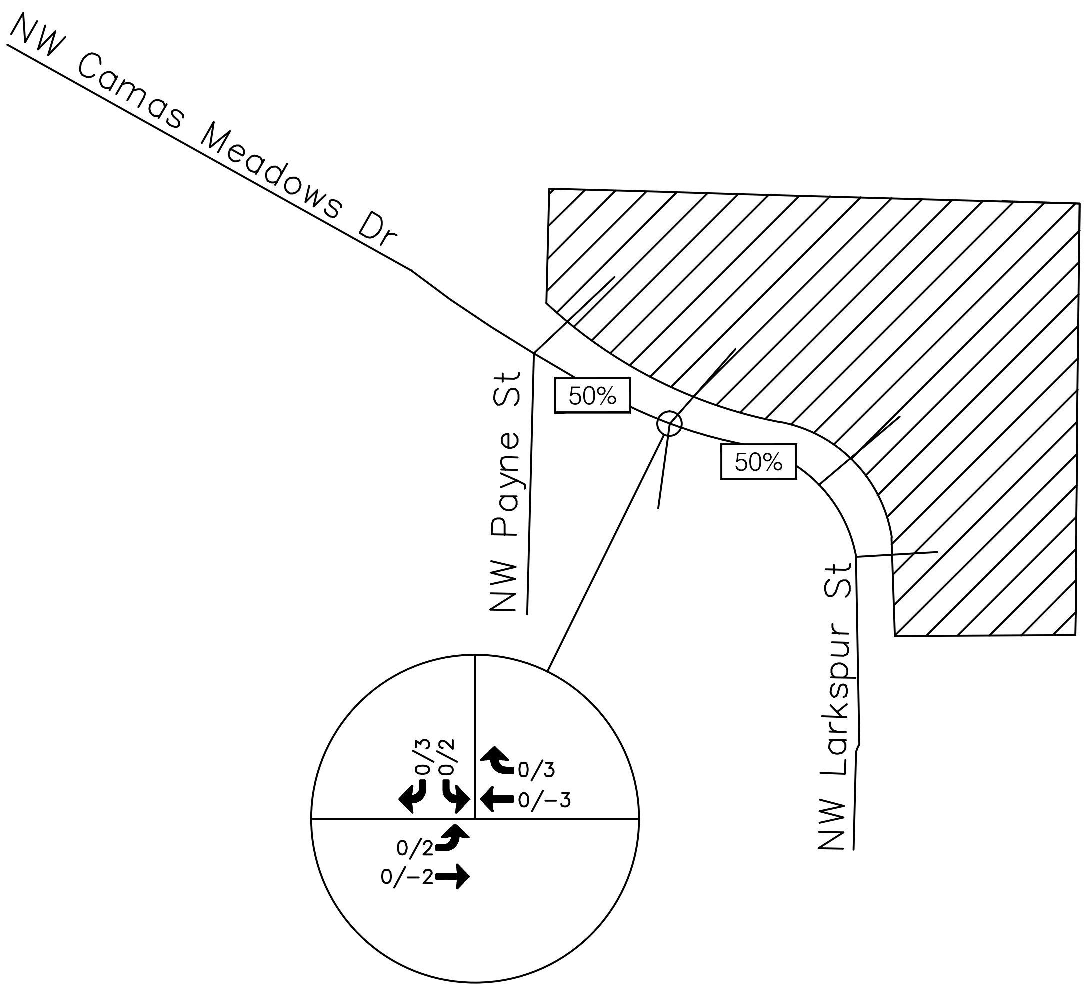
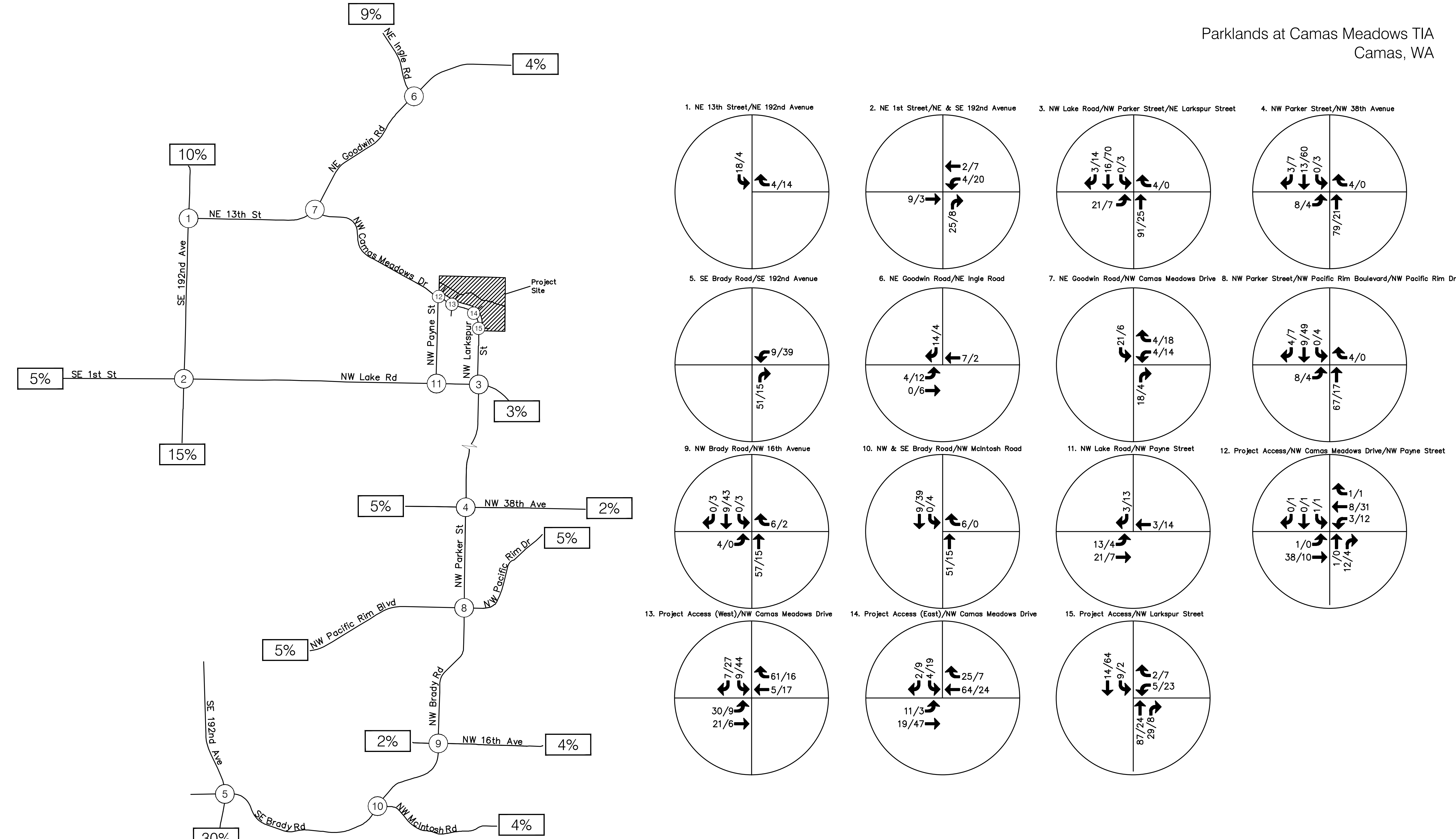


FIGURE 6c
"Quality Restaurant"
Pass-By Trips
Traffic Volumes

NOT TO SCALE

315021.0Figures.Dwg

Parklands at Camas Meadows TIA
Camas, WA



LEGEND

100/128 A.M./P.M. Peak Hour Traffic Volumes

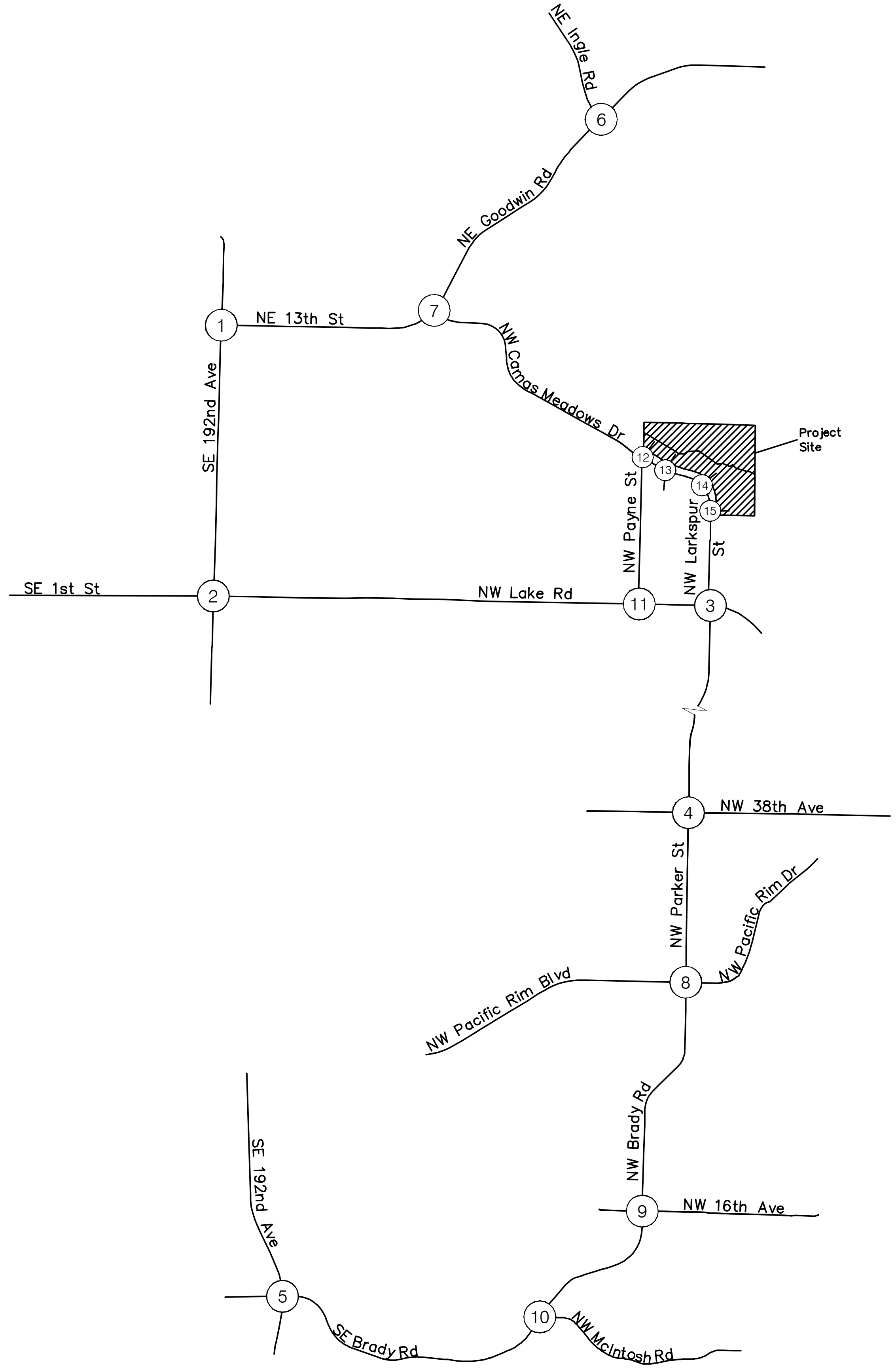
10% A.M. and P.M. Peak Hour Trip Distribution

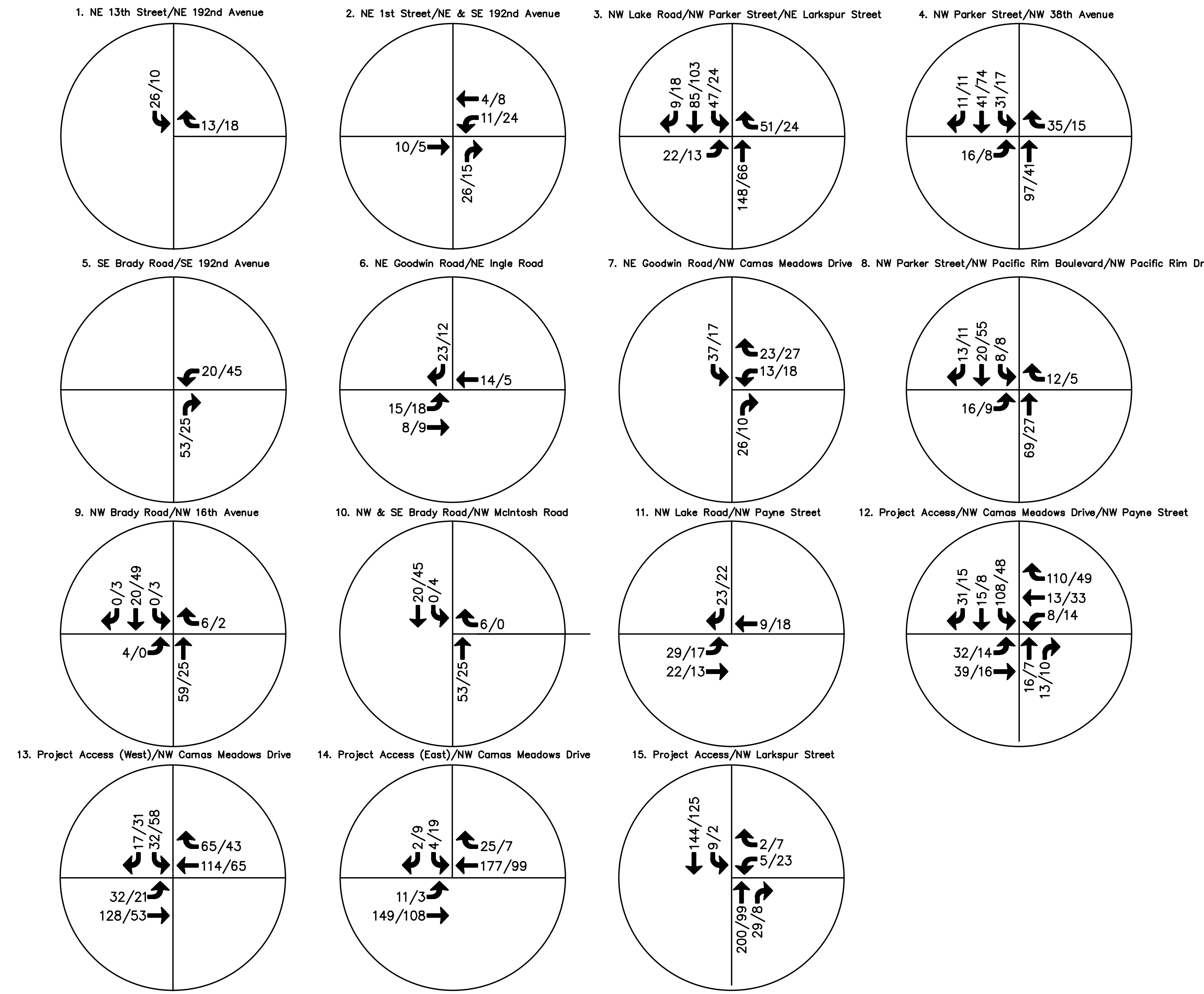
NOT TO SCALE

FIGURE 6d
"Business Park"
Trip Distribution and Assignment
Traffic Volumes

315021.0Figures.Dwg

Parklands at Camas Meadows TIA
Camas, WA





LEGEND
100/128 A.M./P.M. Peak Hour Traffic Volumes

NOT TO SCALE

FIGURE 6e
"Combined Use"
Trip Distribution and Assignment
Traffic Volumes

315021.0Figures.Dwg

2020 “WITH PROJECT” TRAFFIC VOLUMES AND LEVELS OF SERVICE

The traffic volumes shown in Figures 5, 6a and 6b were combined to arrive at the 2020 “With Project” A.M. and P.M. peak hour traffic volumes. Figure 7 shows these traffic volumes. Based on the traffic volumes shown in Figure 7 and the existing lane configurations shown in Figure 3, levels of service were calculated for the 2020 “With Project” condition. Appendix F contains the LOS worksheets for the 2020 “With Project” condition. Table 8A and 8B shows the results of the analysis.

Per conversations with Olson Engineering, Inc. pertaining to the Green Mountain Development, the NE Goodwin Road/NE Ingle Road intersection will be converted to a signalized intersection with additional eastbound and westbound left turn lanes. The NE Goodwin Road/NE Ingle Road intersection was analyzed in the 2020 "Without Project" condition based on those improvements.

It should be noted that the 2020 “With Project” condition was based on the extension of NE Camas Meadows Drive to NW Larkspur Road. Based on this connection, traffic was diverted away from the NW Lake Road/NW Payne Street intersection. All of the southbound right turn movements at the NW Lake Road/NW Payne Street intersection were maintained while the southbound left turns were diverted to the NW Lake Road/NW Parker Street/NW Larkspur Road intersection.

As shown in Table 8A, all City of Camas study area intersections operate at LOS D or better which is within the City of Camas’ standard.

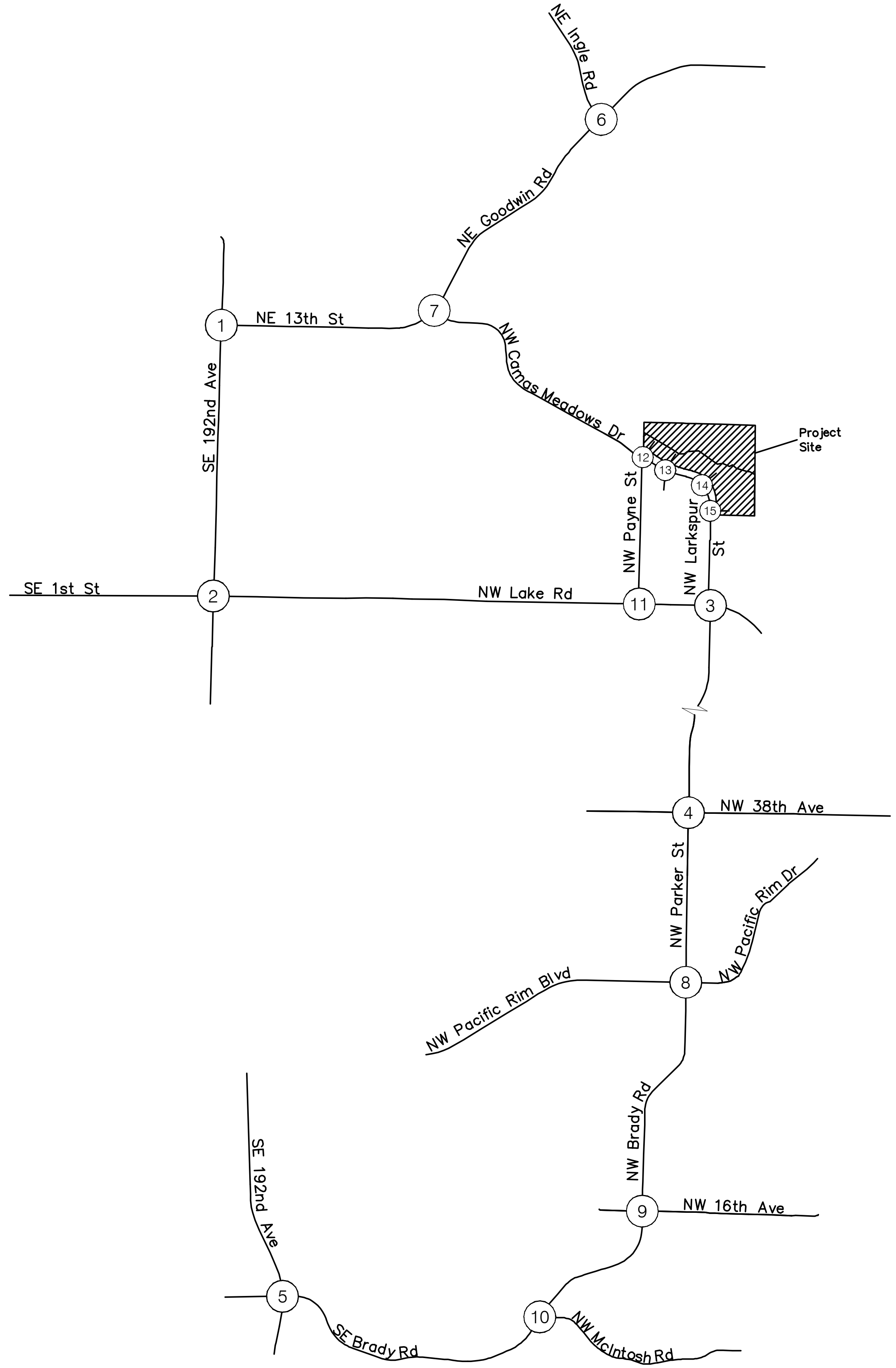
As shown in Table 8B, all City of Vancouver intersection approaches are projected to operate at an acceptable level of service of LOS D or better.

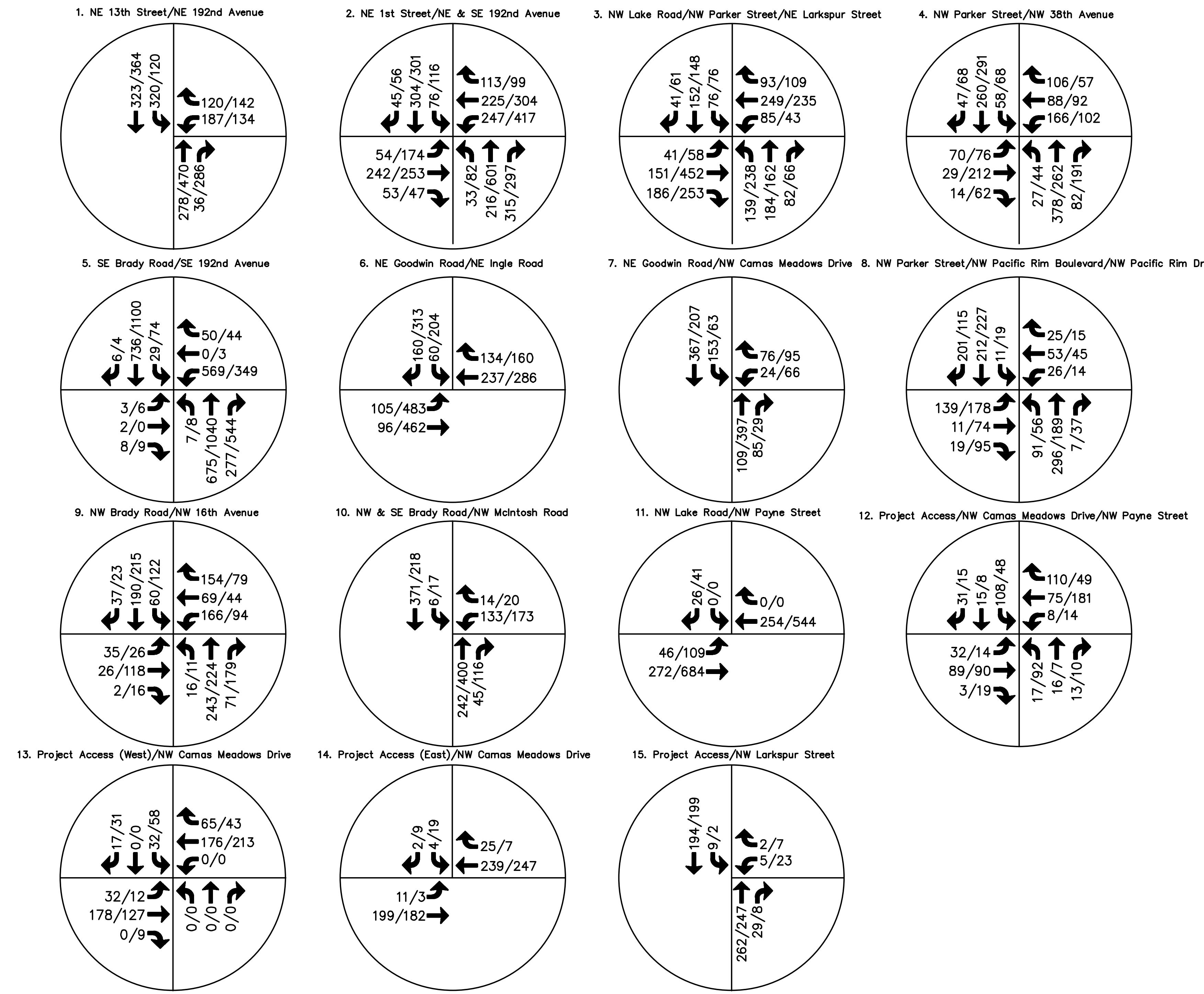
Table 9 shows the 95th percentile queue for the major movements at the study area intersections. These 95th percentile queues were obtained from the Synchro level of service output and can be referenced in Appendix F. As shown in Table 9, all of the 95th percentile queues are within the available storage areas with the exception of the following movements:

- NE 13th Street/NE 192nd Avenue
  The southbound left turn movement in the 2020 “With Project” A.M. peak hour condition exceeds the available storage by 19 feet. This is less than one car length and is not significantly over the available storage. The southbound left turn movement LOS and v/c ratio meet the City of Vancouver standards so no mitigation is necessary. The city should monitor this condition periodically to see if it becomes an operations issue.

- SE Brady Road/NE 192nd Avenue
  The westbound left turn movement in the 2020 “With Project” A.M. and P.M. peak hour conditions exceed the available storage by 241 and 59 feet, respectively. This queue exceeding the available storage may be partially mitigated by reallocating some of the green time from the eastbound through phase to the westbound left turn phase. Reallocating the green time from NE 192nd Avenue to the westbound left movement from SE Brady Road can reduce the excessive queues along SE Brady Road. Since overall levels of service is relatively

low (LOS C in the A.M. peak and LOS B in the P.M peak), it is likely that green time from NE 192nd Avenue can be reallocated to SE Brady Road. The westbound left turn movement LOS and v/c ratio meet the City of Vancouver standards so no mitigation is necessary. The City of Vancouver should monitor this movement periodically to see if it becomes a traffic operations issue.





LEGEND

128/200 AM/PM Peak Hour Traffic Volume

NOT TO SCALE

FIGURE 7
2020 "With Project"
A.M. and P.M. Peak Hour Traffic Volumes

Table 8A. 2020 "With Project" Levels of Service at City of Camas Intersections

Signalized Intersection	A.M. Peak Hour LOS	A.M. Peak Hour Average Delay (sec)	A.M. Peak Hour V/C Ratio	P.M. Peak Hour LOS	P.M. Peak Hour Average Delay (sec)	P.M. Peak Hour V/C Ratio
NW Lake Road/NW Parker Street/NW Larkspur Road	C	21.4	0.52	C	22.2	0.52
NW Parker Street/NW 38th Avenue	C	21.6	0.59	B	17.2	0.42
NE Goodwin Road/NW Ingle Road	A	8.9	0.23	B	15.8	0.56
All Way Stop Intersections						
NW Parker St/NW Pacific Rim Blvd/NW Pacific Rim Dr	C	15.6	0.44	B	14.6	0.38
NW Brady Road/NW 16th Avenue	D	28.2	0.73	C	19.2	0.59
Unsignalized Intersections						
NE Goodwin Road/NW Camas Meadows Drive						
Westbound Left	C	18.9	0.10	C	20.7	0.25
Westbound Right	A	9.3	0.07	B	12.4	0.19
Southbound Left	A	7.7	0.08	A	8.5	0.07
NW & SE Brady Road/NW McIntosh Road						
Westbound Left	C	22.6	0.44	C	22.5	0.31
Westbound Right	B	10.1	0.02	B	12.4	0.05
Southbound Left	A	8.0	0.01	A	9.0	0.02
NW Lake Road/NW Payne Street						
Eastbound Left	A	7.9	0.04	A	9.1	0.12
Southbound Approach	A	9.2	0.01	B	10.5	0.06
NW Payne St/NW Camas Meadows Dr/Project Access						
Eastbound Left	A	7.7	0.03	A	7.8	0.01
Westbound Left	A	7.4	0.01	A	7.5	0.01
Northbound Approach	B	11.6	0.09	B	14.5	0.26
Southbound Approach	B	13.7	0.31	B	13.0	0.16
NW Camas Meadows Dr/West Project Access						
Eastbound Left	A	7.9	0.03	A	7.9	0.02
Southbound Approach	B	12.0	0.10	B	12.5	0.18
NW Camas Meadows Dr/East Project Access						
Eastbound Left	A	7.9	0.01	A	7.9	0.01
Southbound Approach	B	11.6	0.01	B	11.8	0.06
NW Larkspur St/Project Access						
Westbound Approach	B	11.9	0.02	B	12.2	0.07
Southbound Left	A	8.0	0.01	A	7.9	0.01

Table 8B. 2020 "With Project" Levels of Service at City of Vancouver Intersections

Signalized Intersection	A.M. Peak Hour LOS	A.M. Peak Hour Average Delay (sec)	A.M. Peak Hour V/C Ratio	P.M. Peak Hour LOS	P.M. Peak Hour Average Delay (sec)	P.M. Peak Hour V/C Ratio
NE 13th Street/NE 192nd Avenue						
Westbound Approach	D	41.4	0.76	D	46.5	0.81
Northbound Approach	D	40.1	0.73	D	37.0	0.89
Southbound Approach	C	25.5	0.52	B	18.6	0.37
Overall Intersection LOS	C	33.0		C	32.8	
SE 1st Street/NE & SE 192nd Avenue						
Eastbound Approach	D	37.0	0.56	D	42.4	0.53
Westbound Approach	C	34.4	0.57	D	49.0	0.74
Northbound Approach	B	13.8	0.31	C	21.7	0.42
Southbound Approach	C	24.1	0.33	C	29.7	0.35
Overall Intersection LOS	C	26.6		C	34.8	
SE Brady Road/SE 192nd Avenue						
Eastbound Approach	C	26.3	0.09	B	15.9	0.04
Westbound Approach	C	24.7	0.71	D	36.7	0.67
Northbound Approach	B	17.0	0.55	B	15.9	0.60
Southbound Approach	C	20.6	0.63	B	16.5	0.58
Overall Intersection LOS	C	20.3		B	18.7	

Table 9. 95th Percentile Queuing at Study Area Intersections for 2020 "With Project"

Signalized Intersection	A.M. Peak Hour Queue[1]	P.M. Peak Hour Queue[1]	Available Storage	Storage Exceeded?
NE 13th St/NE 192nd Ave				
Westbound Approach	317 feet	265 feet	continuous	No
Northbound Approach	327 feet	886 feet	continuous	No
Southbound Left	396 feet	150 feet	377 feet	Yes
Southbound Through	175 feet	175 feet	continuous	No
SE 1st St/NE & SE 192nd Ave				
Eastbound Left	34 feet	89 feet	285 feet	No
Eastbound Through	113 feet	131 feet	continuous	No
Westbound Left	114 feet	207 feet	345 feet	No
Westbound Through	187 feet	319 feet	continuous	No
Westbound Right	25 feet	32 feet	continuous	No
Northbound Left	47 feet	100 feet	195 feet	No
Northbound Through	86 feet	225 feet	continuous	No
Northbound Right	68 feet	70 feet	230 feet	No
Southbound Left	88 feet	134 feet	295 feet	No
Southbound Through	128 feet	123 feet	continuous	No
NW Lake Rd/NW Parker St/NW Larkspur Rd				
Eastbound Left	52 feet	75 feet	215 feet	No
Eastbound Through	124 feet	359 feet	continuous	No
Eastbound Right	25 feet	25 feet	185 feet	No
Westbound Left	86 feet	79 feet	continuous	No
Westbound Through	100 feet	101 feet	continuous	No
Northbound Left	117 feet	211 feet	350 feet	No
Northbound Through/Right	162 feet	150 feet	continuous	No
Southbound Left	127 feet	145 feet	150 feet	No
Southbound Through/Right	160 feet	207 feet	continuous	No

Table 9. 95th Percentile Queuing at Study Area Intersections for 2020 "With Project" Continued

Signalized Intersection	A.M. Peak Hour Queue	P.M. Peak Hour Queue	Available Storage	Storage Exceeded?
NW Parker St/NW 38th Ave				
Eastbound Left	57 feet	65 feet	250 feet	No
Eastbound Through/Right	27 feet	144 feet	continuous	No
Westbound Left	148 feet	100 feet	200 feet	No
Westbound Through/Right	77 feet	68 feet	continuous	No
Northbound Left	31 feet	46 feet	180 feet	No
Northbound Through	275 feet	153 feet	continuous	No
Northbound Right	25 feet	31 feet	continuous	No
Southbound Left	66 feet	80 feet	295 feet	No
Southbound Through	153 feet	171 feet	continuous	No
Southbound Right	25 feet	25 feet	190 feet	No
SE Brady Road/SE 192nd Avenue				
Eastbound Left	25 feet	25 feet	180 feet	No
Eastbound Through/Right	25 feet	25 feet	continuous	No
Westbound Left	561 feet	379 feet	320 feet	Yes
Westbound Through/Right	25 feet	31 feet	continuous	No
Northbound Left	25 feet	25 feet	325 feet	No
Northbound Through	230 feet	398 feet	continuous	No
Northbound Right	25 feet	34 feet	205 feet	No
Southbound Left	42 feet	87 feet	175 feet	No
Southbound Through	243 feet	385 feet	continuous	No
Southbound Right	25 feet	25 feet	205 feet	No
NE Goodwin Road/NE Ingle Road				
Eastbound Left	61 feet	364 feet	TBD[1]	No[1]
Eastbound Through	25 feet	134 feet	TBD[1]	No[1]
Westbound Through	106 feet	163 feet	TBD[1]	No[1]
Westbound Right	25 feet	30 feet	TBD[1]	No[1]
Southbound Left	41 feet	116 feet	TBD[1]	No[1]
Southbound Right	25 feet	36 feet	TBD[1]	No[1]
All Way Stop Intersections				
NW Parker St/NW Pacific Rim Blvd/NW Pacific Rim Dr				
Eastbound Left	53 feet	65 feet	180 feet	No
Eastbound Through	25 feet	25 feet	continuous	No
Eastbound Right	25 feet	25 feet	continuous	No
Westbound Left	25 feet	25 feet	115 feet	No
Westbound Through	25 feet	25 feet	continuous	No
Northbound Left	25 feet	25 feet	188 feet	No
Northbound Through	73 feet	35 feet	continuous	No
Southbound Left	25 feet	25 feet	190 feet	No
Southbound Through	83 feet	90 feet	continuous	No
Southbound Right	83 feet	90 feet	continuous	No
NW Brady Road/NW 16th Avenue				
Eastbound Approach	25 feet	35 feet	continuous	No
Westbound Approach	228 feet	53 feet	continuous	No
Northbound Approach	158 feet	150 feet	continuous	No
Southbound Approach	123 feet	123 feet	continuous	No
Unsignalized Intersections				
NE Goodwin Road/NW Camas Meadows Drive				
Westbound Left	25 feet	25 feet	140 feet	No
Westbound Right	25 feet	25 feet	continuous	No
Southbound Left	25 feet	25 feet	85 feet	No

[1]Future available storage to be determined with Green Mountain Development Traffic Study.

Table 9. 95th Percentile Queuing at Study Area Intersections for 2020 "With Project" Continued

Unsignalized Intersection	A.M. Peak Hour Queue	P.M. Peak Hour Queue	Available Storage	Storage Exceeded?
NW & SE Brady Road/NW McIntosh Road				
Westbound Left	55 feet	33 feet	continuous	No
Westbound Right	25 feet	25 feet	continuous	No
Southbound Left	25 feet	25 feet	105 feet	No
NW Lake Road/NW Payne Street				
Eastbound Left	25 feet	25 feet	230 feet	No
Southbound Through/Right	25 feet	25 feet	continuous	No

CONCLUSIONS

Findings

The following are the findings from the traffic analysis:

- The proposed development is expected to generate 1,895 net new daily, 197 net new A.M. peak hour (146 in, 51 out), and 191 net new P.M. peak hour (67 in, 124 out) trips.

- The TMZ corridors within the City of Vancouver impacted by 5 or more P.M. peak hour trips as shown below.

TMZ Corridor	Limits of TMZ Corridor	P.M. Peak Hour Trip Impact
18th Street	112th Avenue – 138th Avenue	0
18th Street	138th Avenue – 162nd Avenue	0
28th Street	112th Avenue – 138th Avenue	0
28th Street	138th Avenue – 162nd Avenue	0
112th Avenue	Mill Plain Blvd – 28th Street	0
112th Avenue	28th Street – 51st Street	0
136th Avenue	Mill Plain Blvd – 28th Street	0
138th Avenue	28th Street – Fourth Plain Blvd	0
162nd Avenue	1st Street – Fourth Plain Blvd	0
164th Avenue	SR 14 – 1st Street	0
192nd Avenue	SR 14 – 18th Street	150
Andresen Road	Mill Plain Blvd – SR 500	0
Andresen Road	SR 500 – 78th Street	0
Burton Road	Andresen Road – 112th Avenue	0
Fourth Plain Blvd	Port – I-5	0
Fourth Plain Blvd	I-5 – Stapleton Road	0
Fourth Plain Blvd	Stapleton Road to I-205	0
Fourth Plain Blvd	117th Avenue – 162nd Avenue	0
Mill Plain Blvd	I-5 – Andresen Road	0
Mill Plain Blvd	Andresen Road – I-205	0
Mill Plain Blvd	I-205 – 136th Avenue	0
Mill Plain Blvd	136th Avenue – 164th Avenue	0
Mill Plain Blvd	164th Avenue – 192nd Avenue	0
St. James/St. Johns Road	Fourth Plain – 78th Street	0

- Per conversations with Olson Engineering, Inc. pertaining to the Green Mountain Development, the NE Goodwin Road/NE Ingle Road intersection will be converted to a signalized intersection with additional eastbound and westbound left turn lanes. The NE Goodwin Road/NE Ingle Road intersection was analyzed in the 2020 "Without Project" and “With Project” condition based on those improvements.

  The 2015 existing and 2020 "Without Project" levels of service at the southbound approach of the NW Payne Street/NW Lake Road intersection are operating at LOS D and E, respectively.

With the extension of NW Camas Meadows Drive to NW Larkspur Street and the resulting trip diversion, the level of service is projected to be LOS B in the 2020 "With Project" condition.

- NE 13th Street/NE 192nd Avenue
  The southbound left turn movement in the 2020 “With Project” A.M. peak hour condition exceeds the available storage by 19 feet. This is less than one car length and is not significantly over the available storage. The southbound left turn movement LOS and v/c ratio meet the City of Vancouver standards so no mitigation is necessary. The city should monitor this condition periodically to see if it becomes an operations issue.

- SE Brady Road/NE 192nd Avenue
  The westbound left turn movement in the 2020 “With Project” A.M. and P.M. peak hour conditions exceed the available storage by 241 and 59 feet, respectively. This queue exceeding the available storage may be partially mitigated by reallocating some of the green time from the eastbound through phase to the westbound left turn phase. Reallocating the green time from NE 192nd Avenue to the westbound left movement from SE Brady Road can reduce the excessive queues along SE Brady Road. Since overall levels of service is relatively low (LOS C in the A.M. peak and LOS B in the P.M peak), it is likely that green time from NE 192nd Avenue can be reallocated to SE Brady Road. The westbound left turn movement LOS and v/c ratio meet the City of Vancouver standards so no mitigation is necessary. The City of Vancouver should monitor this movement periodically to see if it becomes a traffic operations issue.

- All of the study intersections are projected to operate at acceptable levels of service for the 2020 “With Project” condition.

Recommendations

- Based on the traffic impact analysis documented in this report, no off-site mitigation would be needed with the build out of the proposed project.

- Because the NW Camas Meadows Drive extension will be constructed for the Parklands at Camas Meadows project, the access intersections sight distances shall be verified later in the final engineering and construction stages of development.

EXHIBIT 14

Parklands Executive Residential Subdivision and the Parklands Business Park

PRELIMINARY STORMWATER DESIGN REPORT (TIR)

FOR
CITY OF CAMAS

11-24-2015

CERTIFICATION OF FEASIBILITY-

The stormwater plan designed for the Parklands Executive Residential Subdivision and Parklands Business Park is FEASIBLE and has been designed in accordance with Camas Municipal Code (CMC) 14.02 and Camas Stormwater Design Standards Manual (CSDSM) and has the ability to meet or exceed the applicable code requirements.

PREPARED BY
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360-991-9300

November 24, 2015

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APPENDICES

D-2 Wetland Hydroperiod Analysis –selected text and project comment
D-3 Ch 13 – selected text with highlighting and project comment
D-4 Wetland Protection Discussion

Appendix E files

- **E-1 -3 Treatment Related Material**
  - **E-1 Treatment Evaluation Criteria – Reference: TAPE and CTAPE - selected text from DOE site**
  - **E-2a Soil Amendments to Enhance Phosphorous Sorption**
  - **E-2b Media depths for removal credit**
  - **E-3 HCAD_MN-Simple-Method**

E-4 Simple Method Description with Analysis for Wetland B

Appendix F files

F-1 Geotech Report

Parklands Executive Residential Subdivision and Parklands Business Park

Section A – Project Overview

The "**Parklands Executive Residential Subdivision and Parklands Business Park**" proposal is to subdivide two existing parcels of land into business and residential development, totaling approximately 36.4 acres. The property, tax parcel numbers 986031650 and 175948000, are located in a portion of the SW and SE ¼ Section 28, Township 2 North, Range 3 East of the Willamette Meridian, Clark County, Washington into 42 single family residences within the R-15 Zone and up to 6 commercial buildings in a mixed use/ Business Park zoning.

The property is currently undeveloped. The site topography slopes from the south, northeasterly towards the north boundary, more specifically towards the wetlands that extends southeasterly across the site (north ⅓) leaving a portion of upland area at the northeast corner that is fairly flat. The majority of the natural runoff is overland, flowing from the south, northeasterly, toward the wetland areas. The site is currently covered with trees and brush.

There are several culverts located onsite, apparently to convey surface runoff across paths or trails or former field roads. These culverts will be removed as part of the site grading. There are four specific culverts at areas that separate the three onsite wetland areas. These culverts will be retained.

Construction of the "**Parklands Executive Residential Subdivision and Parklands Business Park**" will consist of grading approximately 23.5 acres for construction of private streets, sidewalks, 42 single family residential lots, underground utilities, and stormwater mitigation facilities (quality control). Parking areas and loading docks will be constructed with the business park portion including utilities and stormwater mitigation facilities (quality control).

This stormwater report and design also considers the addition of stormwater from future Camas Meadows Drive and the Village at Camas Meadows sites. The design provides capacity to handle this off-site flow from both of these areas.

Due to soil properties in this area it is unlikely stormwater management by infiltration as the primary BMP method will be applicable, but some minor use of infiltration through LID design may be used in the final design. The geotechnical report also indicates that:

> *Weathered and competent conglomerate bedrock was encountered in all test pits at various depths… The bedrock consisted of angular to sub-rounded clasts of various sizes cemented in a matrix of sand, silt, and clay. The bedrock was very dense and excavator refusal was noted at various depths as indicated in Table 1 in Section 5.7, Excavation.*

The design of the proposed stormwater system was influenced by the suitability of the existing site topography. Typically, this type of setting would lend itself to stormwater management within the wetland buffer(s). However, the buffers along these wetlands are treed in most areas and tree preservation has been taken into consideration. There is also a requirement for phosphorous control. Presently, DOE has only certified a few treatment technologies through the TAPE program that meet criteria for phosphorous removal. One certified product has is the Filterra® System.

There are several other treatment facilities that have been demonstrated to achieve significant phosphorous removal, but are not presently certified under the TAPE program. This option might be suitable for several proposed on upland sites – Bioretention Facilities (business parcel and along Camas Meadows drive). These Bioretention Facilities will be further 'enhanced' with phosphorous removal soil amendments.

Another consideration for the site was to provide some wetland enhancement in Wetland B, however, even though this is a possible stormwater treatment and possible control method for the site, it was determined that there were too many regulatory issues that could delay or impact getting approval. **Thus, no stormwater controls or treatment are proposed in the wetlands or in the wetland buffers**. This wetland presently drains directly to Wetland A via two 12 inch diameter culverts at a road crossing. The elevation change from the delineated east end to the outflow invert to Wetland A is 6 feet (192 to 186). By retrofitting the outfall, a shallow ponded area would be developed to elevation 190. This created feature would be similar to Stormwater Wetland Treatment Facilities (SWTF) - but more natural in this case. This natural area would provide a polishing aspect for treatment. The option for ponded water at Wetland B with a static water surface could have been beneficial for maintaining hydration for the wetlands. However, there are too many regulatory roadblocks and processes to achieve, thus, this approach was abandoned for a more traditional stormwater approach.

<u>Private Street Right of Way Stormwater Management</u>

NW 10th Fairway Drive

The runoff will be collected at a single low point catch basin and conveyed (Storm Line A) to a Filterra® System located at the northwest edge of the lower parking area. Runoff from the parking area at Building 1 and some for building 2 and part of the lower parking area will also be treated at this structure prior to release to the wetland buffer.

NW Golf Drive

There are two storm collection systems being proposed for part of the private street system. One system will collect and convey the untreated portion of NW Golf Drive (Storm Line C). The other system (Storm Line E) will collect runoff from some of the lots and the roof water from buildings 4A and 4B (not needing treatment). Runoff from the parking lot area that has been treated with a Filterra® System will also be conveyed to this same system The untreated portion will be routed to a Filterra® System and then connected to the 'clean' pipe system (Storm Line D).

The outfall for both systems will be the existing south culvert that crosses from wetland B to Wetland A. The outfall from this connection point on the existing 12 inch culvert will be increased in size from 12 inches to 36 inches.

NW 17th Green Drive and NW Parklands Trail

Each side of 17th and Parklands will drain to Filterra® Systems which will route (Storm Line F) the outflow to the existing north culvert that crosses from Wetland B to Wetland A.

Private Individual Lot Stormwater Management

Individual lots will disperse roof runoff onto the specific lot for runoff directly overland to the wetland buffer. Lots that do not border the wetland buffer areas will collect runoff from the pervious and impervious areas (including roof areas) in one or more inlets on the lots and be conveyed to the associated wetland and be dispersed through the wetland buffer.

For lots that are not located at or near the wetland buffers, the collected runoff from each lot will be conveyed in a separate storm piping system (Storm Line D) – separate from the public street collection system. This separate system for the lots will be used to dispose of 'clean' stormwater runoff from the developed residential lots directly to Wetland A. See discussion for this system under NW Golf Drive.

To reduce the stormwater runoff quantity impact to the wetlands, this project is proposing for areas with soils running to the wetlands to be amended or replaced with a resultant soil type with runoff characteristics of a hydrological soil group (HSG) type B. This design aspect will re-supply the interflow feature back to the soil profile – which is important for hydrating the wetlands.

Section B – Minimum Requirements

The "**Parklands Executive Residential Subdivision and Parklands Business Park**" proposal contains only one threshold discharge area (TDA) and is subject to consideration of minimum requirements 1 – 10. However, only requirements 1-6, 9 and 10 are applicable. See Appendix B-1.

Table B -1 - Summary of Land Disturbing Activities

The defined site area is 36.4 acres.

1. Amount of Existing Impervious surface	None
2. Amount of New Impervious surface*	11.43 ac.
3.Amount of Replaced Impervious surface	None
4. Amount of Native Vegetation converted to lawn or landscaping	12.03
5. Amount of Native Vegetation converted to pasture	None
6. Amount of Native Vegetation converted to pervious access area	None
7. Total amount of land-disturbing activity	23.46 acres

* Roofs and drives at individual lots assumed at 4,500 sq ft per lot on this project

This project includes a design for management of runoff from offsite areas located upslope from this project and which presently drain overland to and through this site. The defined **drainage area** is 71.22 acres

- Includes The Village at Camas Meadows, Camas Meadows Drive from Payne Road to Larkspur, and an area between Larkspur and The Village at Camas Meadows.

1. Amount of Existing Impervious surface	None
2. Amount of New Impervious surface*	23.61 ac.
3.Amount of Replaced Impervious surface	None
4. Amount of Native Vegetation converted to lawn or landscaping	20.73
5. Amount of Native Vegetation converted to pasture	None
6. Amount of Native Vegetation converted to pervious access area	None
7. Total amount of land-disturbing activity	47.34acres

* Roofs and drives at individual lots assumed at 4,500 sq ft per lot on this project

Table B-2 - TDA Minimum Requirement Summary

TDA Number	Req'd to meet runoff control (treatment) requirements listed in Min. Requirement 6	Req'd to meet flow control requirements listed in Min. Requirement 7	Req'd to meet wetlands protection requirements listed in Min. Requirement 8
TDA # 1	Yes	N/A – large water body	Yes

The effective impervious area for the street ROW portion is 11.43 acres. This includes the driveway entrance portion area for each lot.

Section C – Soils Evaluation

The "Soil Survey of Clark County, Washington" indicates the soil at this site consist of the following:

(HcB) Hesson clay loam, 0 to 8 percent slopes, (HcD) Hesson clay loam, 8 to 20 percent slopes.

Clark County GIS indicates that the site soils are designed as Soil Group 2 – Well Drained Soils for use with the Western Washington Hydrology Model (WWHM2012).

See the soils map in Appendix A for additional information

According to the NRCS web soil survey,
Excerpt from Geotechnical Report:

The Web Soil Survey (United States Department of Agriculture, Natural Resource Conservation Service [USDA NRCS], 2013 Website) indicates the site is underlain by three soil types. Hesson clay loam soils are mapped on the majority of the site from the northwest corner to the southwest corner of the property, while Cove silty clay loam and Lauren gravelly loam soils are mapped in the north and northeastern portions of the property respectively. Soils resembling the Lauren series were not encountered during subsurface excavations.

Although actual on-site soils may vary from the broad USDA descriptions, Lauren soils are generally coarse-textured, well drained soils with rapid permeability. Cove soils are generally fine-textured, poorly drained soils with very slow permeability and high shrink-swell potential. Hesson soils are fine-textured, well drained soils with moderately slow permeability and moderate shrink-swell potential.

Clark County has further segregated this soil group as a Group 2 soil (SG-2) for application in analysis by the Western Washington Hydrology Model software. This soil is also classified as a type A-1-b soil by the AASTHO.

Subsurface infiltration testing was not performed but could be if other LID measures are deemed necessary in the final design. See report in Appendix F.

Section D – Source Control

There are not any prohibited discharges planned for this site. A SWPPP will be developed for the Final TIR that will further identify and list BMPs for Source Control and will include BMPS to prohibit sediment laden runoff from leaving the site and impacting any local or State waters. In addition, BMPs will be implemented as necessary to prevent pollutants from coming in contact with stormwater.

The proposed site is being developed with activities that are pollution generating. The following BMP categories have some degree of applicability, in particular, BMPs for Landscaping and Lawn/ Vegetation Management and Maintenance of Stormwater Drainage and Treatment Systems.

All source control BMPs in the public right-of-way will be the responsibility of Camas City forces per their established maintenance procedures. The stormwater facilities will be publicly owned and maintained in a manner consistent with the Stormwater Facility Maintenance Manual and BMPs for Landscaping and Lawn/Vegetation Management.

Individual lot owners will be responsible for source control BMPs related to installing and maintaining landscaping and roof downspout systems on their respective lots. This responsibility includes the prevention of introduction of pollutants into their system(s). Application of appropriate maintenance measures will also provide source control.

Additional Reference: SMMWW, Volume IV, Chapter 2 - Selection of Operational and Structural Source Control BMPs; 2.2 Pollutant Source-Specific BMPs

BMPs for Dust Control at Disturbed Land Areas and Unpaved Roadways and Parking Lots

BMPs for Landscaping and Lawn/ Vegetation Management

BMPs for Maintenance of Stormwater Drainage and Treatment Systems

BMPs for Urban Streets

Section E – Onsite Stormwater Management BMPs

An Erosion Control Plan(s) will be developed for implementation of BMPs to manage stormwater during grading activities will be shown on the erosion control plan.

Individual lot owners will be responsible for installing and maintaining roof downspout systems on their respective lots consistent with Volume III, Chapter 3.1.1 of the SMMWW.

Section F – Runoff Treatment and Design

1) Basic stormwater treatment is required for the private streets in this project.
2) Enhanced stormwater treatment is required for the business portion of this project.
3) Phosphorous removal is also required. See Appendix D

The runoff streams requiring treatment will be routed to specific Filterra® Systems. The systems will be off-line in nature and be sized to treat the off-line flow rate determined from WWHM2012 analysis.

The management of flows above the WQ flow rates will be directed to the particular storm line system for controlled release to Wetland A. The existing site release is from Wetland B to Wetland A which will then flow overland north into Lacamas Lake. A small portion of the site will continue to flow or have direct release to Wetland C which extends east and has an east to northeast release path.

Initial installation cost and the expenses associated with long-term maintenance are expected to be typical of projects with similar street sections at these slopes and no runoff from interior lots. There are no pollution-generating pervious surfaces (PGPS) on this project. The amount of pollution-generating impervious surfaces (PGIS) is:

Parklands = 11.43 acres.
Camas Meadows Drive = 1.32 acres
The Village = 6.00 acres
Larkspur = 0.46 acres
The total is 19.21 acres

Section G – Flow Control Analysis and Design

Flow control facilities are not required for this project since the discharge is to an exempt water body – Lacamas Lake*. Even with the exemption, the project still provides some voluntary and additional storm controls that will still reduce the peak flow rates and volumes. There are several design features proposed that will 'reduce' peak flow rate and volume.

a) Soil amendment or replacement to replicate HSG B soil characteristics.
b) Employ bioretention systems – the filter media depth and infiltration rate will 'delay' these flows by as much as 4.5 hours. This option may not be approved as the phosphorous removal method has not been certified through TAPE. Other states, Minnesota in particular, have developed specifications and accepted removal percentage rates.

To check the possible impact of no flow control, the historic runoff and the post-development hydrographs were compared. The storage parameters and outlet channel for the wetland were developed based on GIS contour data and the same input was used for each model. See Appendix C-4 and the observations deduced from these plot comparisons. This is significant in evaluating whether or not there is a significant rise in the water depth in the wetland and also for the duration of the rise. These hydrographs indicate that the changes in these parameters are of no significant impact to wetland hydroperiod (see Section I). The data from this analysis is also important from the aspect of no erosive impact to the existing release path. This is part of the requirement for being considered as 'directly connected' to a large water body. See appendix B-2 and B-3.

* The discharge from the site is mostly overland to the north with a direct connection to the mouth of Lacamas Creek or the upper end of Lacamas Lake since Lacamas Lake is a man-made impoundment. The release point is into the water level established by the water level at the lake. This is an area within the backwater condition for Lacamas Creek as it enters the Lake and is subjected to the lake level – (especially for times of significant flow).

Section H – Flow Control System Plan

This project is exempt as discussed in Section G.

Section I – Wetlands Protection

For projects with stormwater discharges to a wetland, either directly or indirectly through a conveyance system, the preliminary TIR shall describe wetland protection measures to be implemented in accordance with Minimum Requirement 8. The narrative shall describe the measures that will maintain the hydrologic conditions, hydrophytic vegetation, and substrate characteristics necessary to support existing and designated uses.

Listed below is the Minimum Requirement #8 from the 2012 SMMWW Volume I, Chapter 2.

The Minimum Requirement #8 is applicable to this site because the stormwater discharges are into wetlands, some directly and some indirectly. In evaluating what measures that would provide wetland protection the following documents were reviewed:

1) Minimum Requirement #8 from the 2012 SMMWW Volume I, Chapter 2.
    - 2.5.8 Minimum Requirement #8: Wetlands Protection which references Guide Sheet 1B in Appendix I-D

2) Section 4 Management of Freshwater Wetlands in the Central Puget Sound Basin
   CHAPTER 13 MANAGING WETLAND HYDROPERIOD:
   ISSUES AND CONCERNS

Historically, the area with runoff to this portion of the wetlands was larger than the present condition. Development of offsite parcels to the west of the site along the west boundary has previously diverted flow to an area west of the project and an area in the southeast has been developed as several subdivisions with separate stormwater facilities. The watershed area to this portion of the wetland complex has been reduced from about historically 94 acres to a current area of about 71acres (almost a 25% reduction in area).

Presently, stormwater runoff enters the three wetland segments as overland flow or as direct rainfall. The expected area for stormwater runoff is:

Source Area	Acres
Parklands Executive Residential Subdivision and Parklands Business Park	26.17
The Village at Camas Meadows	17.31
Camas Meadows Drive	2.40
Offsite – east of The Village at Camas Meadows and west of Larkspur Dr.	14.4
Wetland A (including buffer)	7.96
Wetland B (including buffer)	2.71
Wetland C (including buffer)	0.27
Total	71.22

One of the design elements is to maintain the overland flow aspect – all lots directly bordering the wetland buffers will maintain direct overland runoff. Runoff (considered clean) from the remaining lots not bordering the wetland buffers of this development will be collected and routed to several discharge points.

Several measures to reduce peak flow and hydrograph timing were briefly discussed in Section G.

Regarding *"measures that will maintain the hydrologic conditions, hydrophytic vegetation, and substrate characteristics necessary to support existing and designated uses*", the second reference seemed to provide some data that is helpful in making this assessment.

It provides the following definitions regarding processes that were evaluated.

<u>Hydroperiod</u>

Refers to the depth, duration, frequency and pattern of wetland inundation has been determined to be a key factor in determining biological responses

<u>Water Level Fluctuation</u>

WLF is measured as the average difference between the maximum depth and average instantaneous or base depth in a time period (Taylor 1993, Taylor, Ludwa and Horner 1995).

<u>Excursion</u>

The frequency of storm events was measured in a hydroperiod by defining an event a water level increase above the monthly average depth of more than 0.5 ft.

<u>Duration</u>

defined as the time period of an excursion

The cited paper also provides recommendations:

The result of these findings has been to recommend for there <u>to be limits on the durations of storm events as well as the frequency of excursions,</u> when wetlands will be affected by changes in hydroperiod.

- *The recommendations are that <u>the frequency of water levels greater than</u> 15 cm. (0.5 ft.) <u>above pre-development levels be limited to an annual average of six or less per year</u> and that <u>the durations of water levels greater than</u> 15 cm. (0.5 ft.) above or below pre-development levels <u>be limited to less than three days per excursion</u>.*

<u>Water Level Fluctuation and Excursion</u>

The Western Washington Hydrology Model (WWHM12) was run to determine some data that might be useful in evaluating these conditions. This model does analyze for wetland fluctuation but is not appropriate for this site as it extends offsite in two directions, is within a 100-yr floodplain, and has a natural positive outfall. Also it has several trail crossings with culverts located onsite and offsite. The historical condition model evaluation was based on the forested condition and the post condition include the two proposed developments and full development of Camas Meadows Drive from the south property line to the west property line and the 14.4 acres noted in the tabulation of source areas.

The daily peak runoff values and total daily volume values for the entire statistical period can be exported and listed as a .cvs file and then sorted/rearranged in highest to lowest value order.

Daily Runoff Volume - 1948 to 2008
WWHM12 Output

Sorted and Arranged in order - largest to smallest value
- just selected values over 1 ac-ft for tabulation

501 POC 1 Predeveloped flow (ac-ft)	801 POC 1 Mitigated flow (ac-ft)	Volume difference (ac-ft)	Listing Order
7.704892	11.62547	3.920578	1
7.13533	8.846004	1.710674	2
7.053172	8.161861	1.108689	3
6.884727	8.001134	1.116407	4
6.616997	7.800867	1.18387	5
6.017971	7.770435	1.752464	6
5.812159	7.690884	1.878725	7
5.498548	7.652763	2.154215	8
5.462435	7.356307	1.893872	9
5.289605	7.083555	1.79395	10
5.273884	6.935104	1.66122	11
5.234668	6.924686	1.690018	12
5.220907	6.846447	1.62554	13
5.088735	6.752748	1.664013	14
4.969435	6.573609	1.604174	15
4.848972	6.044921	1.195949	16
4.832914	5.896989	1.064075	17
4.719046	5.780949	1.061903	18

Notes: The wetland area onsite is approx. 7.5 acres

1) The 100-yr precipitation amount is 5.3 inches (isopluvial data)
2) The direct rainfall volume is 3.31 ac-ft
3) The tabulated volumes per WWHM evaluates the total volume – but is not routing it through the wetland – the information is like filling a flat container with no outlet

The largest daily difference is 3.92 ac-ft

This amounts to a depth of 0.52 ft on 7.5 acres of wetland (flat)

The second largest difference is 1.7 ac-ft

This amounts to a depth of 0.227 ft on 7.5 acres of wetland (flat)

Conclusion – Wetland Protection - Water Level Fluctuation and Excursion

- Since the outflow is occurring – initially from the start of the rainfall event - the small added depth likely increases the outflow rate only very slightly. The analysis indicates that the depth impact in the wetland is less than 0.5 feet for this worst case event in the 60 year data set.

<u>Duration</u>

Meeting the criteria related to duration for this site is easily demonstrated with a single event model. This is intuitively evident since this particular site has such a positive outflow condition. A single event analysis allows the option of setting a time span that exceeds the 24-hr rainfall time period. This allows the software to show the outflow hydrograph and essentially the drain down time if the runoff were being routed through a detention type facility. The onsite wetlands do provide an aspect of natural storm flow assimilation and detention as the flow through the wetlands is impacted by grassy vegetation and a meandering path and a result is likely quite slow. However, exact topography for this mostly offsite area is not available and it would be impractical to obtain.

A cursory 100-yr, 24-hr analysis was made with an assumed existing onsite wetland storage scenario and outlet simulation. The post –development analysis indicated a peak water level difference of 0.09 ft above the model with forested conditions input and the same wetland storage and outflow input. Looking at the output for the time span of 48 hours - the historic model had returned to a depth of 0.02 ft and the post-development had retuned to 0.07 ft depth above the starting storage elevation. The storage range input was 1.5 ft depth which was the depth for the post development analysis with the assumed storage input. This analysis disregards the impact of the 100-yr flood, since part of this wetland could theoretically be impacted. However, as seen from an infrared aerial photo taken during the 1996 100 year Flood Event, the flood waters barely left the main channel of upper Lacamas Lake by a hundred feet, and based on this the likelihood that a 100 year event flood would reach the site boundary seems improbable. (See 1996 Photo Attachment)

Conclusion – Wetland Protection

- Based on the findings noted, the issues and concerns regarding wetland impacts affecting the hydroperiod, are not of a nature that violate proper wetland protection.

See Appendix D-4 for some requirements/criteria related to wetlands and responses on how this project meets these criteria and mitigation measures proposed with this project.

EXHIBIT 15

APPENDIX A

A-1 GIS Development Packet

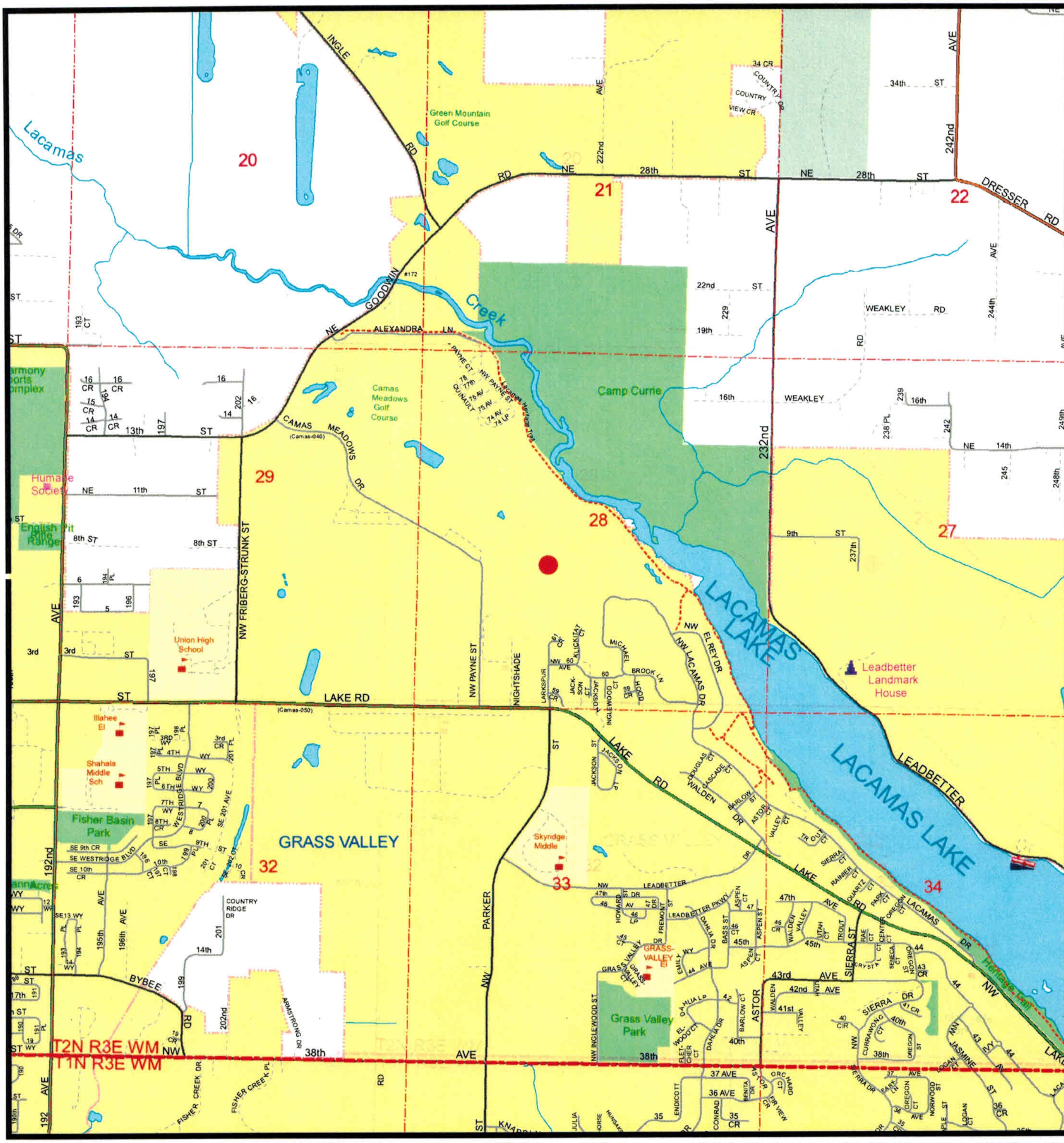
A-2 FIRM Map

A-3 Historic Basin Maps

1) **Fig. 1A Historic Basin Map**
2) **Fig 1B Historic Basin Map – add projects**
3) **Fig 2A Project Areas**
4) **Fig 2B Soils Map**
5) **Fig 3 Post Subbasin Map**

A-4 Selected Soils Data

A-5 Isopluvial Maps



CLARK COUNTY, WASHINGTON

Geographic Information System

1:24,000

0 0.1 0.2 0.3 0.4 0.5 Miles

General Location Map

Printed on: February 04, 2015

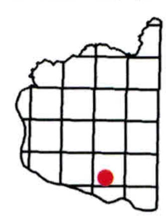
Account No: 175948000, 986031650

Owner: CHINOOK LAND OWNERS GROUP LLC

Address: 1400 NW 63RD ST

C/S/Z: VANCOUVER, WA 98663

● Subject Property Location



Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

Property Information Fact Sheet

Mailing Information:
Account No.: 175948000, 986031650
Owner: CHINOOK LAND OWNERS GROUP LLC
Address: 1400 NW 63RD ST
C/S/Z: VANCOUVER, WA 98663
Assessed Parcel Size: 36.43 Ac
Property Type: UNUSED LAND TIMBERED.

PARCEL LOCATION FINDINGS:

Quarter Section(s): SE 1/4,S28,T2N,R3E,
SW 1/4,S28,T2N,R3E
Municipal Jurisdiction: Camas
Urban Growth Area: Camas
Zoning: BP, R-15
Zoning Overlay: PlannedIndustrialDevelopmentOverlay
Comprehensive Plan Designation: IND,
SFL
Columbia River Gorge NSA: No Mapping Indicators
Building Moratorium: No Mapping Indicators

Late-Comer Area: No Mapping Indicators
Trans. Impact Fee Area: Camas
Park Impact Fee District: No Mapping Indicators
Neighborhood Association: No Mapping Indicators
School District: Camas
Elementary School: Grass Valley
Junior High School: Skyridge Middle
Senior High School: Camas
Fire District: Camas Washougal FD
Sewer District: Camas
Water District: None
Wildland: No Mapping Indicators
Historic Sites: No Mapping Indicators

ENVIRONMENTAL CONSTRAINTS:

Soil Type(s): CvA, 21.3% of parcel
HcB, 2.1%
HcD, 67.0%
HcE, 0.4%
LeB, 9.2%
Hydric Soils: Hydric, 21.3% of parcel
Non-Hydric, 78.7%
Flood Zone Designation: 500 Year Flood Area,
Floodway Fringe,
Outside Flood Area
CARA: Category 2 Recharge Areas
Liquefaction Susceptibility: Very Low
NEHRP: C
Slope: 0 - 5 percent, 56.2% of parcel
10 - 15 percent, 12.5%
15 - 25 percent, 2.9%
5 - 10 percent, 28.4%
Landslide Hazards: Slopes > 15%
Slope Stability: No Mapping Indicators
Priority Habitat and Species Areas: Riparian Habitat Conservation Area,
Species
Priority Species Area Buffer: WDFW Priority Species Buffer
Priority Habitat Area Buffer: No Mapping Indicators
Archeological Predictive: High, 85.2% of parcel
Moderate-High, 14.8%
Archeological Site Buffers: Mapping Indicators Found

Geographic Information System

1:3,600

0 150 300 450 Feet

2014 Aerial Photography with Contours

Account No: 175948000, 986031650

Owner: CHINOOK LAND OWNERS GROUP LLC

Address: 1400 NW 63RD ST

C/S/Z: VANCOUVER, WA 98663

Proposed Development Area

2' Elevation Contours

Printed on: February 04, 2015

23120	23121	23122
23129	23128	23127
23132	23133	23134

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

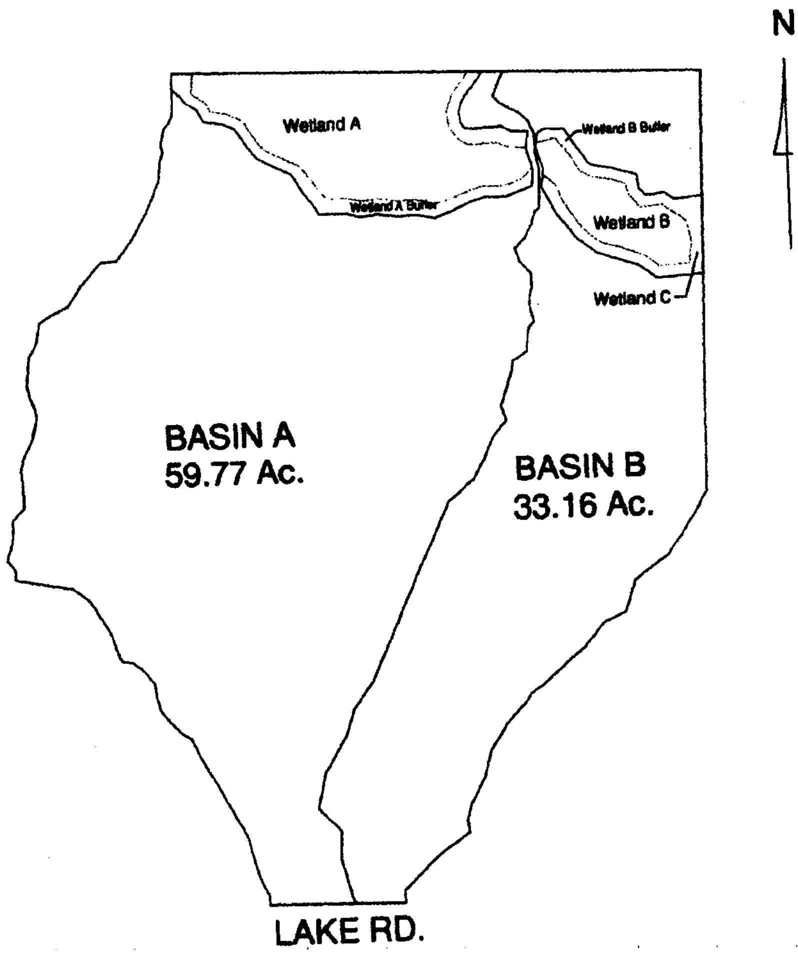


FIG. 1A HISTORIC BASIN MAP

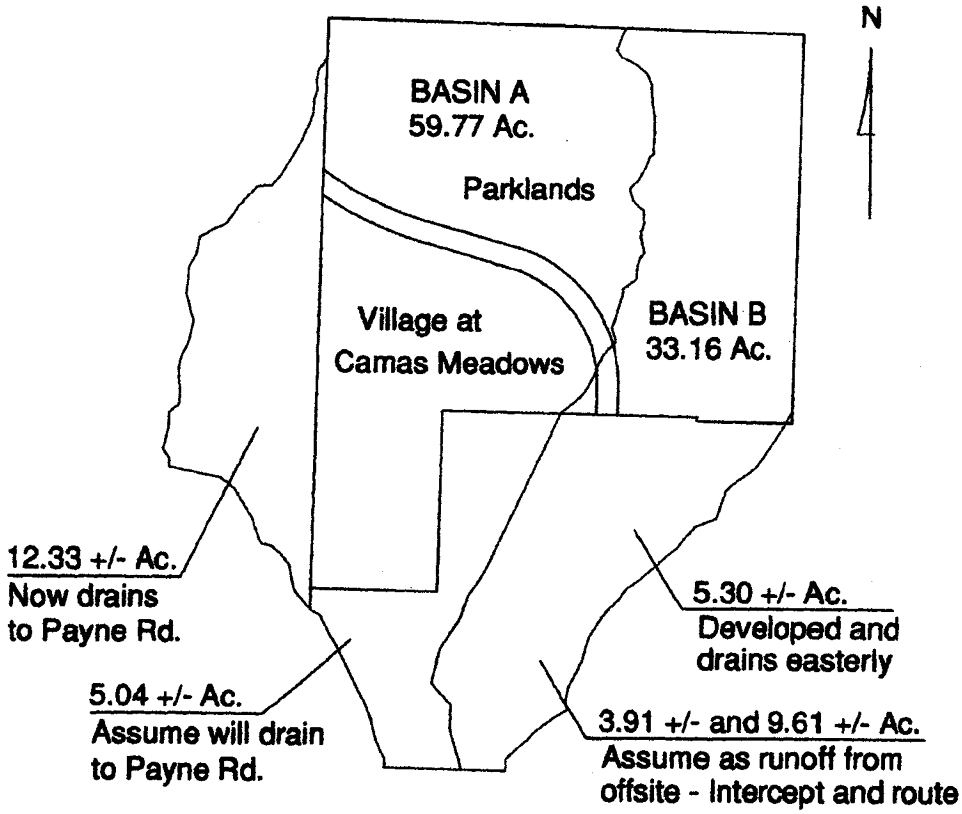


FIG. 1B HISTORIC BASIN MAP

- add PROJECTS

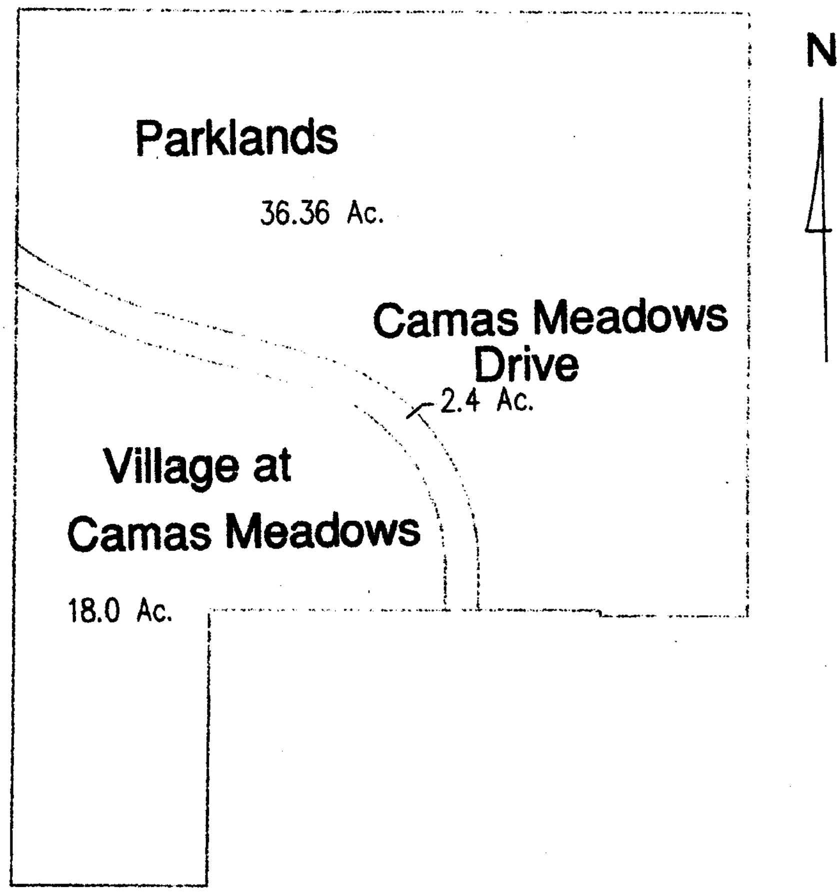


FIG. 2A PROJECT AREAS

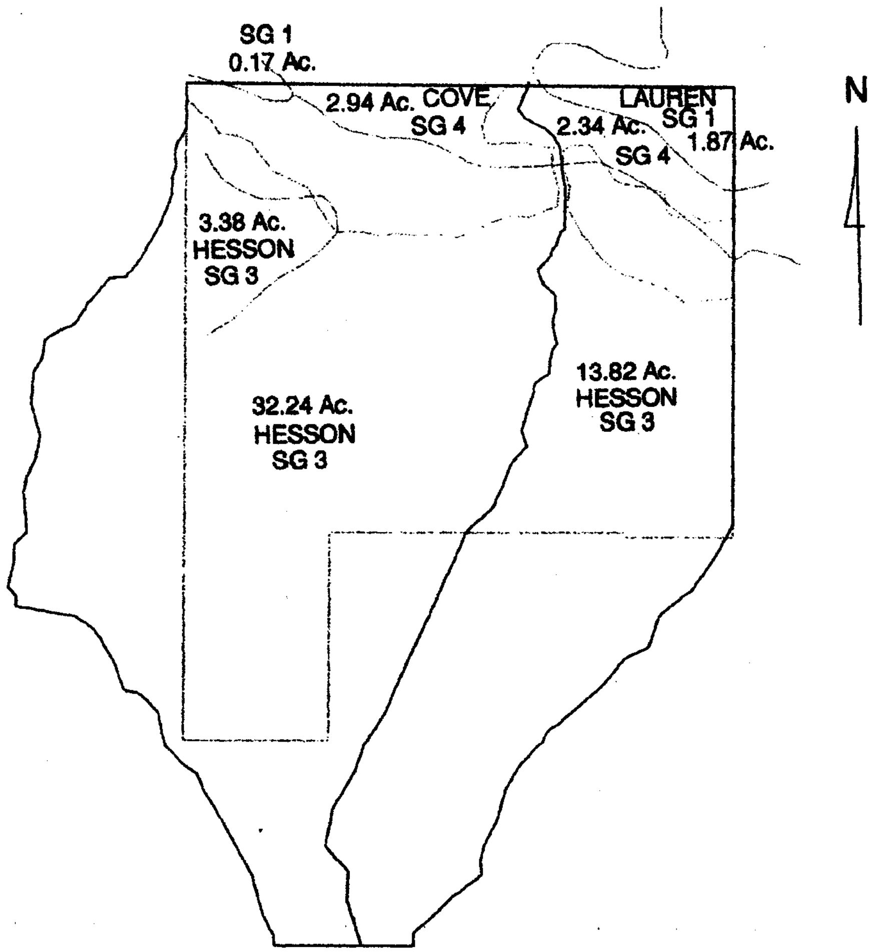


FIG. 2B SOILS MAP

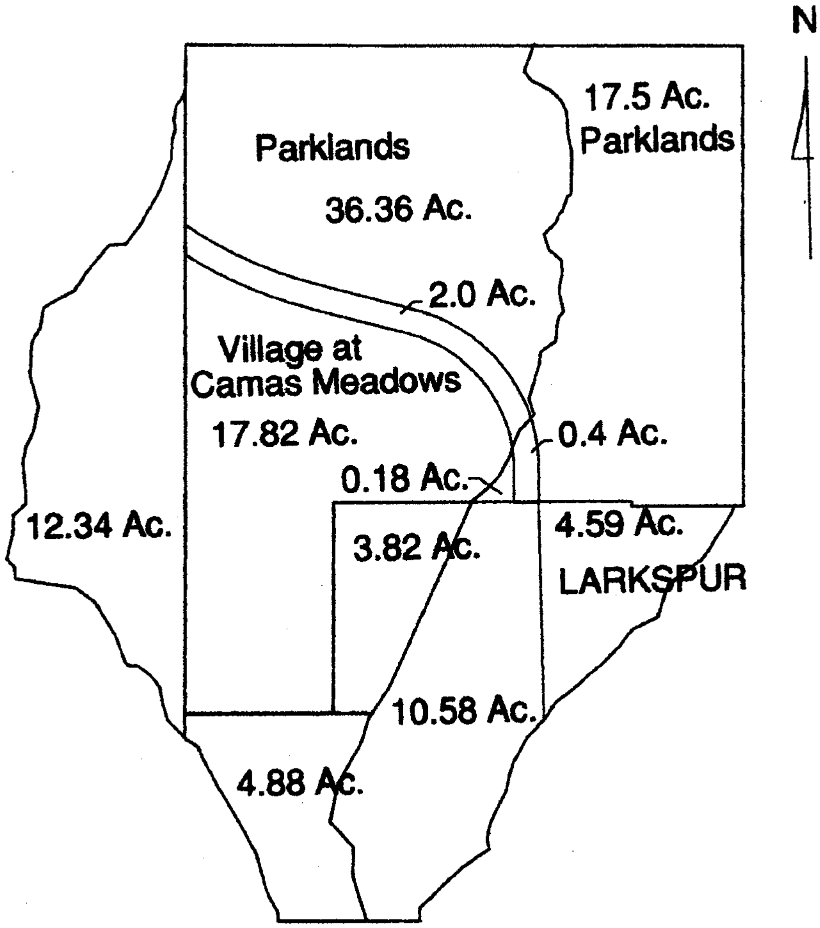


FIG. 1C HISTORIC BASIN MAP
- add PROJECTS

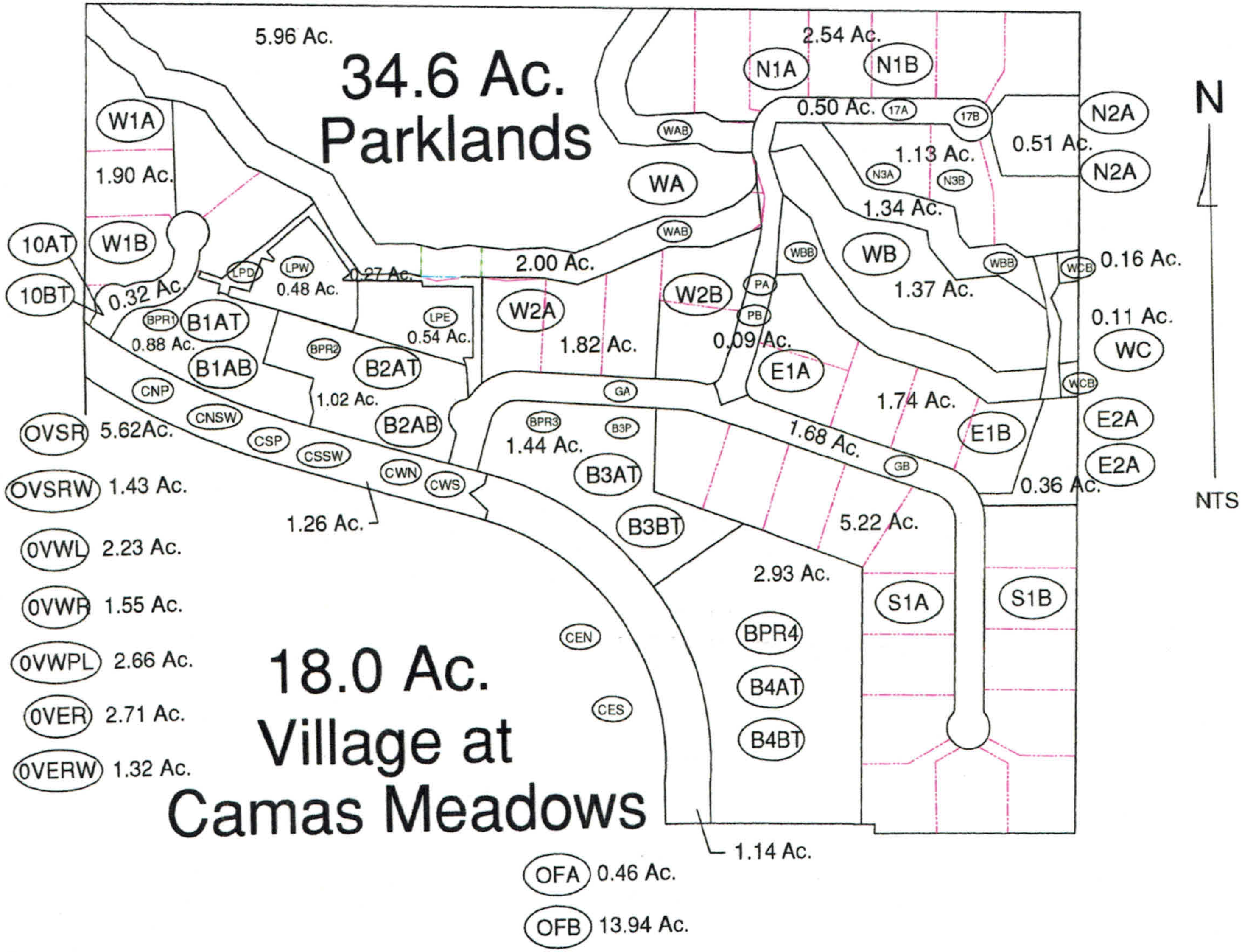


FIG. 3 - POST SUBBASIN AREAS

SOIL INFORMATION

– selected text from USDA Soil Survey report of Clark County, Washington issued November 1972

See Geotech Report, Appendix E

- See page 10 for table with depth to bedrock information.

Cove Series

– selected text from USDA Soil Survey report of Clark County, Washington issued November 1972.

The Cove series consists of deep, very poorly drained, mostly nearly level soils (fig. 3). These soils have a clayey subsoil. They formed in water-laid deposits in old lakes and ponds. The native vegetation is deciduous trees, sedges, reeds, and water-tolerant shrubs and grasses.

Cove soils are used primarily for pasture.

Cove silty clay loam, 0 to 3 percent slopes (CvA).—This soil is in concave drainageways and in large, flat, old lakebeds. The slope is generally less than 1 percent.

In a typical profile the surface layer is very dark gray silty clay about 4 inches thick. Below this is firm clay about 32 inches thick. It is black in the upper part and very dark gray and mottled in the lower part. The underlying material, to a depth of 54 inches, is mottled, light olive-gray gravelly silty clay loam.

Included in mapping were small areas where the surface layer is gravelly silt loam, silty clay, or clay. Also included were areas where the subsoil is gravelly clay.
This soil is very poorly drained and very slowly permeable. Tillage is difficult. The available water capacity and fertility are low. The effective rooting depth averages less than 15 inches. Surface runoff is very slow, and ponding is common in winter unless drainage is provided. There is no hazard of erosion.

Water-tolerant grasses and legumes are well suited, but these plants must also resist drought because this soil is droughty in summer. Tall fescue, meadow foxtail, birdsfoot trefoil, and white Dutch clover are suited grasses and legumes

Hesson Series

– selected text from USDA Soil Survey report of Clark County, Washington issued November 1972.

The Hesson series consists of deep, well-drained soils that are mostly level to gently rolling. Some areas are hilly and very steep. These are moderately fine textured soils that have a fine textured subsoil. The parent material is deeply weathered, mixed old alluvium that contains varying amounts of gravel. The original vegetation is a heavy growth of Douglas-fir and a scattering of western redcedar and grand fir. The understory consists principally of vine maple, salal, Oregongrape, ferns, and red huckleberry.

All the acreage has been logged. Areas not in cultivation are in second-growth timber. The understory is similar in composition to that of the native stands. Red alder is dominant in some areas. The annual precipitation ranges from 50 inches to more than 60 inches.

Hesson clay loam, 0 to 8 percent slopes (HcB).-This is the dominant soil of the high terraces along the mountain foot slopes in the county. In most places the slope is 2 to 5 percent. The relief is undulating. Slopes are generally short to moderate in length.

SOIL INFORMATION

– selected text from USDA Soil Survey report of Clark County, Washington issued November 1972

In a typical profile the surface layer is dark reddish brown clay loam about 8 inches thick. The subsurface layer is dark reddish-brown clay loam about 4 inches thick. Below this layer is friable, dark reddish-brown clay loam about 10 inches thick. The next layer, to a depth of about 91 inches, is reddish-brown clay. In sequence from the top, the uppermost 18 inches is friable, the next 39 inches is firm, and the lower 12 inches is very firm.

Included in mapping were some areas that are nearly level or are slightly depressional and have a slightly mottled layer at a depth of 30 to 40 inches. This indicates reduced permeability and a temporary perched water table during rainy periods.

This soil is well drained and has moderately slow permeability. The available water capacity is high, and fertility is moderate. Problems arise in the proper scouring of tillage equipment when the soil is worked at about field capacity. Tillage is difficult when the surface layer is nearly dry. Surface runoff is slow, and the erosion hazard is slight.

Hesson clay loam, 8 to 20 percent slopes (HcD).-This soil is similar to Hesson clay loam, 0 to 8 percent slopes, except that the surface layer generally is 1 to 2 inches thinner. In places where erosion has been active, the surface layer is 2 to 4 inches thinner. The slopes are generally single and are moderate in length.

Most areas of this soil are cleared and in cultivation, but use is less intensive than on Hesson clay loam, 0 to 8
percent slopes. Runoff is medium, and the erosion hazard is moderate where the surface is left bare in winter.

Lauren Series
– selected text from USDA Soil Survey report of Clark County, Washington issued November 1972.

The Lauren series consists of deep, somewhat excessively drained, nearly level to gently sloping soils on terraces 50 to 300 feet above the Columbia River. In a few places, on terrace fronts, the soils are steep to very steep. These are very gravelly soils that formed in mixed Columbia River alluvium that contained some volcanic ash. Lauren soils are in the southwestern part of the county, in the vicinity of Mill Plain, Orchards, and Fourth Plain. The original vegetation was Douglas-fir, grand fir, bigleaf maple, vine maple, salal, and ferns. The average annual precipitation is about 48 inches.

Nearly all the acreage is cleared and in cultivation or suburban development. There are a few stands of second growth Douglas-fir in farm woodlots.

Lauren gravelly loam, 0 to 8 percent slopes (LgB).-This soil occurs on terraces. The slopes are generally less than 4 percent and approach 8 percent only along the terrace breaks.
In a typical profile the surface layer is very dark brown gravelly and very gravelly loam about 20 inches thick. Below the surface layer is friable, dark-brown very gravelly loam about 13 inches thick. The next layer is dark-brown very gravelly coarse sandy loam about 11 inches thick. The underlying material, to a depth of 70 inches, is dark-brown very gravelly loamy coarse sand.

Included in mapping were a few small areas where very gravelly loamy coarse sand is within 30 inches of the surface.This soil is somewhat excessively drained and easily tilled. Permeability generally is

SOIL INFORMATION

– selected text from USDA Soil Survey report of Clark County, Washington issued November 1972

moderately rapid, but it is rapid in the substratum. The available water capacity is moderate. Fertility is moderate. Surface runoff is slow, and the erosion hazard is slight.

Note: This geotech report by Columbia West Engineering, Inc. reports the following.

> *The Web Soil Survey (United States Department of Agriculture, Natural Resource Conservation Service [USDA NRCS], 2013 Website) indicates the site is underlain by three soil types. Hesson clay loam soils are mapped on the majority of the site from the northwest corner to the southwest corner of the property, while Cove silty clay loam and Lauren gravelly loam soils are mapped in the northern and northwestern portions of the property, respectively. Soils resembling the Lauren series were not encountered during subsurface excavation.**
>
> *Although actual on-site soils may vary from the broad USDA descriptions, Lauren soils are generally coarse-textured, well drained soils with rapid permeability. Cove soils are generally fine-textured, poorly drained soils with very slow permeability and high shrinkswell potential. Hesson soils are fine-textured, well drained soils with moderately slow permeability and moderate shrink-swell potential.*
>
> * Review of the report reveals that TP1 and TP 2 were explored in this area of the site. Poorly graded GRAVEL with silt and sand was observed. Refusal was within 2.5 to 3 feet of the surface.

Permeability: Cove soils are at the wetland and listed at less than 0.06 in/hr in the 0-36 inch depth. Hesson soils located south of the wetlands and listed at less than 0.63 to 2.0 in/hr in the 0-22 inch depth.

This indicates that some infiltration will occur at the proposed biorention facilities even though the majority will be collected in underdrain systems and conveyed in the storm system piping.
Also, some infiltration may occur at the proposed systems in the wetland buffers – not significant.

Cove: CvA.	0–36	Clay	CH	A-7	------	100	70–80	<0.06	0.14–0.16	5.6–7.3
	36–54	Gravelly silty clay loam.	CL	A-7	65–75	60–70	50–60	0.06–0.20	0.15–0.17	5.6–7.3
Cove, thin solum: CwA.	0–14	Silty clay loam	CL	A-7	------	100	85–95	0.06–0.20	0.19–0.21	4.5–6.0
	14–21	Clay	CH	A-7	------	100	70–80	<0.06	0.14–0.16	5.6–7.3
	21–60	Silt loam	ML or CL	A-4 or A-6.	------	100	65–75	0.06–0.20	0.19–0.21	6.6–7.3
Dollar: DoB.	0–32	Loam	ML	A-4	100	90–95	60–70	0.63–2.0	0.16–0.18	4.5–6.0
	32–60	Loam (fragipan)	ML or CL	A-4	100	95–100	60–70	<0.06	0.06–0.08	4.5–6.0
Fill land: Fn.	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]	[2]
Gee: GeB, GeD, GeE, GeF.	0–22	Silt loam	ML or CL	A-6	------	100	70–85	0.63–2.0	0.19–0.21	5.1–6.0
	22–72	Silty clay loam	CL	A-6	------	100	70–80	<0.06	0.06–0.08	5.1–6.0
Gumboot: GuB.	0–12	Silt loam	OL	A-7	90–95	85–95	75–85	0.63–2.0	0.19–0.21	4.5–7.3
	12–50	Gravelly silty clay loam, clay loam.	CL	A-6	90–100	85–95	65–75	0.06–0.2	0.19–0.21	6.1–7.3
	50–60	Very gravelly silty clay.	GC	A-7	40–50	35–50	25–35	<0.06	0.06–0.08	6.1–7.3
Hesson: HcB, HcD, HcE, HcF.	0–22	Clay loam	CL	A-7	85–95	85–95	65–75	0.63–2.0	0.19–0.21	4.5–6.0
	22–91	Clay	CH	A-7	85–90	85–90	75–85	0.2–0.63	0.14–0.16	4.5–6.0
HgB, HgD, HhE.	0–22	Gravelly clay loam.	SC	A-6	75–85	70–80	40–50	0.63–2.0	0.14–0.16	4.5–6.0
	22–91	Gravelly clay	CH	A-7	75–85	70–80	60–70	0.2–0.63	0.11–0.13	4.5–6.0

Figure A-2: 2-Year, 24-Hour Clark County Isopluvial Map

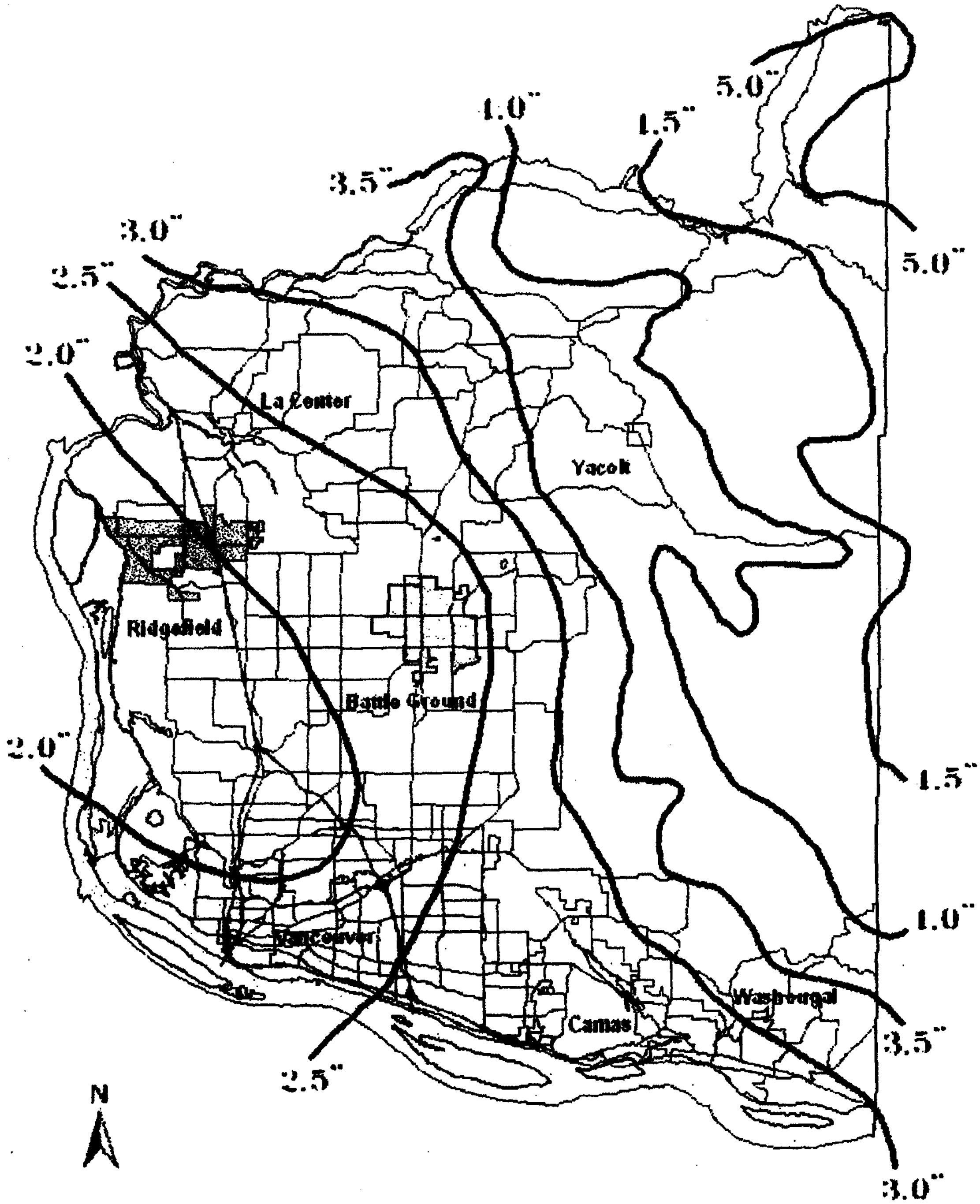


Figure A-3: 10-Year, 24-Hour Clark County Isopluvial Map

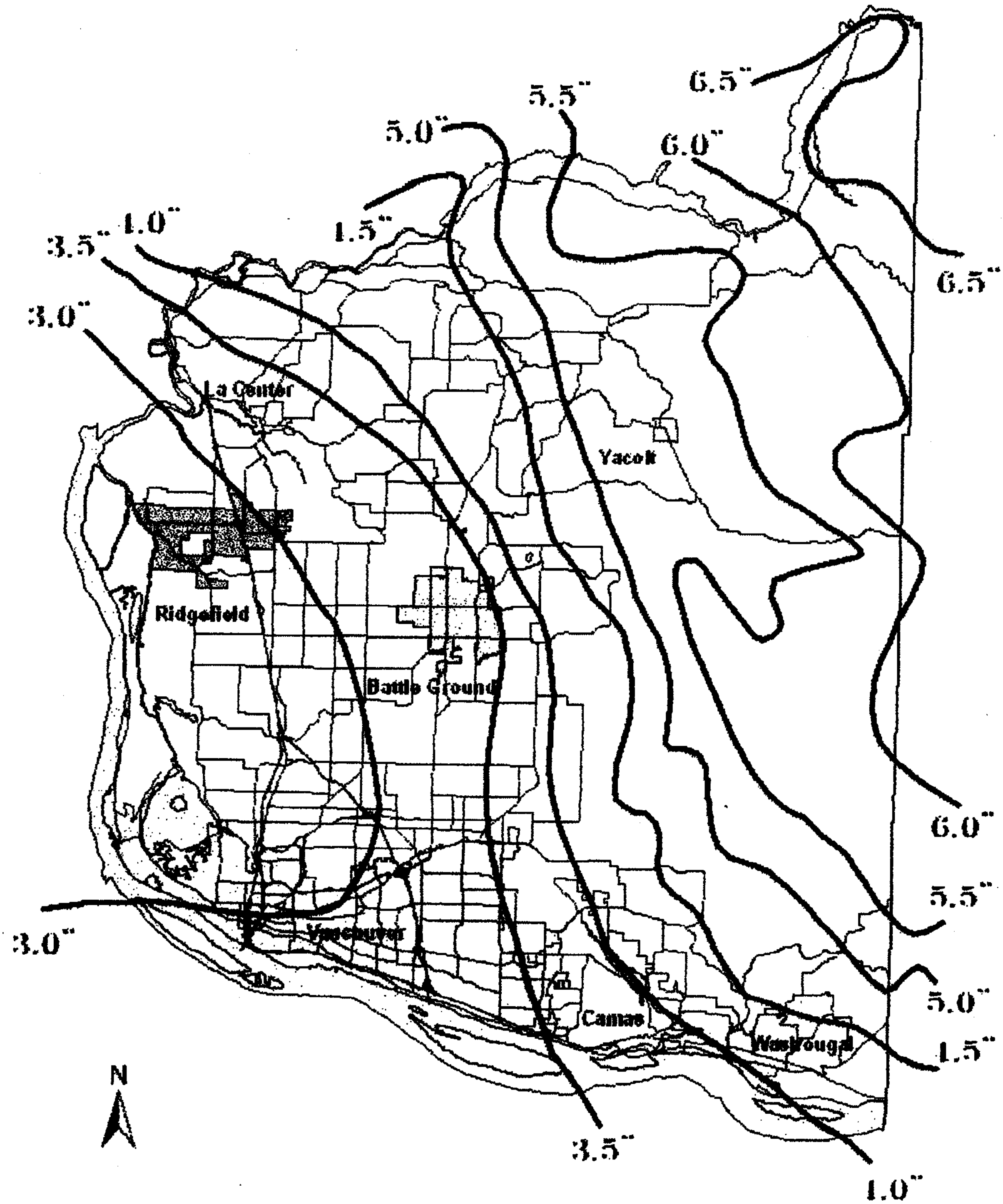


Figure A-4: 25-Year, 24-Hour Clark County Isopluvial Map

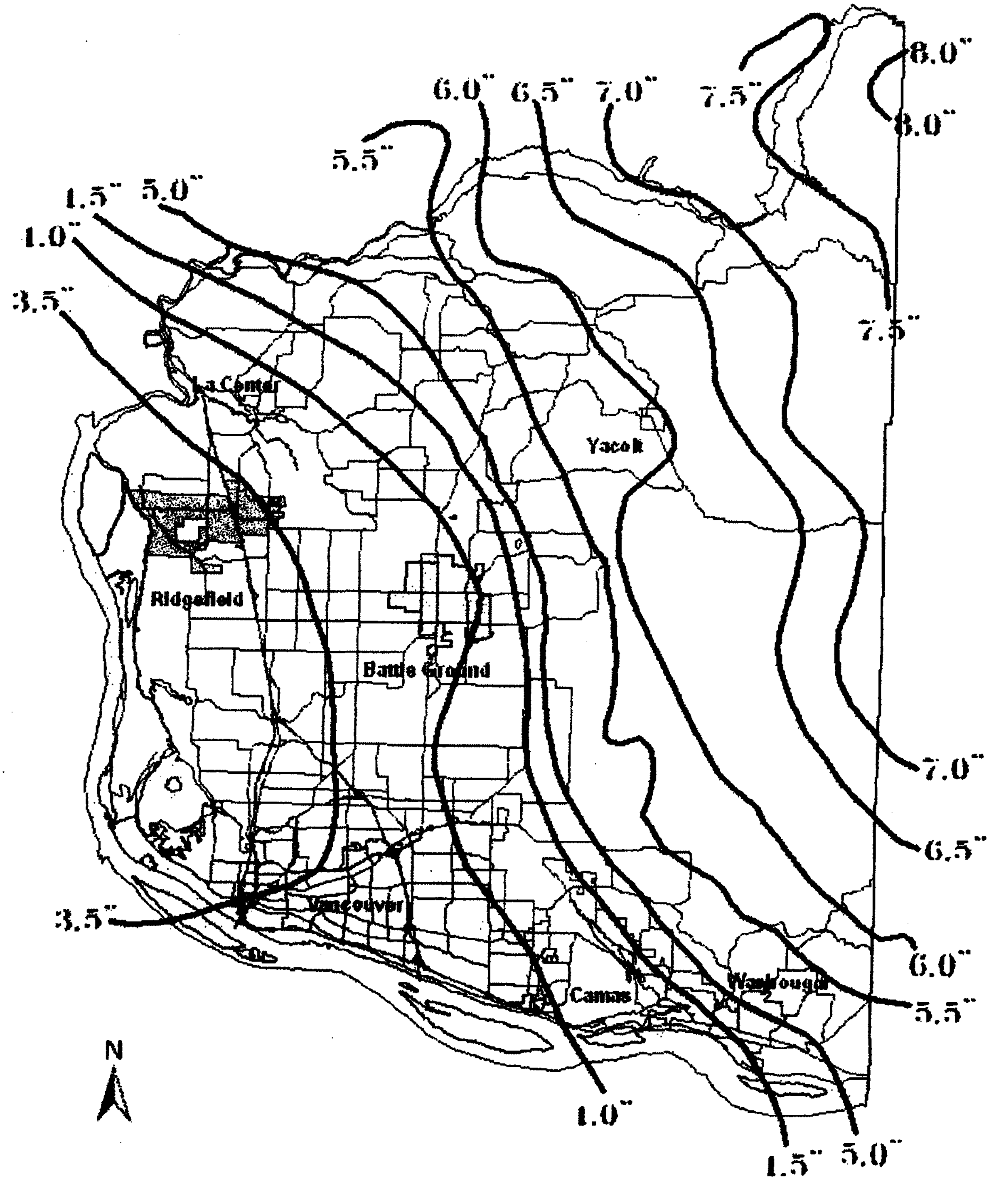


Figure A-5: 100-Year, 24-Hour Clark County Isopluvial Map

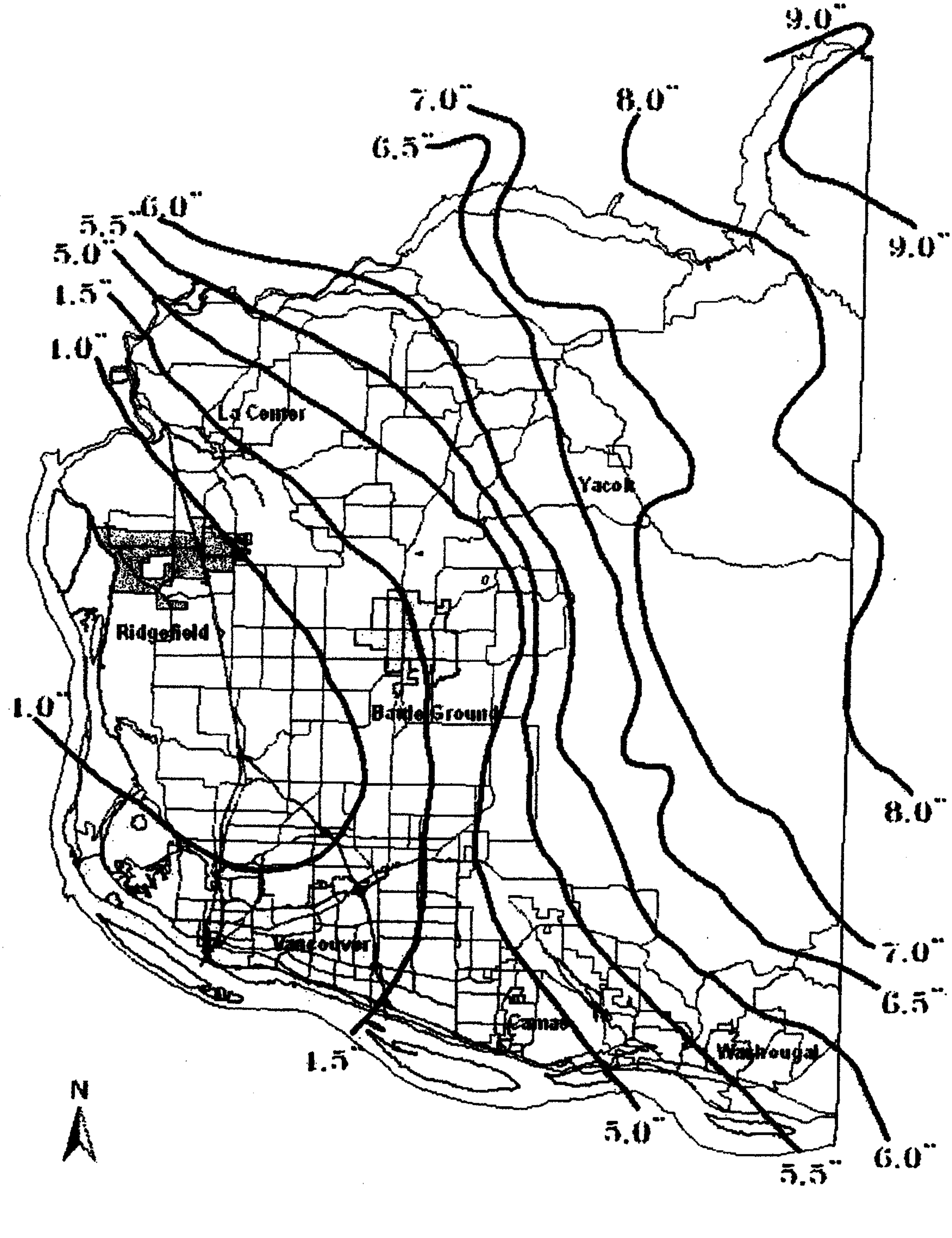


EXHIBIT 16

APPENDIX B

B-1 Minimum Requirements #1 -#9 – Responses for Section B TIR

B-2 Flow Control Discussion

B-3 Direct Connection to Lake

APPENDIX B

Section B (REPORT) - MINIMUM REQUIREMENTS #1-#9 - RESPONSES

Section B – Minimum Requirements

The "**Parklands Executive Residential Subdivision and Parklands Business Park**" proposal contains three threshold discharge areas (TDAs) which are subject to minimum requirements 1 – 10.

1. **Preparation of Stormwater Site Plans**

   To be finalized.

2. **Construction Stormwater Pollution Prevention**

   A SWPP will be prepared for implementation. An erosion control plan will be part of the construction plan set.

3. **Source Control of Pollution**

   Preliminary TIR
   Section D – Source Control
   There are not any prohibited discharges planned for this site. A SWPP will be developed for the Final TIR that will further identify and list BMPs for Source Control and will include BMPS to prohibit sediment laden runoff from leaving the site and impacting any local or State waters. In addition, BMPs will be implemented as necessary to prevent pollutants from coming in contact with stormwater.

   The proposed site is being developed with activities that are pollution generating. The following BMP categories have some degree of applicability, in particular, BMPs for Landscaping and Lawn/ Vegetation Management and Maintenance of Stormwater Drainage and Treatment Systems.

   All source control BMPs in the public right-of-way will be the responsibility of Camas City forces per their established maintenance procedures. The stormwater facilities will be publicly owned and maintained in a manner consistent with the Stormwater Facility Maintenance Manual and BMPs for Landscaping and Lawn/Vegetation Management.

   Individual lot owners will be responsible for source control BMPs related to installing and maintaining landscaping and roof downspout systems on their respective lots. This responsibility includes the prevention of introduction of pollutants into their system(s). Application of appropriate maintenance measures will also provide source control.

4. Preservation of Natural Drainage Systems and Outfalls

There are no existing onsite drainage systems of significance for the overland flow to the wetland areas. See continued discussion under next Minimum Requirement.

5. Onsite Stormwater Management

Preliminary TIR
Section E – Onsite Stormwater Management BMPs

An Erosion Control Plan(s) will be developed for implementation of BMPs to manage stormwater during grading activities will be shown on the erosion control plan.

Individual lot owners will be responsible for installing and maintaining roof downspout systems on their respective lots consistent with Downspout Dispersion Systems (BMP T5.10B) Volume III, Chapter 3.1.2 of the SMMWW (2012).

6. Runoff Treatment

Preliminary TIR
Section F – Runoff Treatment and Design
The following treatment elements pertain to this project:

1. Basic stormwater treatment is required for the private streets within this project.
2. Enhanced stormwater treatment is required for the business portion of this project.
3. Phosphorous removal is also required.

Design approaches:

a) Roof and drive runoff will be re-introduced as sheet flow (dispersion) to the specific lot source. The soils for these lots will amended or augmented with HSG B soils as a surface and fill layer.
b) The management of flows from the lots will be to sheet flow dispersion at the respective wetland buffer.

   Onsite:
   1) Business Park Roof runoff – directed to storm system that is receiving treated runoff
   2) Business Park parking and landscape areas that drain onto parking pavement- treatment in Filtera® system(s)
   3) Private Streets - treatment in Filtera® system(s)

Offsite:

4) Larkspur and a future development west of Larkspur (future) – a bypass by is provided for direct flow Storm Line 'C' for release to Wetland A – assume that this (these) areas will be treated (future) prior to entering bypass system in Camas Meadows Drive.
5) Camas Meadows Drive and landscape areas – paved areas treated in Filtera® system(s) – sidewalk and landscape areas collected and directed to storm system as bypass flow after the Filtera® system(s)
6) The Village site will develop three storm system lines for conveyance - one 'clean' and two 'dirty'. The two 'dirty' lines will be directed Filtera® system(s) or as an option to a bioretention facility(ies) along Camas Meadows Drive prior to further conveyance.

c) The existing site release is from Wetland A to the north toward Lacamas Lake. Wetland A receives flow from Wetland B via two existing culverts at a field road crossing. A small portion of the offsite and onsite drainage basin area flows to Wetland C which extends east and has an east to northeast release path.

d) Wetland B provides an opportunity to provide added water quality mitigation as well as stormwater management. A further description of Wetland B and the inherent suitability for this design approach is presented under 8. Wetlands Protection.

7. Flow Control

<u>Preliminary TIR</u>

<u>Section G – Flow Control Analysis and Design</u>

Control-Exempt Surface Waters) of the Stormwater Manual and all of the following criteria are exempt from Minimum Requirement 7 (Flow Control):

a. Project meets the exemption requirements (described in Volume I, Section 2.5.7 of the Stormwater Manual) for discharges to one of the following water bodies:

- Columbia River
- Lacamas Lake
- Round Lake

b. Runoff is treated in accordance with Minimum Requirement 6 (Runoff Treatment).

c. The discharge structure is designed to avoid erosion during all storms up to the 100-year storm.

d. If an existing discharge structure is used the discharge structure and conveyance system leading to the discharge must have adequate capacity to meet the requirements of Chapter 7 (Conveyance Systems) of this manual.

Flow control facilities are not required for this project. The noted criteria will be applied to meet the exemption. Specifically, in relation to water quality.

However, as previously mentioned, design features are proposed that will slightly 'reduce' peak flow.

a) Soil amendment or replacement to replicate HSG B soil characteristics.
b) An option – may not be accepted for phosphorous treatment. Employ bioretention systems with media for phosphorous control – the filter media depth and infiltration rate will 'delay' these flows by as much as 4.5 hours.

8. Wetlands Protection

Camas Stormwater Manual
For projects with stormwater discharges to a wetland, either directly or indirectly through a conveyance system, the preliminary TIR shall describe wetland protection measures to be implemented in accordance with Minimum Requirement 8. The narrative shall describe the measures that will maintain the hydrologic conditions, hydrophytic vegetation, and substrate characteristics necessary to support existing and designated uses.

1) The TIR will demonstrate that the proposed development will manage stormwater runoff in a manner that will provide wetland protection measures as noted. These wetlands are separated by existing culverts and are somewhat non-typical in that there is a significant gradient for flow through.

- ***Several resources have been reviewed related to wetlands and wetland protection***

  Regarding *"measures that will maintain the hydrologic conditions, hydrophytic vegetation, and substrate characteristics necessary to support* *existing and designated uses*", the second reference seemed to provide some data that is helpful in making this assessment.

It provides the following definitions regarding processes that were evaluated.

<u>Hydroperiod</u>

Refers to the depth, duration, frequency and pattern of wetland inundation has been determined to be a key factor in determining biological responses

<u>Water Level Fluctuation</u>

WLF is measured as the average difference between the maximum depth and average instantaneous or base depth in a time period (Taylor 1993, Taylor, Ludwa and Horner 1995).

<u>Excursion</u>

The frequency of storm events was measured in a hydroperiod by defining an event a water level increase above the monthly average depth of more than 0.5 ft.

<u>Duration</u>

defined as the time period of an excursion

- If the option for bioretention facilities allowed for phosphorous control the following approach for design will be applied:

2) The Simple Method will be applied to ascertain pre and post Phosphorous loading.

3) Phosphorous soil mix will be applied at the bioretention facilities to reduce levels to satisfactory levels. Any portion being further routed through the Wetland A and B will also potentially receive further removal through settling and plant biological processes.

4) Wetland B has a low area near the outlet to Wetland A. One of the two culverts is about six feet lower than the elevations along some of the south, north, and east buffer delineation. By retrofitting the two culverts, a ponding area that covers about 43% of Wetland B could be established. This ponded water along with the ponded water in the SWTF system – aside from water quality benefits - would provide wetness to the surrounding soils and be especially beneficial during extended dry periods in the summer months.

5) This approach also provides opportunity for wetland diversity aspects through additional plantings that would be similar to plantings in a Stormwater Wetland Treatment Facility (SWTF) BMP 10.30.

Basin/Watershed Planning

Not applicable per Camas Stormwater Manual.

9. Operation and Maintenance

An Operation and Maintenance procedure document will be developed and include City of Camas procedures and processes. The Clark County Stormwater Facility Maintenance Manual and DOE references will also be referred to for additional or appropriate material for inclusion.

B-2 FLOW CONTROL DISCUSSION

Parklands Executive Residential and Parklands Business Park at Camas Meadows Golf Course – Flow Control Discussion

This project discharges to a Flow Control - exempt receiving water – Lacamas Lake. Responses are included for this section on flow control, but section *2.5.8 Minimum Requirement #8: Wetlands Protection* ***seems more applicable. The wetlands are within the 100 yr flood plain.***

2.5.7 Minimum Requirement #7: FlowControl
Applicability

Projects must provide flow control to reduce the impacts of stormwater runoff from impervious surfaces and land cover conversions. The requirement below applies to projects that discharge stormwater directly, or indirectly through a conveyance system, into a fresh water - except for projects that discharge to a water in Appendix I-E – Flow Control-Exempt Receiving Waters in accordance with the following restrictions:

- *Direct discharge to the exempt receiving water does not result in the diversion of drainage from any perennial stream classified as Types 1, 2, 3, or 4 in the State of Washington Interim Water Typing System, or Types "S", "F", or "Np" in the Permanent Water Typing System, or from any category I, II, or III wetland; and*

  - **The stormwater runoff from this development <u>does not result in the diversion of drainage from any perennial stream</u> .. or <u>from any category I, II, or III wetland</u>;**

- *Flow splitting devices or drainage BMP's are applied to route natural runoff volumes from the project site to any downstream Type 5 stream or category IV wetland:*

  - **Separate storm systems and BMPs are applied to route from the project site to a category III wetland: The separate systems allow the development to discharge runoff volumes close enough to natural runoff volumes that the wetland hydroperiod and downstream erosion aspects are not negatively impacted. The discharges are to two interconnected category III wetland segments that continue offsite as part of a larger wetland complex.**

- *Design of flow splitting devices or drainage BMP's will be based on continuous hydrologic modeling analysis. The design will assure that flows delivered to Type 5 stream reaches will approximate, but in no case exceed, durations ranging from 50% of the 2-year to the 50-year peak flow.*

  - **The discharge is to large wetland complex. See next comment.**

B-2 FLOW CONTROL DISCUSSION

• *Flow splitting devices or drainage BMP's that deliver flow to category IV wetlands will also be designed using continuous hydrologic modeling to preserve pre-project wetland hydrologic conditions unless specifically waived or exempted by regulatory agencies with permitting jurisdiction; and*

Parklands Executive Residential and Parklands Business Park at Camas Meadows Golf Course – Flow Control Discussion

- **The discharge is to large wetland complex. The available continuous model software is not suited for the complex stormwater management controls being applied for this project. We propose that this reqirement should be waived for this project.**
- **The TIR contains an analysis for a direct area input analysis and provides historic and post-development runoff hydrographs related to the inflow and outflow condition of the discharge from Wetland A. This comparison shows that the wetland hydroperiod elements of concern are not negatively impacted. See C-2d.**

• *The project site must be drained by a conveyance system that is comprised entirely of manmade conveyance elements (e.g., pipes, ditches, outfall protection, etc.) and extends to the ordinary high water line of the exempt receiving water; and*

- **Some of this project is drained by several stormwater piping systems. However, lots directly bordering the wetland buffer areas will sheet flow directly to and through the buffers. The piping system outfalls will be protected against erosive forces before being released to the wetland buffer area.**
- **<u>The wetland area discharges northerly through the continuation of the wetland complex to the ordinary high water line of the exempt receiving water.</u>**

• *The conveyance system between the project site and the exempt receiving water shall have sufficient hydraulic capacity to convey discharges from future build-out conditions (under current zoning) of the site, and the existing condition from non-project areas from which runoff is or will be collected*
; and

- **This offsite area is being accounted for in the piping system design to have sufficient hydraulic capacity to convey discharges from future build-out conditions (under current zoning) of the site, and the existing condition from non-project areas from which runoff is or will be collected .**
- **The conveyance system between the project site and the exempt receiving water <u>has sufficient hydraulic capacity</u> for this project and upstream projects in a fully developed condition.**

B-2 FLOW CONTROL DISCUSSION

• *Any erodible elements of the manmade conveyance system must be adequately stabilized to prevent erosion under the conditions noted above.*

If the discharge is to a stream that leads to a wetland, or to a wetland that has an outflow to a stream, both this requirement and Minimum Requirement #8 apply.

- **There are no elements in the proposed stormwater management design that will introduce erodible elements onsite or to the wetland complex and outfall conveyance as a whole.**

Local governments may petition Ecology to exempt projects in additional areas. A petition must justify the proposed exemption based upon a hydrologic analysis that demonstrates that the potential stormwater runoff from the exempted area will not significantly increase the erosion forces on the stream channel nor have near field impacts.

Contours - Flow to north

Legend
- Contour Lines - 2 ft
- Contour Lines - 10 ft
- Contour Lines - 200 ft
- Building Footprints
- Taxlots
- Cities Boundaries
- Urban Growth Boundaries

Notes:

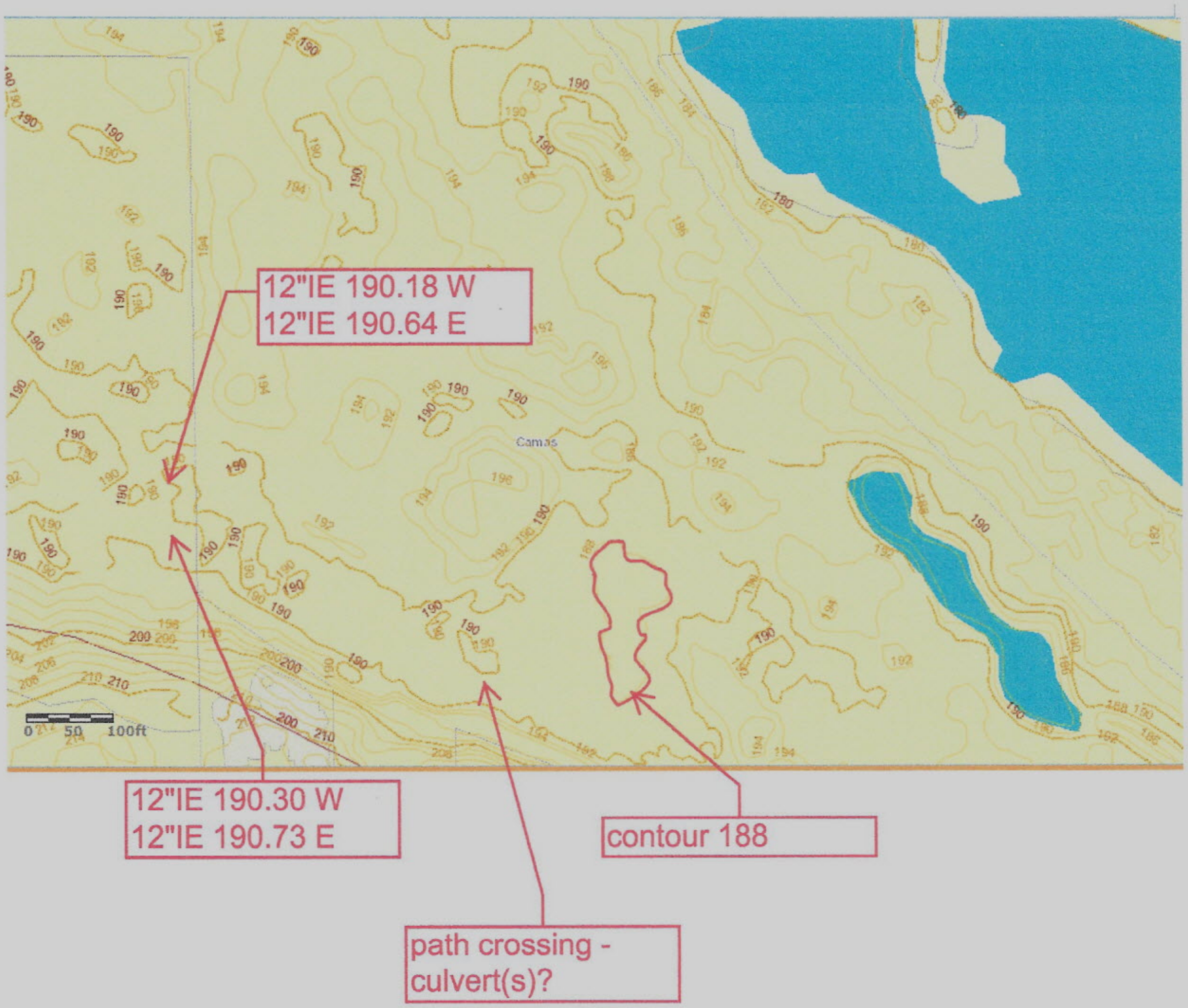
1: 1,717

0.1 0 0.03 0.1 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere
Clark County, WA. GIS - http://gis.clark.wa.gov

This map was generated by Clark County's "MapsOnline" website. 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 infromation.

THIS MAP IS NOT TO BE USED FOR NAVIGATION


12"IE 190.18 W
12"IE 190.64 E
Camas
0 50 100ft
12"IE 190.30 W
12"IE 190.73 E
contour 188
path crossing -
culvert(s)?

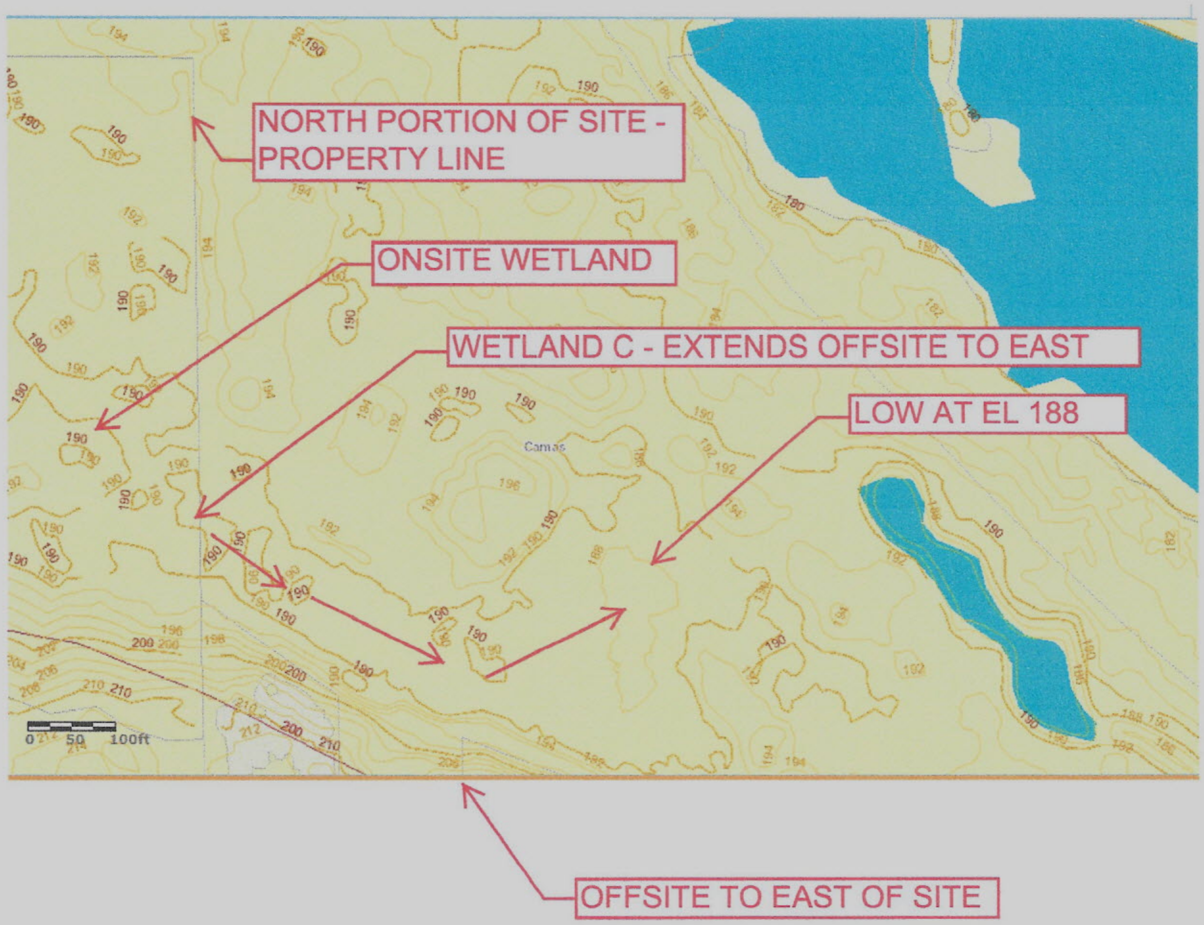

NORTH PORTION OF SITE - PROPERTY LINE
ONSITE WETLAND
WETLAND C - EXTENDS OFFSITE TO EAST
LOW AT EL 188
Camas
0 50 100ft
OFFSITE TO EAST OF SITE

EXHIBIT 17

APPENDIX D

<u>References – Wetlands</u>

- **D-1a Wetland Hydroperiod Analysis**
- **D-1b Chap13 Wetland Hydroperiods King Co.**

D-2 Wetland Hydroperiod Analysis –selected text and project comment

D-3 Ch 13 – selected text with highlighting and project comment

D-4 Wetland Protection Discussion

WETLAND HYDROPERIOD ANALYSIS

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ABSTRACT

Rapid urbanization can adversely impact the functional values of isolated wetlands. The hydroperiod (duration of inundation in a wetland) is one of the functional elements which must be maintained to avoid such impacts to wetlands surrounded by or adjacent to development. In the past, wetlands were typically filled in to facilitate development. Today, instead, many developments incorporate wetlands into stormwater management planning as a means to provide water quality treatment and/or attenuation. However, the hydroperiod of a wetland to be utilized in this way must be properly determined in order to avoid adverse wetland impacts. In this paper, a water budget analysis is depicted to determine the hydroperiod with special emphasis given to surface water runoff resulting from precipitation. An analytical example is included to illustrate the hydroperiod analysis.

INTRODUCTION

Hydrology is probably the single most important determinant for the establishment and maintenance of specific types of wetlands and wetland processes (Mitsch & Gosselink, 1993). Land use changes and stormwater management practices usually alter hydrology within a watershed (Azous & Homer, 1997). Within the last decade or so of rapid urbanization, the stormwater management function of natural wetlands has been recognized by those employed in land development. As a result, rather than being destroyed and replaced by mitigation projects, wetlands are being incorporated more and more into developments' stormwater management systems for water quality treatment and attenuation purposes. Given man's inability thus far to recreate nature, this may be viewed as a godsend. However, some preliminary information must be gathered prior to project design.

The objective of this paper is to evaluate the hydrological and biological functions of a wetland by considering the pre-development and post-development conditions within a wetland watershed.

Hydrologic Characteristics of Wetlands

The hydrological regimen is what distinguishes wetlands from aquatic and terrestrial systems. This characteristic creates the physicochemical conditions that make such an ecosystem unique.

Hydrology modifies or determines the structure and functioning of wetlands by controlling the composition of the plant community and thereby the animal community.

For the purpose of this paper, palustrine wetlands will be used. According to Cowardin et al. (1979) there are eight classes of palustrine wetlands, all nontidal (isolated, freshwater). In addition to physical shape and form, major factors that influence the hydrology of palustrine wetlands are precipitation, surface water inflows and outflows, groundwater exchange and evapotranspiration. These components will be further discussed under the water budget section.

Among the hydrological characteristics of wetlands described by Duever (1988), are flood hydrographs, water level fluctuations and hydroperiods.

Flood Hydrograph

A typical hydrograph is a graph or table showing the flow rate as a function of time at a given storm event in a watershed. The hydrograph is the result of physiographic aspects and meteorological occurrences in the watershed. Since wetlands are one of the physical characteristics of the watershed, the wetlands influence the response of the watershed runoff for a given storm event. The actual shape and scale of a hydrograph can vary substantially depending upon physical characteristics such as slopes, vegetation coverage and ecosystem type within a watershed. There are two types of hydrographs. The first one relates discharge to time and is called a discharge hydrograph and the second relates stage to time and are called a stage hydrograph.

Water Level Fluctuations

The fluctuations of the water level in a wetland are influenced by water inflows and outflows related to the meteorological conditions of the area. Another factor to consider that will cause different ranges in the fluctuation of the water levels is the location of wetlands within higher or lower areas of the watershed. Components which alter such fluctuations are the surface and groundwater inflows attributed to precipitation. However, the main control factor is the rise and fall of the groundwater table which is influenced by other surrounding topographic land features, soil type and vegetation cover.

Hydroperiod

Wetland hydrology may be considered in the context of the hydroperiod, defined as "the seasonal occurrence of flooding and/or soil saturation, encompassing the depth, frequency, duration, and seasonal pattern of inundation" (Azous & Homer, 1997). Wetland type varies according to frequency of inundation, which may be annual, seasonal, or in some cases a daily occurrence. In addition, the water table at times may be so low that there is no apparent soil saturation or flooding (Figure 1).

Wetlands receive water from any combination of the following: precipitation, surface water and/or groundwater. These in turn influence water depth. The duration of soil saturation determines a wetland's hydroperiod.

To determine the existing hydroperiod of a wetland to be incorporated into a stormwater management system, specific hydrological characteristics and biological indicators of the wetland must be identified or field verified. The pre-development wetland watershed must be mapped and quantified so that there is known contributing acreage. The projected post-development wetland watershed must also be mapped and quantified to determine any expected changes in contributing acreage. In addition, existing normal pool (NP) and seasonal high water elevations (SHWL) of the wetland must be identified, the vegetative community described and a wetland assessment performed.

Water Budget

It is important to understand the hydrology of a wetland system because it of its influence on chemical and biological dynamics of the wetland. For example, a significant variation especially the deficit of water associated with the hydroperiod of the wetland during the dry and/or wet seasons can result in biological changes. A major difficulty in managing wetland systems is the inability to distinguish shifis in the hydrological conditions resulting from human activities versus those caused by natural phenomena.

To understand the hydrological process based on the principles of conservation of mass and the continuity equation, the water budget reflects the net effect of all the processes that influence the hydroperiod of wetlands. The water budget for a wetland can be expressed as:

$$AS=P+SSI+SI-PR-SSO-SO-ET$$

where

AS	=	change in storage vohnne~(surface and soil);
P	5	precipitation;
SSI	=	subsurface inflow (groundwater inflow);
SI	=	surface inflow (overland flow);
PR	=	percolation;
SSO		subsurface outflow (groundwater outflow);
SO		surface ouflow (overland outflow); and
ET		evapotranspiration.

In the above equation, all the parameters represent units of depth. These parameters can either be measured or analytically calculated based on information collected at a specific site. The above components of the water budget vary significantly depending upon local topography, hydrology of the site, and wetland type.

Precipitation

Precipitation inputs to wetlands may exhibit extreme spatial variability, even over small areas during a single storm event, This variability has been synthesized and available in data sets appropriate near or within a wetland and its watershed.

For example, within the Tampa Bay area, average rainfall is 53 inches per year, much of this from June to October (the rainy season). Seasonal variation of rainfall is shown in Figure 2.

Subsurface Inflow-Oufflow

The subsurface (groundwater) inflow-outflow beneath a vegetation canopy may differ significantly from adjacent areas without a canopy. Interception of precipitation from foliage and vegetated surfaces and the re-evaporation of water can significantly reduce the amount of water reaching the water table.

In the Tampa Bay area, during the rainy season, the water table varies from zero to 2 feet below the existing ground surface, and during the dry season, the water table falls to as much as six to 8 feet below the surface.

Percolation

Gradual percolation causes a regulating effect on wetlands and its hydroperiod. Note that the percolation rate at the wetland bed would be very low because of low hydraulic conductivity due to the relatively impermeable soil characteristics underlying a wetland as shown in Figure 3 (Eggelsmann, 1972).

Surface Flow-Inflow-Outllow

In general, surface water movement in a wetland is the result of precipitation, surface water inflow and outflow, and losses through seepage, transpiration, and evaporation.

An important wetland characteristic is extended shallow water inundation - extended but not prolonged or permanent. Factors such as orientation, surrounding soil characteristics, storm characteristics, adjacent land use patterns, and man-made alterations (such as land use changes) affect wetland hydrology. During periods of high water levels, large inflows may enter a wetland, but quickly dissipate as outflows. Even several such large flood events occurring within a relatively short time span may substantially raise annual inputs, but have little significant impact on the hydrology of a wetland. However, these occasional peak flows are important to topographically isolated wetlands, which receive the majority of their inflows during storm events.

The water storage capacity of wetlands is intermediate between upland areas and aquatic systems. In a flood event, the runoff rate drastically increases when water levels exceed a system's normal barriers to flow. In other words, the rate of the water level rises and falls quickly as the runoff rates approximate the inputs. This phenomenon leads to a fairly constant year to year maximum water levels in a wetland system (Daniel, 198 1).

For the Tampa Bay area, approximately 14 inches of rainfall is generated in runoff annually.

Evapotranspiration

Evapotranspiration is the combined process of evaporation from vegetation, land, water surface and transpiration by plants. Evapotranspiration for a given wetland depends on its microclimate (relative humidity, air and water temperature, wind velocity and its duration), the soil moisture content and the type and density of the vegetation. Compared to those of other ecosystems, wetlands have among the highest evapotranspiration rates.

Evapotranspiration rates for wetlands can be measured and/or calculated by a variety of techniques. Theoretical rates are established based on regional climatic data or site specific micro climatic data.

For the Tampa Bay area, annual evapotranspiration accounts for a loss of approximately 38 inches. Average seasonal evapotranspiration data are shown in Figure 2.

Stormwater Systems

Developers today face many pressures including state, local and regional regulations and above all the financial interest from shareholders. Land use policies specify what percentage of developable land needs to be set aside for other "non-income producing" usage. Stormwater management is one such use. Existing depressions in the land, or wetlands, are "natural" stormwater facilities, ideal locations for stormwater storage. Today, development plans increasingly incorporate wetlands into stormwater management systems to provide storage, water quality improvement and environmental enhancement.

The impact of quantity and quality of stormwater runoff on wetland processes has raised some concerns among researchers. Quantity of stormwater runoff is a driving force in the establishment and maintenance of wetlands. In fact, assuming adequate quality, and at the correct frequency, depth and duration, stormwater runoff maintains and may even upgrade the quality of wetlands previously altered.

Attenuation (pre- and post-development runoff rate and volume)

Variation in water level in wetlands for a typical storm under both pre- and post- development conditions can be determined by using any hydrological routing program such as EPA-SWMM, HEC-HMS or HEC-1, TR-20, etc. Water levels under pre-development conditions can be established based on biological indicators or determined by a monitoring program. Under post-development conditions, water levels will rise rapidly during and after storm events but would quickly return to its operating level @e-development level). The quick return to this operating level would be controlled by the outflow at the outlet control structure to restore the storage capacity of the wetland.

Stormwater runoff could prove to be detrimental to the wetland by causing rapid water level fluctuations and duration periods, thus altering the wetland's hydroperiod. Plant diversity, for example, is likely to be reduced if wetland hydrology is altered in this manner. Therefore, fluctuations in a wetland should be maintained at pre-development levels.

Measures should be taken to protect the integrity of a wetland during and after development. Among these should be structural and non-structural works which may include but not be limited to; sedimentation vault, erosion control, vegetation management, etc. Equally important but fewer frequently recognized, adjacent, upland buffer zones must be maintained in their natural states.

Water Quality

Urbanization and urban activities are a source of pollution in stormwater runoff. Pollutants can be removed by wetlands through a combination of: 1) incorporation into or attachment to wetland sediments or biota; 2) degradation; or 3) export to the atmosphere or groundwater. Both physical and chemical pollutant removal mechanisms occur in wetlands. These mechanisms include: sedimentation, absorption, precipitation and dissolution, filtration, biochemical interactions, infiltration, etc. These interactive mechanisms vary from wetland to wetland; therefore, the pollutant removal efficiencies also vary from wetland to wetland (Table 1).

Guidelines

Local, state and regional governmental agencies consider “wetlands” as: lands that are seasonally or permanently covered by shallow water, as well as lands where the water level is close to or at the surface. Whatever the case may be the presence of abundant water has caused the formation of hydric soil and has favored the dominance of either hydrophytic or water-tolerant plants.

In circumstances in which it is impossible to eliminate impacts from development, affected wetlands should be incorporated into stormwater management systems or as “natural facility.” enhancements.

For wetlands incorporated into stormwater management systems, government agencies, including the Southwest Florida Water Management District (SWFWMD) require pre-treatment of storm water runoff prior to discharge to a wetland. The SWFWMD (1996) allows isolated wetlands to be included in surface water management systems when it can be demonstrated that the system design will not adversely impact those wetlands. The SWFWMD requires a pre-treatment of one-fourth inch of runoff prior to release to the wetland. The SWFWMD also states that the depth, duration of frequency of inundation through changing the rate or method of discharge of water to the wetlands must be addressed to prevent adverse impacts to the functions that wetlands provide to fish and wildlife species.

The following recommendations should be considered when incorporating wetlands into designs for stormwater management facilities in new land development projects:

- Maximize natural water storage and infiltration outside of existing wetlands.
- Establish and maintain vegetative buffers in the riparian zone surrounding wetlands.
- Acquire specific management measures to avoid general urban impacts to wetlands.
- Support management of runoff water quantity by performing a hydrological assessment to estimate elements of hydropexiod and hydrodynamics under existing pre-development and anticipated post-development conditions based on the mean annual storm event.

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- Acquire specific management measures to avoid general urban impacts to wetlands.
- Support management of runoff water quantity by performing a hydrological assessment to estimate elements of hydroperiod and hydrodynamics under existing pre-development and anticipated post-development conditions based on the mean annual storm event.

- Manage water quality (attempt to match pre-development water quality conditions by considering both source control BMP's and treatment BMP's) by providing a water quality control facility consisting of one or more treatment BMP's (i.e., pre-treatment sediment sump to control suspended sediment, skimmer/baffle to control oil and grease, overland sheet flow length with swale, if any, etc.).
- Establish plans to protect specific biological communities.

To determine the existing and future hydroperiod, a hydrological assessment (routing programs) should be used to determine the water level fluctuation due to storm event(s) prescribed by the regulations.

Water Level Fluctuation = Crest stage - Seasonal High Water Level

To maintain the hydroperiod and hydrodynamics of a wetland, and to avoid adverse impacts to its biological and hydrological functions, water level fluctuation over time should not vary significantly. If the analysis described above predicts excessive water fluctuations, stormwater management strategies should be employed to keep fluctuations within an acceptable range. Some guidelines suggest that the duration of stage excursions above the pre-development stage should not exceed 24 hours in any event in any year (Azous & Homer, 1997).

Hypothetical Example

The analytical example given shows the hydoperiod assessment of an isolated wetland. The following parameters are considered:

Pre-development conditions:

1) Isolated wetland area = 0.9 ha at SHWL (2.0 acres)
2) Watershed area of wetland = 12.14 ha (30.0 acres)
3) Composite curve number, CN = 80
4) Seasonal High Water elevation = 7.32 m (24.0' msl)
5) Normal Pool elevation = 7.16 m (23.5' msl)
6) Time of concentration = 66 minutes

Post-development conditions:

1) Watershed area of wetland = 9.71 ha (24 acres)
2) Composite curve number = 88.2
3) Time of concentration = 18 minutes
4) Lake area = 0.4 ha (1 .O acres) @ elevation 7.32 m (24.0' M.S.L.)

The Palustrine/ Emergent wetland consists of three distinctive vegetative zones. The outer zone is dominated by St. John's wort (Hypericum fasciculatum). A middle zone is dominated by maidencane (Panicurn hemitomon) and a core zone of pickerelweed (Pontederia cordata). The wetland is bordered by an abrupt border of saw palmetto (Serenoa repens).

Several biological indicators were identified in the field to determine the SHWL and NP of the wetland. The adventitious rooting of *H. fasciculatum* and the ground elevation at the jurisdictional line were compared and a SHWL of 7.32 m (24.0' M.S.L.) was determined. The normal pool was determined at 7.16 m (23.5' M.S.L.) by comparing ***H.*** *fasciculutum* indicators with the ground elevation at the apparent change of zonation where *P. hemitomon* begins to dominate. This wetland has minimal impacts and provides significant functions and values.

DISCUSSION

As indicated by the example, based on the mean annual storm event (2.33 year - 24 hour storm), the wetland water level fluctuates from a seasonal high water elevation (SHWL) of 7.32 m to 7.4 m (+/-) (24.0 to 24.3 feet (+/-)) at hour eight to approximately hour 40 (i.e., it takes approximately 32 hours to return to the pre-development seasonal high water level). While in the post-development condition it takes about 50 hours to return to the pre-development level (i.e., there is approximately 18 hours longer inundation time).

During a flood storm event (25 year - 24 hour storm), the wetland water level fluctuates from 7.32 m to 7.5 m (+/-) (24.00 to 24.6 feet (+/-)) and takes approximately 35 hours to return to the pre-development SHWL elevation. While in the post-development conditions it takes about 50 hours (i.e., there is an approximate15 hour longer inundation time).

Since the wetland will be used for the treatment and attenuation of runoff, a pre-treatment lake has been proposed. The pre-treatment lake provides removal of sediment, oils and greases prior to discharge to the wetland. To prevent oils and greases, a structure would be set at the seasonal high water elevation with a skimmer which will function as a positive/negative flow from and to the wetland from the lake. The top of the skimmer and berm elevation around wetland were considered as the routed post-development design high water level for the 25 year - 24 hour storm event.

In both storm events, the stage excursion for the wetland was under the 24 hour guideline proposed by Azous and Homer (1997). Using the proposed guideline and limited literature available concerning the tolerance of emergent vegetative species from prolonged and/or frequent inundations, the example suggests that no adverse wetland impacts would occur; however, it is strongly recommended that each wetland hydroperiod be analyzed, as in the example, on a case by case basis. If the proposed design exceeds the range of the pre-development staging, and adverse wetland impacts are anticipated, a stormwater management design modification or a monitoring plan for the wetland may be necessary.

CONCLUSIONS

In summary, the following statements provide reasonable assurance that when wetlands are incorporated into stormwater management systems, the hydroperiod of the wetland will be maintained or may improve in the case of previously altered wetlands and if used for water quality treatment, will not cause adverse impacts to the functions and values provided by the wetland.

The hydroperiod of isolated wetlands can be determined by using the water budget analysis.

2. Wetlands can be incorporated into the stormwater management system (i.e., attenuation and treatment) provided that all necessary criteria of the govemmental agencies requirements/guidelines/policies including pre-treatment (removal of sediment, oils and greases) of runoff have been met.

3. The depth, duration or frequency of inundation should be analyzed by using a mean annual storm event (2.33 year - 24 hour storm) and at least one flood storm event such as a 25 year - 24 hour or a 100 year - 24 hour storm event.

4. The duration of inundation of stage excursions above the pre-treatment stage should be limited to 24 hours in any storm event (i.e., the difference between the pre- and post-development stage hydrographs (stage versus time) should not exceed 24 hours at the SHWL stage.

5, If the wetland is used for the treatment of stormwater runoff, a water quality recovery structure(s) between the wetland and the proposed stormwater system (dry and/or wet detention) should be considered. The top elevation of the structure(s) should be established between the SHWL and NP elevations depending upon the treatment volume provided in the wetland.

6. If the overland sheet flow from the rear yard is designed to directly discharge into the wetland, a minimum of 80 to 100 feet vegetative (grassed) filter strip including the wetland's buffer should be considered.

ACKNOWLEDGMEIWS

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Section 4 Management of Freshwater Wetlands in the Central Puget Sound Basin

CHAPTER 13 MANAGING WETLAND HYDROPERIOD: ISSUES AND CONCERNS

by Amanda L. Azous, Lorin E. Reinelt and Jeff Burkey

INTRODUCTION

Land use changes and stormwater management practices usually alter hydrology within a watershed. A major finding of our study was that hydrologic changes were having more immediate and greater effects on the composition of vegetation and amphibian communities than other environmental conditions we monitored. Early study results showed wetland hydroperiod, which refers to the depth, duration, frequency and pattern of wetland inundation to be a key factor in determining biological responses.

Continuous recording gages were unavailable for the study, but we were able to monitor hydroperiod in the wetlands with instantaneous staff and crest stage gages. From these measurements a metric was developed called water level fluctuation (WLF) which showed statistically significant relationships with several measures of biological health (Azous 1991a). WLF is measured as the average difference between the maximum depth and average instantaneous or base depth in a time period (Taylor 1993, Taylor, Ludwa and Horner 1995).

Consistently we observed reduced numbers of plant and amphibian species when WLF was high in wetland areas (Azous 1991b, Cooke and Azous 1993, Richter and Azous 1995). As a result, substantial attention was given to understanding WLF and developing management guidelines for protecting wetland plants and animals.

A local jurisdiction, King County Surface Water Management (KCSWM) expressed an interest in developing wetland management guidelines that could be used in continuous flow event simulation computer models. In addition, only a few of the wetlands in the original 19 study wetlands showed extreme water level changes and we wanted to measure more plant and amphibian communities with high WLF conditions. We undertook a cooperative study to monitor the hydroperiods of six wetlands with continuous recording gages, and measure the plant and amphibian communities, in order to better understand the relationship between biological diversity, WLF, and the pattern of water depth, duration and frequency of inundation in wetlands.

This paper will discuss the methods and results of this study. The information has significant implications for evaluating the level of protection afforded wetlands from changing hydroperiod.

METHODS

Continuous recording gages were installed in six wetlands in late 1994 and early 1995. The gages were programmed to record water surface elevations at 15-minute increments. Two of the wetlands we monitored were in relatively undisturbed watersheds and were already experimental controls in our ongoing study. The remaining four were recommended by KCSWM field staff as wetlands known to experience large changes in water depth throughout the year.

Water levels in all six wetlands were monitored over one year, however due to unexpected seasonable differences in rainfall and some losses of data due to malfunctioning equipment, there was only a partial water year for all the wetlands. The hydroperiod data was used to calculate WLF and to calibrate the computer model Hydrologic Simulation Program- FORTRAN (HSPF), a continuous event model with the ability to simulate hydrologic processes in a watershed. The model is used to predict rainfall runoff from different watershed conditions and is more accurate when field measurements are used to adjust runoff from simulated rainfall events with the outflows and stages resulting from actual events.

Of the six wetlands, two control wetlands were not calibrated nor modeled. The complexity of the wetlands' hydraulics were beyond the scope of this project. The remaining four wetlands all had well defined outlets, hydraulics and bethymetry which allowed reasonably accurate stage-storage-discharge relationships to be developed. Based on the margin of errors in the spatial distribution of precipitation represented by nearby gages and the length of the field record, the accuracy of the model's simulated wetland water levels to recorded water levels was limited to plus or minus 0.5 ft. (15 cm).

Emergent (PEM), scrub-shrub (PSS) and forested (PFO) wetland zones were surveyed and evaluated for plant species richness and the presence and dominance of exotic invasive species using the protocols for vegetation field work documented in Cooke et al. (Cooke et al. 1989). Disturbed commodities were those sample stations found to be dominated (>60%) by a weedy species. Amphibians were sampled during the fall and spring breeding seasons using methods described in Richter and Azous (1995).

The condition of plant and amphibian communities were compared with the observed and predicted water depths, the duration of storm events and the frequency of storm events for the whole season and the early growing season (March 1 through May 15). . We analyzed the emergent, scrub-shrub and forested zones to determine if there were significant differences in community composition related to hydroperiod regimes .

The six special study wetlands were also added to the larger database of 19 wetlands and all the data analyzed for differences corresponding to WLF conditions. All sample stations that were inundated at least once during the year were included in the analysis of water level fluctuation. The data was analyzed using StatView (Abacus Concepts Inc. 1993) statistical applications program. The plant richness data were not normal; therefore the non-parametric Kruskal-Wallace (KW) and Mann-Whitney (MW) tests were used to compare the distributions among categories, depending on the number of variables in the category being compared. Both tests indicate whether the underlying distributions for different groups are the same. Both use ranked data and are resistant to outliers.

Much of the data was categorized to provide more statistical rigor given the small data set and the 0.5 ft. (15 cm.) margin of error. Categories were based on frequency distributions of the data and a very limited sensitivity analysis of statistically significant breaks in the data.

We measured frequency of storm events in a hydroperiod by defining an event as an excursion which we define as a water level increase above the monthly average depth of more than 0.5 ft. (15 cm.). Duration was defined as the time period of an excursion. In a stepwise regression, we looked at the statistical relationship between WLF, frequency and duration. Table 1 shows the categories used in the analysis.

Table 13-1. Category Definitions for Water Depth and Excursion Duration.

Frequency of Excursions	Water Depth*	Duration of Excursions
less than 6 per year	Greater than 2.0 ft. depth (>60 cm.)	less than 3 days
more than 6 per year	2 ft. to 0 ft. depth (-60 to 0 cm.)	3 to 6 days
	0 to 2.0 feet above water surface. (0 to +60 cm.)	more than 6 days

*Negative numbers are under water.

RESULTS

Plant richness in the sample stations ranged from three to 31 species in the POW zones, three to 22 in the PSS zones and 17 to 25 in the forested areas. Very few invasive weedy species were found and were dominant in only a few localized areas.

Frequency and Duration and Plant Richness

Plant richness was found to be significantly lower if water depths were usually deeper than 2 feet (60 cm.) (KW, $p < 0.0001$). To control for this, frequency and duration were evaluated separately for different water depths. The test for differences in duration and frequency showed that, in general, plant communities in areas subjected to more than six hydrologic excursions per year tended to have lower richness. In both the greater than 2.0 feet range and zero to 2.0 feet range the difference is statistically significant (MW, $p \leq 0.004$). It was not significant for the -2.0 to zero range (Figure 13-1).

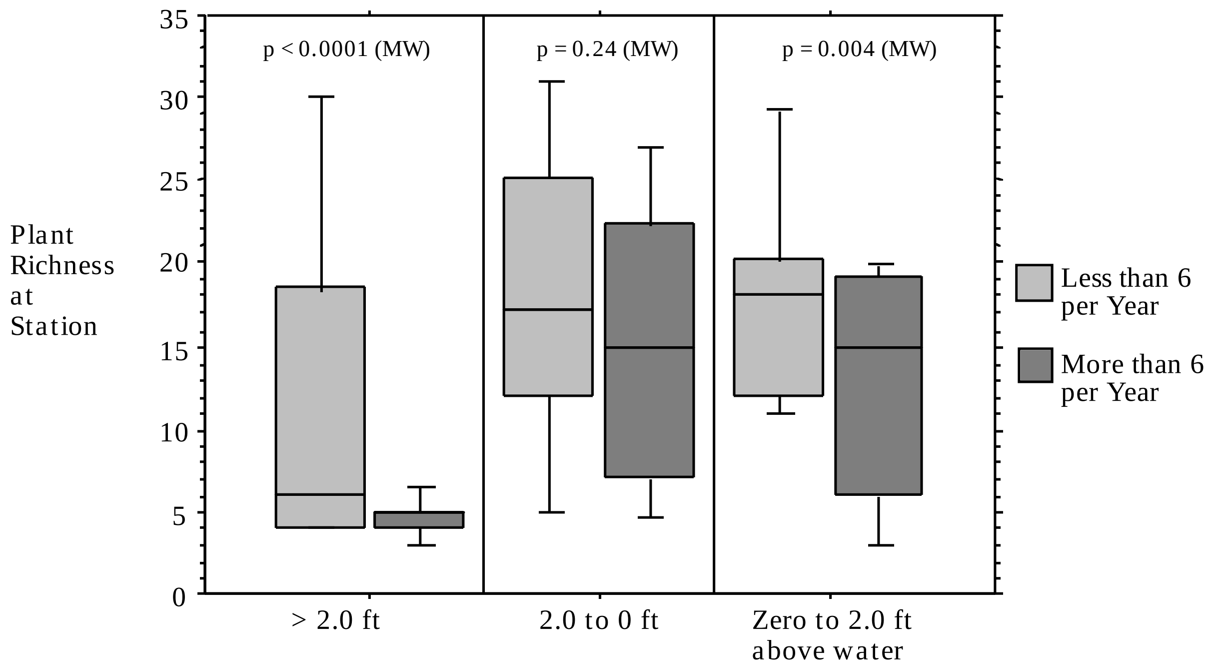

Figure 13-1. Plant richness, water depth and frequency of excursions.

The duration of excursions was compared to plant richness and water depth. Duration alone was a significant factor only in the deepest zones of -8.0 to -2.0 feet (KW, p < 0.001) (Figure 13-2). From -2.0 feet to 2.0 feet, increased duration did not significantly contribute to the variability of plant richness.

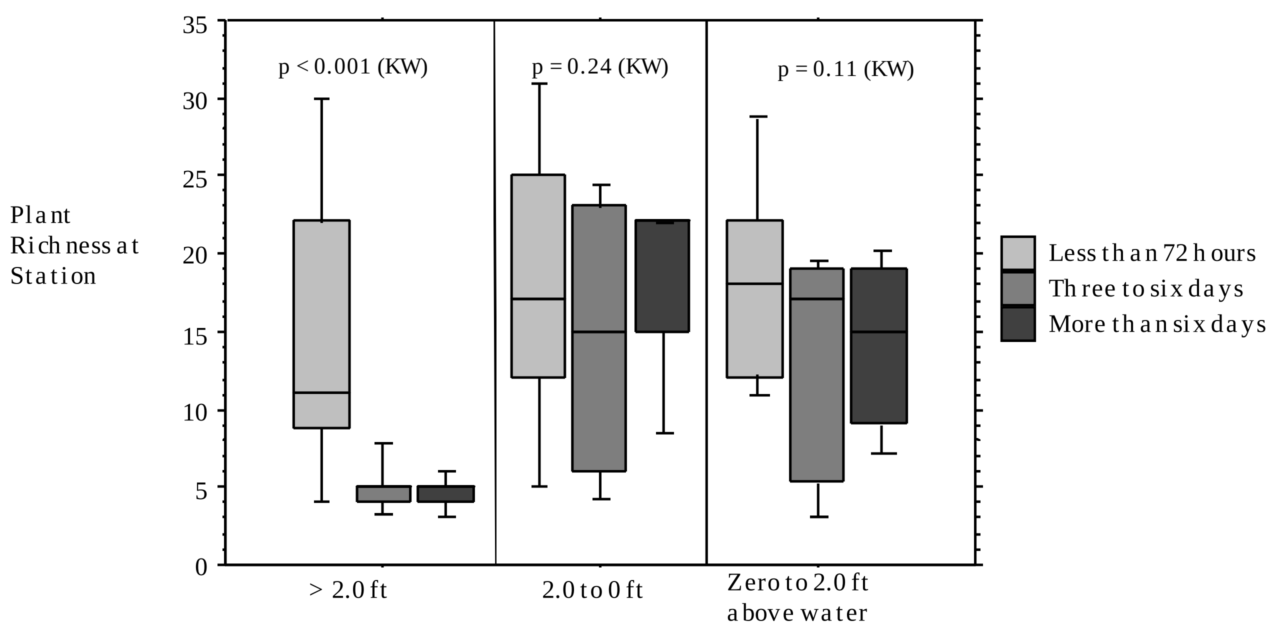

Figure 13-2. Plant richness, water depth and duration of excursions.

When the effects of excursion frequency and duration were combined, the relationship with plant richness was much stronger. Plant richness was found to decrease significantly with excursions longer than six days duration even with frequencies of less than six per year (KW, $p < 0.0001$). For excursion frequencies greater than six per year, richness dropped significantly when duration' exceeded three days per month (KW, $p < 0.0001$) (Figure 13-3)

These results were significant for both emergent and scrub-shrub zones and indicate that the average monthly duration of inundation can be significant to plant species richness, when the frequency of inundation is greater than six times per year on average or when the length of inundation exceeds three days per month. The frequency of excursions did not account for variability in species richness until excursion durations exceeded three days per month. There were an insufficient number of forested zones in the wetlands where frequency and duration were measured to adequately test for differences in the forested conditions and open water.

Water Level Fluctuation and Plant Richness

We looked at the relationship of water level fluctuation to plant richness in different zones of the wetlands. We examined all sample stations inundated at any time of the year and found richness was lower in wetlands with high WLF hydroperiods in the emergent and scrub-shrub zones but not the forested zones. There were not enough aquatic bed zones for adequate evaluation. Emergent zones subject to mean WLFs greater than 0.8 ft. (24 cm.) ranked significantly lower in the number of plant species present (MW, $U \geq 55$, $P \leq 0.003$) than emergent areas with mean WLF less than 0.8 ft. (24 cm.). This relationship was even more significant when richness was compared with water level fluctuation during the early growing season (Figure 13-4). Shrub-scrub zones also showed a significant difference in plant richness related to annual and early growing season water level fluctuation (MW, $U \geq 55$ $p < 0.0001$) (Figure 13-5). Forested zones showed no differences in richness accounted for by WLF.

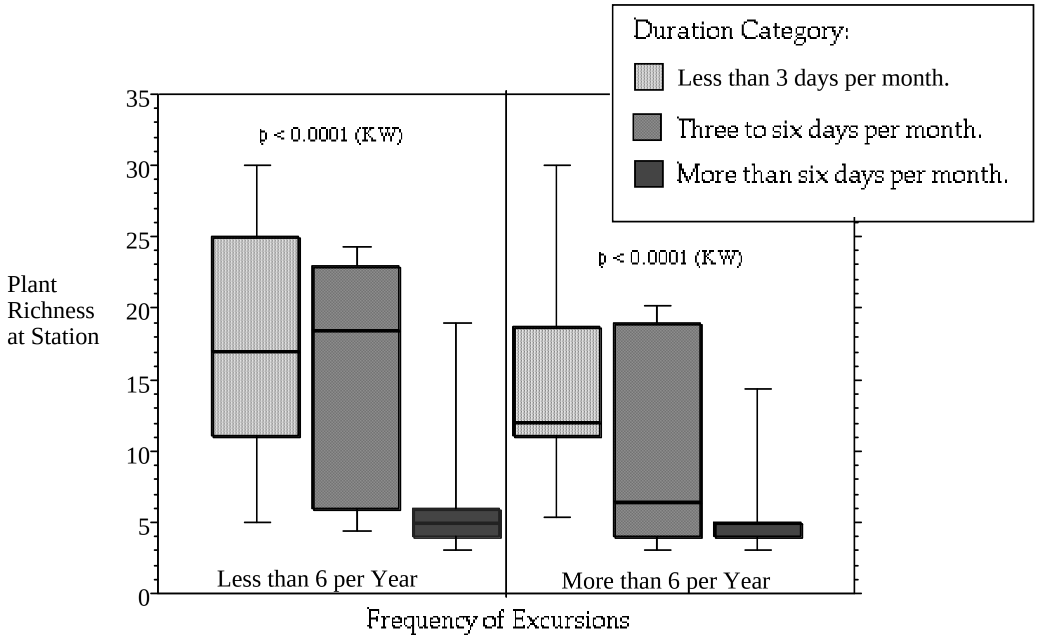

Figure 13-3. Plant richness, frequency and duration of excursions.

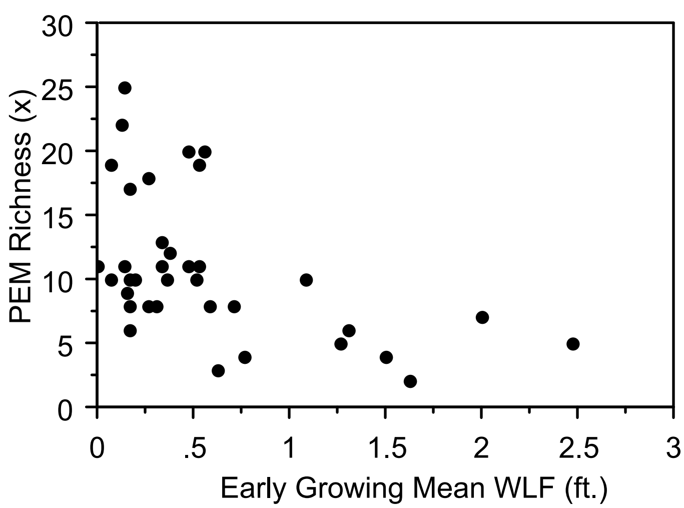

Figure 13-4. Plant rchness in the emergent zones in relation to mean WLF.

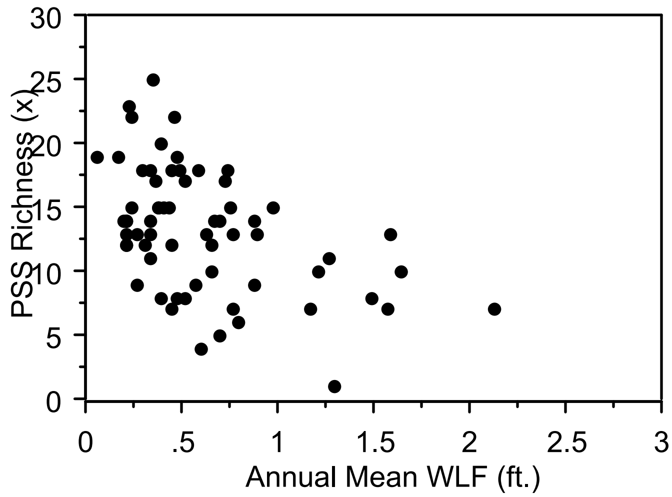

Figure 13-5. Plant richness in the scrub-shrub zones in relation to mean WLF.

Amphibian Results

Our study of amphibians left us with an incomplete picture. All of the wetlands in this study as well as the PSWSRP study had far fewer amphibian species in 1995 than collected in previously years. For example, seven species were collected in a rural wetland, BBC24, in 1989 and only three in 1995. Five species were collected in the urban surrounded wetland, LPS9, in 1989, compared with none in 1995. Eight were captured in SR24 in 1989 and again none were captured in 1995. Figure 13-6 shows amphibian richness for each wetland for both 1989 and 1995 trapping years. The lack of captures prevented analysis of frequency and duration effects for this study's wetlands.

Nevertheless, we were able to measure WLF relationships between amphibian communities over all years and all wetlands using the PSWSMRP wetlands database. The richness of amphibian communities was found to be lower in wetlands with WLF less than 0.8 ft. (24 cm). Wetlands with greater WLF were significantly more likely to have low amphibian richness with three or fewer different species present (*FE*, P = 0.046) as compared with four to eight.

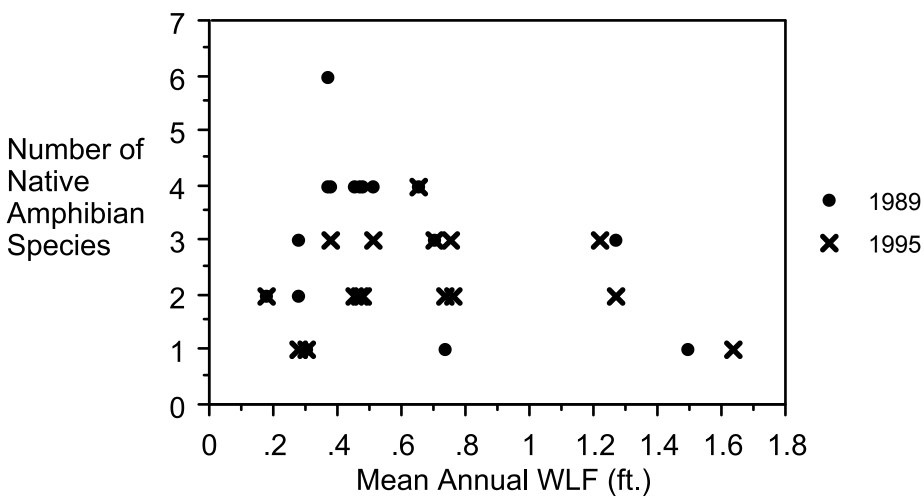

Figure 13-6. Amphibian richness as a function of mean WLF.

The reasons for the amphibian decline in 1995 are not understood. Amphibians sometimes breed in alternate years, hence in one year, populations could be much lower than the next. But we don't know if that phenomenon occurs across a population or just to particular individuals. The fact that low numbers were found in all wetlands suggests that it may be rainfall or climate related and 1995 was a drier spring than usual, but we are speculating.

WLF was found to be statistically related to excursion duration and frequency. Forty-one percent of the variation in WLF can be explained by the duration of events. Adding the effect of excursion frequency can explain as much as 53% of the variability in WLF ($p<0.0001$).

APPLICATION OF RESEARCH RESULTS

These results show that increasing the duration of storm events can be a significant factor in reducing wetland plant diversity. The frequency of storm peaks is also a factor and compounds the duration impact. Decreasing richness in the emergent and scrub-shrub zones and increasing frequency and duration are also associated with high mean water level fluctuation, annually, but particularly during the early spring growing season and amphibian breeding seasons.

Current stormwater protection measures primarily rely on stormwater detention for protecting wetlands. Detention acts to increase the duration of a storm event in order to reduce the peak depth. Water is captured, stored and released after the storm over a longer period of time. It was a management tool designed primarily for controlling floods and erosion in streams, however, it may operate counter to management goals as a tool for wetland protection.

The result of these findings has been to recommend for there to be limits on the durations of storm events as well as the frequency of excursions, when wetlands will be affected by changes in hydroperiod. The recommendations are that the frequency of water levels greater than 15 cm. (.5 ft.) above pre-development levels be limited to an annual average of six or less per year and that the durations of water levels greater than 15 cm. (.5 ft.) above or below pre-development levels be limited to less than three days per excursion.

The data set we analyzed was limited, as were time and funding and some questions remain about the potential for trading flood frequency and flood duration. For example, it might be possible to extend the durations of storm flows in wetlands if the frequency of those events is reduced. Similarly, it may also be possible to reduce durations in trade for allowing greater frequency. These areas of refinement remain largely unexplored.

Irrespective of any further results, it will be difficult for urbanizing jurisdictions to meet such standards in all areas. It is also not likely to happen if detention is the primary management tool. Achieving real resource protection of high value wetlands will require a more comprehensive approach.

Early in the research the PSWSRP learned that wetland management must be holistic, that wetlands are part of a system in a larger landscape and should be managed accordingly. This view has a number of implications for management:

- It is necessary to consider incidental effects on wetlands of activities in their watersheds, along with any engineering performed on the wetland itself for stormwater management purposes;
- Wetland response and management depend on a host of landscape factors, including retention of forest and other natural cover, maintenance of natural storage reservoirs and drainage corridors; the separation of human activities from wetlands; and public awareness.
- Wetland protection means finding root cause solutions e.g. source control practices that prevent or minimize quantities of runoff and release of pollutants, with downstream retention/detention for quantity control and treatment for pollutant capture regarded as secondary back-up measures where source controls alone can not ensure resource protection.
- Potential runoff infiltration opportunities should be explored and those that are found to be workable hydrogeologically and not threaten groundwater quality should be explored.

The experience of King County in its attempts to meet the PSWSRP recom-mendations is noteworthy and affords a view of some alternative approaches to detention.

The PSWSRP guidelines have been used in King County in both the basin and master drainage planning processes. Most of the applications have focused on minimizing water level fluctuation, as it was identified as the most direct effect on wetland functioning, vegetation communities, and habitat for breeding amphibians. Regulations governing factors that affect WLF have been targeted at new development on the urban side of the Urban Growth Boundary (UGB), where the most significant impacts are likely to occur. The general information on construction impacts generated by the Wetlands Research Program has also led to the application of seasonal clearing limits in the drainage areas of Class 1 wetlands.

Basin Planning

The basin planning process was developed by King County to address the significant and rapid land use changes occurring in the county that have an impact on water resources, including flooding, habitat, and water quality. The outcome of the basin planning process is a way of developing a comprehensive set of management recommendations that involve development regulations, capital improvement projects, education programs, improved maintenance practices, and monitoring.

The East Lake Sammamish Basin Plan (King County Surface Water Management Division (KCSWM) 1992) is an example where the results of the Wetlands Research Program were directly applied to management solutions. The East Lake Sammamish basin encompasses about 16 square miles east of Lake Sammamish. Since 1980, the basin has experienced rapid development, converting from low-density residential and forested land uses to higher density residential and some commercial uses. The diversity of the basin's more than 40 inventoried wetlands is as great as anywhere in King County, with nine wetlands ranked as unique and outstanding (Class 1 rating). As one of the prime resources in the basin, wetlands received significant attention for protection from the County and the citizenry.

Wetland Management Areas

Prior to adoption of the basin plan, wetland protection in King County was achieved primarily through the Sensitive Areas Ordinance (SAO). The wetland protection in the SAO provides for discrete buffer widths as a function of assigned rating (e. g., 100 feet for Class 1 wetlands). Although these buffers confer some protection to wetlands, they are inadequate to protect other functions influenced by the broader watershed and surrounding landscape. To address these issues, King County developed wetland management areas (WMA) focused on watershed-based controls to protect the nine Class 1 wetlands. The intent of these controls was to minimize the stormwater-related impacts on wetlands by minimizing impervious surfaces, retaining forests, clustering, and providing constructed infiltration systems, where feasible.

A major component of the wetland management strategy was the limitation of total impervious area in the catchment to eight percent, where allowed by zoning. From the Wetlands Research Program data, it was clear that there were significant increases in WLF between wetlands with watersheds less than 4 percent and those with watersheds greater than 12 percent impervious surface (Taylor 1993; Taylor, Ludwa, and Horner 1995). It was difficult to define this more precisely, because of the absence of impervious surfaces between 4 and 12 percent. Booth and Reinelt (1994) summarized several data sets showing loss of aquatic system function with impervious surface areas above about 10 percent, as measured by changes in channel morphology, fish and amphibian populations, habitat, and water chemistry. While the precise threshold will vary by watershed and the effectiveness of mitigation strategies, 8-10 percent impervious surface appears to be an appropriate threshold.

A requirement for 50 percent forest retention was also imposed in the catchments of some wetlands. This limitation is consistent with King County's reserve tract requirements associated with clustering and growth-reserve zoning. Taylor (1993) found a correlation between forest retention and reduced WLF, but no specific threshold was identified in this work. Clustering of development away from hydrologic source areas (landscape features transmitting water to wetlands during the wet season) was also recommended. An additional requirement in one wetland watershed was the use of constructed infiltration systems to reduce increases in stormwater volumes. This was feasible given the extensive glacial outwash soils in this watershed that were amenable to substantial infiltration. Finally, seasonal clearing limits for construction activities were imposed in eight of the nine watersheds. This limitation prevents clearing and grading during the wet season (October-April) when up to 88 percent of erosion occurs (KCSWM 1992).

King County has continued this approach of wetland management areas for protection of Class 1 wetlands in the Cedar River Basin Plan currently under development. Four Class 1 wetlands in the Cedar basin that are on the urban side of the UGB or that receive runoff from urban areas have been targeted.

Master Drainage Planning and Guidelines

King County uses the Master Drainage Planning (MDP) process for large or complex development sites to assess the potential impacts of development on aquatic resources (KCSWM 1993). The MDP process is required for Urban Plan Developments (UPD), for subdivisions with more than 100 single-family residences, and for projects which clear 500 acres or more within a subbasin. In addition, there are lower thresholds for development in the drainage areas of Class 1 wetlands, regionally significant resource streams, or over sole source aquifers. For Class 1 wetlands, an MDP is required if a project seeks to convert more than 10 percent of the wetland's total watershed area to impervious surface.

The updated guidelines for MDP monitoring and studies (KCSWM 1993), supported in part by results of the Wetlands Research Program, require monitoring for purposes of: (1) assessing wetland functions in storing and releasing stormwater, (2) determining baseline WLF in relation to vegetation and amphibian communities, and (3) establishing baseline conditions from which to measure potential post-development changes. Specific concerns potentially resulting from development are: (1) loss of live storage and infiltration functions of wetlands, (2) stability of outlet control conditions, (3) the effects of increases in flow rates and volumes, (4) changes in spring WLF and resultant habitat changes, and (5) changes in groundwater and interflow.

For purposes of assessing wetland impacts, the MDP guidelines require determination of the following: bathymetry (morphometry) of the wetland; outlet control description and measurement; stage-discharge volume relationships; surface area of open water, including ordinary high water levels; and the dead and live storage maximum elevation and volume. Specific monitoring requirements are: (1) monthly instantaneous and crest water levels to determine WLF in the permanent pool area of the wetland; (2) inflow and outflow rates of the wetland; and (3) the duration of summer drying, if applicable.

For the North Fork Issaquah Creek Wetland 7 Management Area and Grand Ridge MDP, the East Sammamish Community Plan limited development in the drainage area tributary to North Fork Issaquah Creek Wetland 7 (NFIC-7), a Class 1 wetland, to no more than eight percent impervious surfaces and 65 percent forest retention. This condition applies to all development proposals submitted prior to adoption of the Issaquah Basin Plan (KCSWM 1994) and for all developments not going through the MDP process. In the basin plan, impervious surfaces are limited to a maximum of eight percent for all new subdivisions, short subdivision, and UPDs.

The proposed Grand Ridge development in the North and East Fork Issaquah Creek basins involved two development options: rural estates at a density of one unit per 5 acres and an urban proposal consisting of 580 acres of urban development and 1400 acres of permanent open space. In a study of potential development scenarios carried out using the Wetlands Research Program guidelines and a model developed by Taylor (1993), it was possible to examine the development impacts on the water level fluctuation of wetland NFIC-7. Based on the results of that analysis, mitigations were proposed that focused on maintaining greater forested area and utilizing infiltration to reduce stormwater volumes.

CONCLUSION

Fundamentally managing stormwater to protect wetland ecosystems must operate holistically within context of the hydrologic cycle. That requires that we consider infiltration and evapotranspiration in addition to storage, when we think about strategies. Controls focused on minimizing impervious surfaces and maximizing forest retention are likely to be the most widely usable effective strategies; however, additional mitigations that reduce stormwater volumes through infiltration are highly recommended when hydrogeological conditions permit.

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WETLAND HYDROPERIOD ANALYSIS
- **Selected text and comment**

Reference:

WETLAND HYDROPERIOD ANALYSIS

*Linda L . Hawk, P.W.S.*Englewood, Florida
Andrea P. Lipstein, P.W.S. Environmental Scientist
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Sixth Biennial Stormwater Research & Watershed Management Conference

September 14-l 7, 1999

Selected text:

Surface Flow-Inflow-Outllow

In general, surface water movement in a wetland is the result of precipitation, surface water inflow and outflow, and losses through seepage, transpiration, and evaporation. An important wetland characteristic is extended shallow water inundation - extended but not prolonged or permanent. Factors such as orientation, surrounding soil characteristics, storm characteristics, adjacent land use patterns, and man-made alterations (such as land use changes) affect wetland hydrology. During periods of high water levels, large inflows may enter a wetland, but quickly dissipate as outflows. Even several such large flood events occurring within a relatively short time span may substantially raise annual inputs, but have little significant impact on the hydrology of a wetland. However, these occasional peak flows are important to topographically isolated wetlands, which receive the majority of their inflows during storm events.

The water storage capacity of wetlands is intermediate between upland areas and aquatic systems. In a flood event, the runoff rate drastically increases when water levels exceed a system's normal barriers to flow. In other words, the rate of the water level rises and falls quickly as the runoff rates approximate the inputs. This phenomenon leads to a fairly constant year to year maximum water levels in a wetland system (Daniel, 1981).

<u>Information applicable to this site:</u>

Since the wetlands on this property are not topographically isolated, the following statements appply.

1) During periods of high water levels, large inflows may enter a wetland, but quickly dissipate as outflows.
2) Even several such large flood events occurring within a relatively short time span may substantially raise annual inputs, but have little significant impact on the hydrology of a wetland.

WETLAND HYDROPERIOD ANALYSIS

- Selected text and comment

3) The rate of the water level rises and falls quickly… This phenomenon leads to a fairly constant year to year maximum water levels in a wetland system.

Stormwater Systems

Developers today face many pressures including state, local and regional regulations and above all the financial interest from shareholders. Land use policies specify what percentage of developable land needs to be set aside for other "non-income producing" usage. Stormwater management is one such use. Existing depressions in the land, or wetlands, are "natural" stormwater facilities, ideal locations for stormwater storage. Today, development plans increasingly incorporate wetlands into stormwater management systems to provide storage, water quality improvement and environmental enhancement.

The impact of quantity and quality of stormwater runoff on wetland processes has raised some concerns among researchers. Quantity of stormwater runoff is a driving force in the establishment and maintenance of wetlands. In fact, assuming adequate quality, and at the correct frequency, depth and duration, stormwater runoff maintains and may even upgrade the quality of wetlands previously altered. '

Attenuation (pre- and post-development)

… Stormwater runoff could prove to be detrimental to the wetland by causing rapid water level fluctuations and duration periods, thus altering the wetland's hydroperiod. Plant diversity, for example, is likely to be reduced if wetland hydrology is altered in this manner. Therefore, fluctuations in a wetland should be maintained at pre-development levels.

Fluctuation level does not appear to be detrimentally affected based on preliminary crsory analysis. See Appendix ???????????

Portion of:
Section 4 Management of Freshwater Wetlands in the Central Puget Sound Basin
CHAPTER 13 MANAGING WETLAND HYDROPERIOD: ISSUES AND CONCERNS

Hydroperiod

Refers to the depth, duration, frequency and pattern of wetland inundation
- has been determined to be a key factor in determining biological responses

Water Level Fluctuation

WLF is measured as the average difference between the maximum depth and average instantaneous or base depth in a time period (Taylor 1993, Taylor, Ludwa and Horner 1995).

Excursion

Frequency of storm events in a hydroperiod that develop a water level increase above the monthly average depth of more than 0.5 ft.

Duration

Defined as the time period of an excursion.

Selected Text from: – highlighting and underlining added by GME
Section 4 Management of Freshwater Wetlands in the Central Puget Sound Basin
CHAPTER 13 MANAGING WETLAND HYDROPERIOD: ISSUES AND CONCERNS
by Amanda L. Azous, Lorin E. Reinelt and Jeff Burkey

Consistently we observed reduced numbers of plant and amphibian species when WLF was high in wetland areas (Azous 1991b, Cooke and Azous 1993, Richter and Azous 1995). As a result, substantial attention was given to understanding WLF and developing management guidelines for protecting wetland plants and animals.

The complexity of the wetlands' hydraulics were beyond the scope of this project. The remaining four wetlands all had well defined outlets, hydraulics and bethymetry which allowed reasonably accurate stage-storage-discharge relationships to be developed.

We measured frequency of storm events in a hydroperiod by defining an event as an excursion which we define as a water level increase above the monthly average depth of more than 0.5 ft. (15 cm.). Duration was defined as the time period of an excursion. In a stepwise regression, we looked at the statistical relationship between WLF, frequency and duration. Table 1 shows the categories used in the analysis.

Table 13-1. Category Definitions for Water Depth and Excursion Duration.

Frequency of Excursions	Water Depth*	Duration of Excursions
less than 6 per year	Greater than 2.0 ft. depth (>60 cm.)	less than 3 days
more than 6 per year	2 ft. to 0 ft. depth (-60 to 0 cm.)	3 to 6 days
	0 to 2.0 feet above water surface. (0 to +60 cm.)	more than 6 days

*Negative numbers are under water.

RESULTS

Plant richness in the sample stations ranged from three to 31 species in the POW zones, three to 22 in the PSS zones and 17 to 25 in the forested areas. Very few invasive weedy species were found and were dominant in only a few localized areas.

Frequency and Duration and Plant Richness

Plant richness was found to be significantly lower if water depths were usually deeper than 2 feet (60 cm.) (KW, $p < 0.0001$). To control for this, frequency and duration were evaluated separately for different water depths. The test for differences in duration and frequency showed that, in general, plant communities in areas subjected to more than six hydrologic excursions per year tended to have lower richness. In both the greater than 2.0 feet range and zero to 2.0 feet range the difference is statistically significant (MW, $p \leq 0.004$). It was not significant for the -2.0 to zero range (Figure 13-1).

APPLICATION OF RESEARCH RESULTS

These results show that

- increasing the duration of storm events can be a significant factor in reducing wetland plant diversity. The frequency of storm peaks is also a factor and compounds the duration impact.
- Decreasing richness in the emergent and scrub-shrub zones and increasing frequency and duration are also associated with high mean water level fluctuation, annually, but particularly during the early spring growing season and amphibian breeding seasons.

Current stormwater protection measures primarily rely on stormwater detention for protecting wetlands. Detention acts to increase the duration of a storm event in order to reduce the peak depth. Water is captured, stored and released after the storm over a longer period of time. It was a management tool designed primarily for controlling floods and erosion in streams, however, it may operate counter to management goals as a tool for wetland protection.

The result of these findings has been to recommend for there to be limits on the durations of storm events as well as the frequency of excursions, when wetlands will be affected by changes in hydroperiod.

- The recommendations are that the frequency of water levels greater than 15 cm. (0.5 ft.) above pre-development levels be limited to an annual average of six or less per year and that the durations of water levels greater than 15 cm. (0.5 ft.) above or below pre-development levels be limited to less than three days per excursion.

The data set we analyzed was limited, as were time and funding and some questions remain about the potential for trading flood frequency and flood duration. For example, it might be possible to extend the durations of storm flows in wetlands if the frequency of those events is reduced. Similarly, it may also be possible to reduce durations in trade for allowing greater frequency. These areas of refinement remain largely unexplored.

Irrespective of any further results, it will be difficult for urbanizing jurisdictions to meet such standards in all areas. It is also not likely to happen if detention is the primary management tool. Achieving real resource protection of high value wetlands will require a more comprehensive approach.

Early in the research the PSWSRP learned that wetland management must be holistic, that wetlands are part of a system in a larger landscape and should be managed accordingly. This view has a number of implications for management:

CONCLUSION

Fundamentally managing stormwater to protect wetland ecosystems must operate holistically within context of the hydrologic cycle. That requires that we consider infiltration and evapotranspiration in addition to storage, when we think about strategies. Controls focused on minimizing impervious surfaces and maximizing forest retention are likely to be the most widely usable effective strategies; however, additional mitigations that reduce stormwater volumes through infiltration are highly recommended when hydrogeological conditions permit.

D-4 Parklands Executive Residential and Parklands Business Park at Camas Meadows Golf Course – Wetland Protection Discussion

2.5.8 Minimum Requirement #8: Wetlands Protection

Applicability

The requirements below apply only to projects whose stormwater discharges into a wetland, either directly or indirectly through a conveyance system. These requirements must be met in addition to meeting Minimum Requirement #6, Runoff Treatment.

Thresholds

The thresholds identified in Minimum Requirement #6 – Runoff Treatment, and Minimum Requirement #7 – Flow Control shall also be applied for discharges to wetlands.

- **Runoff treatment is being met by several different BMP approaches. <u>This project discharges to a Flow Control - exempt receiving water</u>. See comments that proceed this section.**

Standard Requirement

Discharges to wetlands shall maintain the hydrologic conditions, hydrophytic vegetation, and substrate characteristics necessary to support existing and designated uses. The hydrologic analysis shall use the existing land cover condition to determine the existing hydrologic conditions unless directed otherwise by a regulatory agency with jurisdiction. A wetland can be considered for hydrologic modification and/or stormwater treatment in accordance with Guide Sheet 1B in Appendix I-D.

- **The portions of wetlands on this site (part of larger complex) historically have received runoff from a larger drainage area than presently exists. Approximately 12 to 14 acres west of the present development was diverted as part of the Payne Road project. Another 11 acres seem to have been diverted when Larkspur Road and Larkspur Subdivsion was developed.**

- **The proposed stormwater management plan is proposing measures to reduce runoff impact in two specific manners.**
  1) **Apply soil amendment and flow dispersion to reduce runoff volume.**
  2) **Design for lots along buffer to continue to flow overland to and through the buffer and into the wetland.**
- **The wetland does have gradient for flow to and through the wetland. The large surface area involved allows for hydraulic flow movement with little fluctuation in water depth or velocity.**

- **This site has three separate wetlands hydraulically connected with existing culverts. Therefore it seems advisable and prudent to utilize these structures to continue to manage inflow/outflow from one wetland to another. Even though the required**

treatment is provided onsite for the conveyance systems, further treatment if needed will be naturally accomplished.

- **Optional – only pursued by City approval: In particular, by allowing a bit of storage attenuation in the smaller wetland, the timing of outflow to the larger wetland can be delayed and 'spread out' over time to reduce the impact to the larger wetland. It appears that this design approach can be considered appropriate for hydrologic modification and/or stormwater treatment in accordance with Guide Sheet 1B in Appendix I-D.**

Additional Requirements

The standard requirement does not excuse any discharge from the obligation to apply whatever technology is necessary to comply with state water quality standards, Chapter 173-201A WAC, or state ground water standards, Chapter 173-200 WAC. Additional treatment requirements to meet those standards may be required by federal, state, or local governments.

Stormwater treatment and flow control facilities shall not be built within a natural vegetated buffer, except for:

- *necessary conveyance systems as approved by the local government; or*
- *as allowed in wetlands approved for hydrologic modification and/or treatment in accordance with Guidesheet 1B.*

- **This design approach (optional – see above) is applicable for this site. However, a number of trees might need to be removed, and the approval process seems cumbersome because of concerns about the wetland.**
- **The overflow water would enter the wetlands in a non-erodible manner.**

An adopted and implemented basin plan (Minimum Requirement #9),or a Total Maximum Daily Load (TMDL, also known as a Water2-36 Volume I – Minimum Technical Requirements February 2005

Clean-up Plan) may be used to develop requirements for wetlands that are tailored to a specific basin.

Objective

To ensure that wetlands receive the same level of protection as any other waters of the state. Wetlands are extremely important natural resources which provide multiple stormwater benefits, including ground water recharge, flood control, and stream channel erosion protection. They are easily impacted by development unless careful planning and management are conducted. Wetlands can be severely degraded by stormwater discharges from urban development due to pollutants in the runoff and also due to disruption of natural hydrologic functioning of the *wetland system. Changes in water levels and the frequency and duration of inundations are of particular concern.*

Supplemental Guidelines
Appendix I-D, "Wetlands and Stormwater Management Guidelines" is an amended version of Chapter 14 of the publication, "Wetlands and Urbanization, Implications for the Future", the final report of the Puget Sound Wetland and Stormwater Management Research Program, 1997.

- **This document is being used as guidance for this project.**

It should be used for discharges to natural wetlands and wetlands constructed as mitigation. The amendments were added to Guidesheets 1A, 2B, and 2C to improve clarity of intent and to make them compatible with the updated manual. While it is always necessary to pre-treat stormwater prior to discharge to a wetland, there are limited circumstances where wetlands may be used for additional treatment and detention of stormwater. These situations are considered in Guide Sheet 1B of the guidelines.

- **See comments on separate document related to these guidelines.**

Note that if selective runoff bypass is an alternative being considered to maintain the hydroperiod, the hydrologic analysis must consider the impacts of the bypassed flow. For instance, if the bypassed flow is eventually directed to a stream, the flow duration standard,

Minimum
Requirement #7, applies to the bypass.

- **Selective runoff bypass is not being proposed.**

EXHIBIT 18

TREATMENT EVALUATION CRITERIA – REFERENCE:
TAPE AND CTAPE DOCUMENT

Stormwater Treatment Technologies Approved through TAPE and CTAPE

Pretreatment

Pretreatment is generally applied to:

- Project sites using infiltration treatment
- Treatment systems where needed to assure and extend performance of the downstream basic or enhanced treatment facility

Intended to achieve **50% removal of fine** (50 micron-mean size) and 80% removal of coarse (125-micron-mean size) total suspended solids for influent concentrations greater than 100 mg/L, but less than 200 mg/L.

For influent concentrations less than 100 mg/L, the facilities are intended to achieve effluent goals of 50 mg/L of fine and 20 mg/L of coarse total suspended solids.

Basic Treatment

Intended to achieve a goal of 80% removal of total suspended solids for an influent concentration range of 100 mg/L to 200 mg/L.

For influent concentration less than 100 mg/L the effluent goal is 20 mg/L total suspended solids.

For influent concentrations greater than 200 mg/L a higher treatment goal is intended. Technologies listed in this section with a GULD designation are also approved for Pre-treatment in accordance with Volume V Section 6.2 of the Stormwater Management Manual for Western Washington (SWMMWW) and Section 5.2.1 of the Stormwater Management Manual for Eastern Washington (SWMMEW).

Enhanced Treatment

Intended to achieve a higher level of treatment than basic treatment. Enhanced treatment is targeted at removing dissolved metals.

Phosphorous Treatment

Intended to achieve a goal of 50% total phosphorus removal for an influent concentration range of 0.1 to 0.5 mg/L as well as achieving basic treatment.

E-3 Soil Amendments to Enhance Phosphorus Sorption

Minnesota Stormwater Manual

Special:Search > Design criteria for bioretention > File:St cloud pretreatment.png > Bioretention > Soil amendments to enhance phosphorus sorption

Principal mechanisms for phosphorus (P) removal in bioretention are the filtration of particulate-bound P and chemical sorption of dissolved P (see Hunt et al., 2012). Most stormwater control measures (SCMs) capture particulate P by settling or filtration, but leave dissolved P (typically phosphates) untreated. This untreated P accounts on average for 45 percent of total phosphorus in stormwater runoff and can be up to 95 percent of the total phosphorus, depending on the storm event (Erickson et al., 2012). Dissolved phosphorus is bioavailable and represents a significant concern for surface water quality.

Phosphorus sorbing materials contain a metal cation (typically di or trivalent) that reacts with dissolved phosphorus to create an insoluble compound by adsorption or precipitation or both (Buda et al., 2012). Soil components and amendments that have been shown to be effective in increasing chemical sorption of dissolved P include

- iron filings (Erickson et al., 2012);
- steel wool (Erickson et al., 2007);
- native iron rich soils such as those in the Piedmont of the Mid and Southern Atlantic USA (Hunt et al 2012), or Krasnozem soil in Australia (Lucas and Greenway, 2011);
- Drinking Water Treatment Residuals (WTRs), which are a by-product of drinking water treatment and a source of aluminum and iron hydroxides (O'Neill and Davis, 2012a and 2012b, Hinman and Wulkan, 2012; Lucas and Greenway, 2011; Lucas and Greenway, 2010); and
- sorptive media (Imbrium) (Balch et al 2013)

Caution: Acceptable amendments include the following.

- 5 percent by volume elemental iron filings above IWS or elevated underdrain;
- minimum 5 percent by volume sorptive media above IWS or elevated underdrain;
- minimum 5 percent by weight water treatment residuals (WTR) to a depth of at least 10 centimeters; and
- other P sorptive amendments with supporting third party research results showing P reduction for at least 20 year lifespan, P credit commensurate with research results

Buda et al. (2012) provide a literature review of P-sorption amendments. Characteristics of ideal P-sorption amendments include low cost, high availability, low toxicity for soil and water resources, potential for reuse as a soil amendment once fully saturated, and no toxicity to plants, wildlife, or children. It is also crucial that soil amendments not negatively impact soil infiltration rate and the ability to grow vigorous plants. Some P sorptive amendments, such as water treatment residuals (WTRs), are waste products turned into a resource to reduce P in bioretention (or agricultural) soils. Results from much of the research to date on use of P-sorbing materials to reduce nutrients in stormwater effluent are promising, but much remains to be learned about lifespan and long term effects of P-sorbing materials on soils and plants.

Benefits

P sorptive amendments have been shown to provide effective P retention for the expected lifetime of bioretention facilities (e.g. Lucas and Greenway, 2011; O'Neill and Davis, 2012a and 2012b). The presence of healthy vegetation plays a crucial role in extending P reduction lifespan of amendments.

Types of P-sorbing materials

The primary P-sorbing chemicals are calcium (Ca), aluminum (Al) and iron (Fe). These are found in a variety of materials.

Limestone or calcareous sand

Combinations of C 33 sand with limestone or calcareous sand were tested in laboratory columns by Erickson et al. (2007). Limestone or calcareous sand is not recommended as a P sorptive amendment in bioretention facilities because it clogged the columns, resulting in hydraulic failure.

Drinking Water Treatment Residuals (WTS)

Drinking-water treatment residuals are primarily sediment, metal (aluminum, iron or calcium) oxide/hydroxides, activated carbon, and lime removed from raw water during the water purification process (Agyin-Birikorang et al., 2009). WTRs are increasingly being used to control phosphorus in soils where phosphorus leaching may be problematic for water quality. Kawczyinski and Achtermann (1991) reported that landfilling is the predominant disposal method, followed by land application, sanitary sewer disposal, direct stream discharge, and lagooning. WTRs contain high concentrations of amorphous aluminum (Al) or iron (Fe), making them potential amendments for sorbing soil phosphorus.

Aluminum-based Water Treatment Residuals (WTRs)

O'Neill and Davis (2012a and 2012b) recommend a bioretention soil media of 5 percent WTR, 3 percent triple-shredded hardwood bark mulch, and 92 percent loamy sand for P reduction on the basis of batch, minicolumn, and large column studies. The life expectancy for this media was 20 years. In a comparison of bioretention soil medias (BSM's) with varying fines concentrations, they found that increasing the concentration of sand (i.e. decreasing fines) improved P reduction.

They also found that hardwood bark mulch, a source of organic matter typically low in P, further improved P reduction (O'Neill and Davis 2012a). The authors contend that an oxalate-extractable aluminum-, iron-, and phosphorus-based metric, the oxalate ratio, can be used to predict P sorption capacity, and suggest that a media oxalate ratio of 20 to 40 is expected to meet P adsorption requirements for nutrient sensitive watersheds. This media adsorbed 88.5 percent of the applied P mass, compared to a non-WTR amended control media for which effluent P mass increased 71.2 increased.

O'Neill and Davis (2012b) state "This media consistently produced total phosphorus effluent mean event concentrations less than 25 micrograms per liter and exhibited a maximum effluent concentration of only 70 micrograms per liter". Concentrations of P as low as 25 micrograms P per liter may be necessary to reduce eutrophication risk depending on receiving water conditions (U.S. Environmental Protection Agency (US EPA, 1986) in O'Neill and Davis, 2012a). References to additional studies are found in O'Neill and Davis (2012a and 2012b).

Iron-based Water Treatment Residuals (WTRs)

As reviewed in O'Neill and Davis (2012 a), one study of iron based WTRs found iron based WTRs to be ineffective to P reduction because they solubilized and released all adsorbed P in reducing conditions, but another more recent study found this may not be the case. According to Dr. Allen Davis (University of Maryland), iron based water treatment residuals "should work just as well, maybe better than Al. The concern with Fe is that if the media becomes anaerobic due to flooding or any other reason, the Fe can be reduced and will dissolve. It adds another layer of complexity to the system." This concern can be addressed by designing the bioretention practice to ensure the layer where P sorbtion will occur stays aerobic.

Iron filings

Research by Erickson et al. (2012) suggests that the lifespan for iron enhanced sand filtration (5 percent iron) with a typical impervious area ratio should be at least 30 years. Dissolved phosphorus capture should be greater than 80 percent for more than 30 years (Erickson, 2010). Many agricultural studies have also found several forms of iron enhancements to be effective to capture P (e.g. Chardon et al., 2012; Stoner et al. 2012; literature review in Buda et al. 2012). Research showing that native iron-rich soils also have high P sorption capacity further supports giving dissolved P removal credit (e.g. Lucas and Greenway, 2011). Stenlund (2013 personal communication) has observed that adding iron to soil causes the soil to harden to a rock like medium, and recommends augering holes for plant growth into soils that have been amended with iron.

Imbrium Sorptive®MEDIA

Imbrium Sorptive®MEDIA, a proprietary P sorbing amendment available from Contech, is an engineered granular media containing aluminum oxide and iron oxide that demonstrates substantial capacity for adsorption of dissolved phosphorus from stormwater runoff. A recent study reported results from monitoring P reduction of 5 bioretention mesocosms with varying concentrations of Imbrium Sorptive®MEDIA (Balch et al 2013). The study is summarized below.

Five individual bioretention cells were monitored, each with 50 cm (20 inches) depth of soil that consisted of sand and 15 percent peat moss. The authors state “Four of [the cells] had different concentrations of Sorbtive® Media (3, 5, 10 and 17 percent by volume). The fifth cell contained only the sand/peat soil mix and no amendment, and therefore represented a control that provided the ability to determine how much phosphorus was retained by the sand/peat mix alone. The total volume of spiked artificial stormwater applied to each cell approximated the volume of cumulative runoff generated in this region [Canada] over a two-year period by a drainage area five times the size of a bioretention cell. At every phosphorus concentration, all the cells amended with Sorbtive® Media demonstrated much higher percent removal of phosphorus compared to the control cell with no Sorbtive® Media. The performance gap between the amended cells and the control cell widened as the phosphorus concentration increased. At the 0.2 percent target phosphorus concentration, mean dissolved phosphorus removal ranged 79 to 92 percent for the amended cells compared to 54 percent for the control cell. At the 0.8 percent target phosphorus concentration, mean dissolved phosphorus removal ranged 86 to 98 percent for the amended cells compared to 20 percent for the control cell. In the final week of the study, with 0.8 percent target phosphorus concentration in the artificial stormwater, percent removal of dissolved phosphorus was 82 percent for the 3 percent amendment, 97 to 98 percent for the 5, 10, and 17 percent amendments, and 11 percent for the control. These results demonstrate that the Sorbtive® Media maintained high phosphorus adsorptive capacity throughout the study, especially at the 5 percent and greater amendment levels.”

Researchers estimate that the lifespan for Imbrium should be at least 10 to 30 years, depending on P loading and performance goals (Garbon, 2013 personal communication; Contech Engineering, 2013). Contech Engineering (2013) estimated 45 percent dissolved P removal at 20 years after initial installation of 5 percent Sorptive media by volume.

Field studies with Imbrium are also underway in Wisconsin (Bannerman, 2013 personal communication). Additionally, Imbrium media has been used in an upflow filter on a North Carolina wet pond, resulting in greater than 80 percent removal of dissolved P during ten monitored storm events (Winston, 2013 personal communication).

To our knowledge, no field installations with Imbrium Sorptive®MEDIA have been monitored long term. Field studies to monitor long term performance of bioretention with P sorbing amendments are recommended to monitor clogging potential and P reduction performance over the bioretention lifespan.

E-3 Soil Amendments to Enhance Phosphorus Sorption

Examples of other innovative applications

Using P-sorptive amendments to reduce effluent P content from BMP's is a newly emerging field. Some applications of P-sorptive amendments that are promising but for which there is not sufficient research to recommend them as standard practices are discussed below.

Using by-products like gypsum, mining residuals, or drinking water treatment residuals in filters

Several researchers have developed ditch filters with P-sorbing materials to intercept surface and subsurface flow ditch water to trap dissolved P. The filters can be replaced as needed when the P-sorption sites are full (Schneider, 2013; Stoner et al., 2012). They report that "Overall, by-products that are elevated in oxalate Al or Fe, WS Ca [water soluble calcium], and BI [buffer index] serve as the best P sorbents in P removal structures, and screening for these properties allows comparison between materials for this potential use. The flow-through approach described in this paper for predicting design curves at specific [retention time] and inflow P combinations aids in predicting how much P can be removed and how long a specific material will last until P saturation if the P loading rate for a specific site is known." (Stoner et al., 2012)

Researching the use of such filters on effluent from bioretention systems is recommended, as this would likely be an effective technique for P reduction in bioretention systems on projects where use of filters and ability to replace them as needed is realistic and desirable. For research on by-products, testing of composition and leaching of potentially harmful chemicals (e.g. dissolved metals) should be undertaken to ensure public health.

Using drain pipes enveloped in Fe-coated sand

Groenenberg et al. (2013) tested the performance of a pipe drain enveloped with Fe-coated sand, a side product of the drinking water industry with a high ability to bind P from the (agricultural) drainage water. They report that "The results of this trial, encompassing more than one hydrological season, are very encouraging because the efficiency of this mitigation measure to remove P amounted to 94 percent. During the trial, the pipe drains were below the groundwater level for a prolonged time. Nevertheless, no reduction of Fe(III) in the Fe-coated sand occurred, which was most likely prevented by reduction of Mn oxides present in this material. The enveloped pipe drain was estimated to be able to lower the P concentration in the effluent to the desired water quality criterion for about 14 years. Manganese oxides are expected to be depleted after 5 to 10 years. The performance of the enveloped pipe drain, both in terms of its ability to remove P to a sufficiently low level and the stability of the Fe-coated sand under submerged conditions in the long term, needs prolonged experimental research." Application of this technique could also potentially be effective for reducing P in effluent from bioretention systems with underdrains. Unlike the filter application described in Schneider (2013), though, the iron around the pipe cannot easily be removed and replaced when the P binding sites are full. However, depending on P, Ca, and iron concentrations, there may be enough P sorption sites to last the lifespan of the bioretention system. This application is similar to bioretention systems currently being tested by Bannerman in Wisconsin (Bannerman, 2013 personal communication)

Rototilling Water Treatment Residuals into existing bioretention facilities

O'Neill and Davis (2012b) also suggest that established bioretention facilities could be retrofitted for increased P reduction by rototilling WTRs into the media, as agricultural surface application has been shown to be effective. Bioretention facilities may need to be re-planted after roto-tilling WTRs into the media, however, as rototilling would likely damage roots of existing vegetation. Alternatively perhaps a different way could be found to incorporate WTRs into existing bioretention facilities, such as, perhaps by air spading out some of the existing soil around existing vegetation, and replacing the soil that was removed with bioretention soil media amended with WTR's. This technique could perhaps be used to renew P sorption capacity of bioretention facilities when P sorption sites are filled.

Applicability

- Removal of dissolved phosphorus requires a comparatively high hydraulic retention time, and therefore a deeper media (Hsieh et al., 2007 in Hunt et al 2012). Media depth should therefore be at least 0.6 meters, with 0.9 meters recommended (Hunt et al., 2012).
- Infiltration rates between 0.007 and 0.028 millimeters per second (1 to 4 inches per hour) work best, as this increases the hydraulic retention time, allowing for more sorption to occur (Hunt et al 2012).
- If the media is saturated where phosphorus is stored, P is likely to leach out. So if an internal water storage (IWS) layer is used, it should be located below the P-sequestering portion of the media. Therefore, a 0.45 to 0.6 meter (1.5 to 2 foot) separation is recommended between the top of the IWS layer and the media surface (Hunt et al 2012). The P-sorptive amendment should be located at least 0.5 feet above the top of the IWS zone (Winston, 2013).

Life cycle properties

P sorptive amendments have been shown to provide effective P retention for the expected lifetime of bioretention facilities (e.g. Lucas and Greenway, 2011; O'Neill and Davis, 2012a and 2012b).

Maintenance needs

Soil amendments to enhance P sorption typically do not increase bioretention maintenance needs. Water treatment residuals (WTR's) are fine textured, so systems with WTR's should be designed to minimize clogging. Hinman and Wulkan (2012) recommend adding shredded bark at

15 percent by volume for each 10 percent WTRs added by volume to compensate for the fine texture of WTRs.

Iron filings can be obtained with a size distribution similar to sand. Erickson et al (2012) found that hydraulic conductivity of a sand filter was not negatively affected when operated for a year with up to 10.7 percent iron filings, which is enough iron to capture a significant percent of dissolved P.

Cost information

Soil amendments to enhance P sorption are a relatively low cost technique to improve long term dissolved P removal. Steel wool, for example, has been found to increase the material cost by 3 to 5 percent (Erickson et al., 2007). Iron filings cost less than steel wool per unit weight because they require less manufacturing to produce (Erickson et al., 2012). Since WTRs are byproducts of the water treatment process, they can often be procured for little or no cost.

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The following pages address incorporation of trees into stormwater management under paved surfaces

- Design guidelines for tree quality and planting - tree trenches and tree boxes
- Design guidelines for soil characteristics - tree trenches and tree boxes
- Construction guidelines for tree trenches and tree boxes
- Protection of existing trees on construction sites
- Operation and maintenance of tree trenches and tree boxes
- Assessing the performance of tree trenches and tree boxes
- Calculating credits for tree trenches and tree boxes
- Case studies for tree trenches and tree boxes
- **Soil amendments to enhance phosphorus sorption**
- Fact sheet for tree trenches and tree boxes
- Requirements, recommendations and information for using trees as a BMP in the MIDS calculator
- Requirements, recommendations and information for using trees with an underdrain as a BMP in the MIDS calculator

Minimum Bioretention Soil Media Depths

Minnesota Stormwater Manual

Minimum bioretention soil media depths recommended to target specific stormwater pollutants. From Hunt et al. (2012) and Hathaway et al., (2011).
Link to this **table**

Pollutant	Depth of Treatment with upturned elbow or elevated underdrain	Depth of Treatment without underdrain or with underdrain at bottom	Minimum depth
Total suspended solids (TSS)	Top 2 to 3 inches of bioretention soil media	Top 2 to 3 inches of bioretention soil media	Not applicable for TSS because minimum depth needed for plant survival and growth is greater than minimum depth needed for TSS reduction
Metals	Top 8 inches of bioretention soil media	Top 8 inches of bioretention soil media	Not applicable for metals because minimum depth needed for plant survival and growth is greater than minimum depth needed for metals reduction
Hydrocarbons	3 to 4 inch Mulch layer, top 1 inch of bioretention soil media	3 to 4 inches Mulch layer, top 1 inch of bioretention soil media	Not applicable for hydrocarbons because minimum depth needed for plant survival and growth is greater than minimum depth needed for hydrocarbons reduction
Nitrogen	From top to bottom of bioretention soil media; Internal Water Storage Zone (IWS) improves exfiltration, thereby reducing pollutant load to the receiving stream, and also improves nitrogen removal because the longer retention time allows denitrification to occur underanoxic conditions.	From top to bottom of bioretention soil media	Retention time is important, so deeper media is preferred (3 foot minimum)

Minimum Bioretention Soil Media Depths

Particulate phosphorus	Top 2 to 3 inches of bioretention soil media.	Top 2 to 3 inches of bioretention soil media.	Not applicable for particulate phosphorus because minimum depth needed for plant survival and growth is greater than minimum depth needed for particulate phosphorus reduction
Dissolved phosphorus	From top of media to top of submerged zone. Saturated conditions cause P to not be effectively stored in submerged zone.	From top to bottom of bioretention soil media	Minimum 2 feet, but 3 feet recommended as a conservative value; if IWS is included, keep top of submerged zone at least 1.5 to 2 feet from surface of media
Pathogens	From top of soil to top of submerged zone.	From top to bottom of bioretention soil media	Minimum 2 feet; if IWS is included, keep top of submerged zone at least 2 feet from surface of media
Temperature	From top to bottom of bioretention soil media; Internal Water Storage Zone (IWS) improves exfiltration, thereby reducing volume of warm runoff discharged to the receiving stream, and also improves thermal pollution abatement because the longer retention time allows runoff to cool more before discharge.	From top to bottom of bioretention soil media	Minimum 3 feet, with 4 feet preferred

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www.hydrocad.net/pdf/MN-Simple-Method.pdf

Appendix L

Simple Method for Estimating Phosphorus Export

1. The Simple Method

The Simple Method is a technique used for estimating storm pollutant export delivered from urban development sites. The method was developed to provide an easy yet reasonably accurate means of predicting the change in pollutant loadings in response to development. This information is needed by planners and engineers to make rational non-point source pollution decisions at the site level.

The Simple Method Calculation is intended for use on development sites less than a square mile in area. As with any simple model, the method to some degree sacrifices precision for the sake of simplicity and generality. Even so, the Simple Method is still reliable enough to use as a basis for making non-point pollution management decisions at the site level.

Phosphorus pollutant loading (L, in pounds per year) from a development site can be determined by solving the equation displayed in Table L.1.

1.1. Depth of Rainfall (P)

The value of P represents the number of inches of precipitation that falls during the course of a normal year of rainfall. Long-term weather records around the state of Minnesota suggest that the average annual rainfall depth is about 26 inches. This can be used to estimate P or a user can substitute the average annual rainfall depth from the closest National Weather Service long-term weather station or other suitable locations for which a reliable record can be demonstrated (> 10 years).

1.2. Correction Factor (P_j)

The P_j factor is used to account for the fraction of the annual rainfall that does not produce any measurable runoff. Many of the storms that occur during the year are so minor that all of the rainfall is stored in surface depressions and eventually evaporates. As a consequence, no runoff is produced. An analysis of regional rainfall/runoff patterns indicates that only 90% of the annual rainfall volume produces any runoff at all. Therefore, P_j should be set at 0.9.

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1.3. Runoff Coefficient (R_v)

The R_v is a measure of the site response to rainfall events, and in theory is calculated as:

R_v = r/p, where r and p are the volume of storm runoff and storm rainfall, respectively, expressed as inches.

The R_v for the site depends on the nature of the soils, topography, and cover. However, the primary influence on the R_v in urban areas is the amount of imperviousness of the site. Impervious area is defined as those surfaces in the landscape that cannot infiltrate rainfall consisting of building rooftops, pavement, sidewalks, driveways, etc. In the equation:

$$R_v = 0.05 + 0.009(I)$$

"I" represents the percentage of impervious cover expressed as a whole number. A site that is 75% impervious would use I = 75 for the purposes of calculating R_v.

1.4. Site Area (A)

The total area of the site (in acres) can be directly obtained from site plans. If the total area of the site is greater than one square mile (640 acres), the Simple Method may not be appropriate and applicants should consider utilizing other approaches, such as modeling or monitoring.

1.5. Pollutant Concentration (C)

Statistical analysis of several urban runoff monitoring datasets has shown that the average storm concentrations for total phosphorus do not significantly differ between new and existing development sites. Therefore, a pollutant concentration, C, of 0.30 mg/l should be used in this equation as a default. However, if good local data are available or an adjustment is needed, this factor can be customized for local condition.

Chapter 8 contains a range of C values for those interested in conducting a more detailed analysis of phosphorus export.

The Simple Method equation listed in Table L.1 can be simplified to the equation shown in Table L.2. Applicants with verified data indicating alternative values may choose to use the original Simple Method equation as represented in Table 1; otherwise, Table L.2 represents the revised Simple Method equation and associated values.

2. Calculating Pre-Development and Post-Development Phosphorus Load

The methodology for comparing annual pre-development pollutant loads to post-development pollutant loads is a six-step process (Table L.3).

Step 1: Calculate Site Imperviousness

In this step, the applicant calculates the impervious cover of the pre-development (existing) and post-development (proposed) site conditions.

Impervious cover is defined as those surfaces in the landscape that impede the infiltration of rainfall and result in an increased volume of surface runoff. As a simple rule, human-made surfaces that are not vegetated will be considered impervious. Impervious surfaces include roofs,

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buildings, paved streets and parking areas and any concrete, asphalt, compacted dirt or compacted gravel surface.

Step 2: Calculate Pre-Development Phosphorus Load

In this step, the applicant calculates stormwater phosphorus loadings from the site prior to development. Depending on the development classification, the applicant will use one of two equations (Table L.4). The equation to determine phosphorus loading in a redevelopment situation is based on the Simple Method. The equation to determine phosphorus loading in a new development situation utilizes a benchmark load for undeveloped areas, which is based on average phosphorus loadings for a typical mix of undeveloped land uses.

Step 3: Calculate Post-Development Pollutant Load

In this step, the applicant calculates stormwater phosphorus loadings from the post-development, or proposed, site. Again, an abbreviated version of the Simple Method is used for the calculations, and the equation is the same for both new development and redevelopment sites (Table L.5).

Table L.1 Phosphorus Pollutant Export Calculation

$$L = [(P)(P_j)(R_v)/12]\ (C)\ (A)\ (2.72)^*$$

Where:

- L = Load of a pollutant in pounds per year
- P = Rainfall depth per year (inches)
- P_j = Fraction of rainfall events that produce runoff
- R_v = Runoff coefficient, which expresses the fraction of rainfall which is converted into runoff. $R_v = 0.05 + 0.009(I)$
- C = Flow-weighted mean concentration of the pollutant in urban runoff (mg/l)
- A = Area of the development site (acres)

*12 and 2.72 are unit conversion factors

Table L.2 Simplified Pollutant Loading Calculation

$$L = (P)\ (R_v)\ (C)\ (A)\ (0.20)^*$$

Where:

- L = Load of a pollutant in pounds per year
- P = Rainfall depth per year (inches)
- R_v = Runoff coefficient, which expresses the fraction of rainfall which is converted into runoff = 0.05 + 0.009(I)
- I = Site imperviousness (i.e., I = 75 if site is 75% impervious)
- C = Flow-weighted mean concentration of the pollutant (total phosphorus) in urban runoff (mg/l) = 0.30 mg/l**
- A = Area of the development site (acres)

*0.20 is a regional constant and unit conversion factor

** The C factor can be customized if good local water quality data exist or if an adjustment in the 0.30 mg/l term is needed.

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Step 4: Calculate the Pollutant Removal Requirement

The phosphorus load generated from the post-development site must be reduced so that it is 90% or less of the load generated prior to development, In this example, a 10% reduction in phosphorus loading from pre-development conditions is used. This should not be construed as a recommended reduction for the State of Minnesota. Applicants should check with local stormwater authorities to determine if specific pre- to post-development phosphorus reduction requirements exist. The amount of phosphorus that must be removed through the use of stormwater BMPs is called the Pollutant Removal Requirement (RR). The equation in Table L.6 expresses this term numerically.

Table L.3 Process For Calculating Pre- and Post-Development Pollutant Loads

Step No.	Task
1	Calculate Site Imperviousness
2	Calculate the Pre-Development Phosphorus Load
3	Calculate Post-Development Pollutant Load
4	Calculate the Pollutant Removal Requirement
5	Identify Feasible BMPs
6	Select Off-Site Mitigation Option

Table L.4 Method For Calculating Pre-development Phosphorus Loading

New Development Phosphorus Loading, L_{pre} = 0.5 (A)

Where:

- L_{pre} = Average annual load of total phosphorus exported from the site prior to development (lbs/year)
- 0.5 = Annual total phosphorus load from undeveloped lands (lbs/acre/year)
- A = Area of the site (acres)

Redevelopment Phosphorus Loading, L_{pre} = (P) (R_v) (C) (A) (0.20)

Where:

- L_{pre} = Average annual load of total phosphorus exported from the site prior to development (lbs/year)
- P = Rainfall depth over the desired time interval (inches)
- R_v = Runoff coefficient, which expresses the fraction of rainfall which is converted into runoff = 0.05 + 0.009(I_{pre})
- I_{pre} = Pre-development (existing) site imperviousness (i.e., I = 75 if site is 75% impervious)
- C = Flow-weighted mean concentration of the pollutant (total phosphorus) in urban runoff (mg/l) = 0.30 mg/l
- A = Area of the development site (acres)

*0.20 is a regional constant and unit conversion factor

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Step 5: Identify Feasible BMPs

Step 5 looks at the ability of the chosen BMP to meet the site's pollutant removal requirements. The pollutant load removed by each BMP (Table L.7) is calculated using the average BMP removal rate (Table L.8), the computed post-development load, and the drainage area served.

If the load removed is equal to or greater than the pollutant removal requirement computed in Step 4, then the on-site BMP complies. If not, the designer must evaluate alternative BMP designs to achieve higher removal efficiencies, add additional BMPs, design the project so that more of the site is treated by the proposed BMPs, or design the BMP to treat runoff from an off-site area.

Table L.5 Method For Calculating Post-Development Phosphorus Loading

$$L_{post} = (P)\,(R_v)\,(C)\,(A)\,(0.20)$$

Where:

L_{post} = Average annual load of total phosphorus exported from the post-development site (lbs/year)
P = Rainfall depth over the desired time interval (inches)
R_v = Runoff coefficient, which expresses the fraction of rainfall which is converted into runoff = $0.05 + 0.009(I_{post})$
I_{post} = Post-development (proposed) site imperviousness (i.e., I = 75 if site is 75% impervious)
C = Flow-weighted mean concentration of the pollutant (total phosphorus) in urban runoff (mg/l) = 0.30 mg/l
A = Area of the development site (acres)

*0.20 is a regional constant and unit conversion factor

Table L.6 Computing Pollutant Removal Requirements

$$RR = L_{post} - 0.9(L_{pre})$$

Where:

RR* = Pollutant removal requirement (lbs/year)
L_{post} = Average annual load of total phosphorus exported from the post-development site (lbs/year)
L_{pre} = Average annual load of total phosphorus exported from the site prior to development (lbs/year)

*0.90 is suggested post-development phosphorus load reduction. Local requirements may vary.

Table L.7 Estimate of Pollutant Load Removed by Each BMP

$$LR = (L_{post})\,(BMP_{RE})\,(\%\ DA\ Served)$$

Where:

LR = Annual total phosphorus load removed by the proposed BMP (lbs/year)
L_{post} = Average annual load of total phosphorus exported from the post-development site prior to development (lbs/year)
BMP_{RE} = BMP removal efficiency for total phosphorus, Table 8 (%)
% DA Served = Fraction of the drainage area served by the BMP (%)

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Step 6: Select Off-Site Mitigation Option

If the pollutant removal requirement has been met through the application of on-site stormwater BMPs, the process is complete.

In the event that on-site BMPs cannot fully meet the pollutant removal requirement and on-site design cannot be changed, an offset fee should be charge (e.g. $X per pound of phosphorus).

Table L.8 Comparative BMP Phosphorus Removal Performance [a, e, f]

BMP Group	BMP Design Variation	Average TP Removal Rate[b]	Maximum TP Removal Rate[c]	Average Soluble P Removal Rate [d, g]
Bioretention	Underdrain	50%	65%	60%
	Infiltration	100	100	100
Filtration	Sand Filter	50	55	0
	Dry Swale	0	55	0
	Wet Swale	0	40	0
Infiltration [f,i]	Infiltration Trench	100	100	100
	Infiltration Basin	100	100	100
Stormwater Ponds	Wet Pond	50	75	70
	Multiple Pond	60	75	75
Stormwater Wetlands	Shallow Wetland	40	55	50
	Pond/Wetland	55	75	65

[a] Removal rates shown in table are a composite of five sources: ASCE/EPA International BMP Database (www.bmpdatabase.org); Caraco (CWP), 2001; MDE, 2000; Winer (CWP), 2000; and Issue Paper D P8 (William Walker, http://wwwalker.net/p8/) modeling

[b] Average removal efficiency expected under MPCA CGP Sizing Rules 1 and 3 (see Chapter 10)

[c] Upper limit on phosphorus removal with increased sizing and design features, based on national review

d Average rate of soluble phosphorus removal in literature

[e] See also Appendix N (link) and Chapter 12 for details.

[f] Note that the performance numbers apply only to that portion of total flow actually being treated; it does not include any runoff that by-passes the BMP

[g] Note that soluble P can transfer from surface water to ground water, but this column refers only to surface water

[h] Note that 100% is assumed for all infiltration, but only for that portion of the flow fully treated in the infiltration facility; by-passed runoff or runoff diverted via underdrain does not receive this level of treatment

IMPORTANT NOTE: Removal rates shown here are composite averages intended solely for use in comparing performance between BMP designs and for use in calculating load reduction in site-based TP models. They have been adapted, rounded and slightly discounted from statistical values published in BMP performance databases.

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3. References

Caraco, D. 2001. "Managing Phosphorus Inputs Into Lakes III: Evaluating the Impact of Watershed Treatment." Watershed Protection Techniques. 3 (4): 791-796. Center for Watershed Protection. Ellicott City, MD.

Maryland Department of the Environment (MDE). 2000. 2000 Maryland Stormwater Design Manual. MDE. Baltimore, MD.

Winer, R. 2000. National Pollutant Removal Performance Database for Stormwater Treatment Practices. 2nd Edition. Center for Watershed Protection. Ellicott City, MD.

SIMPLE METHOD DESCRIPTION AND ANALYSIS
WETLAND B

Table L.1 Phosphorus Pollutant Export Calculation

$L = [(P)(P_J)(R_V)/12]\ (C)\ (A)\ (2.72)$*

* 12 and 2.72 are unit conversion factors

Where,
L = Load of pollutant in pounds per year
P = Rainfall depth per year (inches)
PJ = Fraction of rainfall events that produce runoff
RV = Runoff coeefficient, which expresses the fraction of the rainfall which is converted into runoff. RV = 0.05 + 0.009 (I)
C = Flow-weighted mean concentration of the pollutant in urban runoff (mg/l)
A = Area of the development site (acres)

P	P_J	R_V	C	A	L
45.5	0.9	0.0504	0.3	13	1.83

Camas

Site Impervious (I) % = 47

Table L.2 Simplified Pollutant Loading Calculation

$L = [(P)(R_V)\ (C)\ (A)\ (0.20)$*

* 0.20 is a regional constant and unit conversion factors

Where,
L = Load of a pollutant exported in pounds per year
P = Rainfall depth per year (inches)
R_V = Runoff coeefficient, which expresses the fraction of the rainfall which is converted into runoff. RV = 0.05 + 0.009 (I)
I = Site imperviousness (i.e., I=75 if site is 75% impervious)
C = Flow-weighted mean concentration of the pollutant (total phosphorus) in urban runoff (mg/l) = 0.30 mg/l**
A = Area of the development site (acres)

** The C factor can be customized if good local water quality data exist or if an adjustment in the 0.30 mg/l term is needed.

Table L.4 New Development Phosphorus Loading

$L_{PRE} = 0.5\ (A)$

A	L_{PRE}
31.2	15.6
13.0	6.5

Redevelopment Phosphorus Loading

$L_{PRE} = [(P)(R_V)\ (C)\ (A)\ (0.20)$*

P	R_V	C	A	L_{PRE}
		0.30		0.0
		0.30		0.0

SIMPLE METHOD DESCRIPTION AND ANALYSIS
WETLAND B

Table L.5 Method for Calculating Post-development Phosphorus Loading

L_{POST} = [(P)(R_V) (C) (A) (0.20)*

* 0.20 is a regional constant and unit conversion factors

L = Average annual load of the total phosphorus exported from the post-development site (pounds per year)
P = Rainfall depth over the desired time interval(inches)
R_V = Runoff coefficient, which expresses the fraction of the rainfall which is converted into runoff. RV = 0.05 + 0.009 (I_{POST}
I_{POST} = Post-development (proposed0 site imperviousness (i.e., I=75 if site is 75% impervious)
C = Flow-weighted mean concentration of the pollutant (total phosphorus) in urban runoff (mg/l) = 0.30 mg/l
A = Area of the development site (acres)

Impervious road = 6.07
I = 47%
I = 47

P	R_V	C	A	L_{POST}
45.5	0.05	0.30	13	1.8

Table L.6 Computing Pollutant Removal Requirements

RR = L_{POST} - 0.9 (L_{PRE})

Where,

RR* = Pollutant removal requirement (lbs/yr)
L_{POST} = Average annual load of total phosphorus exported from the post-development site (lbs/yr)
L_{PRE} = Average annual load of total phosphorus exported from the site prior to development site (lbs/yr)

* 0.90 is the suggested post-development phosphorus load reduction. Local requirements may vary.

L_{POST}	$0.9L_{PRE}$	RR
3	14.04	-11.0
3	5.85	-2.9

Table L.7 Estimate of Pollutant Load Removed by Each BMP

LR = ($L_{POST)}$ (BMP_{RE}) (% DA served)

Where,

LR = Annual total phosphorus load removed by the proposed BMP (lbs/yr)
L_{POST} = Average annual load of total phosphorus exported from the post-development site (lbs/yr)
BMP_{RE} = BMP removal efficiency for total phosphorus, Table 8 (%)
% DA Served = Fraction of the drainage area served by the BMP (%)

L_{POST}	BMP_{RE}	%DA	LR
3	0.55	1	1.65

EXHIBIT 19

Geotechnical Site Investigation

Parklands at Camas Meadows

Camas, Washington

June 23, 2015

Geotechnical ■ Environmental ■ Special Inspections

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Geotechnical ▪ Environmental ▪ Special Inspections
Columbia West
Engineering, Inc

GEOTECHNICAL SITE INVESTIGATION
PARKLANDS AT CAMAS MEADOWS
CAMAS, WASHINGTON

Prepared For:	**Mr. Aaron Barr & Mr. Kevin Deford** **Parklands at Camas Meadows, LLC** **PO Box 61962** **Vancouver, WA 98666**
Site Location:	**NE of NW Payne Street and NW Camas Meadows Drive Intersection** **Parcels 175948000 and 986031650** **Camas, Washington**
Prepared By:	**Columbia West Engineering, Inc.** **11917 NE 95th Street** **Vancouver, Washington 98682** **Phone: 360-823-2900** **Fax: 360-823-2901**
Date Prepared:	**June 23, 2015**

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GEOTECHNICAL SITE INVESTIGATION
PARKLANDS AT CAMAS MEADOWS
CAMAS, WASHINGTON

1.0 INTRODUCTION

Columbia West Engineering, Inc. was retained by Parklands at Camas Meadows, LLC to conduct a geotechnical site investigation for proposed development on tax parcel numbers 986031650 and 175948000 in Camas, Washington. The purpose of the investigation was to observe and assess subsurface soil conditions at specific locations and provide subsequent appropriate geotechnical engineering analyses to support property development feasibility, planning, and design recommendations. The specific scope of services was outlined in a proposal contract dated May 27, 2015. This report summarizes the investigation and provides field assessment documentation and laboratory analytical test reports. This report is subject to the limitations expressed in Section 6.0, *Conclusion and Limitations*, and Appendix E.

1.1 General Site Information

As indicated on Figures 1 and 2, the subject site is located northeast of the intersection of NW Payne Street and NW Camas Meadows Drive in Camas, Washington. The site is comprised of two tax parcels numbered 986031650 and 175948000 totaling approximately 36.4 acres. The regulatory jurisdictional agency is the City of Camas, Washington. The approximate latitude and longitude are N 45° 37’ 40” and W 122° 26’ 54”, and the legal description is a portion of the SW and SE ¼ of Section 28, T2N, R3E, Willamette Meridian.

1.2 Proposed Development

Review of preliminary site plans provided by the client indicates that proposed development will consist of approximately 46 residential lots and 6 commercial buildings, parking areas, loading docks, private roadways and a future extension of NW Camas Meadows Drive. Stormwater facilities and underground utilities may also be constructed as part of proposed development. Columbia West understands that cut and fill areas will likely be proposed at the property. This report is based upon proposed development as described above and may not be applicable if modified.

2.0 REGIONAL GEOLOGY AND SOIL CONDITIONS

The subject site lies within the Willamette Valley/Puget Sound Lowland, a wide physiographic depression flanked by the mountainous Coast Range on the west and the Cascade Range on the east. Inclined or uplifted structural zones within the Willamette Valley/Puget Sound Lowland constitute highland areas and depressed structural zones form sediment-filled basins. The site is located within the central portion of the Portland/Vancouver Basin, an open, somewhat elliptical, northwest-trending syncline approximately 60 miles wide.

According to the *Geologic Map of the Lacamas Quadrangle, Clark County, Washington* (US Geological Survey, Science Investigations Map 2924, 2006), the primary geologic unit present at the site is a Pleistocene gravel facies unit deposited by cataclysmic, glacial-outburst floods associated with Lake Missoula in Montana. However, in the areas explored during subsurface excavation, the unconsolidated boulder to cobbly gravel unit was either extremely thin or missing completely. Instead, the subsurface investigation revealed that the bulk of the site is underlain by two similar sedimentary formations. Test pit exploration indicated that the western corner of the site is underlain by an unnamed, Pleistocene to Pliocene, semi-consolidated, pebble to cobble conglomerate (QTc). This geologic unit is lithologically similar to the Pliocene or late Miocene Troutdale Formation, differing primarily in age of emplacement, degree of weathering, and the presence of hyaloclastite interbeds. Previously published geologic mapping has identified this unit as the Troutdale Formation.

The southern and eastern portion of the site is underlain by the Hyaoclastic sandstone member of the Troutdale formation (Ttfh). This Pliocene to Pleistocene formation is comprised of coarse-grained sandstone and pebble conglomerate containing basalt pebbles and cobbles. This geologic unit is lithologically similar to the Pliocene or late Miocene Troutdale Formation, differing primarily in age of emplacement, degree of weathering, and the presence of hyaloclastite interbeds. Previously published geologic mapping has identified this unit as the Troutdale Formation.

The *Web Soil Survey (United States Department of Agriculture, Natural Resource Conservation Service [USDA NRCS], 2013 Website)* indicates the site is underlain by three soil types. Hesson clay loam soils are mapped on the majority of the site from the northwest corner to the southwest corner of the property, while Cove silty clay loam and Lauren gravelly loam soils are mapped in the northern and northwestern portions of the property, respectively. Soils resembling the Lauren series were not encountered during subsurface excavation.

Although actual on-site soils may vary from the broad USDA descriptions, Lauren soils are generally coarse-textured, well drained soils with rapid permeability. Cove soils are generally fine-textured, poorly drained soils with very slow permeability and high shrink-swell potential. Hesson soils are fine-textured, well drained soils with moderately slow permeability and moderate shrink-swell potential.

3.0 REGIONAL SEISMOLOGY

Recent research and subsurface mapping investigations within the Pacific Northwest appear to suggest the historic potential risk for a large earthquake event with strong localized ground movement may be underestimated. Past earthquakes in the Pacific Northwest appear to have caused landslides and ground subsidence, in addition to severe flooding near coastal areas. Earthquakes may also induce soil liquefaction, which occurs when elevated horizontal ground acceleration and velocity cause soil particles to interact as a fluid as opposed to a solid. Liquefaction of soil can result in lateral spreading and temporary loss of bearing capacity and shear strength.

There are at least four major known fault zones in the vicinity of the site that may be capable of generating potentially destructive horizontal accelerations. These fault zones are described briefly in the following text.

Portland Hills Fault Zone

The Portland Hills Fault Zone consists of several northwest-trending faults located along the northeastern margin of the Tualatin Mountains, also known as the Portland Hills, and the southwest margin of the Portland Basin. The fault zone is approximately 25 to 30 miles in length and is located approximately 17 miles southwest of the site. According to *Seismic Design Mapping, State of Oregon (Geomatrix Consultants, 1995),* there is no definitive consensus among geologists as to the zone fault type. Several alternate interpretations have been suggested.

According to the *USGS Earthquake Hazards Program*, the fault was originally mapped as a down-to-the-northeast normal fault, but has also been mapped as part of a regional-scale zone of right-lateral, oblique slip faults, and as a steep escarpment caused by asymmetrical folding above a south-west dipping, blind thrust fault. The Portland Hills fault offsets Miocene Columbia River Basalts, and Miocene to Pliocene sedimentary rocks of the Troutdale Formation. No fault scarps on surficial Quaternary deposits have been described along the fault trace, and the fault is mapped as buried by the Pleistocene aged Missoula flood deposits.

However, evidence is thought to exist which suggests that fault movement has impacted shallow Holocene deposits and deeper Pleistocene sediments. Seismologists recorded a M3.2 earthquake thought to be associated with the fault zone near Kelly Point Park in November 2012, a M3.9 earthquake thought to be associated with the fault zone near Kelly Point Park in April 2003, and a M3.5 earthquake possibly associated with the fault zone occurred approximately 1.3 miles east of the fault in 1991. Therefore, the Portland Hills Fault Zone is generally thought to be potentially active and capable of producing possible damaging earthquakes.

Gales Creek-Newberg-Mt. Angel Fault Zone

Located approximately 35 miles southwest of the site, the northwest-striking, approximately 50-mile long Gales Creek-Newberg-Mt. Angel Structural Zone forms the northwestern boundary between the Oregon Coast Range and the Willamette Valley, and consists of a series of discontinuous northwest-trending faults. The southern end the fault zone forms the southwest margin of the Tualatin basin. Possible late-Quaternary geomorphic surface deformation may exist along the structural zone *(Geomatrix Consultants, 1995)*.

According to the *USGS Earthquake Hazards Program*, the Mount Angel fault is mapped as a high-angle, reverse-oblique fault, which offsets Miocene rocks of the Columbia River Basalts, and Miocene and Pliocene sedimentary rocks. The fault appears to have controlled emplacement of the Frenchman Spring Member of the Wanapum Basalts, and thus must have a history that predates the Miocene age of these rocks. No unequivocal evidence of deformation of Quaternary deposits has been described, but a thick sequence of sediments deposited by the Missoula floods covers much of the southern part of the fault trace.

Although no definitive evidence of impacts to Holocene sediments have clearly been identified, the Mount Angel fault appears to have been the location of minor earthquake swarms in 1990 near Woodburn, Oregon, and a M5.6 earthquake in March 1993 near Scotts Mills, approximately four miles south of the mapped extent of the Mt. Angel fault. It is unclear if the earthquake occurred along the fault zone or a parallel structure. Therefore, the Gales Creek-Newberg-Mt. Angel Structural Zone is considered potentially active.

Lacamas Lake-Sandy River Fault Zone

The northwest-trending Lacamas Creek Fault and northeast-trending Sandy River Fault intersect north of Camas, Washington approximately 1 mile east of the site, and form part of the northeastern margin of the Portland basin. According to *Geology and Groundwater Conditions of Clark County Washington (USGS Water Supply Paper 1600, Mundorff, 1964)* and the *Geologic Map of the Lake Oswego Quadrangle (Oregon DOGAMI Series GMS-59, 1989)*, the Lacamas Creek fault zone consists of shear contact between the Troutdale Formation and underlying Oligocene andesite-basalt bedrock. Secondary shear contact associated with the fault zone may have produced a series of prominent northwest-southeast geomorphic lineaments in proximity to the site.

According to the *USGS Earthquake Hazards Program* the fault has been mapped as a normal fault with down-to-the-southwest displacement, and has also been described as a steeply northeast or southwest-dipping, oblique, right-lateral, slip-fault. The trace of the Lacamas Lake fault is marked by the very linear lower reach of Lacamas Creek. No fault scarps on Quaternary surficial deposits have been described. The Lacamas Lake fault offsets Pliocene-aged sedimentary conglomerates generally identified as the Troutdale formation, and Pliocene to Pleistocene aged basalts generally identified as the Boring Lava formation.

Recent seismic reflection data across the probable trace of the fault under the Columbia River yielded no unequivocal evidence of displacement underlying the Missoula flood deposits, however, recorded mild seismic activity during the recent past indicates this area may be potentially seismogenic.

Cascadia Subduction Zone

The Cascadia Subduction Zone has recently been recognized as a potential source of strong earthquake activity in the Portland/Vancouver Basin. This phenomenon is the result of the earth's large tectonic plate movement. Geologic evidence indicates that volcanic ocean floor activity along the Juan de Fuca ridge in the Pacific Ocean causes the Juan de Fuca Plate to perpetually move east and subduct under the North American Continental Plate. The subduction zone results in historic volcanic and potential earthquake activity in proximity to the plate interface, believed to lie approximately 20 to 50 miles west of the general location of the Oregon and Washington coast *(Geomatrix Consultants, 1995)*.

4.0 GEOTECHNICAL FIELD INVESTIGATION

A geotechnical field investigation consisting of visual reconnaissance and eight test pits (TP-1 through TP-8) was conducted at the site on June 4, 2015. Subsurface soil profiles were logged in accordance with Unified Soil Classification System (USCS) specifications. Disturbed soil samples were collected from relevant soil horizons and submitted for laboratory analysis. Laboratory test results are presented in Appendix A. Subsurface exploration locations are indicated on Figure 2. Exploration logs are presented in Appendix B. Soil descriptions and classification information are provided in Appendix C. A photo log is provided in Appendix D.

4.1 Surface Investigation and Site Description

The approximately 36.4-acre subject site occupies two tax parcels to the east of the Camas Meadows Golf Club located at 4105 NW Camas Meadows Drive in Camas, Washington. The site was previously undeveloped and is densely vegetated with large fir and deciduous trees, associated understory vegetation, and a wetland area. The site lies at the toe of a north-facing slope near the western end of Lacamas Lake. Site elevations range from approximately 240 feet elevation in the southern portion of the site to approximately 190 feet elevation along the northern property boundary. Slope grades range from isolated short slopes of approximately 20 percent in the south central portion of the property to generally flat in the wetland area of the northern property boundary. Most slopes are gentle and range from 5 to 10 percent.

4.2 Subsurface Exploration and Investigation

Test pit explorations TP-1 through TP-8 were advanced at the site to a maximum depth of 16.5 feet using a track-mounted excavator on June 4, 2015. Subsurface exploration locations were selected to observe soil characteristics in proximity to proposed development areas and are indicated on Figure 2.

4.2.1 Soil Type Description

The field investigation indicated the site is generally covered with approximately 10 to 18 inches of topsoil and associated organic-rich root zone material at the locations observed. Underlying the topsoil layer, fine-textured silt and clay soils underlain by weathered conglomerate bedrock and competent conglomerate bedrock were encountered. Subsurface lithology may generally be described by the following soil types for engineering purposes.

<u>Soil Type 1 – *Sandy SILT to Sandy FAT CLAY*</u>

Soil Type 1 was observed to consist primarily of medium brown medium stiff, moist to wet, moderate to high plasticity sandy SILT to sandy FAT CLAY. Soil Type 1 was observed underlying the topsoil layer in test pits TP-3 through TP-6 and TP-8 to a maximum depth of 5 feet.

Analytical laboratory testing conducted upon representative soil samples obtained from test pits TP-3 (sandy SILT) and TP-6 (sandy FAT CLAY) indicate approximately 57 to 63 percent by weight passing the No. 200 sieve and in situ moisture content ranging from 32 to 36 percent. Atterberg test results indicated a liquid limit ranging from 44 to 51 percent and a plasticity index ranging from 16 to 25 percent. Soil Type 1 is classified as ML, sandy SILT, and CH, sandy FAT CLAY according to USCS specifications and A-7-6(7) and A-7-6(7) according to AASHTO specifications.

Soil Type 2 – Clayey SAND to Poorly Graded GRAVEL with silt and sand

Soil Type 2 was observed to consist primarily of light brown to multi-colored, dense to very dense, moist to wet, clayey SAND and poorly graded GRAVEL with silt and sand. Soil Type 2 represents weathered conglomerate bedrock. Soil Type 2 was encountered underlying surficial fine textured soils or topsoil in all test pits.

Analytical laboratory testing conducted upon representative soil samples obtained from test pit TP-8 indicate approximately 8 to 20 percent by weight passing the No. 200 sieve and in situ moisture content ranging from 33 to 43 percent. Atterberg test results indicated a liquid limit ranging from 43 to 46 percent and a plasticity index of 18 percent. Soil Type 2 is classified as SC, clayey SAND and GP-GM, poorly-graded GRAVEL with silt and sand according to USCS specifications and A-2-7(0) according to AASHTO specifications.

Soil Type 3: Weathered and Competent Conglomerate Bedrock

Weathered and competent conglomerate bedrock was encountered in all test pits at various depths. The conglomerate bedrock encountered generally resembled the descriptions of the unnamed Pleistocene to Pliocene, semi-consolidated, pebble to cobble conglomerate (QTc) and the Hyaoclastic sandstone member of the Troutdale formation (Ttfh). The bedrock consisted of angular to sub-rounded clasts of various sizes cemented in a matrix of sand, silt, and clay. The bedrock was very dense and excavator refusal was noted at various depths as indicated in Table 1 in Section 5.7, *Excavation.*

4.2.2 Groundwater

Groundwater was encountered in test pits TP-1 and TP-8 at depths of 2.5 feet and 15 feet below ground surface, respectively. Standing water was observed at the ground surface elevation in the wetland which occupies the central north portion of the site. According to *Clark County Maps Online*, the static aquifer elevation in the vicinity of the subject site ranges from 190 to 210 feet amsl. These elevations correspond to an approximate depth to groundwater between 0 and 20 feet below ground surface.

Groundwater levels are often subject to seasonal variance and may rise during extended periods of increased precipitation. Perched groundwater may also be present in localized areas. Seeps and springs may become evident during site grading, primarily along slopes or in areas cut below existing grade. Structures, roads, and drainage design should be planned accordingly. Piezometer installation and long-term monitoring, beyond the scope of this investigation, would be necessary to provide more detailed groundwater information.

5.0 DESIGN RECOMMENDATIONS

The geotechnical site investigation suggests the proposed development is generally compatible with surface and subsurface soils, provided the recommendations presented in this report are utilized and incorporated into the design and construction processes. Design recommendations are presented in the following text sections.

5.1 Site Preparation and Grading

Vegetation, organic material, unsuitable fill, and deleterious material that may be encountered should be cleared from areas identified for structures and site grading. Vegetation, other organic material, and debris should be removed from the site. Stripped topsoil should also be removed, or used only as landscape fill in nonstructural areas with slopes less than 25 percent. The anticipated stripping depth for sod and highly organic topsoil is anticipated to vary from 10 to 18 inches. The required stripping depth may increase in areas of heavy organics, large tree root balls, or disturbed soil. Actual stripping depths should be determined based upon visual observations made during construction when soil conditions are exposed. The post-construction maximum depth of landscape fill placed or spread at any location onsite should not exceed one foot.

Previously disturbed soil, debris, unsuitable, or undocumented fill encountered during grading or construction activities should be removed completely and thoroughly from structural areas. This includes old foundations, basement walls, utilities, associated soft soils, and debris. Excavation areas should be backfilled with engineered structural fill.

Site grading activities should be performed in accordance with requirements specified in the 2012 *International Building Code* (IBC), Chapter 18 and Appendix J, with exceptions noted in the text herein. Site preparation, soil stripping, grading activities, and demolition debris removal verification should be observed and documented by an experienced geotechnical engineer or designated representative.

5.2 Engineered Structural Fill

Areas proposed for fill placement should be appropriately prepared as described in the preceding text. Surface soils should then be scarified and compacted prior to additional fill placement. Engineered structural fill should be placed upon prepared subgrade in loose lifts not exceeding 12 inches in depth and compacted using standard conventional compaction equipment. The soil moisture content should be within three percentage points of optimum conditions. A field density at least equal to 95 percent of the maximum dry density, obtained from the standard Proctor moisture-density relationship test (ASTM D698), is recommended for structural fill placement. Engineered structural fill placed on sloped grades should be benched to provide a horizontal surface for compaction.

Compaction of engineered structural fill should be verified by nuclear gauge field compaction testing performed in accordance with ASTM D6938. Field compaction testing should be performed for each vertical foot of engineered fill placed. Engineered fill placement should be observed by an experienced geotechnical engineer or designated representative.

Engineered structural fill placement activities should be performed during dry summer months if possible. If fill placement occurs during dry weather conditions, clean, fine-textured native soils are anticipated be suitable for use as structural fill if adequately moisture-conditioned to achieve recommended compaction specifications. Areas of sandy FAT CLAY that may be encountered may not be suitable for building foundation subgrade or road subgrade embankments. The use of clay soils for structural fill should be analyzed by Columbia West during site grading activities.

Because they are moisture-sensitive, fine-textured soils such as Soil Type 1 are often difficult to excavate and compact during wet weather conditions. If adequate compaction is not achievable with clean, fine-textured soils, import fill consisting of well-graded granular material with a maximum particle size of three inches and no more than five percent passing the No. 200 sieve is recommended for structural fill.

Representative samples of proposed engineered structural fill should be submitted for laboratory analysis and approval by the geotechnical engineer prior to placement. Laboratory analyses should include particle-size gradation and Proctor moisture-density analysis.

5.3 Cut and Fill Slopes

Fill placed on existing grades steeper than 5H:1V should be horizontally benched at least 10 feet into the slope. Fill slopes greater than six feet in height should be vertically keyed into existing subsurface soil. A typical fill slope cross-section is shown in Figure 3. Drainage implementations, including subdrains or perforated drain pipe trenches, may also be necessary in proximity to cut and fill slopes if seeps or springs are encountered. Drainage design may be performed on a case-by-case basis. Extent, depth, and location of drainage may be determined in the field by the geotechnical engineer during construction when soil conditions are exposed. Failure to provide adequate drainage may result in soil sloughing, settlement, or erosion.

Final cut or fill slopes at the site should not exceed 2H:1V or 15 feet in total height without individual slope stability analysis. The values above assume a minimum horizontal setback for loads of 10 feet from top of cut or fill slope face or overall slope height divided by three (H/3), whichever is greater. A minimum slope setback detail for structures is presented in Figure 4.

Concentrated drainage or water flow over the face of slopes should be prohibited, and adequate protection against erosion is required. Fill slopes should be constructed by placing fill material in maximum 12-inch level lifts, compacting as described in Section 5.2, *Engineered Structural Fill* and horizontally benching where appropriate. Fill slopes should be overbuilt, compacted, and trimmed at least two feet horizontally to provide adequate compaction of the outer slope face. Proper cut and fill slope construction is critical to overall project stability and should be observed by an experienced geotechnical engineer.

5.4 Foundations

Review of preliminary site plans indicates that both residential and commercial/light industrial buildings are proposed. Foundations are anticipated to consist of shallow continuous perimeter or column spread footings. Footings should be designed by a licensed structural engineer and conform to the recommendations below. Typical building loads are not expected to exceed approximately 3 to 4 kips per foot for perimeter footings or 80 kips per column. If actual loading exceeds anticipated loading, additional analysis should be conducted for the specific load conditions and proposed footing dimensions.

The existing ground surface should be prepared as described in Section 5.1, *Site Preparation and Grading*, and Section 5.2, *Engineered Structural Fill*. Foundations should bear upon a 12-inch-thick layer of crushed aggregate base compacted to at least 95 percent of modified Proctor maximum dry density (ASTM D1557) placed on firm competent in situ soil or engineered structural fill. Disturbed surface soils and unsuitable fill should be removed from foundation alignments and replaced with structural fill.

Footings should have a minimum width of 18 inches and extend to a depth at least 18 inches below lowest adjacent grade to provide adequate bearing capacity and protection against frost heave. Foundations constructed during wet weather conditions may require over-excavation of saturated subgrade soils and granular structural backfill prior to concrete placement. Over-excavation recommendations should be provided by a qualified geotechnical engineer during foundation excavation and construction. Excavations adjacent to foundations should not extend within a 1.5H:1V angle projected down from the outside bottom footing edge without additional geotechnical analysis.

Allowable bearing capacity is typically a function of footing dimension and subsurface soil properties, including settlement and shear resistance. Based upon in situ field testing and laboratory analysis, the estimated allowable bearing capacity for well-drained foundations prepared as described above and bearing on Soil Type 1 is 1,500 psf. The estimated allowable bearing capacity for well-drained foundations bearing upon Soil Types 2 and 3 is 2,000 psf. Bearing capacity may be increased by one-third for transient lateral forces such as seismic or wind. The estimated coefficient of friction between in situ compacted native soil or engineered structural fill and in-place poured concrete is 0.35. Lateral forces may also be resisted by an assumed passive soil equivalent fluid pressure of 250 psf/f against embedded footings. The upper six inches of soil should be neglected in passive pressure calculations.

Foundations should not be permitted to bear upon existing fill, soft soil, or disturbed soil. Because soil is often heterogeneous and anisotropic, it is recommended that an experienced geotechnical engineer or designated representative observe foundation excavations prior to placing forms or reinforcing bar to verify subgrade support conditions are as anticipated in this report.

5.5 Slabs on Grade

The proposed structures may have slab-on-grade floors. Slabs should be supported on firm, competent, in situ soil or engineered structural fill. Disturbed soils and unsuitable fills in proposed slab locations should be removed and replaced with structural fill.

Preparation and compaction beneath slabs should be performed in accordance with the recommendations presented in Section 5.1, *Site Preparation and Grading* and Section 5.2, *Engineered Structural Fill*. Slabs should be underlain by at least 6 inches of free-draining 1

¼”-0 crushed aggregate meeting WSDOT 9-03.9(3). Geotextile filter fabric conforming to *WSDOT 2010 Standard Specification M 41-10, 9-33.2(1), Geotextile Properties, Table 3: Geotextile for Separation or Soil Stabilization* may be used below the crushed aggregate to increase subgrade support. If desired, a moisture barrier may be constructed beneath the slabs. Slabs should be appropriately waterproofed in accordance with the desired type of finished flooring. Slab thickness and reinforcement should be designed by an experienced structural engineer in accordance with anticipated loads.

5.6 Settlement

Total long-term static footing displacement for shallow to medium-depth foundations constructed as described in this report is not anticipated to exceed approximately 1 inch. Differential settlement between comparably loaded footing elements is not expected to exceed approximately ½ inch over a span of 50 feet. The resulting vertical displacement after loading may be due to elastic distortion, dissipation of excess pore pressure, or soil creep.

5.7 Excavation

Soils at the site were explored to a maximum depth of 16.5 feet using a track-mounted excavator. As mentioned previously, weathered and competent conglomerate bedrock was encountered in all test pits at various depths ranging from 3 to 16.5 feet below ground surface. Table 1 presents a summary of depths to bedrock and groundwater.

Table 1. *Depth to bedrock and groundwater*.

Test Pit	Depth to Bedrock Refusal (feet below ground surface)	Depth of Seep or Groundwater (feet below ground surface)
TP-1	3	2.5
TP-2	3.5	not encountered
TP-3	4.5	not encountered
TP-4	3	not encountered
TP-5	4.5	not encountered
TP-6	6.5	not encountered
TP-7	3.5	not encountered
TP-8	16.5	15

The conglomerate was generally weathered in the top few feet, but became dense and massive with depth. If significant utilities or other excavations are designed at elevations that encounter bedrock, specialized rock-excavation techniques or blasting may be necessary. As mentioned previously, groundwater seeps were also observed during the site investigation, often at a depth coincident with the soil-to-bedrock interface.

Near-surface soils are likely classified as Washington State Industrial Safety and Health Administration (WISHA) Type C. For temporary open-cut excavations deeper than four feet, but less than 20 feet in soils of these types, the maximum allowable slope is 1.5H:1V. WISHA soil type should be confirmed during field construction activities by the contractor. Soil is often anisotropic and heterogeneous, and it is possible that WISHA soil types determined in the field may differ from those described above.

The contractor should be held responsible for site safety, sloping, and shoring. Columbia West is not responsible for contractor activities and in no case should excavation be conducted in excess of all applicable local, state, and federal laws.

5.8 Dewatering

Groundwater elevation and hydrostatic pressure should be carefully considered during design of utilities, retaining walls, or other structures that require below-grade excavation. As described previously, groundwater may be encountered in the vicinity of proposed development areas. Utility trenches in shallow groundwater areas or excavations and cuts that remain open for even short periods of time may undermine or collapse due to groundwater effects. Placement of layers of riprap or quarry spalls in localized areas on shallow excavation side slopes may be required to limit instability. Over-excavation and stabilization of pipe trenches or other excavations with imported crushed aggregate or gabion rock may also be necessary to provide adequate subgrade support.

Pumping and dewatering may be required to temporarily reduce the groundwater elevation to allow construction of proposed below-grade structures, installation of utilities, or placement of structural fills. Dewatering via a sump within excavation zones may be insufficient to control groundwater and provide excavation side slope stability. Dewatering may be more feasibly conducted by installing a system of temporary well points and pumps around proposed excavation areas or utility trenches. Depending on proposed utility depths, a site-specific dewatering plan may be necessary. Well pumps should remain functioning at all times during the excavation and construction period. Suitable back-up pumps and power supplies should be available to prevent unanticipated shut-down of dewatering equipment. Failure to operate pumps full-time may result in flooding of the excavation zones, resulting in damage to forms, slopes, or equipment.

5.9 Lateral Earth Pressure

If retaining walls are proposed, lateral earth pressures should be carefully considered for design. Hydrostatic pressure and additional surcharge loading should also be considered. Retained material may include engineered structural backfill or undisturbed soil. Structural wall backfill should consist of imported granular material meeting *Section 9-03.12(2)* of WSDOT Standard Specifications. Backfill should be prepared and compacted to at least 95 percent of maximum dry density as determined by the modified Proctor test (ASTM D1557). Recommended parameters for lateral earth pressures for in situ undisturbed native soils and engineered structural fill consisting of imported granular fill meeting WSDOT specifications for *Gravel Backfill for Walls 9-03.12(2)* are presented in Table 1. Soil Type 1 is excluded due to the relative thin profile observed on the site.

The design parameters presented in Table 2 are valid for static loading cases. The recommended earth pressures do not include surcharge loads, dynamic loading, hydrostatic pressure, or seismic design.

Table 2. Lateral Earth Pressure Parameters for Level Backfill

Backfill Material	Equivalent Fluid Pressure for Level Backfill			Wet Density	Drained Internal Angle of Friction
	At-rest	Active	Passive		
WSDOT 9-03.12(2) compacted aggregate backfill	54 pcf	33 pcf	589 pcf	135 pcf	38°
In situ undisturbed clayey SAND and Poorly Graded GRAVEL with silt and sand (Soil Type 2)	64 pcf	43 pcf	360 pcf	125 pcf	29°

** The upper 6 inches of soil should be neglected in passive pressure calculations. If exterior grade from top or toe of retaining wall is sloped, Columbia West should be contacted to provide location-specific lateral earth pressures.*

If seismic design is required, seismic forces may be calculated by superimposing a uniform lateral force of $10H^2$ pounds per lineal foot of wall, where H is the total wall height in feet. The resultant force should be applied at 0.6H from the base of the wall.

A continuous one-foot-thick zone of free-draining, washed, open-graded 1-inch by 2-inch drain rock and a 4-inch perforated gravity drain pipe is assumed behind retaining walls. Geotextile filter fabric should be placed between the drain rock and backfill soil. Specifications for drainpipe design are presented in Section 5.12, *Drainage*. If walls cannot be gravity drained, saturated base conditions and/or applicable hydrostatic pressures should be assumed.

Final retaining wall design should be reviewed and approved by Columbia West. Retaining wall subgrade and backfill activities should also be observed and tested for compliance with recommended specifications by the geotechnical engineer or designated representative during construction.

5.10 Seismic Design Considerations

According to the *United States Geologic Survey (USGS) 2010 ASCE 7 Seismic Design Maps Summary Report,* the anticipated peak ground and maximum considered earthquake spectral response accelerations resulting from seismic activity for the subject site are summarized in Table 3.

The listed probabilistic ground motion values are based upon “firm rock” sites with an assumed shear wave velocity of 2,500 ft/s in the upper 100 feet of soil profile. These values should be adjusted for site class effects by applying site coefficients Fa and Fv as defined in 2012 IBC Tables 1613.3.3(1) and (2). The site coefficients are intended to more accurately characterize estimated peak ground and respective earthquake spectral response accelerations by considering site-specific soil characteristics and index properties.

The *Site Class Map of Clark County, Washington (Washington State Department of Natural Resources, 2004),* indicates site soils may be represented by Site Class C. Based upon observed subsurface soil conditions at the site, and review of well logs and local geologic maps, site soils may be considered to be Site Class C as defined in 2012 IBC Section 1613.3.5. This site class designation indicates that some amplification of seismic energy may occur during a seismic event because of subsurface conditions. This assessment is preliminary and is based upon limited field exploration and research of existing published literature. Additional exploration would be necessary to provide soil site class information at greater depths.

Table 3. Approximate Probabilistic Ground Motion Values for 'firm rock' sites based on subject property longitude and latitude

	2% Probability of Exceedance in 50 yrs
Peak Ground Acceleration	0.38 g
0.2 sec Spectral Acceleration	0.89 g
1.0 sec Spectral Acceleration	0.38 g

Localized peak ground accelerations exceeding the adjusted values may occur in some areas in direct proximity to an earthquake's origin. This may be a result of amplification of seismic energy due to depth to competent bedrock, compression and shear wave velocity of bedrock, presence and thickness of loose, unconsolidated alluvial deposits, soil plasticity, grain size, and other factors.

Identification of specific seismic response spectra for the site is beyond the scope of this investigation. If site structures are designed in accordance with recommendations specified in the 2012 IBC, the potential for peak ground accelerations in excess of the adjusted and amplified values should be understood.

5.11 Soil Liquefaction and Dynamic Settlement

According to the *Alternative Liquefaction Susceptibility Map of Clark County Washington (Washington State Department of Natural Resources, 2004)*, the site is mapped as very low susceptibility for liquefaction. Liquefaction, defined as the transformation of the behavior of a granular material from a solid to a liquid due to increased pore-water pressure and reduced effective stress, may occur when granular or non-plastic silt materials quickly compact under cyclic stresses caused by a seismic event. The effects of liquefaction may include immediate ground settlement and lateral spreading.

Soils most susceptible to liquefaction are generally saturated, cohesionless, loose to medium-dense sands within 50 feet of the ground surface. Recent research has also indicated that low plasticity silts and clays may also be subject to sand-like liquefaction behavior if the plasticity index determined by the Atterberg Limits analysis is less than 8. Potentially liquefiable soils located above the existing, historic, or expected ground water levels do not generally pose a liquefaction hazard. It is important to note that changes in perched ground water elevation may occur due to project development or other factors not observed at the time of investigation.

Based upon the results of the geotechnical investigation, the potential for liquefaction of shallow soils at the site is considered to be low.

5.12 Drainage

At a minimum, site drainage should include surface water collection and conveyance to properly designed stormwater management structures and facilities. Drainage design in general should conform to City of Camas regulations. Finished site grading should be conducted with positive drainage away from structures. Depressions or shallow areas that may retain ponding water should be avoided. Roof drains, low-point drains, and perimeter foundation drains are recommended for structures. Drains should consist of separate systems and gravity flow with a minimum two-percent slope away from foundations into the stormwater system or approved discharge location. Concentrated discharge of water should be prohibited across slopes and water should not be diverted, routed, or allowed to flow over or across slope faces.

Perimeter foundation drains should consist of 3-inch perforated PVC pipe surrounded by a minimum of 1 ft^3 of clean, washed drain rock per linear foot of pipe and wrapped with geotextile filter fabric. Open-graded drain rock with a maximum particle size of 3 inches and less than 2 percent passing the No. 200 sieve is recommended. Geotextile filter fabric should consist of Mirafi 140N or approved equivalent, with AOS between No. 70 and No. 100 sieve. The water permittivity should be greater than 1.5/sec. Figure 5 presents a typical foundation drain. Perimeter drains may limit increased hydrostatic pressure beneath footings and assist in reducing potential perched moisture areas.

Subdrains should also be considered if portions of the site are cut below surrounding grades. Shallow groundwater, springs, or seeps should be conveyed via drainage channel or perforated pipe into the stormwater management system or an approved discharge. Recommendations for design and installation of perforated drainage pipe may be performed on a case-by-case basis by the geotechnical engineer during construction. Failure to provide adequate surface and sub-surface drainage may result in soil slumping or unanticipated settlement of structures exceeding tolerable limits. A typical perforated drain pipe trench detail is presented in Figure 6.

Foundation drains and subdrains should be closely monitored after construction to assess their effectiveness. If additional surface or shallow subsurface seeps become evident, the drainage provisions may require modification or additional drains. The geotechnical engineer should be consulted to provide appropriate recommendations.

5.13 Bituminous Asphalt and Portland Cement Concrete

Preliminary site plans indicate that proposed development includes private asphalt concrete driveways and parking areas. Additionally, an extension of the City of Camas' NW Camas Meadows Drive may be constructed as part of the development. Pavement section thickness should be carefully considered to provide adequate lifespan and serviceability. Pavement section design is outside the scope of this investigation; however, Columbia West can provide section design services in the future if requested. Columbia West recommends adherence to the City of Camas standards for public works construction if improvements to public roads are proposed.

For dry weather construction, pavement surface sections should bear upon competent subgrade consisting of scarified and compacted native soil or engineered structural fill. Wet weather pavement construction is discussed later in Section 5.14, *Wet Weather Construction Methods and Techniques*. Areas proposed for asphalt pavement construction should be prepared as described in Section 5.1, *Site Preparation and Grading*. Subgrade conditions should be evaluated and tested by a licensed geotechnical engineer or designated representative prior to placement of crushed aggregate base. Subgrade evaluation should include nuclear gauge density testing and wheel proof-roll observations conducted with a 12-cubic yard, double-axle dump truck or equivalent. Nuclear gauge density testing should be conducted at 250-foot intervals or as determined by the onsite geotechnical engineer. Subgrade soil should be compacted to at least 95 percent of the modified Proctor dry density, as determined by ASTM D698. Areas of observed deflection or rutting during proof-roll evaluation should be excavated to a firm surface and replaced with compacted crushed aggregate.

Crushed aggregate base should be compacted and tested in accordance with the specifications outlined above. Asphalt concrete pavement should be compacted to at least 91 percent of maximum Rice density. Nuclear gauge density testing should be conducted to verify adherence to recommended specifications. Testing frequency should be in accordance with Washington Department of Transportation and City of Camas specifications.

Portland cement concrete curbs should be installed in accordance with the City of Camas specifications. Aggregate base should be observed and proof-rolled in the presence of an experienced geotechnical engineer or designated representative. Soft areas that deflect or rut should be stabilized prior to pouring concrete. Concrete should be tested during installation in accordance with ASTM C171, C138, C231, C143, C1064, and C31. This includes casting of cylinder specimen at a frequency of four cylinders per 100 cubic yards of poured concrete. Recommended field and analytical laboratory concrete testing includes slump, air entrainment, temperature, and unit weight.

5.14 Wet Weather Construction Methods and Techniques

Wet weather construction often results in significant shear strength reduction and soft areas that may rut or deflect. Installation of granular working layers may be necessary to provide a firm support base and sustain construction equipment. Granular layers should consist of all-weather gravel, 4-inch by 6-inch gabion, or other similar material (6-inch maximum size with less than 5 percent passing the No. 200 sieve).

Construction equipment traffic across exposed fine-textured soil should be minimized. Equipment traffic induces dynamic loading, which may result in weak areas and significant reduction in shear strength for soils above plastic limit. Wet weather construction may generate significant excess quantities of soft wet soil, which should be removed from the site or stockpiled in a designated area.

Construction during wet weather conditions may require increased base thickness. Road base should consist of 3”-0 or 1¼”-0 crushed aggregate and should be placed on previously stripped and structurally competent subgrade. Over-excavation may be necessary to provide a firm base upon which to place crushed aggregate. Geotextile filter fabric such as Mirafi 500X or an approved equivalent is also recommended. Crushed aggregate base should be installed in a single lift with trucks end-dumping from an advancing layer of granular fill. During extended wet periods, stripping activities may also need to be conducted from an advancing layer of granular fill. Once installed, the crushed aggregate base should be compacted with several passes from a static drum roller. A vibratory compactor is not recommended because it may further disturb the subgrade. Subdrains may also be necessary to provide subgrade drainage and maintain structural integrity.

Crushed aggregate base should be compacted to at least 95 percent of maximum dry density according to the modified Proctor density test (ASTM D1557). Compaction should be verified by nuclear gauge density testing. Observation of a proof-roll with a loaded dump truck is also recommended as an indication of subgrade performance.

It should be understood that wet weather construction is risky and costly. An experienced geotechnical engineer or designated representative should observe and document wet weather construction activities. Proper construction methods and techniques are critical to overall project integrity.

5.15 Erosion Control Measures

Based upon field observations and laboratory testing, the erosion hazard for site soils in flat to shallow-gradient portions of the property is likely to be low. The potential for erosion generally increases in sloped areas. Therefore, disturbance to vegetation in sloped areas should be minimized during construction activities. Soil is also prone to erosion if unprotected and unvegetated during periods of increased precipitation. Erosion can be minimized by performing construction activities during dry summer months.

Site-specific erosion control measures should be implemented to address the maintenance of exposed areas. This may include silt fence, biofilter bags, straw wattles, or other suitable methods. During construction activities, exposed areas should be well-compacted and protected from erosion with visqueen, surface tactifier, or other means, as appropriate. Temporary slopes or exposed areas may be covered with straw, crushed aggregate, or riprap in localized areas to minimize erosion. Erosion and water runoff during wet weather conditions may be controlled by application of strategically placed channels and small detention depressions with overflow pipes.

After grading, exposed surfaces should be vegetated as soon as possible with erosion-resistant native species. Jute mesh or straw may be applied to enhance vegetation. Once established, vegetation should be properly maintained. Disturbance to existing native vegetation and surrounding organic soil should also be minimized during construction activities.

5.16 Soil Shrink/Swell Potential

Based upon laboratory analysis, subsurface soils contain as much as 63 percent by weight passing the No. 200 sieve and exhibit a plasticity index ranging from 16 to 25 percent. This indicates low to moderate potential for soil shrinking or swelling.

5.17 Utility Installation

Utility installation may require subsurface excavation and trenching. Excavation, trenching and shoring should conform to federal (Occupational Safety and Health Administration) (OSHA) (29 CFR, Part 1926) and *WISHA* (WAC, Chapter 296-155) regulations. Site soils may slough when cut vertically and sudden precipitation events or perched groundwater may result in accumulation of water within excavation zones and trenches.

Utilities should be installed in general accordance with manufacturer's recommendations. Utility trench backfill should consist of crushed aggregate or other coarse-textured, free-draining material acceptable to the client, City of Camas, and the site geotechnical engineer. Trench backfill material within 18 inches of the top of utility pipes should be hand compacted (i.e., no heavy compaction equipment). The remaining backfill should be compacted to at least 95 percent of maximum dry density as determined by the standard Proctor moisture-density test (ASTM D698). Clean, free-draining, fine bedding sand is recommended for use in the pipe zone. With exception of the pipe zone, backfill should be placed in loose lifts not exceeding 12 inches in thickness.

Compaction of utility trench backfill material should be verified by nuclear gauge field compaction testing performed in accordance with ASTM D6938. It is recommended that field compaction testing be performed at 200-foot intervals along the utility trench centerline at the surface and midpoint depth of the trench. Compaction frequency and specifications may be modified for non-structural areas in accordance with recommendations of the site geotechnical engineer.

6.0 CONCLUSION AND LIMITATIONS

This geotechnical site investigation report was prepared in accordance with accepted standard conventional principles and practices of geotechnical engineering. This investigation pertains only to material tested and observed as of the date of this report, and is based upon proposed site development as described in the text herein. This report is a professional opinion containing recommendations established by engineering interpretations of subsurface soils based upon conditions observed during site exploration. Soil conditions may differ between tested locations or over time. Even slight variations may produce impacts to the performance of structural facilities if not adequately addressed. This underscores the importance of diligent QA/QC construction observation and testing to verify soil conditions are as anticipated in this report.

Therefore, this report contains several recommendations for field observation and testing by Columbia West personnel during construction activities. Columbia West cannot accept responsibility for deviations from recommendations described in this report. Future performance of structural facilities is often related to the degree of construction observation by qualified personnel. These services should be performed to the full extent recommended.

This report is not an environmental assessment and should not be construed as a representative warranty of site subsurface conditions. The discovery of adverse environmental conditions, or subsurface soils that deviate significantly from those described in this report, should immediately prompt further investigation. The above statements are in lieu of all other statements expressed or implied.

This report was prepared solely for the client and is not to be reproduced without prior authorization from Columbia West. Final engineering plans and specifications for the project should be reviewed and approved by Columbia West as they relate to geotechnical and grading issues prior to final design approval. Columbia West is not responsible for independent conclusions or recommendations made by other parties based upon information presented in this report. Unless a particular service was expressly included in the scope, it was not performed and there should be no assumptions based upon services not provided. Additional report limitations and important information about this document are presented in Appendix E. This information should be carefully read and understood by the client and other parties reviewing this document.

Sincerely,

COLUMBIA WEST ENGINEERING, Inc.

Daniel E. Lehto, PE, GE
Principal

DANIEL E. LEHTO
STATE OF WASHINGTON
44702
REGISTERED
PROFESSIONAL ENGINEER

6-23-15

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FIGURES

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Design	Drawn: ASR		
Checked: DEL	Date: 6/12/15		
Client: PACM, LLC	Rev	By	Date
Job No.: 15153			
CAD File: FIGURE 1			
Scale: ~1:50,000			

SITE LOCATION MAP

PARKLANDS AT CAMAS MEADOWS
CAMAS, WASHINGTON

FIGURE 1

NOTES:
1. SITE LOCATION: 2150 NE iONE STREET.
2. DRAWING IS NOT TO SCALE.
3. BASE MAP OBTAINED FROM BING MAPS.
4. TEST PIT LOCATIONS ARE APPROXIMATE AND NOT SURVEYED.
5. SOIL BOTING BACKFILLED WITH BENTONITE ON 6-26-2013.

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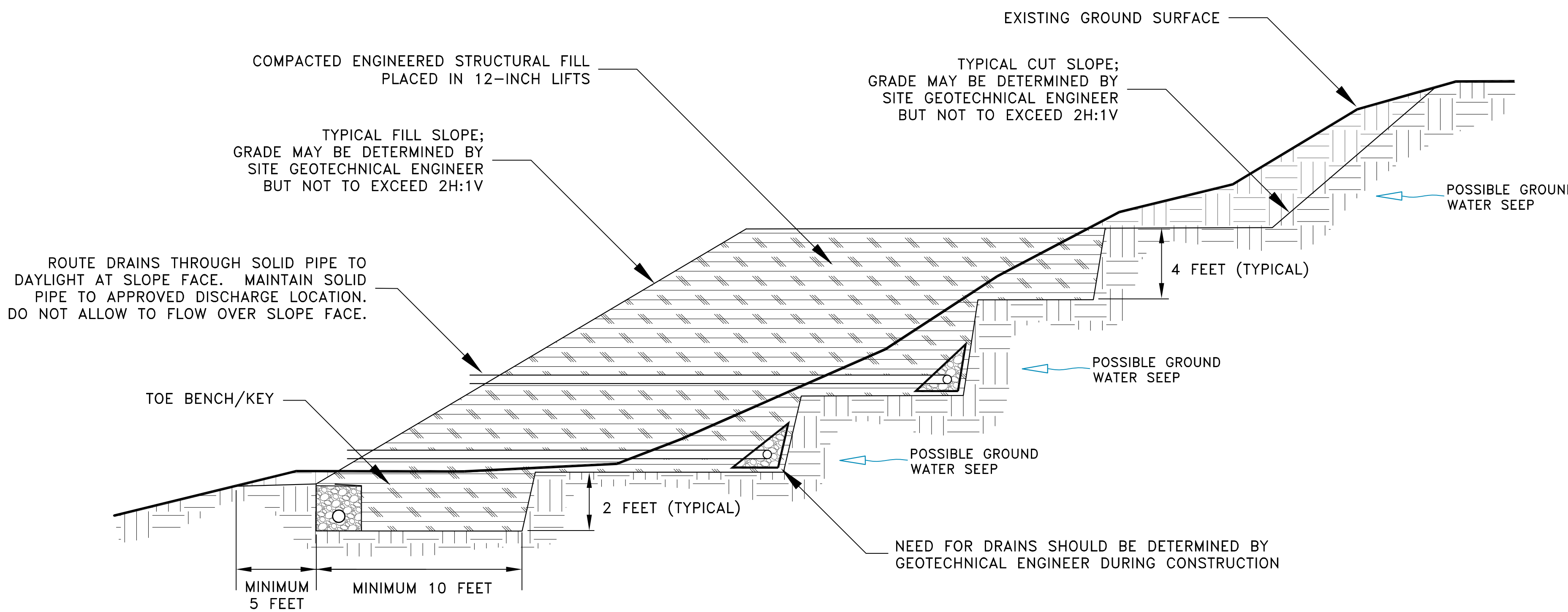
Scale: NONE			

SUBSURFACE EXPLORATION LOCATION MAP

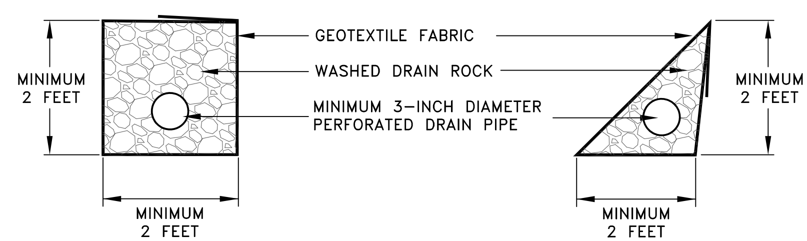
PARKLANDS AT CAMAS MEADOWS
CAMAS, WASHINGTON

FIGURE 2

TYPICAL CUT AND FILL SLOPE CROSS-SECTION



TYPICAL DRAIN SECTION DETAIL



DRAIN SPECIFICATIONS

GEOTEXTILE FABRIC SHALL CONSIST OF MIRAFI 140N OR APPROVED EQUIVALENT WITH AOS BETWEEN No. 70 AND No. 100 SIEVE.

WASHED DRAIN ROCK SHALL BE OPEN-GRADED ANGULAR DRAIN ROCK WITH LESS THAN 2 PERCENT PASSING THE No. 200 SIEVE AND A MAXIMUM PARTICLE SIZE OF 3 INCHES.

NOTES:
1. DRAWING IS NOT TO SCALE.
2. SLOPES AND PROFILES SHOWN ARE APPROXIMATE.
3. DRAWING REPRESENTS TYPICAL FILL AND CUT SLOPE SECTION, AND MAY NOT BE SITE-SPECIFIC.

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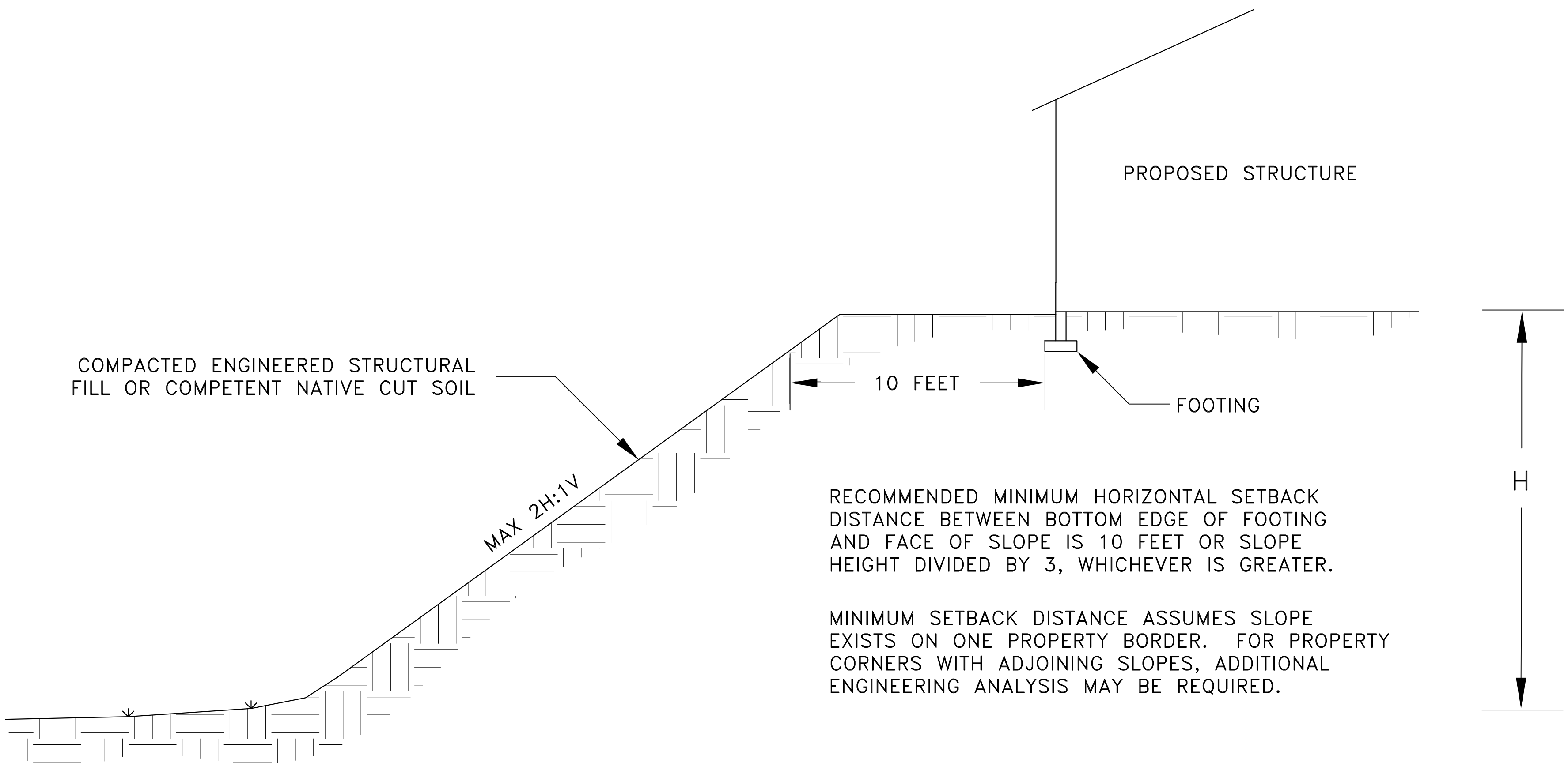
CAD File: FIGURE 3				
Scale: NONE				

TYPICAL CUT AND FILL SLOPE CROSS-SECTION

PARKLANDS AT CAMAS MEADOWS
CAMAS, WASHINGTON

FIGURE 3

TYPICAL CUT AND FILL SLOPE CROSS-SECTION



NOTES:
1. DRAWING IS NOT TO SCALE.
2. SLOPES AND PROFILES SHOWN ARE APPROXIMATE.
3. DRAWING REPRESENTS TYPICAL FOUNDATION SETBACK DETAIL, AND MAY NOT BE SITE-SPECIFIC.

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Design:	Drawn: ASR	MINIMUM FOUNDATION SLOPE SETBACK DETAIL
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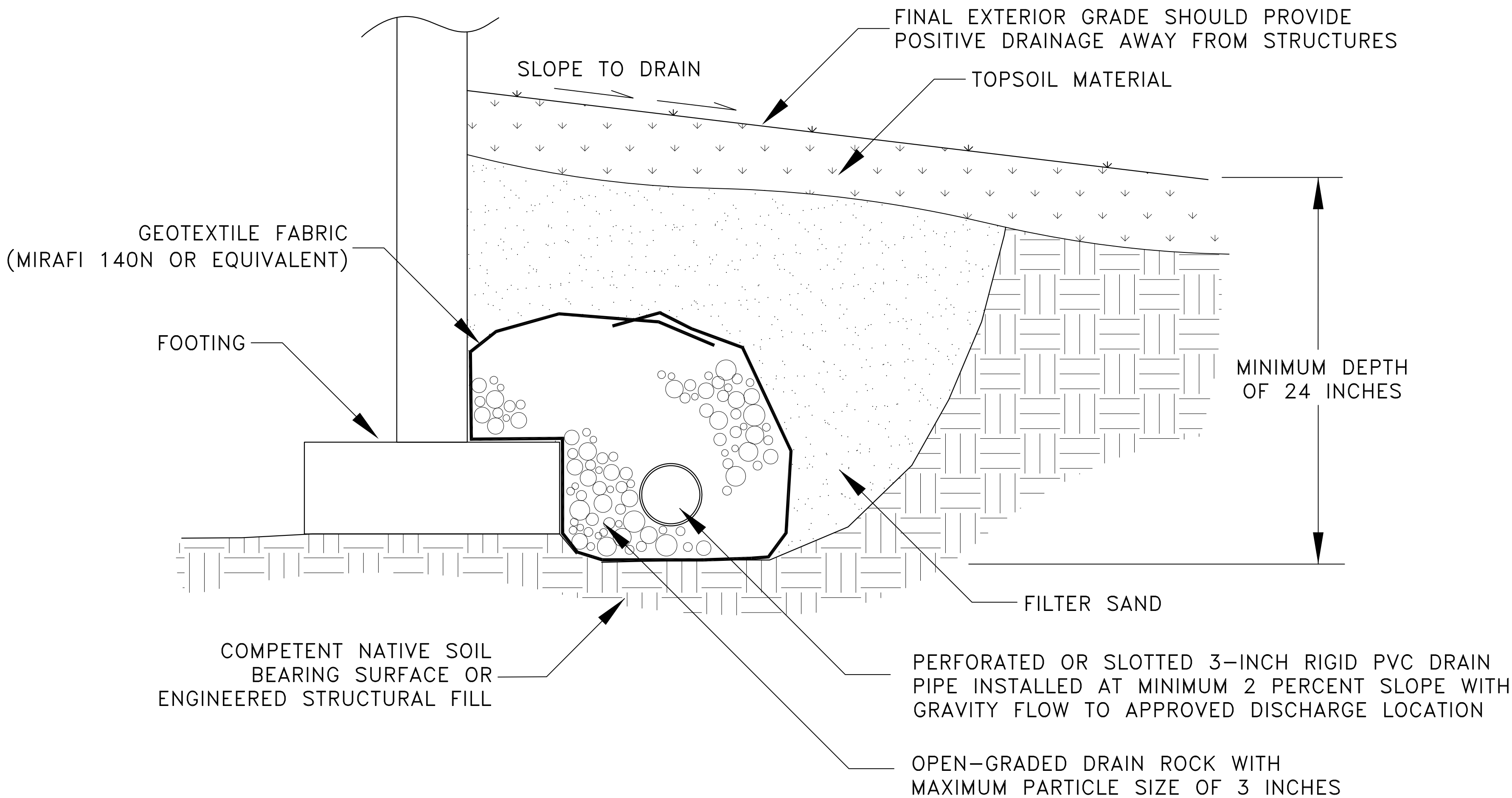
Job No: 15153		CAMAS, WASHINGTON
CAD File: FIGURE 4		
Scale: NONE		

FIGURE 4

TYPICAL PERIMETER FOOTING DRAIN DETAIL



NOTES:
1. DRAWING IS NOT TO SCALE.
2. DRAWING REPRESENTS TYPICAL FOOTING DRAIN DETAIL AND MAY NOT BE SITE-SPECIFIC.

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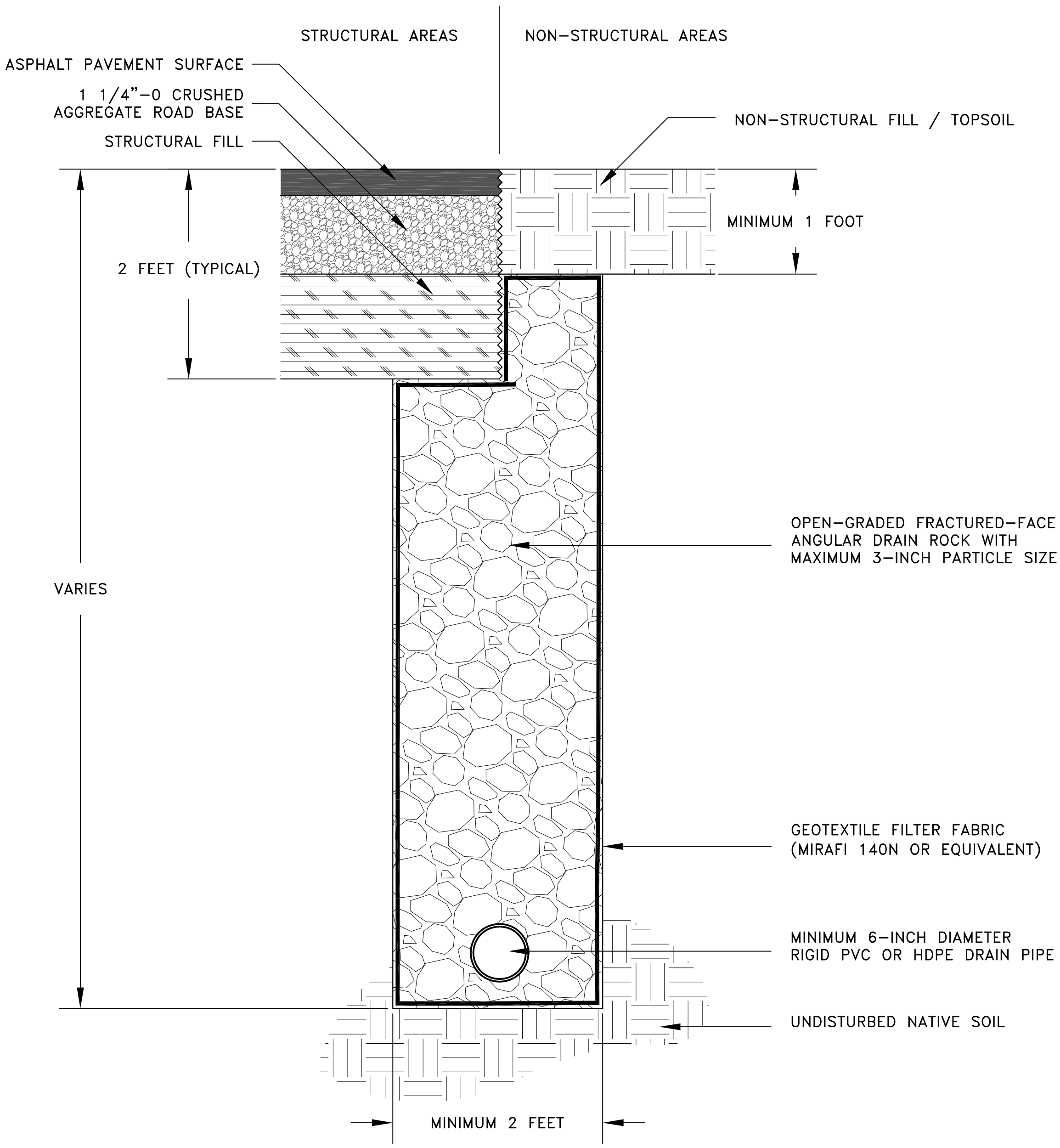
Job No: 15153				
CAD File: FIGURE 5				
Scale: NONE				

TYPICAL PERIMETER FOOTING DRAIN DETAIL

PARKLANDS AT CAMAS MEADOWS
CAMAS, WASHINGTON

FIGURE 5

TYPICAL PERFORATED DRAIN PIPE TRENCH DETAIL



NOTE: LOCATION, INVERT ELEVATION, DEPTH OF TRENCH, AND EXTENT OF PERFORATED PIPE REQUIRED MAY BE MODIFIED BY THE GEOTECHNICAL ENGINEER DURING CONSTRUCTION BASED UPON FIELD OBSERVATION AND SITE-SPECIFIC SOIL CONDITIONS.

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Design:	Drawn: ASR		TYPICAL PERFORATED DRAIN PIPE TRENCH DETAIL	FIGURE 6
Checked: DEL	Date: 06/12/15			
Client: PACM, LLC	Rev	By	Date	
Job No: 15153			PARKLANDS AT CAMAS MEADOWS	
CAD File: FIGURE 6			CAMAS, WASHINGTON	
Scale: NONE				

APPENDIX A
ANALYTICAL LABORATORY TEST RESULTS

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Parklands at Camas Meadows Camas, Washington	Mr. Aaron Barr & Mr. Kevin Deford Parklands at Camas Meadows, LLC PO Box 61962 Vancouver, WA 98666	15153	S15-359
		REPORT DATE: 06/16/15	FIELD ID: TP3.1
		DATE SAMPLED: 06/04/15	SAMPLED BY: HDG

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Sandy SILT	Test Pit TP-03 depth = 2 feet	ML, Sandy Silt

SPECIFICATIONS	AASHTO SOIL TYPE
none	A-7-6(7)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913, D422

ADDITIONAL DATA

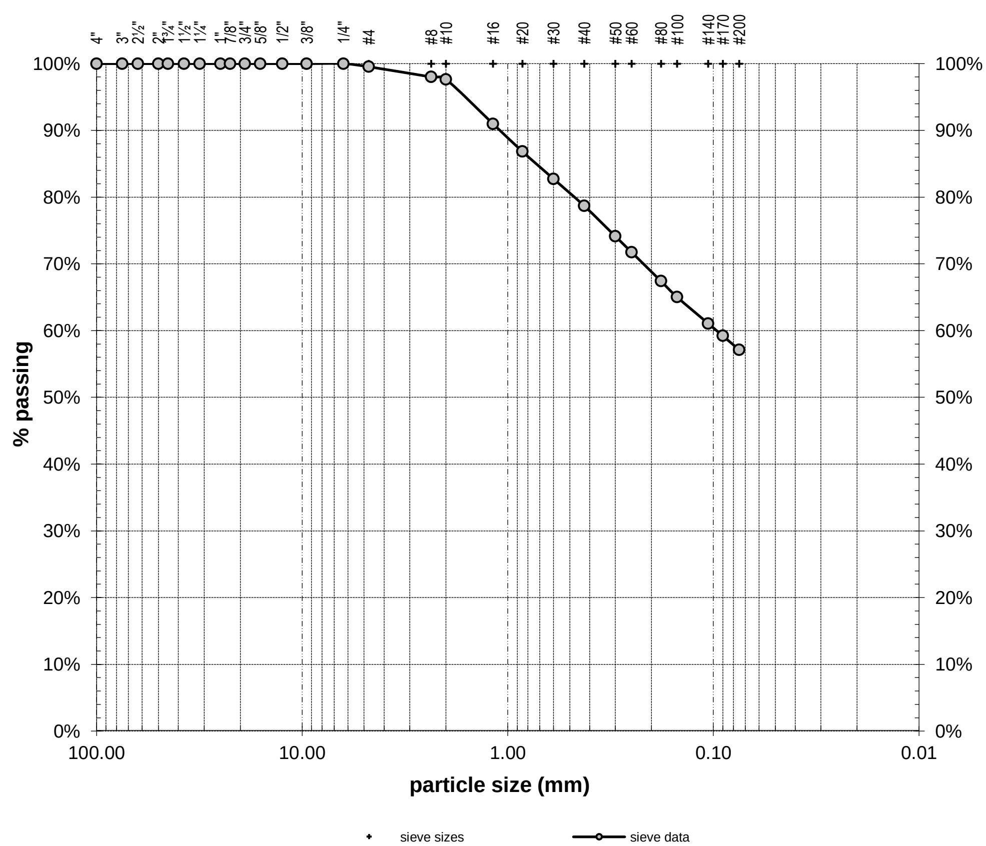
initial dry mass (g) =	158.3		
as-received moisture content =	36.4%	coefficient of curvature, C_C =	n/a
liquid limit =	44	coefficient of uniformity, C_U =	n/a
plastic limit =	28	effective size, $D_{(10)}$ =	n/a
plasticity index =	16	$D_{(30)}$ =	n/a
fineness modulus =	n/a	$D_{(60)}$ =	0.097 mm

SIEVE DATA

% gravel = 0.5%
% sand = 42.4%
% silt and clay = 57.1%

	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50		100.0%		
	1/4"	6.30	100.0%			
	#4	4.75	99.5%			
SAND	#8	2.36		98.0%		
	#10	2.00	97.6%			
	#16	1.18		91.0%		
	#20	0.850	86.8%			
	#30	0.600		82.7%		
	#40	0.425	78.7%			
	#50	0.300		74.1%		
	#60	0.250	71.7%			
	#80	0.180		67.4%		
	#100	0.150	65.0%			
	#140	0.106		61.1%		
	#170	0.090		59.2%		
	#200	0.075	57.1%			

GRAIN SIZE DISTRIBUTION



DATE TESTED	TESTED BY
06/08/15	BTT/MJR

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ATTERBERG LIMITS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Parklands at Camas Meadows Camas, Washington	Mr. Aaron Barr & Mr. Kevin Deford Parklands at Camas Meadows, LLC PO Box 61962 Vancouver, WA 98666	15153	S15-359
		REPORT DATE: 06/16/15	FIELD ID: TP3.1
		DATE SAMPLED: 06/04/15	SAMPLED BY: HDG

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Sandy SILT	Test Pit TP-03 depth = 2 feet	ML, Sandy Silt

LABORATORY TEST DATA

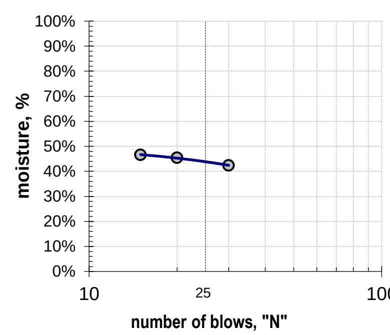
LABORATORY EQUIPMENT	TEST PROCEDURE
Liquid Limit Machine, Hand Rolled	ASTM D4318

ATTERBERG LIMITS

liquid limit = 44
plastic limit = 28
plasticity index = 16

LIQUID LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	33.30	33.31	33.93	
dry soil + pan weight, g =	29.59	29.37	29.72	
pan weight, g =	20.83	20.70	20.68	
N (blows) =	30	20	15	
moisture, % =	42.4 %	45.4 %	46.6 %	



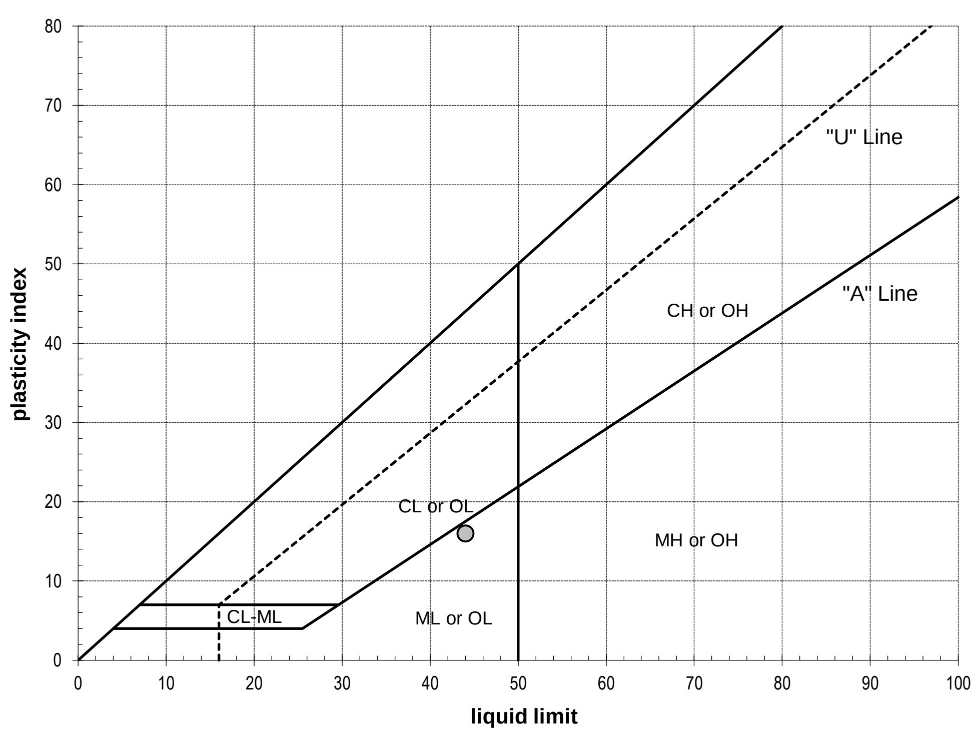
SHRINKAGE

shrinkage limit = n/a
shrinkage ratio = n/a

PLASTIC LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	27.85	27.97		
dry soil + pan weight, g =	26.28	26.35		
pan weight, g =	20.69	20.50		
moisture, % =	28.1 %	27.7 %		

PLASTICITY CHART



ADDITIONAL DATA

% gravel = 0.5%
% sand = 42.4%
% silt and clay = 57.1%
% silt = n/a
% clay = n/a
moisture content = 36.4%

DATE TESTED	TESTED BY
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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Parklands at Camas Meadows Camas, Washington	Mr. Aaron Barr & Mr. Kevin Deford Parklands at Camas Meadows, LLC PO Box 61962 Vancouver, WA 98666	15153	S15-360
		REPORT DATE: 06/16/15	FIELD ID: TP6.1
		DATE SAMPLED: 06/04/15	SAMPLED BY: HDG

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Sandy Fat CLAY	Test Pit TP-06 depth = 2.5 feet	CH, Sandy Fat Clay

SPECIFICATIONS	AASHTO SOIL TYPE
none	A-7-6(14)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913, D422

ADDITIONAL DATA

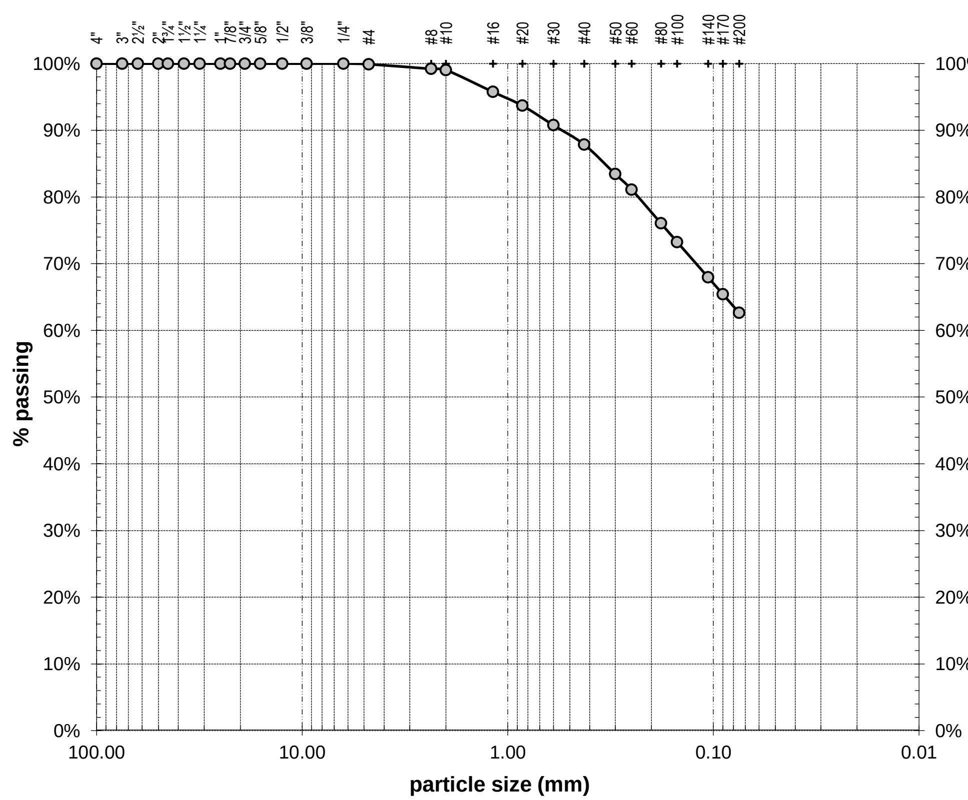
initial dry mass (g) =	173.4		
as-received moisture content =	32.3%	coefficient of curvature, C_C =	n/a
liquid limit =	51	coefficient of uniformity, C_U =	n/a
plastic limit =	26	effective size, $D_{(10)}$ =	n/a
plasticity index =	25	$D_{(30)}$ =	n/a
fineness modulus =	n/a	$D_{(60)}$ =	n/a

SIEVE DATA

% gravel = 0.1%
% sand = 37.3%
% silt and clay = 62.6%

	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50		100.0%		
	1/4"	6.30	100.0%			
	#4	4.75	99.9%			
SAND	#8	2.36		99.2%		
	#10	2.00	99.0%			
	#16	1.18		95.7%		
	#20	0.850	93.7%			
	#30	0.600		90.8%		
	#40	0.425	87.9%			
	#50	0.300		83.4%		
	#60	0.250	81.1%			
	#80	0.180		76.1%		
	#100	0.150	73.2%			
	#140	0.106		67.9%		
	#170	0.090		65.4%		
	#200	0.075	62.6%			

GRAIN SIZE DISTRIBUTION



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ATTERBERG LIMITS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Parklands at Camas Meadows Camas, Washington	Mr. Aaron Barr & Mr. Kevin Deford Parklands at Camas Meadows, LLC PO Box 61962 Vancouver, WA 98666	15153	S15-360
		REPORT DATE: 06/16/15	FIELD ID: TP6.1
		DATE SAMPLED: 06/04/15	SAMPLED BY: HDG

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Sandy Fat CLAY	Test Pit TP-06 depth = 2.5 feet	CH, Sandy Fat Clay

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Liquid Limit Machine, Hand Rolled	ASTM D4318

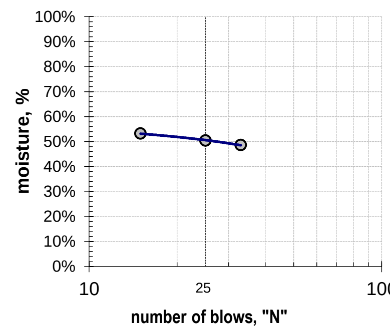
ATTERBERG LIMITS

liquid limit = 51
plastic limit = 26
plasticity index = 25

LIQUID LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	34.63	34.09	37.32	
dry soil + pan weight, g =	30.07	29.61	31.60	
pan weight, g =	20.69	20.73	20.85	
N (blows) =	33	25	15	
moisture, % =	48.6 %	50.5 %	53.2 %	

LIQUID LIMIT



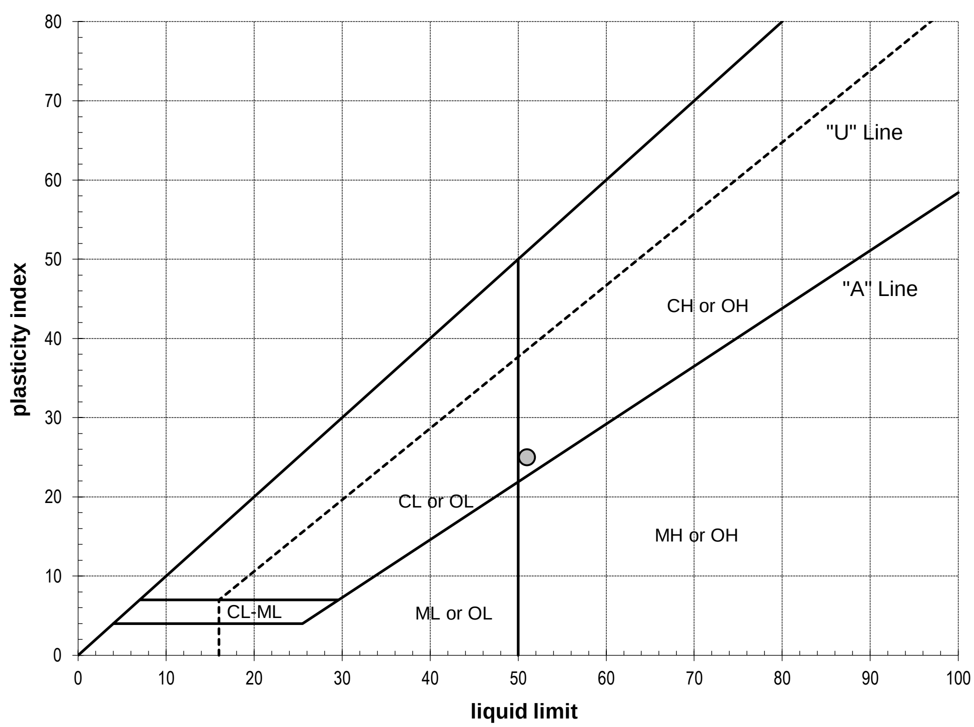
SHRINKAGE

shrinkage limit = n/a
shrinkage ratio = n/a

PLASTIC LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	27.64	27.63		
dry soil + pan weight, g =	26.18	26.21		
pan weight, g =	20.69	20.82		
moisture, % =	26.6 %	26.4 %		

PLASTICITY CHART



ADDITIONAL DATA

% gravel = 0.1%
% sand = 37.3%
% silt and clay = 62.6%
% silt = n/a
% clay = n/a
moisture content = 32.3%

DATE TESTED	TESTED BY
06/15/15	MJR

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Parklands at Camas Meadows Camas, Washington	Mr. Aaron Barr & Mr. Kevin Deford Parklands at Camas Meadows, LLC PO Box 61962 Vancouver, WA 98666	15153	S15-361
		REPORT DATE: 06/16/15	FIELD ID: TP8.2
		DATE SAMPLED: 06/04/15	SAMPLED BY: HDG

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Clayey SAND	Test Pit TP-08 depth = 8 feet	SC, Clayey Sand

SPECIFICATIONS	AASHTO SOIL TYPE
none	A-2-7(0)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913, D422

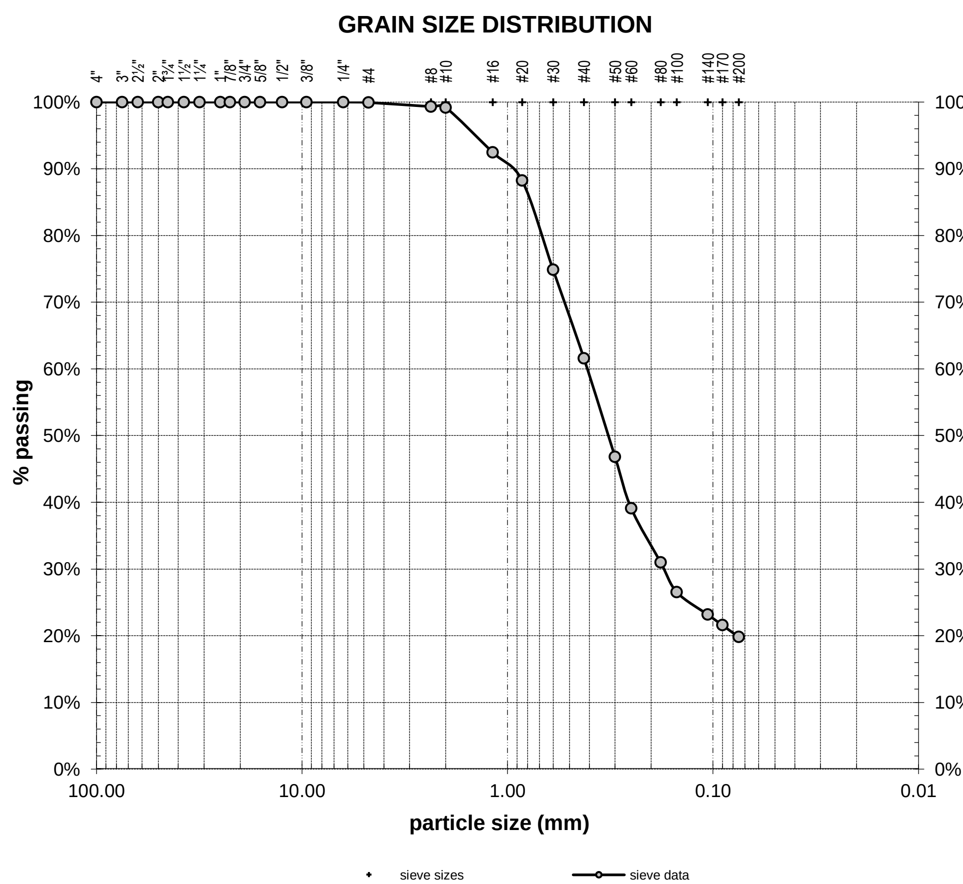
ADDITIONAL DATA

initial dry mass (g) =	151.9		
as-received moisture content =	42.6%	coefficient of curvature, C_C =	n/a
liquid limit =	43	coefficient of uniformity, C_U =	n/a
plastic limit =	25	effective size, $D_{(10)}$ =	n/a
plasticity index =	18	$D_{(30)}$ =	0.173 mm
fineness modulus =	n/a	$D_{(60)}$ =	0.410 mm

SIEVE DATA

% gravel = 0.1%
% sand = 80.1%
% silt and clay = 19.8%

	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0		100.0%		
	1.75"	45.0		100.0%		
	1.50"	37.5		100.0%		
	1.25"	31.5		100.0%		
	1.00"	25.0		100.0%		
	7/8"	22.4		100.0%		
	3/4"	19.0		100.0%		
	5/8"	16.0		100.0%		
	1/2"	12.5		100.0%		
	3/8"	9.50		100.0%		
	1/4"	6.30	100.0%			
	#4	4.75	99.9%			
SAND	#8	2.36		99.3%		
	#10	2.00	99.2%			
	#16	1.18		92.4%		
	#20	0.850	88.3%			
	#30	0.600		74.8%		
	#40	0.425	61.6%			
	#50	0.300		46.8%		
	#60	0.250	39.1%			
	#80	0.180		31.0%		
	#100	0.150	26.5%			
	#140	0.106		23.2%		
	#170	0.090		21.6%		
	#200	0.075	19.8%			



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ATTERBERG LIMITS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Parklands at Camas Meadows Camas, Washington	Mr. Aaron Barr & Mr. Kevin Deford Parklands at Camas Meadows, LLC PO Box 61962 Vancouver, WA 98666	15153	S15-361
		REPORT DATE: 06/16/15	FIELD ID: TP8.2
		DATE SAMPLED: 06/04/15	SAMPLED BY: HDG

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Clayey SAND	Test Pit TP-08 depth = 8 feet	SC, Clayey Sand

LABORATORY TEST DATA

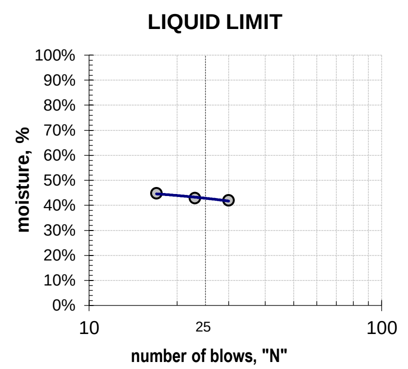
LABORATORY EQUIPMENT	TEST PROCEDURE
Liquid Limit Machine, Hand Rolled	ASTM D4318

ATTERBERG LIMITS

liquid limit = 43
plastic limit = 25
plasticity index = 18

LIQUID LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	39.55	37.83	35.98	
dry soil + pan weight, g =	33.98	32.70	31.23	
pan weight, g =	20.69	20.73	20.63	
N (blows) =	30	23	17	
moisture, % =	41.9 %	42.9 %	44.8 %	

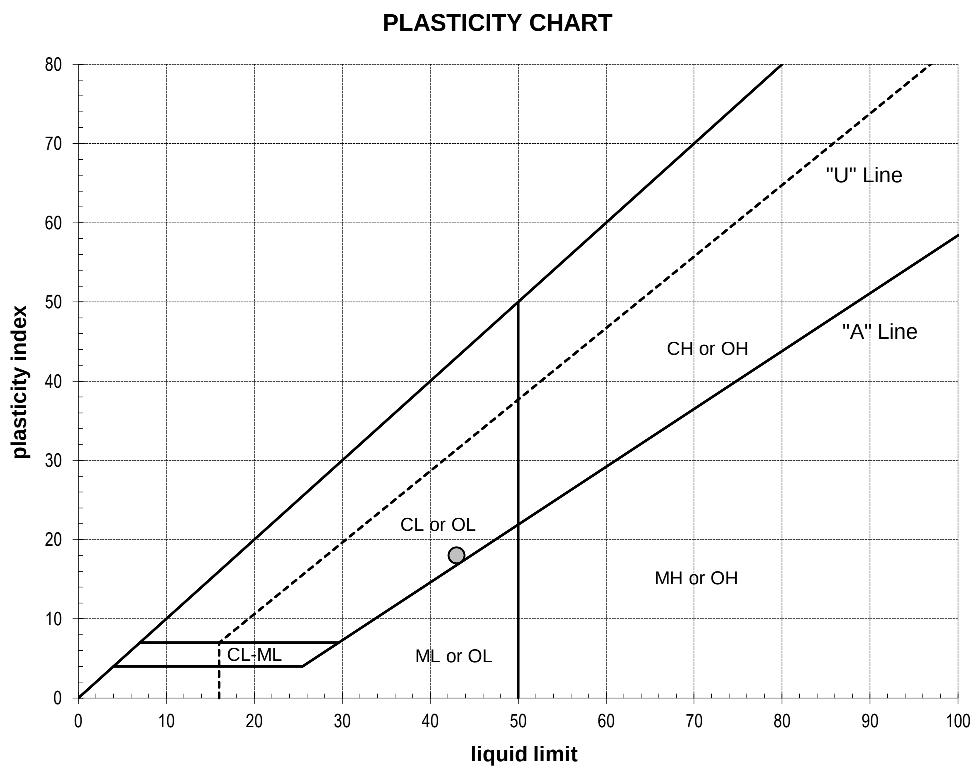


SHRINKAGE

shrinkage limit = n/a
shrinkage ratio = n/a

PLASTIC LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	27.97	28.28		
dry soil + pan weight, g =	26.54	26.79		
pan weight, g =	20.74	20.77		
moisture, % =	24.7 %	24.8 %		



ADDITIONAL DATA

% gravel = 0.1%
% sand = 80.1%
% silt and clay = 19.8%
% silt = n/a
% clay = n/a
moisture content = 42.6%

DATE TESTED	TESTED BY
06/15/15	MJR

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PARTICLE-SIZE ANALYSIS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Parklands at Camas Meadows Camas, Washington	Mr. Aaron Barr & Mr. Kevin Deford Parklands at Camas Meadows, LLC PO Box 61962 Vancouver, WA 98666	15153	S15-362
		REPORT DATE: 06/16/15	FIELD ID: TP8.3
		DATE SAMPLED: 06/04/15	SAMPLED BY: HDG

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Poorly graded GRAVEL with Silt and Sand	Test Pit TP-08 depth = 12 feet	GP-GM, Poorly graded gravel with silt and sand

SPECIFICATIONS	AASHTO SOIL TYPE
none	A-2-7(0)

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Rainhart "Mary Ann" Sifter 637	ASTM D6913, D422

ADDITIONAL DATA

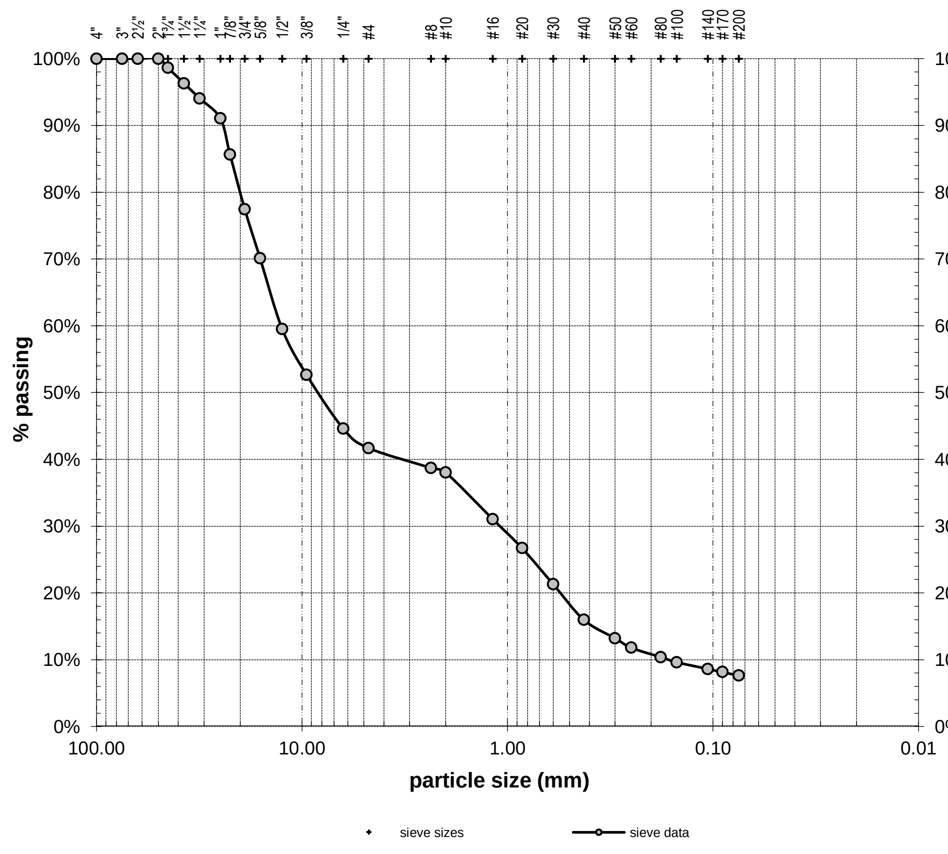
initial dry mass (g) =	3089.1		
as-received moisture content =	33.2%	coefficient of curvature, C_C =	0.57
liquid limit =	46	coefficient of uniformity, C_U =	76.93
plastic limit =	28	effective size, $D_{(10)}$ =	0.164 mm
plasticity index =	18	$D_{(30)}$ =	1.091 mm
fineness modulus =	n/a	$D_{(60)}$ =	12.637 mm

SIEVE DATA

% gravel = 58.3%
% sand = 34.1%
% silt and clay = 7.6%

	SIEVE SIZE US	SIEVE SIZE mm	PERCENT PASSING SIEVE act.	PERCENT PASSING SIEVE interp.	SPECS max	SPECS min
GRAVEL	6.00"	150.0		100.0%		
	4.00"	100.0		100.0%		
	3.00"	75.0		100.0%		
	2.50"	63.0		100.0%		
	2.00"	50.0	100.0%			
	1.75"	45.0		98.6%		
	1.50"	37.5		96.3%		
	1.25"	31.5		94.0%		
	1.00"	25.0	91.1%			
	7/8"	22.4		85.6%		
	3/4"	19.0	77.5%			
	5/8"	16.0		70.1%		
	1/2"	12.5	59.5%			
	3/8"	9.50	52.6%			
	1/4"	6.30	44.6%			
	#4	4.75	41.7%			
SAND	#8	2.36		38.7%		
	#10	2.00	38.0%			
	#16	1.18		31.0%		
	#20	0.850	26.7%			
	#30	0.600		21.3%		
	#40	0.425	16.0%			
	#50	0.300		13.2%		
	#60	0.250	11.8%			
	#80	0.180		10.4%		
	#100	0.150	9.6%			
	#140	0.106		8.6%		
	#170	0.090		8.1%		
	#200	0.075	7.6%			

GRAIN SIZE DISTRIBUTION



DATE TESTED	TESTED BY
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ATTERBERG LIMITS REPORT

PROJECT	CLIENT	PROJECT NO.	LAB ID
Parklands at Camas Meadows Camas, Washington	Mr. Aaron Barr & Mr. Kevin Deford Parklands at Camas Meadows, LLC PO Box 61962 Vancouver, WA 98666	15153	S15-362
		REPORT DATE 06/16/15	**FIELD ID** TP8.3
		DATE SAMPLED 06/04/15	**SAMPLED BY** HDG

MATERIAL DATA

MATERIAL SAMPLED	MATERIAL SOURCE	USCS SOIL TYPE
Poorly graded GRAVEL with Silt and Sand	Test Pit TP-08 depth = 12 feet	GP-GM, Poorly graded gravel with silt and sand

LABORATORY TEST DATA

LABORATORY EQUIPMENT	TEST PROCEDURE
Liquid Limit Machine, Hand Rolled	ASTM D4318

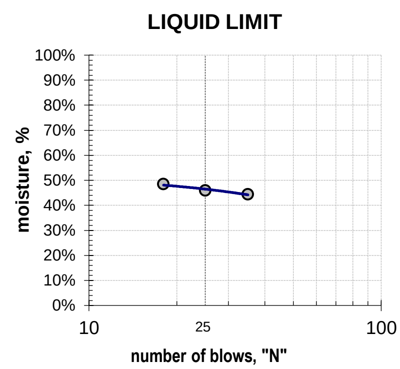
ATTERBERG LIMITS

liquid limit =	46
plastic limit =	28
plasticity index =	18

LIQUID LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	39.57	37.55	37.51	
dry soil + pan weight, g =	33.76	32.29	32.08	
pan weight, g =	20.69	20.82	20.87	
N (blows) =	35	25	18	
moisture, % =	44.5 %	45.9 %	48.4 %	

LIQUID LIMIT



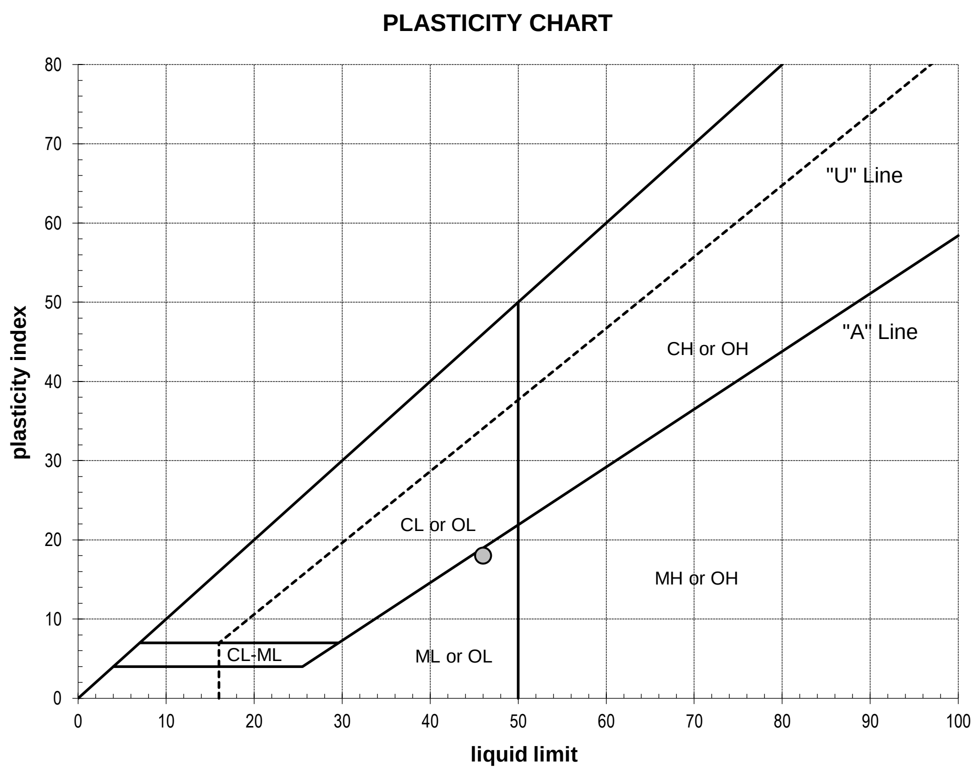
SHRINKAGE

shrinkage limit =	n/a
shrinkage ratio =	n/a

PLASTIC LIMIT DETERMINATION

	❶	❷	❸	❹
wet soil + pan weight, g =	27.57	27.51		
dry soil + pan weight, g =	26.11	26.06		
pan weight, g =	20.82	20.80		
moisture, % =	27.6 %	27.6 %		

PLASTICITY CHART



ADDITIONAL DATA

% gravel =	58.3%
% sand =	34.1%
% silt and clay =	7.6%
% silt =	n/a
% clay =	n/a
moisture content =	33.2%

DATE TESTED	TESTED BY
06/15/15	MJR

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APPENDIX B
SUBSURFACE EXPLORATION LOGS

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
The Parklands at Camas Meadows	Parklands, LLC		15153	TP-1
PROJECT LOCATION	**CONTRACTOR**	**EQUIPMENT**	**ENGINEER**	**DATE**
Camas, Washington		Excavator	HDG	6/4/15
TEST PIT LOCATION	**APPROX. SURFACE ELEVATION**	**GROUNDWATER DEPTH**	**START TIME**	**FINISH TIME**
See Figure 2	186	2.5 ft bgs	1030	1035

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 10 to 12 inches of topsoil and root zone material.					
				GP-GM		Poorly graded GRAVEL with silt and sand, dense, wet to saturated. Represents weathered conglomerate bedrock. Difficult excavation. 6" to 8" weathered cobbles observed.					
						Refusal at 3.0 feet, competent conglomerate bedrock encountered. Bottom of test pit at 3.0 feet. Groundwater encountered at 2.5 feet.					
5											
10											
15											
20											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
The Parklands at Camas Meadows	Parklands, LLC		15153	TP-2
PROJECT LOCATION: Camas, Washington	CONTRACTOR:	EQUIPMENT: Excavator	ENGINEER: HDG	DATE: 6/4/15
TEST PIT LOCATION: See Figure 2	APPROX. SURFACE ELEVATION: 190	GROUNDWATER DEPTH: Not encountered.	START TIME: 1000	FINISH TIME: 1015

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 12 to 14 inches of topsoil and root zone material.					
				GP-GM		Poorly graded GRAVEL with silt and sand, dense, wet to saturated. Represents weathered conglomerate bedrock. Difficult excavation. 6" to 8" weathered cobbles observed.					
						Refusal at 3.5 feet, competent conglomerate bedrock encountered. Bottom of test pit at 3.5 feet. Groundwater not encoutered.					
5											
10											
15											
20											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
The Parklands at Camas Meadows	Parklands, LLC		15153	TP-3
PROJECT LOCATION	CONTRACTOR	EQUIPMENT	ENGINEER	DATE
Camas, Washington		Excavator	HDG	6/4/15
TEST PIT LOCATION	APPROX. SURFACE ELEVATION	GROUNDWATER DEPTH	START TIME	FINISH TIME
See Figure 2	208	Not encountered.	1115	1130

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 16 to 18 inches of topsoil and root zone material.					
	TP3.1		A-7-6(7)	CL		Brown sandy CLAY, moist, medium stiff, fines are medium plasticity.	36.4	57.1	44	16	
				GP-GM		Poorly graded GRAVEL with silt and sand, dense, wet to saturated, gravels are rounded to subrounded. Represents weathered conglomerate bedrock. Difficult excavation.					
5						Refusal at 4.5 feet, competent conglomerate bedrock encountered. Bottom of test pit at 4.5 feet. Groundwater not encoutered.					
10											
15											
20											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
The Parklands at Camas Meadows	Parklands, LLC		15153	TP-4
PROJECT LOCATION: Camas, Washington	CONTRACTOR:	EQUIPMENT: Excavator	ENGINEER: HDG	DATE: 6/4/15
TEST PIT LOCATION: See Figure 2	APPROX. SURFACE ELEVATION: 214	GROUNDWATER DEPTH: Not encountered.	START TIME: 1150	FINISH TIME: 1200

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 12 to 16 inches of topsoil and root zone material.					
				CL		Brown sandy CLAY, moist, medium stiff, fines are medium plasticity.					
				GP-GM		Poorly graded GRAVEL with silt and sand, dense, wet to saturated, gravels are rounded to subrounded. Represents weathered conglomerate bedrock.					
						Refusal at 3.0 feet, competent conglomerate bedrock encountered. Bottom of test pit at 3.0 feet. Groundwater not encountered.					
5											
10											
15											
20											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
The Parklands at Camas Meadows	Parklands, LLC		15153	TP-5
PROJECT LOCATION Camas, Washington	CONTRACTOR	EQUIPMENT Excavator	ENGINEER HDG	DATE 6/4/15
TEST PIT LOCATION See Figure 2	APPROX. SURFACE ELEVATION 228	GROUNDWATER DEPTH Not encountered.	START TIME 1245	FINISH TIME 1255

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 12 to 14 inches of topsoil and root zone material.					
				CL		Brown sandy CLAY, moist, medium stiff, fines are medium plasticity.					
				GP-GM		Poorly graded GRAVEL with silt and sand, dense, wet to saturated, gravels are rounded to subrounded. Represents weathered conglomerate bedrock. Difficult excavation.					
5						Refusal at 4.5 feet, competent conglomerate bedrock encountered. Bottom of test pit at 4.5 feet. Groundwater not encoutered.					
10											
15											
20											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
The Parklands at Camas Meadows	Parklands, LLC		15153	TP-6
PROJECT LOCATION: Camas, Washington	CONTRACTOR:	EQUIPMENT: Excavator	ENGINEER: HDG	DATE: 6/4/15
TEST PIT LOCATION: See Figure 2	APPROX. SURFACE ELEVATION: 210	GROUNDWATER DEPTH: Not encountered.	START TIME: 1215	FINISH TIME: 1230

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 12 to 14 inches of topsoil and root zone material.					
	TP6.1		A-7-6(14)	CH		Brown sandy FAT CLAY, moist, medium stiff, fines are moderate to high plasticity.	32.3	62.6	51	25	
5				GP-GM		Poorly graded GRAVEL with silt and sand, dense, wet to saturated, gravels are rounded to subrounded. Represents weathered conglomerate bedrock. Difficult excavation. 6" to 8" weathered cobbles observed.					
						Refusal at 6.5 feet, competent conglomerate bedrock encountered. Bottom of test pit at 6.5 feet. Groundwater not encountered.					
10											
15											
20											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
The Parklands at Camas Meadows	Parklands, LLC		15153	TP-7
PROJECT LOCATION: Camas, Washington	CONTRACTOR:	EQUIPMENT: Excavator	ENGINEER: HDG	DATE: 6/4/15
TEST PIT LOCATION: See Figure 2	APPROX. SURFACE ELEVATION: 218	GROUNDWATER DEPTH: Not encountered.	START TIME: 810	FINISH TIME: 815

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 12 to 14 inches of topsoil and root zone material.					
				GP-GM		Poorly graded GRAVEL with silt and sand, dense, wet to saturated, gravels are rounded to subrounded. Represents weathered conglomerate bedrock. Difficult excavation. 6" to 8" weathered cobbles observed.					
						Refusal at 3.5 feet, competent conglomerate bedrock encountered. Bottom of test pit at 3.5 feet. Groundwater not encoutered.					
5											
10											
15											
20											

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TEST PIT LOG

PROJECT NAME	CLIENT		PROJECT NO.	TEST PIT NO.
The Parklands at Camas Meadows	Parklands, LLC		15153	TP-8
PROJECT LOCATION: Camas, Washington	CONTRACTOR:	EQUIPMENT: Excavator	ENGINEER: HDG	DATE: 6/4/15
TEST PIT LOCATION: See Figure 2	APPROX. SURFACE ELEVATION: 210	GROUNDWATER DEPTH: Not encountered	START TIME: 830	FINISH TIME: 900

Depth (feet)	Sample Field ID	SCS Soil Survey Description	AASHTO Soil Type	USCS Soil Type	Graphic Log	LITHOLOGIC DESCRIPTION AND REMARKS	Moisture Content (%)	Passing No. 200 Sieve (%)	Liquid Limit	Plasticity Index	Infiltration Testing
0						Approximately 16 to 18 inches of topsoil and root zone material.					
				CL		Brown sandy CLAY, moist, medium stiff, fines are medium plasticity.					
5				SC		Light brown clayey SAND, moist, dense, lightly cemented, fines are medium plasticity.					
	TP8.2		A-2-7(0)				42.6	19.8	43	18	
						Difficult excavation.					
10											
	TP8.3		A-2-7(0)	GP-GM		Poorly graded GRAVEL with silt and sand, dense, saturated, gravels are subrounded to rounded.	33.2	7.6	46	18	
15						Groundwater seep.					
						Refusal at 16.5 feet, competent conglomerate bedrock encountered.. Bottom of test pit at 16.5 feet. Groundwater encoutered at 15.5 feet.					
20											

APPENDIX C
SOIL CLASSIFICATION INFORMATION

SOIL DESCRIPTION AND CLASSIFICATION GUIDELINES

Particle-Size Classification

COMPONENT	ASTM/USCS		AASHTO	
	size range	sieve size range	size range	sieve size range
Cobbles	> 75 mm	greater than 3 inches	> 75 mm	greater than 3 inches
Gravel	75 mm – 4.75 mm	3 inches to No. 4 sieve	75 mm – 2.00 mm	3 inches to No. 10 sieve
Coarse	75 mm – 19.0 mm	3 inches to 3/4-inch sieve	-	-
Fine	19.0 mm – 4.75 mm	3/4-inch to No. 4 sieve	-	-
Sand	4.75 mm – 0.075 mm	No. 4 to No. 200 sieve	2.00 mm – 0.075 mm	No. 10 to No. 200 sieve
Coarse	4.75 mm – 2.00 mm	No. 4 to No. 10 sieve	2.00 mm – 0.425 mm	No. 10 to No. 40 sieve
Medium	2.00 mm – 0.425 mm	No. 10 to No. 40 sieve	-	-
Fine	0.425 mm – 0.075 mm	No. 40 to No. 200 sieve	0.425 mm – 0.075 mm	No. 40 to No. 200 sieve
Fines (Silt and Clay)	< 0.075 mm	Passing No. 200 sieve	< 0.075 mm	Passing No. 200 sieve

Consistency for Cohesive Soil

CONSISTENCY	SPT N-VALUE (BLOWS PER FOOT)	POCKET PENETROMETER (UNCONFINED COMPRESSIVE STRENGTH, tsf)
Very Soft	2	less than 0.25
Soft	2 to 4	0.25 to 0.50
Medium Stiff	4 to 8	0.50 to 1.0
Stiff	8 to 15	1.0 to 2.0
Very Stiff	15 to 30	2.0 to 4.0
Hard	30 to 60	greater than 4.0
Very Hard	greater than 60	-

Relative Density for Granular Soil

RELATIVE DENSITY	SPT N-VALUE (BLOWS PER FOOT)
Very Loose	0 to 4
Loose	4 to 10
Medium Dense	10 to 30
Dense	30 to 50
Very Dense	more than 50

Moisture Designations

TERM	FIELD IDENTIFICATION
Dry	No moisture. Dusty or dry.
Damp	Some moisture. Cohesive soils are usually below plastic limit and are moldable.
Moist	Grains appear darkened, but no visible water is present. Cohesive soils will clump. Sand will bulk. Soils are often at or near plastic limit.
Wet	Visible water on larger grains. Sand and silt exhibit dilatancy. Cohesive soil can be readily remolded. Soil leaves wetness on the hand when squeezed. Soil is much wetter than optimum moisture content and is above plastic limit.

AASHTO SOIL CLASSIFICATION SYSTEM

TABLE 1. Classification of Soils and Soil-Aggregate Mixtures

General Classification	Granular Materials (35 Percent or Less Passing .075 mm)			Silt-Clay Materials (More than 35 Percent Passing 0.075)			
Group Classification	A-1	A-3	A-2	A-4	A-5	A-6	A-7
Sieve analysis, percent passing:							
2.00 mm (No. 10)	-	-	-				
0.425 mm (No. 40)	50 max	51 min	-	-	-	-	-
0.075 mm (No. 200)	25 max	10 max	35 max	36 min	36 min	36 min	36 min
Characteristics of fraction passing 0.425 mm (No. 40)							
Liquid limit				40 max	41 min	40 max	41 min
Plasticity index	6 max	N.P.		10 max	10 max	11 min	11 min
General rating as subgrade	Excellent to good			Fair to poor			

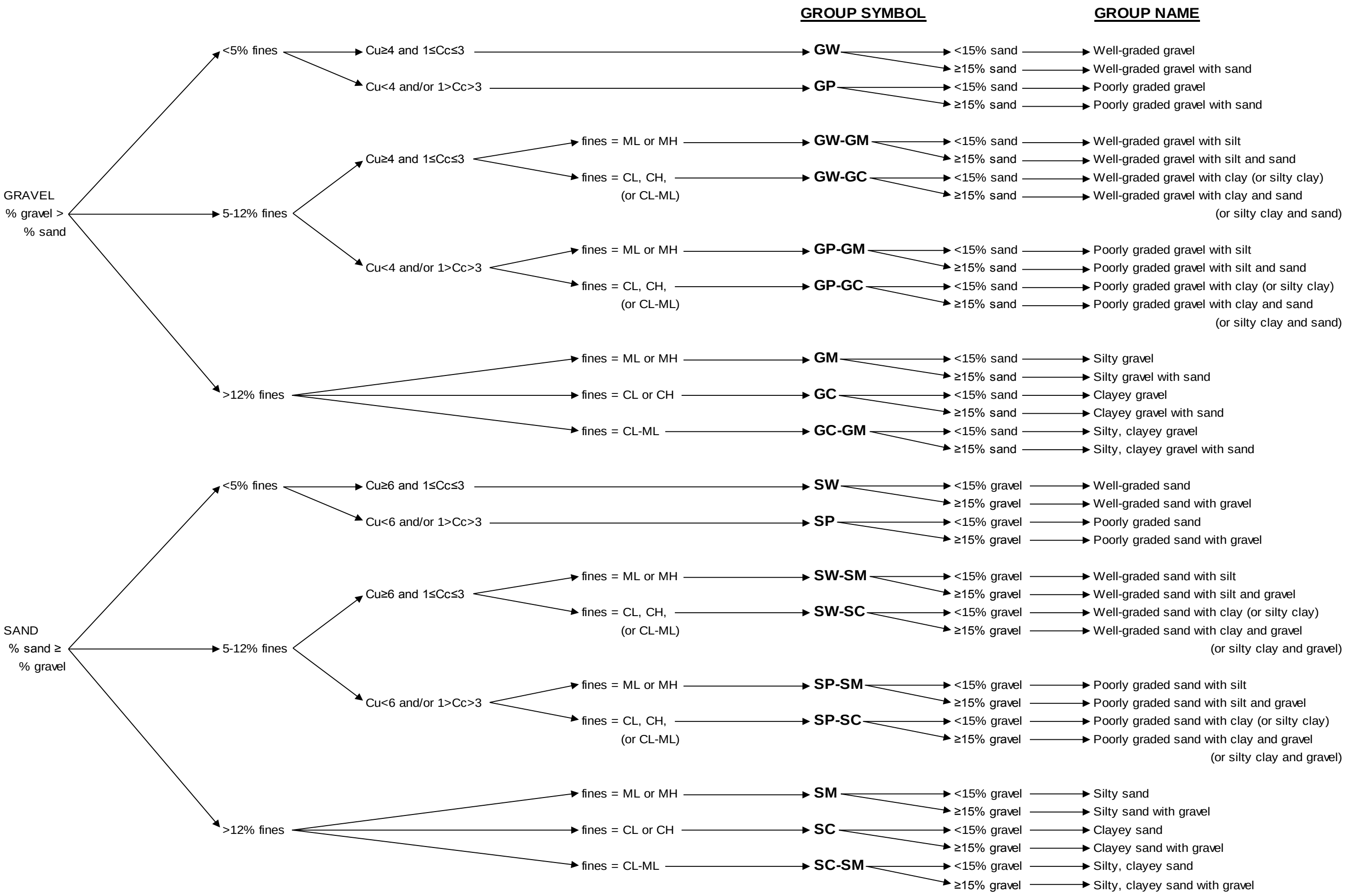
Note: The placing of A-3 before A-2 is necessary in the "left to right elimination process" and does not indicate superiority of A-3 over A-2.

TABLE 2. Classification of Soils and Soil-Aggregate Mixtures

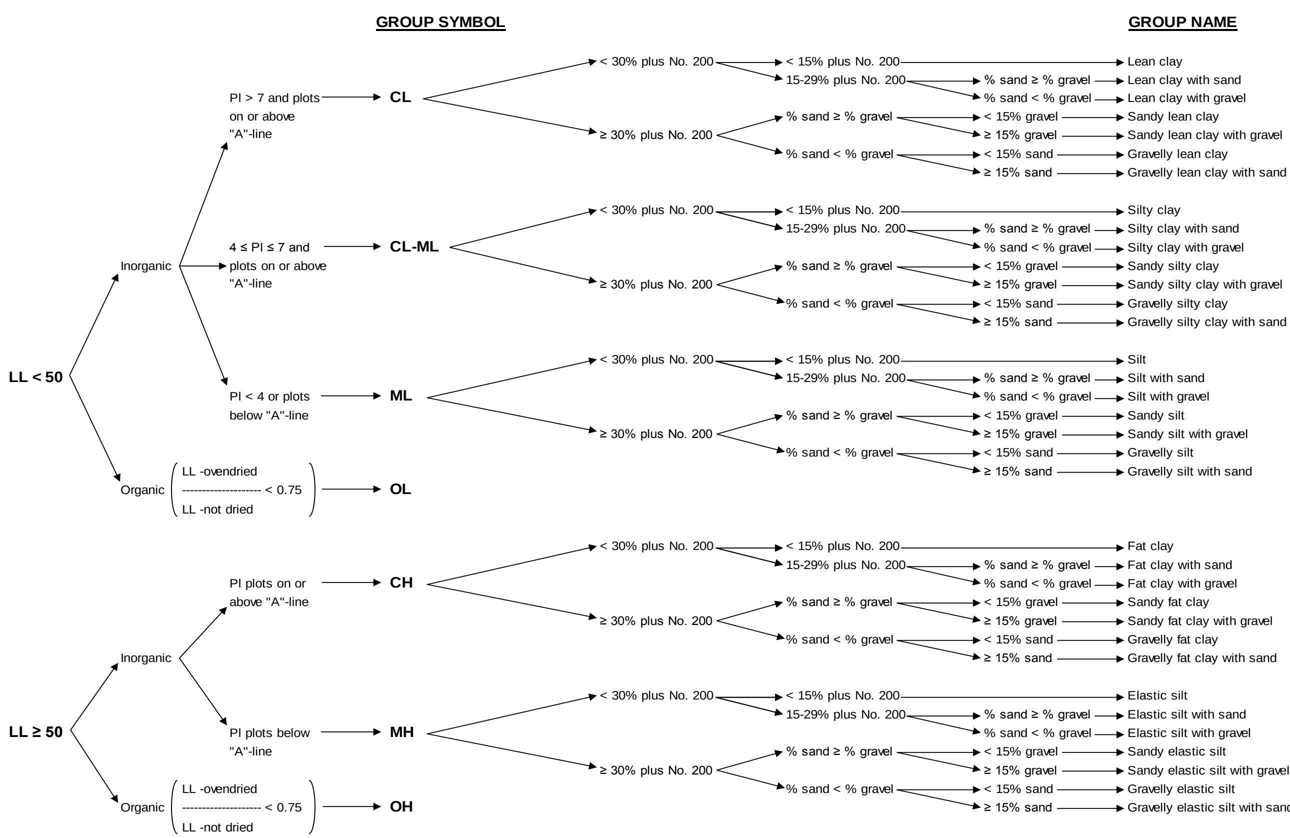
General Classification	Granular Materials (35 Percent or Less Passing 0.075 mm)							Silt-Clay Materials (More than 35 Percent Passing 0.075 mm)			
	A-1			A-2							A-7
Group Classification	A-1-a	A-1-b	A-3	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7-5, A-7-6
Sieve analysis, percent passing:											
2.00 mm (No. 10)	50 max	-	-	-	-	-	-	-	-	-	-
0.425 mm (No. 40)	30 max	50 max	51 min	-	-	-	-	-	-	-	-
0.075 mm (No. 200)	15 max	25 max	10 max	35 max	35 max	35 max	35 max	36 min	36 min	36 min	36 min
Characteristics of fraction passing 0.425 mm (No. 40)											
Liquid limit				40 max	41 min	40 max	41 min	40 max	41 min	40 max	41 min
Plasticity index	6 max		N.P.	10 max	10 max	11 min	11 min	10 max	10 max	11 min	11min
Usual types of significant constituent materials	Stone fragments, gravel and sand		Fine sand	Silty or clayey gravel and sand				Silty soils		Clayey soils	
General ratings as subgrade	Excellent to Good							Fair to poor			

Note: Plasticity index of A-7-5 subgroup is equal to or less than LL minus 30. Plasticity index of A-7-6 subgroup is greater than LL minus 30 (see Figure 2).

AASHTO = American Association of State Highway and Transportation Officials



Flow Chart for Classifying Coarse-Grained Soils (More Than 50% Retained on No. 200 Sieve)



Flow Chart for Classifying Fine-Grained Soil (50% or More Passes No. 200 Sieve)

APPENDIX D
PHOTO LOG

PHOTO LOG
Parklands at Camas Meadows
Camas, Washington

Shallow conglomerate bedrock in Test Pit TP-1

Shallow hyaoclastic sandstone bedrock in Test Pit TP-3

Shallow groundwater near Test Pit TP-1

Deeper conglomerate bedrock encountered in Test Pit TP-8

APPENDIX E
REPORT LIMITATIONS AND IMPORTANT INFORMATION

Geotechnical ▪ Environmental ▪ Special Inspections
Columbia West Engineering, Inc

Date: June 23, 2015
Project: Parklands at Camas Meadows
Camas, Washington

Geotechnical and Environmental Report Limitations and Important Information

Report Purpose, Use, and Standard of Care

This report has been prepared in accordance with standard fundamental principles and practices of geotechnical engineering and/or environmental consulting, and in a manner consistent with the level of care and skill typical of currently practicing local engineers and consultants. This report has been prepared to meet the specific needs of specific individuals for the indicated site. It may not be adequate for use by other consultants, contractors, or engineers, or if change in project ownership has occurred. It should not be used for any other reason than its stated purpose without prior consultation with Columbia West Engineering, Inc. (Columbia West). It is a unique report and not applicable for any other site or project. If site conditions are altered, or if modifications to the project description or proposed plans are made after the date of this report, it may not be valid. Columbia West cannot accept responsibility for use of this report by other individuals for unauthorized purposes, or if problems occur resulting from changes in site conditions for which Columbia West was not aware or informed.

Report Conclusions and Preliminary Nature

This geotechnical or environmental report should be considered preliminary and summary in nature. The recommendations contained herein have been established by engineering interpretations of subsurface soils based upon conditions observed during site exploration. The exploration and associated laboratory analysis of collected representative samples identifies soil conditions at specific discreet locations. It is assumed that these conditions are indicative of actual conditions throughout the subject property. However, soil conditions may differ between tested locations at different seasonal times of the year, either by natural causes or human activity. Distinction between soil types may be more abrupt or gradual than indicated on the soil logs. This report is not intended to stand alone without understanding of concomitant instructions, correspondence, communication, or potential supplemental reports that may have been provided to the client.

Because this report is based upon observations obtained at the time of exploration, its adequacy may be compromised with time. This is particularly relevant in the case of natural disasters, earthquakes, floods, or other significant events. Report conclusions or interpretations may also be subject to revision if significant development or other manmade impacts occur within or in proximity to the subject property. Groundwater conditions, if presented in this report, reflect observed conditions at the time of investigation. These conditions may change annually, seasonally or as a result of adjacent development.

Additional Investigation and Construction QA/QC

Columbia West should be consulted prior to construction to assess whether additional investigation above and beyond that presented in this report is necessary. Even slight variations in soil or site conditions may produce impacts to the performance of structural facilities if not adequately addressed. This underscores the importance of diligent QA/QC construction observation and testing to verify soil conditions do not differ materially or significantly from the interpreted conditions utilized for preparation of this report.

Therefore, this report contains several recommendations for field observation and testing by Columbia West personnel during construction activities. Actual subsurface conditions are more readily observed and discerned during the earthwork phase of construction when soils are exposed. Columbia West cannot accept responsibility for deviations from recommendations described in this report or future performance of structural facilities if another consultant is retained during the construction phase or Columbia West is not engaged to provide construction observation to the full extent recommended.

Collected Samples

Uncontaminated samples of soil or rock collected in connection with this report will be retained for thirty days. Retention of such samples beyond thirty days will occur only at client's request and in return for payment of storage charges incurred. All contaminated or environmentally impacted materials or samples are the sole property of the client. Client maintains responsibility for proper disposal.

Report Contents

This geotechnical or environmental report should not be copied or duplicated unless in full, and even then only under prior written consent by Columbia West, as indicated in further detail in the following text section entitled *Report Ownership*. The recommendations, interpretations, and suggestions presented in this report are only understandable in context of reference to the whole report. Under no circumstances should the soil boring or test pit excavation logs, monitor well logs, or laboratory analytical reports be separated from the remainder of the report. The logs or reports should not be redrawn or summarized by other entities for inclusion in architectural or civil drawings, or other relevant applications.

Report Limitations for Contractors

Geotechnical or environmental reports, unless otherwise specifically noted, are not prepared for the purpose of developing cost estimates or bids by contractors. The extent of exploration or investigation conducted as part of this report is usually less than that necessary for contractor's needs. Contractors should be advised of these report limitations, particularly as they relate to development of cost estimates. Contractors may gain valuable information from this report, but should rely upon their own interpretations as to how subsurface conditions may affect cost, feasibility, accessibility and other components of the project work. If believed necessary or relevant, contractors should conduct additional exploratory investigation to obtain satisfactory data for the purposes of developing adequate cost estimates. Clients or developers cannot insulate themselves from attendant liability by disclaiming accuracy for subsurface ground conditions without advising contractors appropriately and providing the best information possible to limit potential for cost overruns, construction problems, or misunderstandings.

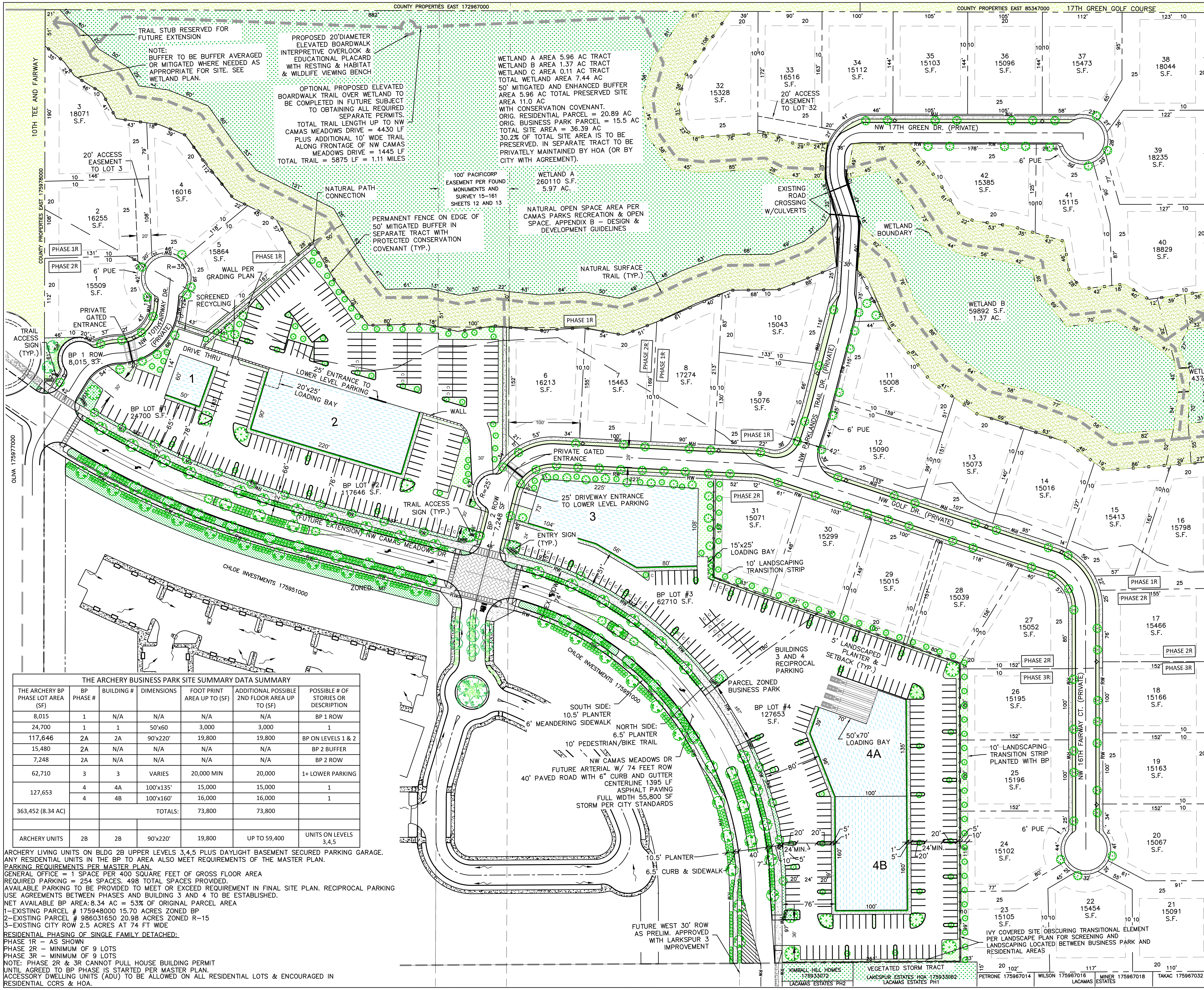
Report Ownership

Columbia West retains the ownership and copyright property rights to this entire report and its contents, which may include, but may not be limited to, figures, text, logs, electronic media, drawings, laboratory reports, and appendices. This report was prepared solely for the client, and other relevant approved users or parties, and its distribution must be contingent upon prior express written consent by Columbia West. Furthermore, client or approved users may not use, lend, sell, copy, or distribute this document without express written consent by Columbia West. Client does not own nor have rights to electronic media files that constitute this report, and under no circumstances should said electronic files be distributed or copied. Electronic media is susceptible to unauthorized manipulation or modification, and may not be reliable.

Consultant Responsibility

Geotechnical and environmental engineering and consulting is much less exact than other scientific or engineering disciplines, and relies heavily upon experience, judgment, interpretation, and opinion often based upon media (soils) that are variable, anisotropic, and non-homogenous. This often results in unrealistic expectations, unwarranted claims, and uninformed disputes against a geotechnical or environmental consultant. To reduce potential for these problems and assist relevant parties in better understanding of risk, liability, and responsibility, geotechnical and environmental reports often provide definitive statements or clauses defining and outlining consultant responsibility. The client is encouraged to read these statements carefully and request additional information from Columbia West if necessary.

EXHIBIT 20



THE ARCHERY BUSINESS PARK SITE SUMMARY DATA SUMMARY						
THE ARCHERY BP PHASE LOT AREA (SF)	BP PHASE #	BUILDING #	DIMENSIONS	FOOT PRINT AREA UP TO (SF)	ADDITIONAL POSSIBLE 2ND FLOOR AREA UP TO (SF)	POSSIBLE # OF STORIES OR DESCRIPTION
8,015	1	N/A	N/A	N/A	N/A	BP 1 ROW
24,700	1	1	50'x60	3,000	3,000	1
117,646	2A	2A	90'x220'	19,800	19,800	BP ON LEVELS 1 & 2
15,480	2A	N/A	N/A	N/A	N/A	BP 2 BUFFER
7,248	2A	N/A	N/A	N/A	N/A	BP 2 ROW
62,710	3	3	VARIES	20,000 MIN	20,000	1+ LOWER PARKING
127,653	4	4A	100'x135'	15,000	15,000	1
	4	4B	100'x160'	16,000	16,000	1
363,452 (8.34 AC)			TOTALS:	73,800	73,800	
ARCHERY UNITS	2B	2B	90'x220'	19,800	UP TO 59,400	UNITS ON LEVELS 3,4,5

ARCHERY LIVING UNITS ON BLDG 2B UPPER LEVELS 3,4,5 PLUS DAYLIGHT BASEMENT SECURED PARKING GARAGE.
ANY RESIDENTIAL UNITS IN THE BP TO AREA ALSO MEET REQUIREMENTS OF THE MASTER PLAN.

PARKING REQUIREMENTS PER MASTER PLAN.
GENERAL OFFICE = 1 SPACE PER 400 SQUARE FEET OF GROSS FLOOR AREA
REQUIRED PARKING = 254 SPACES. 498 TOTAL SPACES PROVIDED.
AVAILABLE PARKING TO BE PROVIDED TO MEET OR EXCEED REQUIREMENT IN FINAL SITE PLAN. RECIPROCAL PARKING USE AGREEMENTS BETWEEN PHASES AND BUILDING 3 AND 4 TO BE ESTABLISHED.
NET AVAILABLE BP AREA: 8.34 AC = 53% OF ORIGINAL PARCEL AREA
1-EXISTING PARCEL # 175948000 15.70 ACRES ZONED BP
2-EXISTING PARCEL # 986031650 20.98 ACRES ZONED R-15
3-EXISTING CITY ROW 2.5 ACRES AT 74 FT WIDE

RESIDENTIAL PHASING OF SINGLE FAMILY DETACHED:
PHASE 1R - AS SHOWN
PHASE 2R - MINIMUM OF 9 LOTS
PHASE 3R - MINIMUM OF 9 LOTS
NOTE: PHASE 2R & 3R CANNOT PULL HOUSE BUILDING PERMIT UNTIL AGREED TO BP PHASE IS STARTED PER MASTER PLAN.
ACCESSORY DWELLING UNITS (ADU) TO BE ALLOWED ON ALL RESIDENTIAL LOTS & ENCOURAGED IN RESIDENTIAL CCRS & HOA.

DEVELOPER & APPLICANT:
PARKLANDS AT CAMAS MEADOWS LLC
KEVIN DEFORD 360-823-6222 ngdelopment@gmail.com
AARON BARR 503-319-4021 abarrmail@gmail.com
20705 SE EVERGREEN HWY CAMAS, WA 98607

FOR ALL LOTS WITH ACCESS EASEMENTS NOTE:
PER TABLE 17.19.040-1 FOOT NOTE 2, SHARED ACCESS TO 1 OR 2 LOTS = 20' WIDE PRIVATE EASEMENT WITH 12'-20' PAVED, NO PARKING AND ALL LOTS SPRINKLERED.

BOUNDARIES:
BOUNDARIES ARE BASED ON SURVEY FROM MGS AND WETLAND BOUNDARY FROM ECOLOGICAL LAND SERVICES,INC. FINAL BOUNDARIES AND LOT LINES MAY CHANGE SLIGHTLY PRIOR TO FINAL ENGINEERING AND FINAL PLAT.

PRELIMINARY PLAT AND BINDING SITE PLAN:
REFER TO MASTER PLAN AND DEVELOPMENT AGREEMENT D.A. FOR PROJECT SPECIFIC RESIDENTIAL AND BUSINESS PARK DEVELOPMENT STANDARDS TABLE.

PRIVATE STREET PER PVT2
30' PRIVATE R/W
20' PAVED ROAD WITH CURB AND GUTTER
NO PARKING BOTH SIDES
5' ATTACHED SIDEWALK WEST SIDE
CENTERLINE 240 LF
NW PARKLANDS TRAIL DR ASPHALT PAVING = 4,927 SF
PER TABLE 17.19.040-1-B TO MINIMIZE BUFFER IMPACTS, MINIMIZE STREET WIDTH & ATTACH SIDEWALK, ALL LOTS SPRINKLERED AS > 100' IN LENGTH.

PRIVATE STREET PER PVT3
42' PRIVATE TRACT R/W
28' PAVED ROAD WITH CURB AND GUTTER
5' DETACHED SIDEWALK ONE SIDE
NW 10TH FAIRWAY DR ASPHALT PAVING = 11,151 SF
NW PARKLANDS TRAIL DR ASPHALT PAVING = 6,541 SF
NW 17TH GREEN DR ASPHALT PAVING = 10,815 SF
NO PARKING ONE SIDE

PRIVATE STREET PER PVT4
48' PRIVATE R/W
28' PAVED ROAD WITH CURB AND GUTTER
5' PLANTER BOTH SIDES
5' DETACHED SIDEWALK BOTH SIDES
CENTERLINE 1480 LF
NW 16TH FAIRWAY CT ASPHALT PAVING = 11,194 SF
NW GOLF DR ASPHALT PAVING = 28,860 SF

ALL CUL-DE-SAC TURNAROUNDS PER ST36 FOR SPRINKLERED DEVELOPMENT WITH 30' PAVED & 5' ATTACHED SIDEWALK WITH OUTER SIDEWALK TURNAROUND RADIUS BULB = 35'
35' RADIUS CUL-DE-SAC BULB
30' PAVED CUL-DE-SAC BULB

EXISTING CONDITION NOTES:
NO EXISTING STRUCTURES ONSITE.
EXISTING FIRE HYDRANT LOCATION:
200' WEST OF SITE ON NW CAMAS MEADOWS DR.
375' SOUTH OF SITE ON NW LAKESPUR ST.

GRADING NOTES:
SEE THE GRADING PLAN FOR PROPOSED ONSITE GRADING.

STREET NOTES:
STREET LIGHTS AND STREET TREES TO BE DESIGNED BY OTHERS PRIOR TO FINAL PLAT.

STREET LIGHTS
PROPOSED ENTRY SIGN LOCATIONS
TRAIL ACCESS SIGNAGE

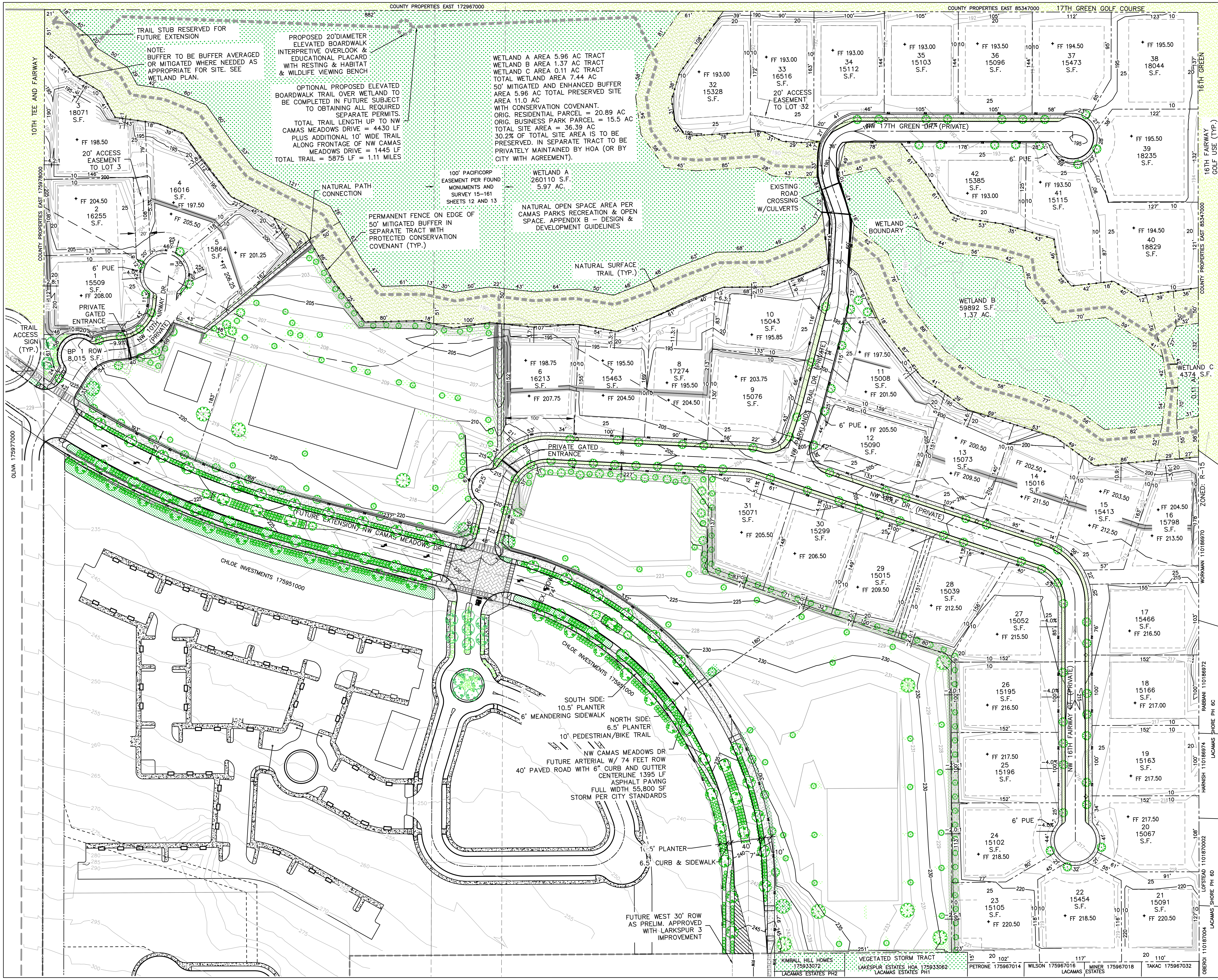
GRAPHIC SCALE 1"=60'
0 60 120

KESSI ENGINEERING
6400 NE HWY 99 #G-169
VANCOUVER, WA 98665
Tel: (360) 991-9300
www.kessiconsulting.com
CONSULTING
PLANNING
CIVIL ENGINEERING
PROJECT MANAGEMENT

DATE: 07 DEC 2015

PARKLANDS EXECUTIVE SUBDIVISION AND THE ARCHERY BUSINESS PARK SITE PLAN AT CAMAS MEADOWS GOLF COURSE
PRELIMINARY PLAT & SITE PLAN WITH MASTER PLAN

SHEET 1



DEVELOPER & APPLICANT:
PARKLANDS AT CAMAS MEADOWS LLC
KEVIN DEFORD 360-823-6222 ngdelopment@gmail.com
AARON BARR 503-319-4021 abarrmail@gmail.com
20705 SE EVERGREEN HWY CAMAS, WA 98607

EXHIBIT 21

FOR ALL LOTS WITH ACCESS EASEMENTS NOTE:
PER TABLE 17.19.040-1 FOOT NOTE 2, SHARED ACCESS TO 1 OR 2 LOTS = 20' WIDE PRIVATE EASEMENT WITH 12'-20' PAVED, NO PARKING AND ALL LOTS SPRINKLERED.

BOUNDARIES:
BOUNDARIES ARE BASED ON SURVEY FROM MGS AND WETLAND BOUNDARY FROM ECOLOGICAL LAND SERVICES,INC. FINAL BOUNDARIES AND LOT LINES MAY CHANGE SLIGHTLY PRIOR TO FINAL ENGINEERING AND FINAL PLAT.

PRELIMINARY PLAT AND BINDING SITE PLAN:
REFER TO MASTER PLAN AND DEVELOPMENT AGREEMENT

PRIVATE STREET PER PVT2
30' PRIVATE R/W
20' PAVED ROAD WITH CURB AND GUTTER
NO PARKING BOTH SIDES
5' ATTACHED SIDEWALK WEST SIDE
CENTERLINE 240 LF
NW PARKLANDS TRAIL DR ASPHALT PAVING = 4,927 SF
PER TABLE 17.19.040-1-B TO MINIMIZE BUFFER IMPACTS, MINIMIZE STREET WIDTH & ATTACH SIDEWALK, ALL LOTS SPRINKLERED AS > 100' IN LENGTH.

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STREET LIGHTS

PROPOSED ENTRY SIGN LOCATIONS

TRAIL ACCESS SIGNAGE

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VANCOUVER, WA 98665
Tel: (360) 991-9300
www.kessiconsulting.com

CONSULTING
PLANNING
CIVIL ENGINEERING
PROJECT MANAGEMENT

DATE: 09 JAN 2016

PARKLANDS EXECUTIVE SUBDIVISION AT CAMAS MEADOWS GOLF COURSE

PRELIMINARY PLAT RESIDENTIAL R-15

SHEET R-1

EXHIBIT 22


BUFFER NOTE 1:
938SF OF AREA IN 17TH GREEN DR. TO BE BUFFER AVERAGED ON LOT 5 WITH 938SF AS SHOWN.
WETLAND BUFFER A1 26099 S.F.
BUFFER AVERAGE SEE BUFFER NOTE 1
STILLING WELLS ARE LIKE A HYDRAULIC JUMP – THE WATER RISES IN THE STRUCTURE AND SPILLS OUT AT GROUND LEVEL ABOUT EL:192
100' PACIFICORP EASEMENT PER FOUND MONUMENTS AND SURVEY 15-161 SHEETS 12 AND 13
WETLAND A 260110 S.F. 5.97 AC.
STILLING WELL AND OUTLET PROTECTION FLOW SPREADER
WETLAND BUFFER BP A2 10584 S.F.
RIM WILL BE AT ABOUT EL:194 – FILTERRA VAULT #8 & #9 TOP SLAB WILL NEED TO BE UP ABOUT EL: 197 OR 198 FOR THIS LAYOUT.
BP TRACT C BUFFER 4896 S.F.
WETLAND BUFFER A3 23964 S.F.
FILTERRA VAULT #9
FILTERRA VAULT #8 OR STORMFILTER CB'S WITH PHOSPHORUS MEDIA (TYP.) VAULT TO BE 4' ABOVE STILLING WELL OUTFLOW ELEVATION.
TREATED CLEAN & ROOF WATER
STORM LINE 'A'
DRIVE THRU
BP 1 ROW 8,015 S.F.
BP LOT #1 24700 S.F.
STORM LINE 'B'
AREA DRAIN
BP LOT #2 117646 S.F.
STORM LINE 'C'
FILTERRA VAULT #7
UNTREATED WATER FROM TRAFFIC BEARING AREAS, STREETS & PARKING
STILLING WELL AND OUTLET PROTECTION FLOW SPREADER
WETLAND BUFFER A4 21652 S.F.
STORM LINE 'F'
FILTERRA VAULT #1
BUFFER AVERAGE SEE BUFFER NOTE 1
NW 17TH GREEN DR. (PRIVATE)
FILTERRA VAULT #2
WALL BY OTHERS
EXTG. 12" CULVERT
REPLACE 12" WITH 36" FROM NEW MANHOLE
WALL BY OTHERS
WETLAND BUFFER B2 27248 S.F.
FILTERRA VAULT #3
TRACT: D 1839 S.F.
WETLAND B 59892 S.F. 1.37 AC.
WETLAND BUFFER C3 1693 S.F.
WETLAND BUFFER C2 5520 S.F.
WETLAND C 4374 S.F.
WETLAND BUFFER B1 28091 S.F.
WETLAND BUFFER C1 1647 S.F.
STORM LINE 'D'
STORM LINE 'E'
NW PARKLANDS TRAIL DR. (PRIVATE)
NW GOLF DR. (PRIVATE)
TREATED CLEAN & ROOF WATER
(ROOF DRAIN)
FILTERRA VAULT #6
FILTERRA VAULT #5
10' PRIVATE STORM EASEMENT
TREATED WATER
SPLIT FLOW STRUCTURE (GRATE ON MH BASE)
AREA DRAIN
FILTERRA VAULT
FILTERRA VAULT #4
BP LOT #4 127653 S.F.
4A
4B
NW 16TH FAIRWAY CT. (PRIVATE)
12" NYPLAST PRIVATE ROOF & YARD GRATED DRAIN WITH TWO 4' WYE @ 8" STUBS SHARED BETWEEN 2 LOTS (TYP)
OLIVA 175977000
TREATED RUNOFF SYSTEM
FILTERRA VAULT
(FUTURE EXTENSION) NW CAMAS MEADOWS DR
FILTERRA VAULT VAULT TOP 3 FEET BELOW GROUND SURFACE
AREA DRAIN
CHLOE INVESTMENTS 175951000
SPLIT FLOW STRUCTURE
FILTERRA VAULT
FILTERRA VAULT
TREATED WATER FROM SOUTH VILLAGE DETACHED LOTS
AREA DRAIN – FOR SIDEWALKS AND LANDSCAPING – PASSES BELOW FILTER MEDIA IN BY-PASS PIPING (TYP)
OPTIONAL SLOTTED DRAIN TO FILTERRA VAULT
OFFSITE BYPASS SYSTEM
TREATED RUNOFF SYSTEM
FILTERRA VAULT
STREET RUNOFF FROM STREETS TO FLOW TO VAULT TO BE TREATED AND CONNECTED TO TREATED RUNOFF PIPE SYSTEM
NOTE:
ALL OFF-SITE STORM AND SITE INFO WITHIN CAMAS MEADOWS DRIVE AND THE VILLAGE AT CAMAS MEADOWS (SOUTH OF CAMAS MEADOWS DRIVE) IS SHOWN FOR INFORMATIONAL PURPOSES ONLY. SEE THE CAMAS MEADOWS DRIVE STORM CONSTRUCTION PLANS AND THE VILLAGE AT CAMAS MEADOWS PLANS FOR DETAILED INFORMATION.
C.O.#1 FUTURE OFFSITE BYPASS SYSTEM PIPE
GRAPHIC SCALE 1"=60'
0 60 120
KESSI ENGINEERING
6400 NE HWY 99 #G-169 VANCOUVER, WA 98665 TEL: (360) 991-9300 www.kessiconsulting.com
CONSULTING PLANNING CIVIL ENGINEERING PROJECT MANAGEMENT
DATE: 07 DEC 2015
PARKLANDS EXECUTIVE SUBDIVISION AND THE ARCHERY BUSINESS PARK SITE PLAN AT CAMAS MEADOWS GOLF COURSE
PRE;IMINARY STORMWATER & GRADING PLAN
SHEET 2

Exhibit 23

EXISTING CONDITIONS SURVEY

OF
THE PARKLANDS AT CAMAS MEADOWS
TAX LOTS 21 & 68
IN THE SW 1/4 OF SECTION 28,
T. 2 N., R. 3 E., W.M.
CITY OF CAMAS
CLARK COUNTY, WA
JOB NO.: 15-185
DATA COLLECT: 06-08-15 THROUGH 07-06-15
DRAWING DATE: 12-10-15
SHEET 1 OF 2

LEGEND:

- INDICATES WATER VALVE
- INDICATES FIRE HYDRANT
- INDICATES WATER METER
- INDICATES CONTROL VALVE
- INDICATES WATER STAND PIPE
- INDICATES TELEPHONE PEDESTAL
- INDICATES STORM SEWER MANHOLE
- INDICATES CURB INLET
- INDICATES COMBINATION CURB INLET
- INDICATES CATCH BASIN
- INDICATES SANITARY CLEANOUT
- INDICATES POWER POLE WITH DIRECTION OF OVERHEAD LINES
- INDICATES LIGHT POLE
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- INDICATES ELECTRIC SERVICE BOX
- INDICATES ELECTRIC METER
- INDICATES GAS RISER
- INDICATES BOLLARD
- INDICATES SIGN "NO PARKING ON PAVEMENT" UNLESS OTHERWISE NOTED
- INDICATES TEST PIT
- INDICATES WETLAND FLAG
- INDICATES BOUNDARY
- INDICATES EDGE OF ASPHALT
- INDICATES EDGE OF GRAVEL
- INDICATES 5 FOOT INTERVAL CONTOUR
- INDICATES 1 FOOT INTERVAL CONTOUR
- INDICATES FENCE LINE
- INDICATES ELECTRIC LOCATE
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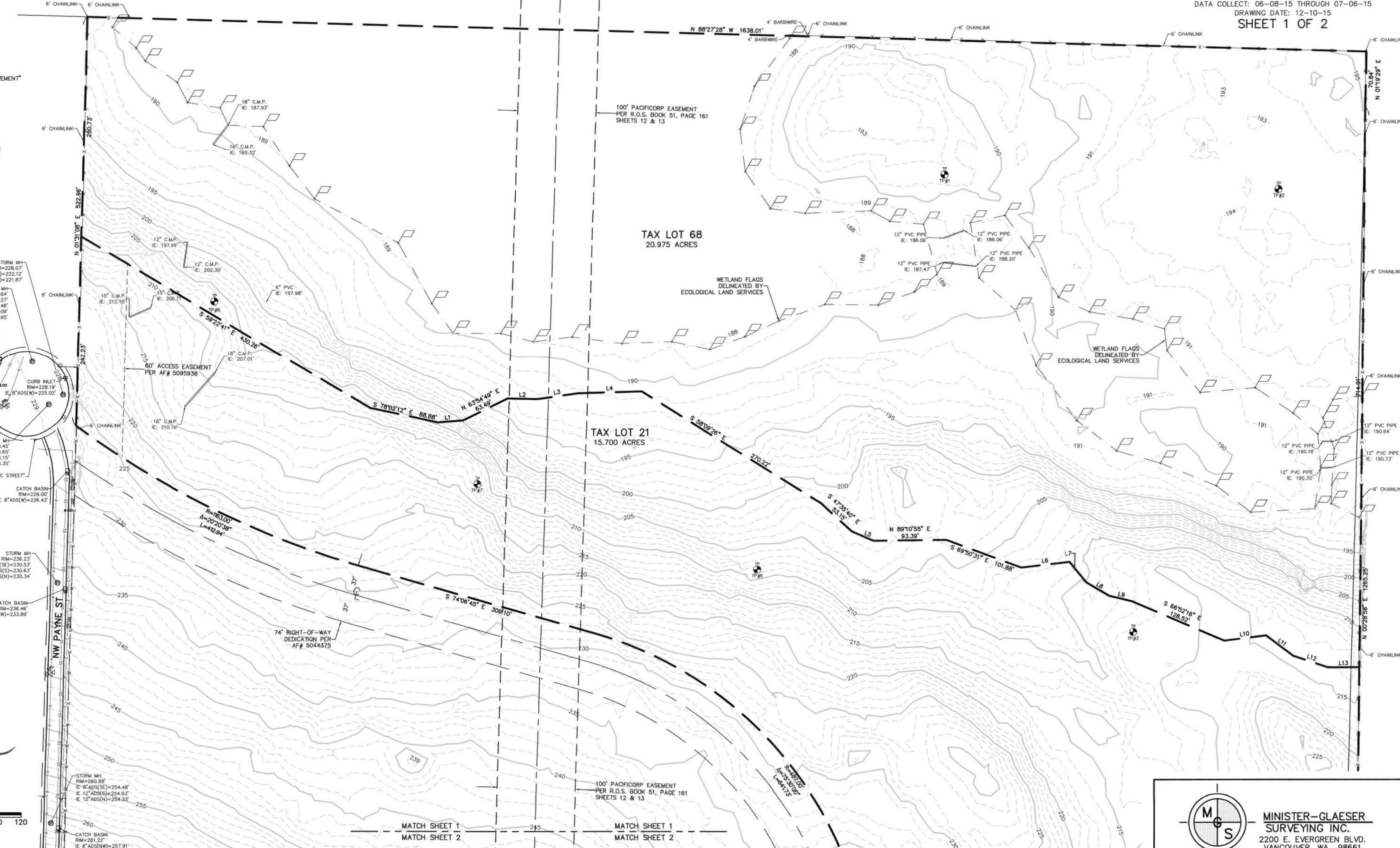
HORIZONTAL DATUM:
NAD83(2011)(EPOCH: 2010.0000), WASHINGTON STATE PLANE COORDINATE SYSTEM SOUTH ZONE, U.S. SURVEY FEET

VERTICAL DATUM:
ELEVATIONS WERE ESTABLISHED USING A TRIMBLE R10 RECEIVER OPERATING IN A REAL TIME KINEMATIC MODE (RTK), RECEIVING CORRECTIONS FROM THE WASHINGTON STATE REFERENCE NETWORK (WSRN).
ELEVATION = NAVD 88 DATUM, GEOID12AUS.

NOTES:
A UTILITY LOCATE WAS CALLED FOR ON 12-09-14 UNDER TICKET NUMBERS 14346094 (LARKSPUR ST.) AND 14346097 (NW PAYNE ST & CAMAS MEADOW DRIVE). THE UNDERGROUND UTILITIES AS SHOWN HEREON ARE AS MARKED AT THE TIME OF THIS SURVEY. UNDERGROUND UTILITY LOCATIONS SHOWN ARE APPROXIMATE ONLY. UNDERGROUND CONNECTIONS ARE SHOWN AS STRAIGHT LINES BETWEEN SURFACE LOCATIONS BUT MAY CONTAIN BENDS OR CURVES NOT SHOWN. SOME UNDERGROUND LOCATIONS HEREON MAY HAVE BEEN TAKEN FROM PUBLIC RECORDS. M.G.S. ASSUMES NO LIABILITY FOR THE ACCURACY OF PUBLIC RECORDS.

PER FEMA FIRM PANEL 53011C0414D A PORTION OF THIS SITE IS LOCATED WITHIN A SPECIAL FLOOD HAZARD AREA. THE BASE FLOOD ELEVATION MAY BE SUBJECT TO CHANGE PER HYDROLOGICAL STUDY TO BE PERFORMED BY OTHERS.



LINE TABLE		
LINE	BEARING	DISTANCE
L1	N 85°13'42" E	32.11'
L2	S 88°45'13" E	37.93'
L3	N 81°48'50" E	52.24'
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L13	N 89°37'17" E	39.98'

MINISTER-GLAESER SURVEYING INC.
2200 E. EVERGREEN BLVD.
VANCOUVER, WA 98661
(360) 694-3313

DRAWING FILE: 15185T1.DWG DRAWN BY: CSA PROJECT MGR: CSA

EXISTING CONDITIONS SURVEY

OF
THE PARKLANDS AT CAMAS MEADOWS
TAX LOTS 21 & 68
IN THE SW 1/4 OF SECTION 28,
T. 2 N., R. 3 E., W.M.
CITY OF CAMAS
CLARK COUNTY, WA

JOB NO.: 15-185
DATA COLLECT: 06-08-15 THROUGH 07-06-15
DRAWING DATE: 12-10-15
SHEET 2 OF 2

LEGEND:

- INDICATES WATER VALVE
- INDICATES FIRE HYDRANT
- INDICATES WATER METER
- INDICATES CONTROL VALVE
- INDICATES WATER STAND PIPE
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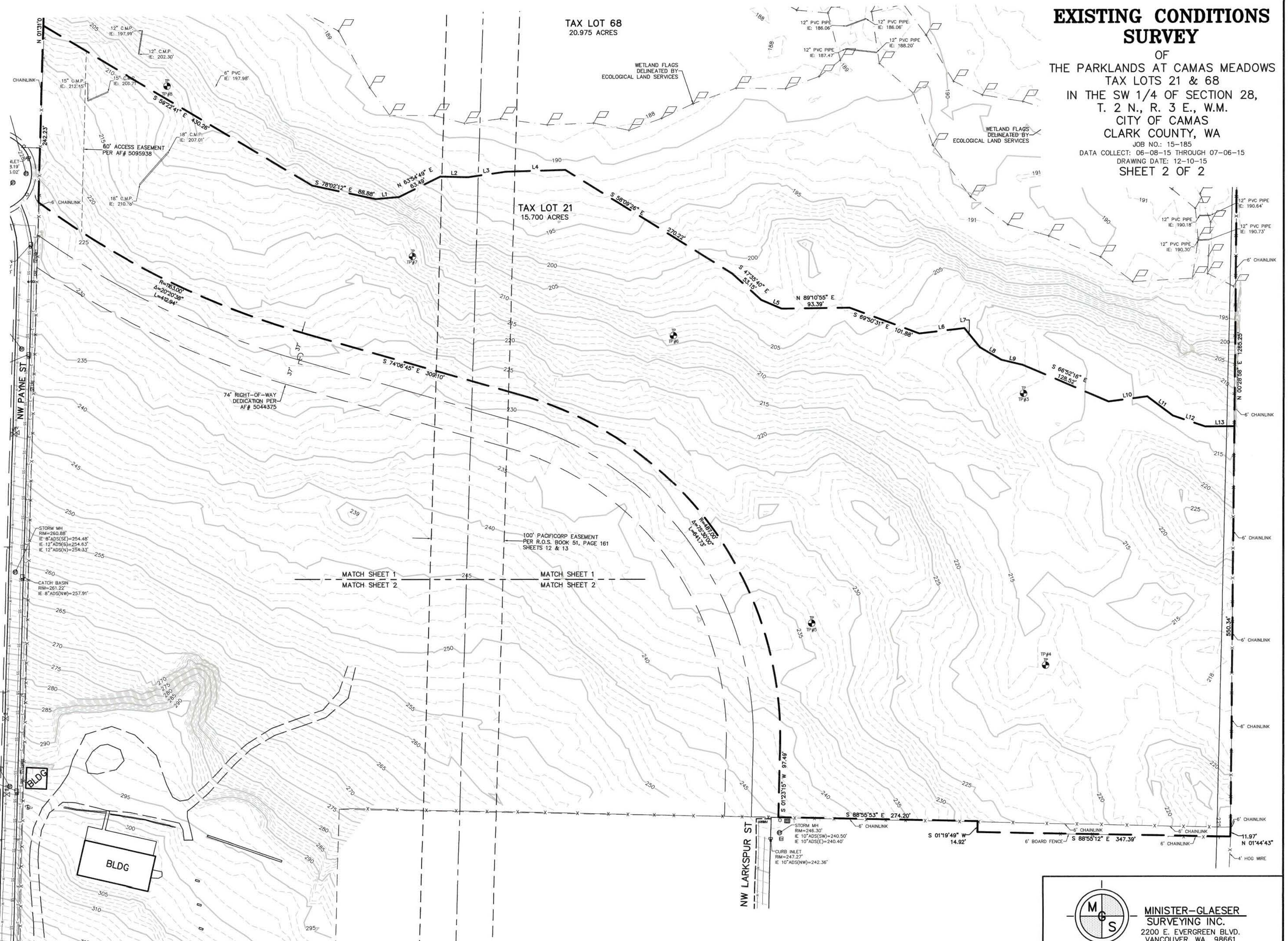

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12/10/15

DANIEL ADOLPH RENTON
STATE OF WASHINGTON
37535
REGISTERED PROFESSIONAL LAND SURVEYOR

60 30 0 60 90 120
SCALE 1 INCH = 60 FEET

MINISTER-GLAESER SURVEYING INC.
2200 E. EVERGREEN BLVD.
VANCOUVER, WA 98661
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EXHIBIT 24

EXISTING CONDITIONS SURVEY

OF
THE PARKLANDS AT CAMAS MEADOWS
TAX LOTS 21 & 68
IN THE SW 1/4 OF SECTION 28,
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JOB NO.: 15-185
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DRAWING DATE: 12-10-15
SHEET 1 OF 2

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- 12"MAPLE INDICATES DECIDUOUS TREE WITH TRUNK DIAMETER AND TYPE
- INDICATES TEST PIT
- INDICATES WETLAND FLAG
- INDICATES BOUNDARY
- INDICATES EDGE OF ASPHALT
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HORIZONTAL DATUM:

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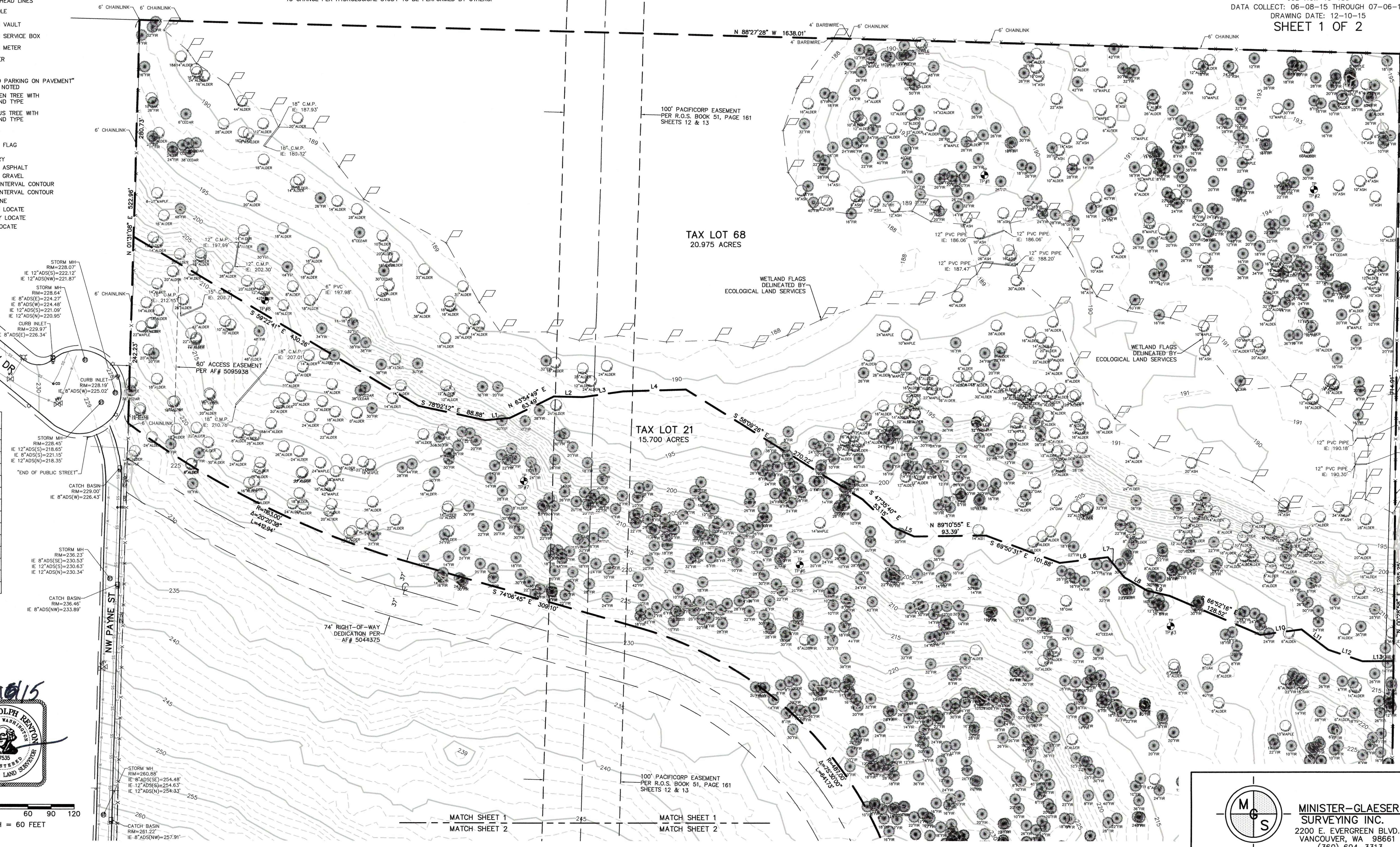

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SHEET 2 OF 2

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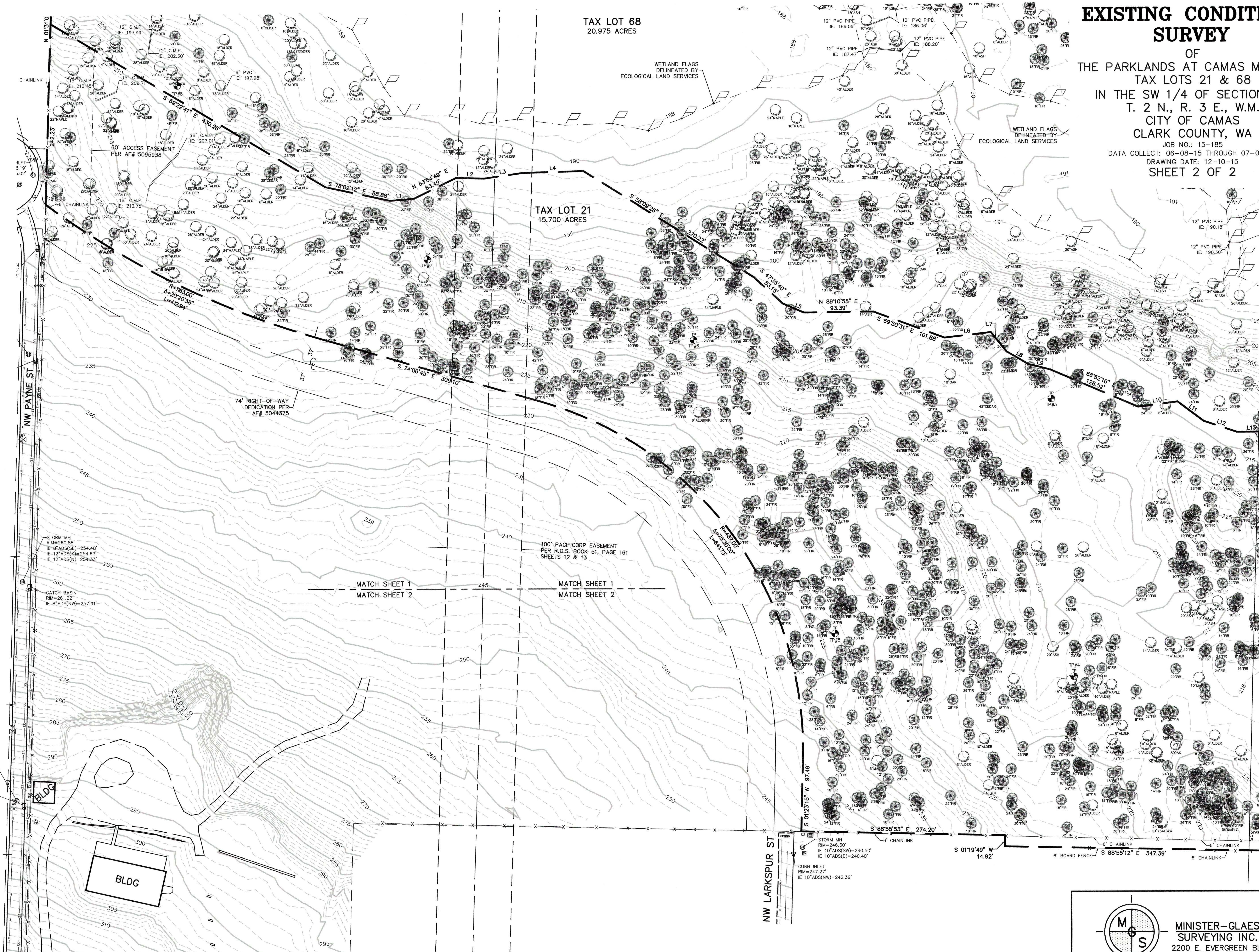

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EXHIBIT 25A

Planning Solutions, Inc.

Creating Solutions to Complex Issues

4400 NE 77th Avenue
Suite 275
VANCOUVER, WA 98662
VOICE: 360-750-1131 FAX: 360-713-6102
www.planningsolutionsinc.com

PRELIMINARY NOT FOR CONSTRUCTION SUBJECT TO APPROVAL

CHRISTOPHER A. BALMANN
LICENSE NO.
EXPIRES ON 02/__/2017

The Archery @ Camas Meadows

NW Camas Meadows Drive
Camas, Washington

DRAWN: HA/CB	CHECKED: CB
SCALE: 1" = 20'-0"	DATE: 11.24.15
JOB #: 15-1349	
ISSUED FOR: PLR	
REVISIONS:	

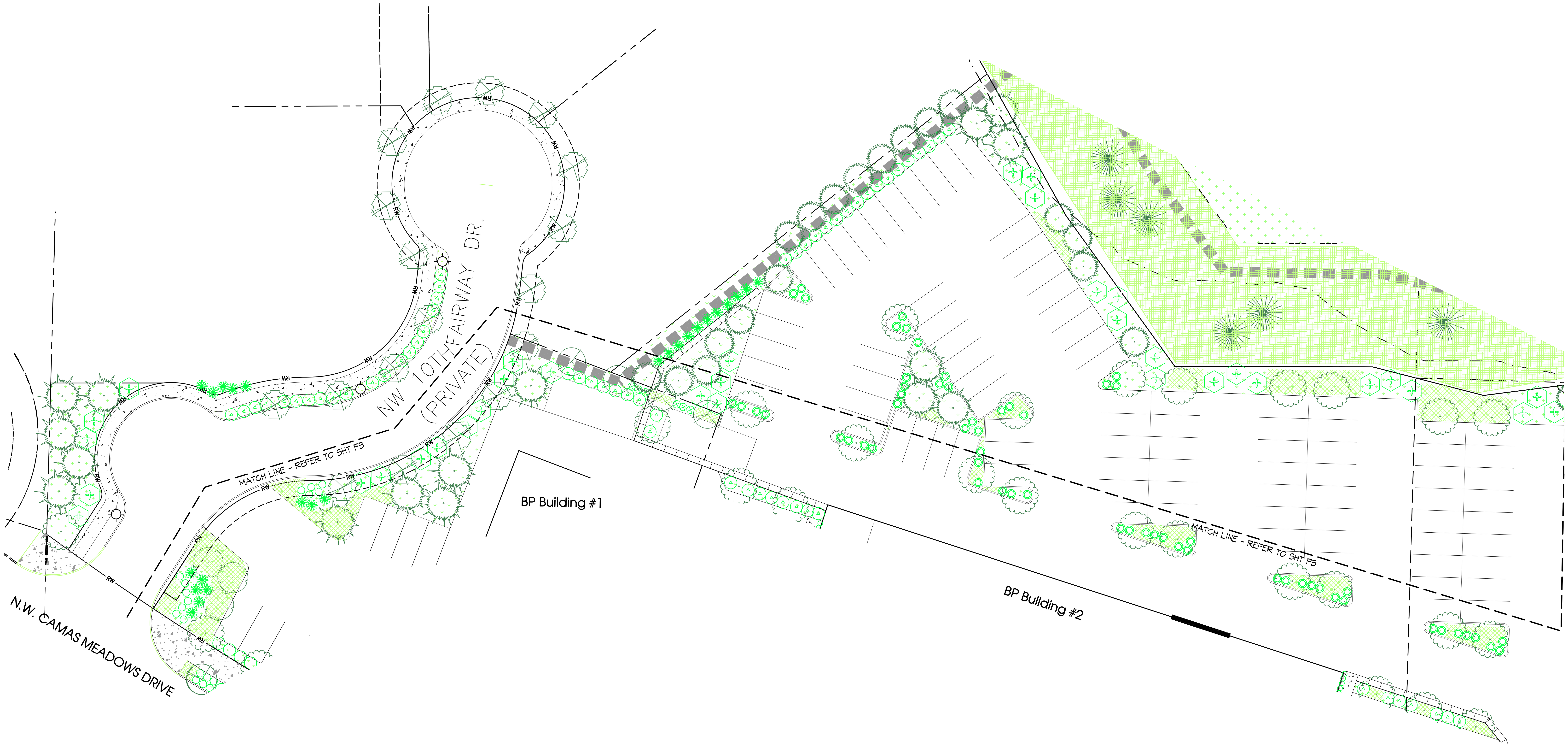
SHEET NAME:
LANDSCAPE PLAN

REFER TO SHEET P1 FOR LANDSCAPE LEGEND

0 20 40 60 80 100

SHEET #: P3

EXHIBIT 25B



REFER TO SHEET P1 FOR LANDSCAPE LEGEND

0 20 40 60 80 100

Planning Solutions, Inc.

Creating Solutions to Complex Issues

4400 NE 77th Avenue
Suite 275
VANCOUVER, WA 98662
VOICE: 360-750-7000 360-713-6102
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SCALE: 1" = 20'-0"	DATE: 11.24.15
JOB #: 15-1349	
ISSUED FOR: PLR	
REVISIONS:	
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SHEET NAME:
LANDSCAPE PLAN

SHEET #:
P4

SHEET 4 OF 5

EXHIBIT 25C

Planning Solutions, Inc.
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The Archery @ Camas Meadows

NW Camas Meadows Drive
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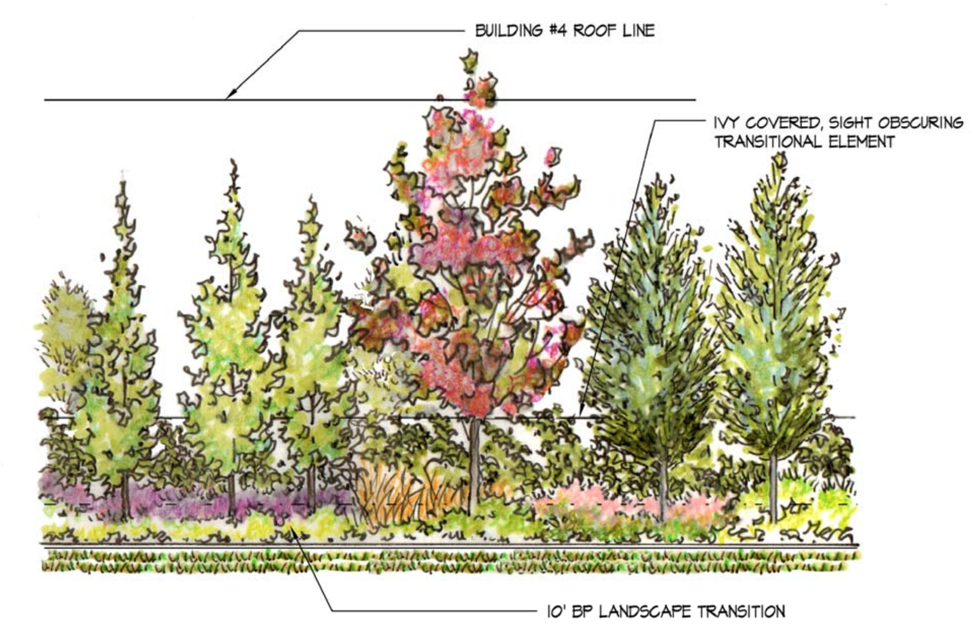
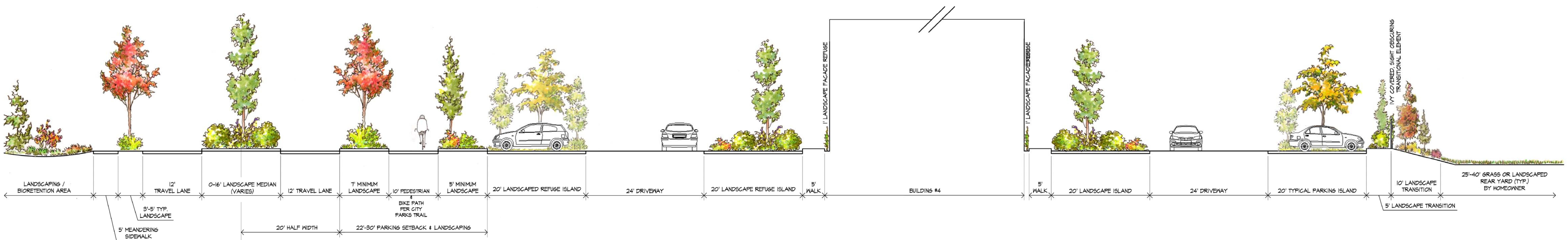


ELEVATION A

EXAMPLE ELEVATION AS VIEWED FROM STANDING AT THE CENTER OF LOT 24 LOOKING WEST TOWARD THE REAR YARD VIEW OF THE TRANSITIONAL ELEMENT AND THE 10' TRANSITIONAL LANDSCAPING. SEE SHEET P1.

NOT TO SCALE



SECTION A-A

AS VIEWED FROM STANDING NEAR THE SOUTHWEST CORNER OF BP LOT #4 LOOKING NORTH. SEE SHEET P1 FOR CROSS SECTION.

NOT TO SCALE

0 20 40 60 80 100

DRAWN: HA/CB	CHECKED: CB
SCALE: 1" = 20'-0"	DATE: 11.24.15
JOB #: 15-1349	
ISSUED FOR: PLR	
REVISIONS:	
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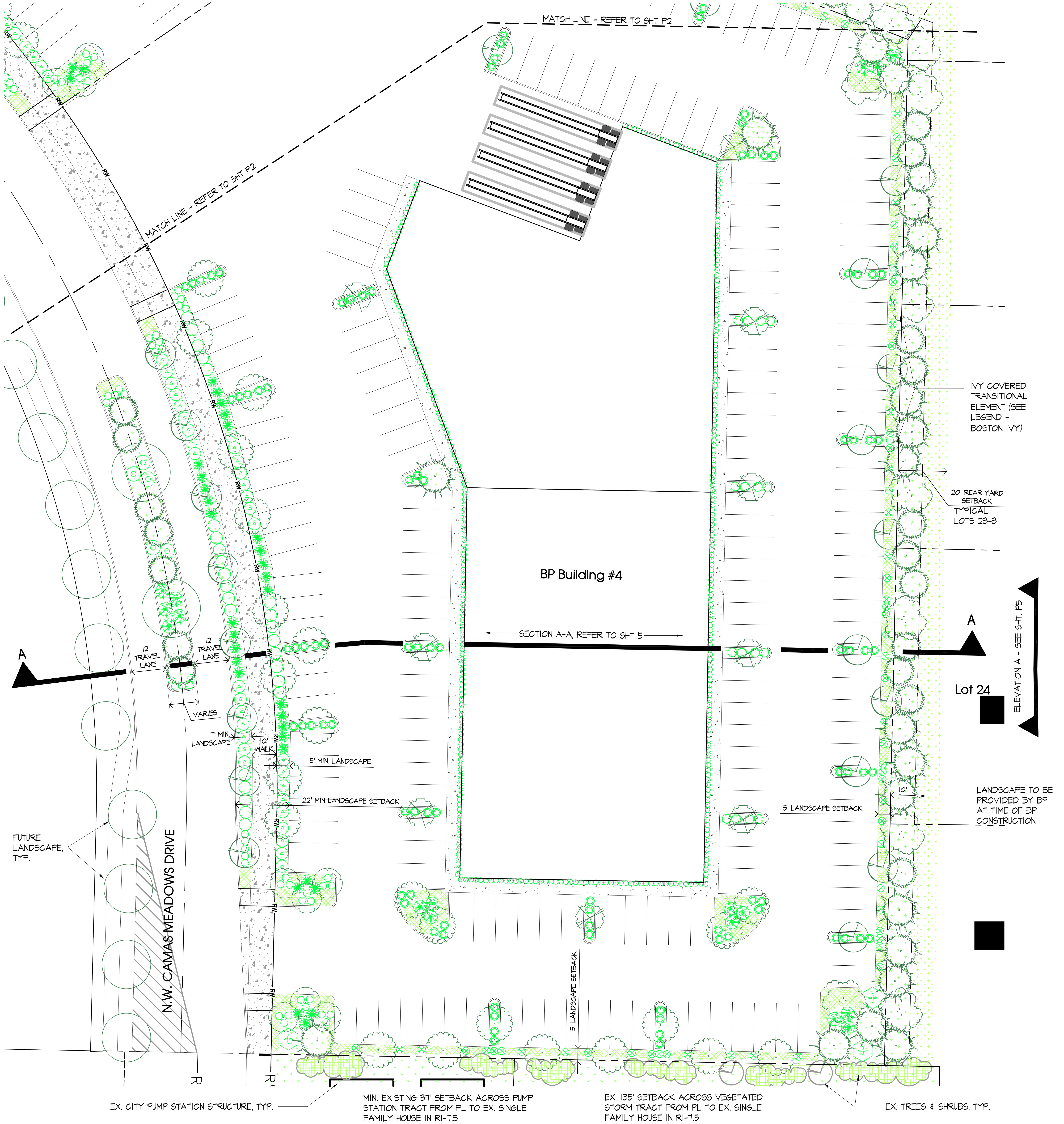
SHEET NAME:
LANDSCAPE PLAN

SHEET #:
P5

SHEET 5 OF 5

EXHIBIT 25D



TREE LEGEND

SYMBOL	BOTANICAL / COMMON NAME	SIZE	QUANTITY	NATIVE
	CORNUS ALTERNIFOLIA 'ARGENTEA' / AGRENTEA DOGWOOD	2" Cal. Min.	6	✓
	LIRIODENDRON TULIPIFERA 'FASTIGIATA' / TULIP TREE - FASTIGIATE	6' ht. Min.	60	
	CALOCEDRUS DECURRENS / INCENSE CEDAR	6' ht. Min.	76	✓
	QUERCUS ROBUR 'FASTIGIATA' / COLUMNAR ENGLISH OAK	2" Cal. Min.	96	
	THUJA PLICATA 'HOGAN' / HOGAN WESTERN RED CEDAR	6' ht. Min.	72	✓
	ACER CIRCINATUM / VINE MAPLE	6' ht. Min.	23	✓
	ACER PLATANOIDES 'CRIMSON SENTRY' / CRIMSON SENTRY MAPLE	2" Cal. Min.	19	
	PYRUS CALLERYANA 'CAPITAL' / CAPITAL PEAR	2" Cal. Min.	57	
	CORNUS FLORIDA / EASTERN DOGWOOD	2" Cal. Min.	24	✓

SHRUB & GROUND COVER LEGEND*

SYMBOL	BOTANICAL / COMMON NAME	SIZE	QUANTITY	
	ILEX X MESERVEAE 'BLUE GIRL' / BLUE GIRL MESERVE HYBRID HOLLY	2 GAL. min.	84	
	ILEX X MESERVEAE 'BLUE BOY' / BLUE BOY MESERVE HYBRID HOLLY	2 GAL. min.	293	
	CORNUS ALBA 'BAILHALO' / IVORY HALO DOGWOOD	2 GAL. min.	140	✓
	CORNUS SERICEA 'KELSEYI' / KELSEY'S DWARF RED TWIG DOGWOOD	2 GAL. min.	167	
	PHYSOCARPUS CAPITATUS / PACIFIC NINEBARK	2 GAL. min.	54	✓
	SYMPHORICARPOS ALBUS / NATIVE SNOWBERRY	2 GAL. min.	23	✓
	RIBES SANGUINEUM / RED FLOWERING CURRANT	2 GAL. min.	24	✓
	MAHONIA REPENS / CREEPING MAHONIA	1 GAL. min.	235	✓
	THUJA OCCIDENTALIS 'SMARAGD' / EMERALD GREEN ARBORVITAE	5' TALL min.	178	
	GAULTHERIA SHALLON / SALAL	2 GAL.	16	✓
	ACCENT SHRUB TBD	1 GAL.	12" O.C.	
SYMBOL NOT SHOWN (ON FENCE BETWEEN RES & BP)	PARTHENOCISSUS TRICUSPIDATA / BOSTON IVY	1 GAL.	10' O.C.	
GROUNDCOVER & ORNAMENTAL GRASSES				
	ARCTOSTAPHYLOS UVA URSI 'MASS.' MASSACHUSETTS KINIICKINNICK	1 GAL. min.	30" O.C. max.	✓
SYMBOL NOT SHOWN (IN MEDIAN)	FRAGARIA CHILOENSIS / BEACH STRAWBERRY	1 GAL. min.	24" O.C. max.	✓

* QUANTITIES NOTED ARE FOR ENTIRE PROJECT. FINAL SPECIES & QUANTITIES TO BE DETERMINED AT FINAL DESIGN

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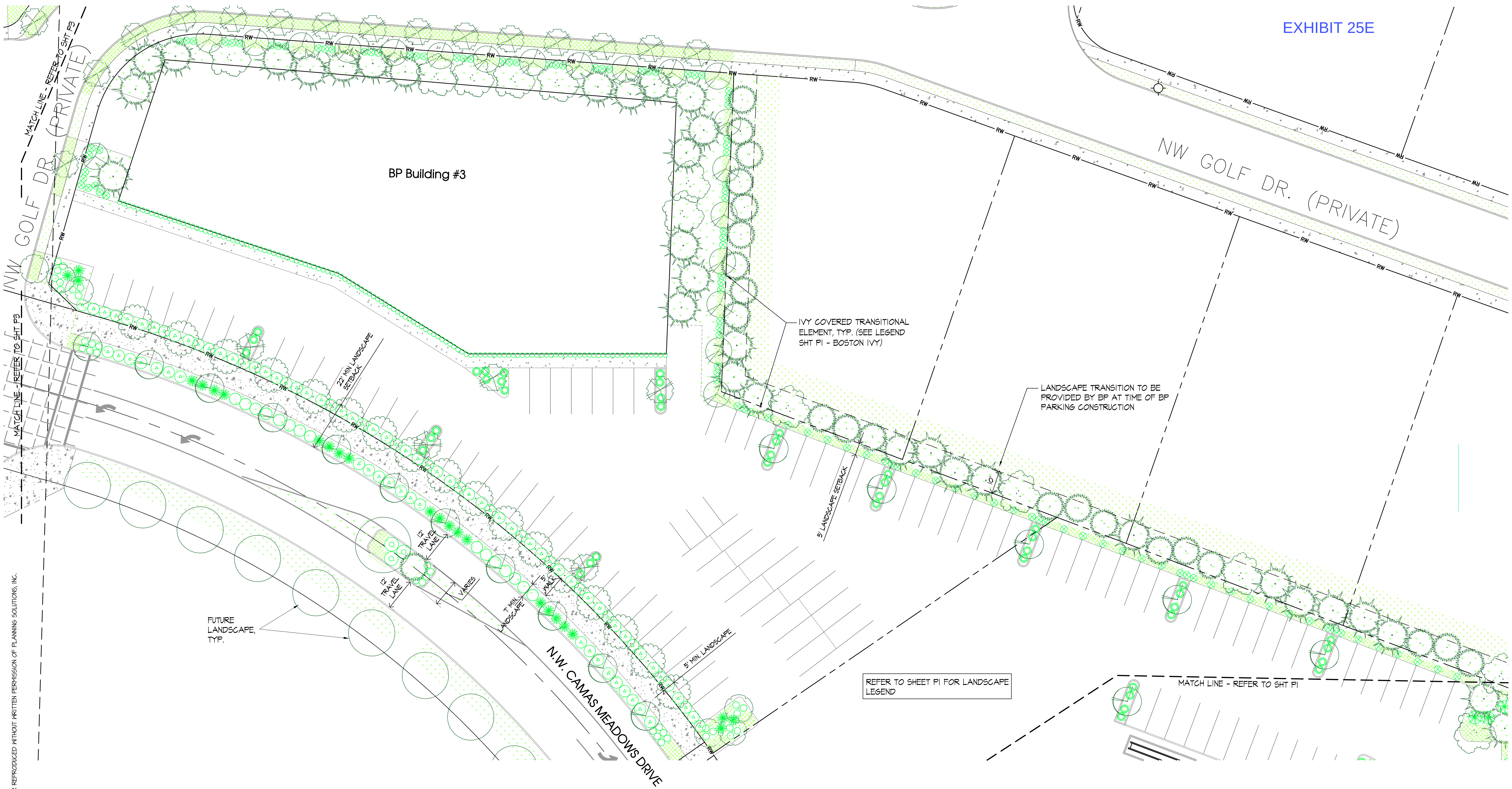
SHEET NAME:
LANDSCAPE PLAN

SHEET #:
P1

SHEET 1 OF 5

EXHIBIT 25E



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PRELIMINARY
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SUBJECT TO APPROVAL

STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT
CHRISTOPHER A. BAUMANN
LICENSE NO.
EXPIRES ON 02/ /2017

The Archery @ Camas Meadows

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REVISIONS:

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6

SHEET NAME:

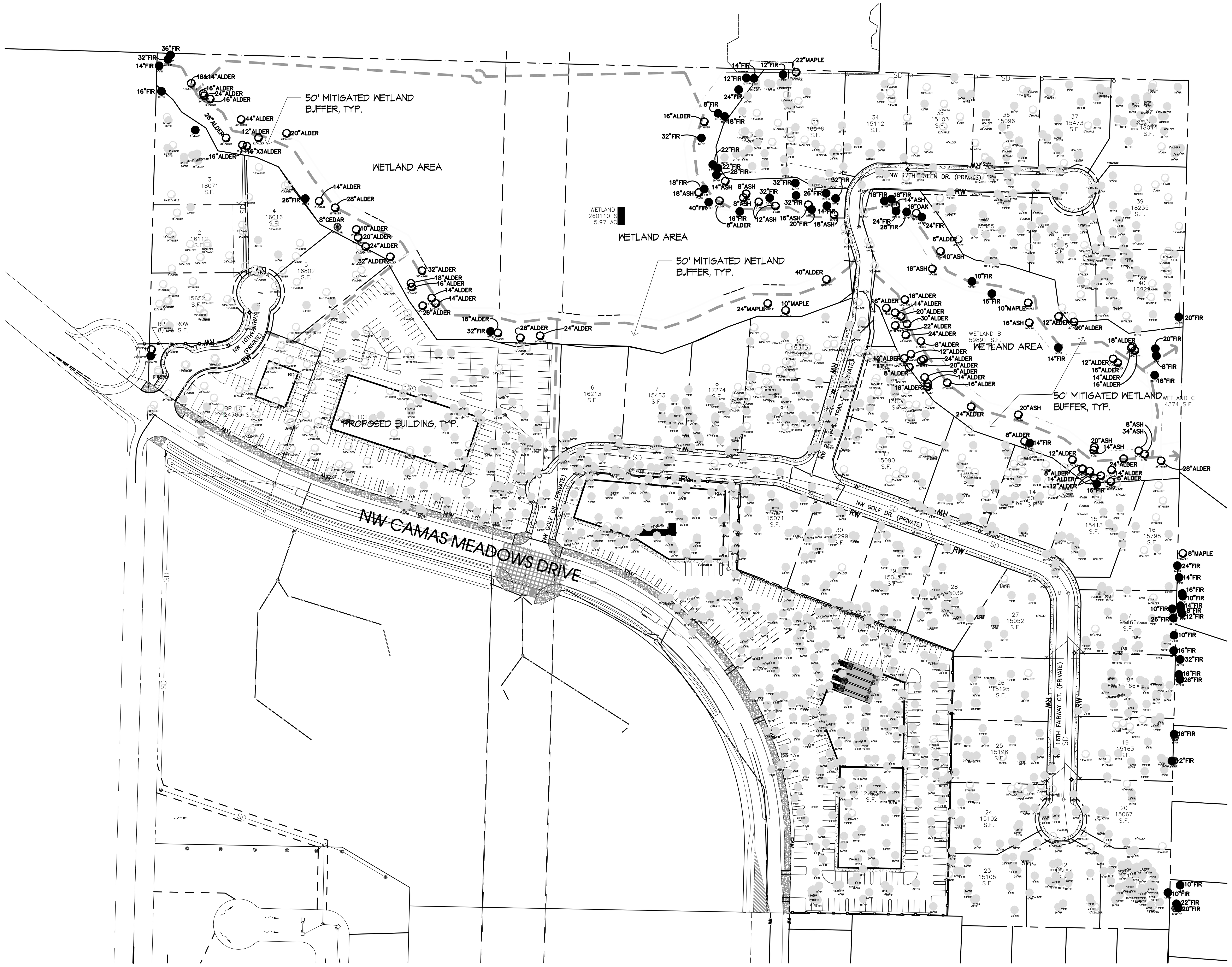
LANDSCAPE PLAN

SHEET #:

P2

SHEET 2 OF 5

EXHIBIT 26



SYMBOL LEGEND

SYMBOL	DESCRIPTION
	EXISTING TREE TO BE RETAINED
	EXISTING TREE TO BE REMOVED, REFER TO TREE SURVEY FOR SPECIES AND SIZES.

TREE LOCATIONS AND SIZES HAVE BEEN OBTAINED FROM AN EXISTING CONDITIONS SURVEY PROVIDED BY M&G SURVEYING.

SURVEYOR TO LOCATE TREES ALONG PROPERTY LINE. NO TREE WITH ANY PORTION OF THE TREE TRUNK ON NEIGHBORING PROPERTY OR OFF-SITE SHALL BE CUT DOWN WITHOUT CONSENT OF CO-TENANT NEIGHBOR.

ALL TREES WITHIN WETLAND AREAS (NOT SHOWN) SHALL BE RETAINED.

TREE PROTECTION STANDARDS

WHERE NOTED BELOW THE CRITICAL ROOT ZONE SHALL BE DEFINED AS A RADIUS AROUND EACH TREE EQUAL TO ONE FOOT OF RADIUS PER 1 INCH OF TREE DBH (DIA. AT BREAST HEIGHT).

A. PLACING MATERIALS NEAR TREES. NO PERSON MAY CONDUCT ANY ACTIVITY WITHIN THE PROTECTED AREA OF ANY TREE DESIGNATED TO REMAIN, INCLUDING, BUT NOT LIMITED TO, PARKING EQUIPMENT, PLACING SOLVENTS, STORING BUILDING MATERIAL AND SOIL DEPOSITS, DUMPING CONCRETE WASHOUT AND LOCATING BURN HOLES.
B. ATTACHMENT TO TREES. DURING CONSTRUCTION, NO PERSON SHALL ATTACH ANY OBJECT TO ANY TREE DESIGNATED FOR PROTECTION.
C. PROTECTIVE BARRIER. BEFORE DEVELOPMENT, LAND CLEARING, FILLING OR ANY LAND ALTERATION, THE APPLICANT:
   1. SHALL ERECT AND MAINTAIN READILY VISIBLE PROTECTIVE TREE FENCING ALONG THE OUTER EDGE AND COMPLETELY SURROUNDING THE PROTECTED AREA OF ALL PROTECTED TREES OR GROUPS OF TREES. FENCES SHALL BE CONSTRUCTED OF CHAIN LINK OR OTHER APPROVED MATERIAL AND AT LEAST FOUR FEET HIGH, UNLESS OTHER TYPE OF FENCING IS AUTHORIZED BY THE CITY OF CAMAS.
   2. MAY BE REQUIRED TO COVER, WITH MULCH TO A DEPTH OF AT LEAST SIX (6) INCHES OR WITH PLYWOOD OR SIMILAR MATERIAL, THE AREAS ADJOINING THE CRITICAL ROOT ZONE OF A TREE IN ORDER TO PROTECT ROOTS FROM DAMAGE CAUSED BY HEAVY EQUIPMENT.
   3. SHALL PROHIBIT EXCAVATION OR COMPACTION OF EARTH OR OTHER POTENTIALLY DAMAGING ACTIVITIES WITHIN THE BARRIERS.
   4. MAY BE REQUIRED TO MINIMIZE ROOT DAMAGE BY EXCAVATING A TWO (2) FOOT DEEP TRENCH TO CLEANLY SEVER THE ROOTS OF TREES TO BE RETAINED.
   5. SHALL MAINTAIN THE PROTECTIVE BARRIERS IN PLACE UNTIL THE CITY OF CAMAS AUTHORIZES THEIR REMOVAL OR A FINAL CERTIFICATE OF OCCUPANCY IS ISSUED, WHICHEVER OCCURS FIRST.
   6. SHALL ENSURE THAT ANY LANDSCAPING DONE IN THE PROTECTED ZONE SUBSEQUENT TO THE REMOVAL OF THE BARRIERS SHALL BE ACCOMPLISHED WITH LIGHT MACHINERY OR HAND LABOR.

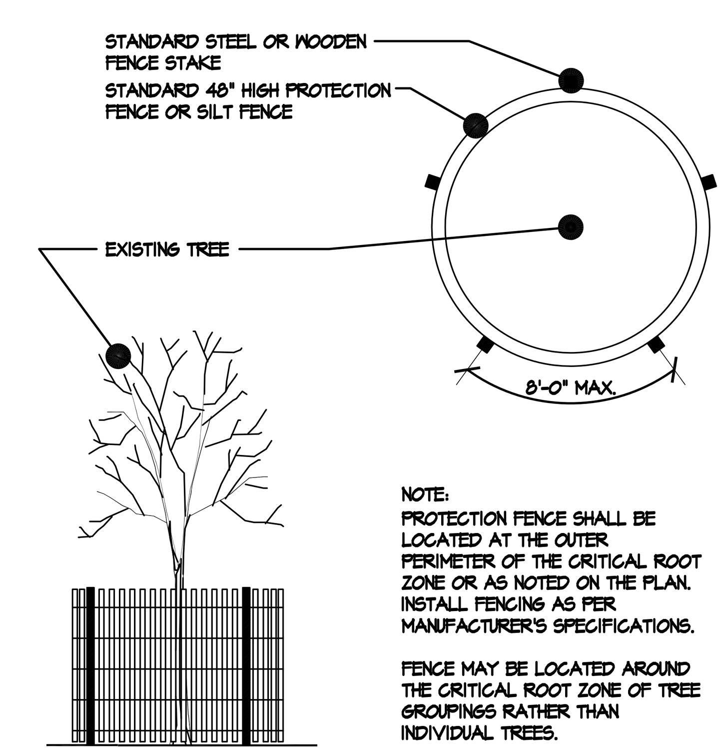
D. GRADE
   1. THE GRADE SHALL NOT BE ELEVATED OR REDUCED WITHIN THE CRITICAL ROOT ZONE OF TREES TO BE PRESERVED WITHOUT THE CITY OF CAMAS' AUTHORIZATION. COVERAGE OF UP TO ONE HALF OF THE AREA OF THE TREE'S CRITICAL ROOT ZONE WITH LIGHT SOILS (NO CLAY) TO THE MINIMUM DEPTH NECESSARY TO CARRY OUT GRADING OR OR LANDSCAPE PLANS, IF IT WILL NOT IMPERIL THE SURVIVAL OF THE TREE MAY BE ALLOWED. AEREATION DEVICES MAY BE REQUIRED TO ENSURE THE TREE'S SURVIVAL.
   2. IF THE GRADE ADJACENT TO A PRESERVED TREE IS RAISED SUCH THAT IT COULD SLOUGH OR ERODE INTO THE TREE'S CRITICAL ROOT ZONE, IT SHALL BE PERMANENTLY STABILIZED TO PREVENT SUFFOCATION OF THE ROOTS.
   3. THE APPLICANT SHALL NOT INSTALL AN IMPERVIOUS SURFACE WITHIN THE CRITICAL ROOT ZONE OF ANY TREE TO BE RETAINED.
   4. TO THE GREATEST EXTENT PRACTICAL, UTILITY TRENCHES SHALL BE LOCATED OUTSIDE OF THE CRITICAL ROOT ZONE OF TREES TO BE RETAINED.
   5. TREES AND OTHER VEGETATION TO BE RETAINED SHALL BE PROTECTED FROM EROSION AND SEDIMENTATION. CLEARING OPERATIONS SHALL BE CONDUCTED SO AS TO EXPOSE THE SMALLEST PRACTICAL AREA OF SOIL TO EROSION FOR THE LEAST POSSIBLE TIME. TO CONTROL EROSION, SHRUBS, GROUND COVER AND STUMPS SHALL BE MAINTAINED ON THE INDIVIDUAL LOTS, WHERE FEASIBLE. WHERE NOT FEASIBLE APPROPRIATE EROSION CONTROL PRACTICES SHALL BE IMPLEMENTED.

E. DIRECTIONAL FELLING. DIRECTIONAL FELLING OF TREES SHALL BE USED TO AVOID DAMAGE TO TREE DESIGNATED FOR RETENTION.
F. AS RESULT OF FURTHER REVIEW, SOME EXISTING TREES MARKED FOR PRESERVATION MAY NEED TO BE REMOVED TO ACCOMMODATE FINAL GRADING PLANS AND STORMWATER FACILITIES. IN THE EVENT IT BECOMES NECESSARY TO REMOVE A TREE THAT IS PROPOSED TO BE RETAINED, APPROVAL SHALL BE OBTAINED FROM THE CITY OF CAMAS AND ADDITIONAL MITIGATION TREES MAY BE REQUIRED.

TREE PRESERVATION NARRATIVE

ALL TREES WITHIN THE WETLAND & WETLAND BUFFER AREAS AS WELL AS THE PROJECT PERIMETER ARE PROPOSED TO BE RETAINED.

TREES ARE PROPOSED TO BE REMOVED CONFLICT WITH STREET IMPROVEMENTS, SITE GRADING, UTILITIES, AND BUILDING ENVELOPES.



NOTE:
PROTECTION FENCE SHALL BE LOCATED AT THE OUTER PERIMETER OF THE CRITICAL ROOT ZONE OR AS NOTED ON THE PLAN. INSTALL FENCING AS PER MANUFACTURER'S SPECIFICATIONS.

FENCE MAY BE LOCATED AROUND THE CRITICAL ROOT ZONE OF TREE GROUPINGS RATHER THAN INDIVIDUAL TREES.

A **Tree Protection Fencing Detail**
Not To Scale
SECTION / PLAN VIEW

0 100 200 300 400 500

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PRELIMINARY
NOT FOR CONSTRUCTION
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STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT
CHRISTOPHER A. BAUMANN
LICENSE NO.
EXPIRES ON 02/20/2017

The Archery @ Camas Meadows

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REVISIONS:	
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SHEET NAME:
PRELIMINARY TREE PLAN

SHEET #:
TP
SHEET 1 OF 1

EXHIBIT 27

5097844 D
RecFee - $76.00 Pages: 5 - FIDELITY NATIONAL TITLE
Clark County, WA 08/20/2014 12:20

When recorded return to:
Gonard G. Harb
Chloe Investment, LLC
C/O Diane Gregory, 3905 SE 154th Court
Vancouver, WA 98683

Filed for record at the request of:
Fidelity National Title
COMPANY OF WASHINGTON, INC.
500 E. Broadway, #425
Vancouver, WA 98660

Escrow No.: 612825537

713896
Real Estate Excise Tax
Ch. 11 Rev. Laws 1951
$ 44500.00 has been paid
Recp.# ______ Date 08/20/14
Sec. 61, see Affd. No. ______
Doug Lasher
Clark County Treasurer
By ______ Deputy

STATUTORY WARRANTY DEED

THE GRANTOR(S) Chinook Land Owners Group of Vancouver, Washignton LLC., a Washington limited liability company

for and in consideration of Ten And No/100 Dollars ($10.00) and other valuable consideration

in hand paid, conveys, and warrants to Chloe Investment, LLC, a Washington limited liability company

the following described real estate, situated in the County of Clark, State of Washington:

SEE EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF

Abbreviated Legal: (Required if full legal not inserted above.)

Tax Lot 24 and a ptn of Tax Lot 21, Section 28, Township 2 North, Range 3 East

Tax Parcel Number(s): 175951-000, 175948-000

Subject to:

SEE EXHIBIT "B" ATTACHED HERETO AND MADE A PART HEREOF

STATUTORY WARRANTY DEED
(continued)

Dated: August 18, 2014

Chinook Land Owners Group of Vancouver, Washignton LLC.

BY: Richard M. Newell Jr.

Richard M. Newell, Jr.
Acting General Manager

State of Washington

County of Clark

I certify that I know or have satisfactory evidence that Richard M. Newell, Jr. is the person who appeared before me, and said person acknowledged that he/she signed this instrument, on oath stated that he/she was authorized to execute the instrument and acknowledged it as General Manager of Chinook Land Owners Group of Vancouver, Washignton LLC. to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: 8/19/2014

Rebecca A. Smith
Notary Public in and for the State of Washington
Residing at: Vancouver, WA
My appointment expires: March 19, 2015

REBECCA A. SMITH
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
MARCH 19, 2015

EXHIBIT "A"
Legal Description

For APN/Parcel ID(s): 175951-000 and 175948-000

Real property lying in the Southwest quarter of Section 28, Township 2 North, Range 3 East of the Willamette Meridian, Clark County, Washington, being a portion of Parcel 1 and Parcel 2 as described in Auditor's File No. 3321351, records of said County, more particularly described as follows:

Commencing at the Northeast corner of the Southwest quarter of said Section 28; thence along the North line of said Southwest quarter North 88° 28' 50" West a distance of 1638.32 feet to the Northwest corner of the East half of the East half of the West half of said Southwest quarter; thence along the West line of said East half of the East half of the West half of said Southwest quarter South 01° 30' 28" West 612.09 feet to a point on the South line of that tract of land described in Auditor's File No. 5044375, said point being the **Point of Beginning**; thence continuing along said West line and along the East line of NW Payne Street and its Northerly Extension South 01° 30' 28" West 1409.55 feet to the Northwest corner of that tract of land described in Auditor's File No. G382348; thence along the North line of said tract of land described in Auditor's File No. G382348 South 88° 55' 12" East a distance of 439.00 feet to the Northeast corner thereof; thence along the East line of said tract of land described in Auditor's File No. G382348 South 01° 27' 47" West a distance of 616.00 feet to the North right of way line of NW Lake Road as described in Auditor's File No. 3653606; thence along said North right of way line South 88° 55' 10" East a distance of 59.53 feet to the West line of that tract of land described in Auditor's File No. G716221; thence along said West line North 01° 30' 28" East a distance of 670.00 feet to the Easterly extension of the South line of that tract of land described in Auditor's File No. G581015; thence along said South line and Easterly extension North 88° 55' 12" West a distance of 60.50 feet to the Southwest corner thereof; thence along the West line of said Auditor's File No. G581015 North 01° 30' 28" East a distance of 620.66 feet to the South line of said tract of land described in Auditor's File No. G394526; thence along said South line South 88° 56' 38" East a distance of 526.79 feet to the South line of said tract of land described in Auditor's File No. 5044375; thence along said South line the following four courses: North 01° 22' 36" East a distance of 98.21 feet to a point of curvature with a 413.00 foot radius curve; thence along said curve to the left, through a central angle of 75° 30' 00", an arc distance of 544.22 feet to a point of tangency; thence North 74° 07' 24" West a distance of 309.10 feet to a point of curvature with a 1237.00 foot radius curve; thence along said curve to the right, through a central angle of 17° 59' 26", an arc distance of 388.41 feet to the **Point of Beginning**.

EXHIBIT "B"
Exceptions

1. Taxes and Assessments as they become due and payable.

2. Easement(s) for the purpose(s) shown below and rights incidental thereto as set forth in a document:

   In favor of: Pacific Power & Light Company
   Purpose: transmission of electric energy and distribution line
   Recording Date: May 13, 1958
   Recording No.: G 239607
   Affects: a portion of said premises

3. Easement(s) for the purpose(s) shown below and rights incidental thereto as set forth in a document:

   In favor of: Adjacent Property Owners
   Purpose: access
   Recording Date: May 12, 1976
   Recording No.: G 722879
   Affects: a portion of said premises

4. Easement(s) for the purpose(s) shown below and rights incidental thereto as set forth in a document:

   In favor of: Adjacent Property Owners
   Purpose: access
   Recording Date: February 15, 1978
   Recording No.: 7802150126
   Affects: a portion of said premises

5. Easement(s) for the purpose(s) shown below and rights incidental thereto as set forth in a document:

   In favor of: Adjacent Property Owners
   Purpose: access
   Recording Date: October 29, 1979
   Recording No.: 7910290231
   Affects: a portion of said premises

6. Easement(s) for the purpose(s) shown below and rights incidental thereto as set forth in a document:

   In favor of: Adjacent Property Owners
   Purpose: access
   Recording Date: September 21, 1998
   Recording No.: 3007328
   Affects: a portion of said premises

7. Easement(s) for the purpose(s) shown below and rights incidental thereto as set forth in a document:

   In favor of: Public Utility District No. 1 of Clark County
   Purpose: transmission of electric energy, including communication facilities
   Recording Date: February 11, 2004
   Recording No.: 3787560
   Affects: a portion of said premises

8. Easement(s) for the purpose(s) shown below and rights incidental thereto as set forth in a document:

   In favor of: Adjacent Property Owners
   Purpose: access
   Recording Date: June 8, 2006
   Recording No.: 4178948
   Affects: a portion of said premises

EXHIBIT "B"

Exceptions
(continued)

9. Easement(s) for the purpose(s) shown below and rights incidental thereto as set forth in a document:

In favor of:	City of Camas
Purpose:	sewer utility
Recording Date:	December 6, 2011
Recording No.:	4813156
Affects:	a portion of said premises

5095691 D
RecFee - $79.00 Pages: 8 - VANCOUVER LAND LAW
Clark County, WA 08/13/2014 11:22

MAIL TAX STATEMENTS TO:
Unchanged

AFTER RECORDING RETURN TO:
Jordan Ramis, PC
Attn: James D. Howsley
1499 S.E. Tech Center Place, Suite 380
Vancouver, WA 98683

Real Estate Excise Tax
Ch. 11 Rev. Laws 1951
EXEMPT
Affd. # 713543 Date 8-13-14
For Details of tax paid see
Affd. #
Doug Lasher
Clark County Treasurer
By Deputy

INSTRUMENT TITLE: **QUIT CLAIM DEED**

GRANTOR(S): CHINOOK LAND OWNERS GROUP OF VANCOUVER, WASHINGTON, a Washington limited liability company

GRANTEE: CHINOOK LAND OWNERS GROUP OF VANCOUVER, WASHINGTON, a Washington limited liability company

ABBREVIATED LEGAL DESCRIPTION: Portion #21 SEC 28 T2NR3EWM 14.02A

FULL LEGAL: See Exhibit A.To This Document

ASSESSOR'S PROPERTY TAX PARCEL ACCOUNT NUMBER(S): 175948000 into 175951000

REFERENCE NUMBER OF RELATED DOCUMENTS: 5044375

After Recording Return to:
Jordan Ramis, PC
Attn: James D. Howsley
1499 SE Tech Center Place, Suite 380
Vancouver, WA 98683

File No.: 51848-71561

QUIT CLAIM DEED

Whereas, the Grantor, Chinook Land Owners Group of Vancouver, Washington, LLC, a Washington limited liability company, previously dedicated a road right-of way to the City of Camas, recorded as AFN 5044375, through its property, Assessor's Property Number 175948000, which divided the property; and

Whereas, the division of Grantor's property by dedication of public right-of-way was exempt from land division requirements pursuant to Camas Municipal Code 17.01.030.B(3); and

Whereas, the Grantor desires to consolidate the portion of Assessor's Property Number 175948000 south of the new road with Assessor's Property Number 175951000 in one legal description;

Therefore, in consideration of value other than money and to facilitate the road dedication, Chinook Land Owners Group of Vancouver, Washington, LLC, a Washington limited liability company, conveys and quitclaims to Chinook Land Owners Group of Vancouver, Washington, LLC, a Washington limited liability company, all interest in the real estate described in Exhibit A and depicted on Exhibit B.

Dated this 1 day of August, 2014 by

Max D. Hall
Chinook Land Owners Group of Vancouver, Washington, LLC, a Washington limited liability company

By: Max Dempsey Hall, its Secretary

STATE OF WASHINGTON)
) ss.
County of Clark)

I certify that I know or have satisfactory evidence that Max Dempsey Hall is the person who appeared before me, and he acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as the Secretary of Chinook Land Owners Group of Vancouver, Washington, LLC, a Washington limited liability company, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

DATED this 1 day of Aug., 2014.

Cassie N. Crawford
NOTARY PUBLIC FOR WASHINGTON
My Appointment Expires: 4/1/18

CASSIE N. CRAWFORD COMMISSION EXP. NOTARY PUBLIC APRIL 1, 2018 STATE OF WASHINGTON

Exhibit A

15643 LD4
9/23/13
CCS/btm

MacKay Sposito

VANCOUVER OFFICE

1325 SE Tech Center Drive, Suite 140 • Vancouver, WA 98683
360.695.3411 • info@mackaysposito.com

LEGAL DESCRIPTION
PARCEL IND

Real property lying in the Southwest quarter of Section 28, Township 2 North, Range 3 East of the Willamette Meridian, Clark County, Washington, being a portion of Parcel 2 as described in Auditor's File No. 3321351, records of said County, more particularly described as follows:

Commencing at the Northeast corner of the Southwest quarter of said Section 28; thence along the East line of said Southwest quarter South 01° 19' 12" West a distance of 785.99 feet to the **Point of Beginning**; thence South 89° 35' 35" West a distance of 29.14 feet; thence North 71°34' 38" West a distance of 47.11 feet; thence North 53° 18' 01" West a distance of 43.59 feet; thence South 82° 39' 10" West a distance of 53.73 feet; thence North 66° 53' 58" West a distance of 128.52 feet; thence North 76° 43' 58" West a distance of 29.74 feet; thence North 59° 59' 57" West a distance of 34.09 feet; thence North 39° 25' 10" West a distance of 33.79 feet; thence South 83° 15' 20" West a distance of 62.85 feet; thence North 69° 52' 13" West a distance of 101.88 feet; thence South 89° 09' 13" West a distance of 93.39 feet; thence North 67° 01' 34" West a distance of 30.60 feet; thence North 47° 37' 22" West a distance of 53.15 feet; thence North 58° 11' 08" West a distance of 270.22 feet; thence South 88° 18' 12" West a distance of 81.99 feet; thence South 81° 47' 08" West a distance of 52.24 feet; thence North 88° 46' 55" West a distance of 37.93 feet; thence South 63° 53' 07" West a distance of 63.49 feet; thence South 85° 12' 00" West a distance of 32.11 feet; thence North 78° 03' 54" West a distance of 88.88 feet; thence North 59° 24' 23" West a distance of 430.71 feet to the West line of the East half of the East half of the West half of said Southwest quarter; thence along said West line South 01° 30' 28" West a distance of 242.66 feet to a point on the arc of a 1163.00 foot radius curve; thence leaving said West line, from a tangent bearing of South 53° 47' 31" East, along said curve to the left, through a central angle of 20° 19' 54", an arc distance of 412.69 feet to a point of tangency; thence South 74° 07' 24" East a distance of 309.10 feet to a point of curvature with a 487.00 foot radius curve; thence along said curve to the right, through a central angle of 75° 30' 00", an arc distance of 641.73 feet to a point of tangency; thence South 01° 22' 36" West a distance of 97.79 feet to a point on the North line of Larkspur Estates Phase 2 as recorded in Book 311 of Plats, at Page 401; thence along said North line and the North line of Larkspur Estates Phase 1 as recorded in Book 311 of Plats, at Page 358 South 88° 56' 38" East a distance of 274.38 feet to the Northeast corner thereof; thence along the East line of said Plat South 01° 03' 22" West 14.85 feet to the Northwest corner of Lacamas Estates as recorded in Book 311 of Plats, at Page 414; thence along the North line of said Lacamas Estates South 88° 53' 22" East a distance of 329.00 feet to the East line of said Southwest quarter of Section 28; thence along the East line of said Southwest quarter North 01° 19' 12" East a distance of 563.04 feet to the **Point of Beginning.**

Exhibit A

<u>SUBJECT TO</u>

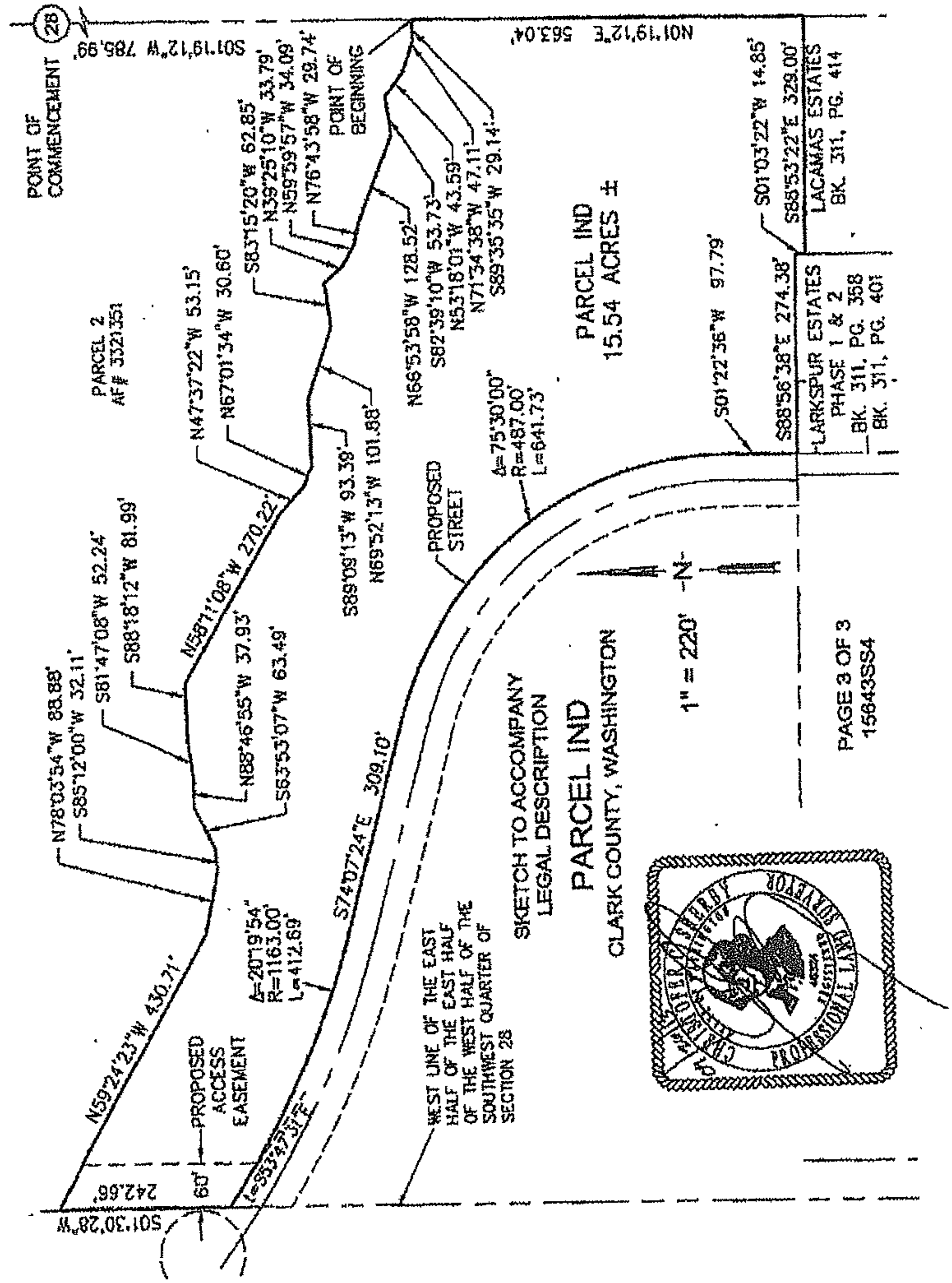
A 60.00 foot access easement being the West 60.00 feet of the above described parcel.

Containing 15.54 acres, more or less.

Subject to easements and restrictions of record.

CHRISTOPHER Q. SHERRY
STATE OF WASHINGTON
48324
REGISTERED
PROFESSIONAL LAND SURVEYOR

Exhibit B



POINT OF COMMENCEMENT
28
S01°19'12"W 785.99'
N01°19'12"E 563.04'
POINT OF BEGINNING
PARCEL 2
AF# 3321351
PARCEL IND
15.54 ACRES ±
LACAMAS ESTATES
BK. 311, PG. 414
LARKSPUR ESTATES
PHASE 1 & 2
BK. 311, PG. 358
BK. 311, PG. 401
S01°03'22"W 14.85'
S88°53'22"E 329.00'
S88°56'38"E 274.38'
S01°22'36"W 97.79'
Δ=75°30'00"
R=487.00'
L=641.73'
PROPOSED STREET
S74°07'24"E 309.10'
Δ=20°19'54"
R=1163.00'
L=412.69'
N59°24'23"W 430.71'
PROPOSED ACCESS EASEMENT
60'
242.66'
S01°30'28"W
WEST LINE OF THE EAST HALF OF THE EAST HALF OF THE WEST HALF OF THE SOUTHWEST QUARTER OF SECTION 28
SKETCH TO ACCOMPANY LEGAL DESCRIPTION
PARCEL IND
CLARK COUNTY, WASHINGTON
1" = 220'
N
PAGE 3 OF 3
15843SS4

Exhibit A

15643 LD6
07/23/14
CCS/btm

MacKay Sposito

VANCOUVER OFFICE

1325 SE Tech Center Drive, Suite 140 • Vancouver, WA 98683
360.695.3411 • info@mackaysposito.com

LEGAL DESCRIPTION
PARCEL MF

Real property lying in the Southwest quarter of Section 28, Township 2 North, Range 3 East of the Willamette Meridian, Clark County, Washington, being a portion of Parcel 1 and Parcel 2 as described in Auditor's File No. 3321351, records of said County, more particularly described as follows:

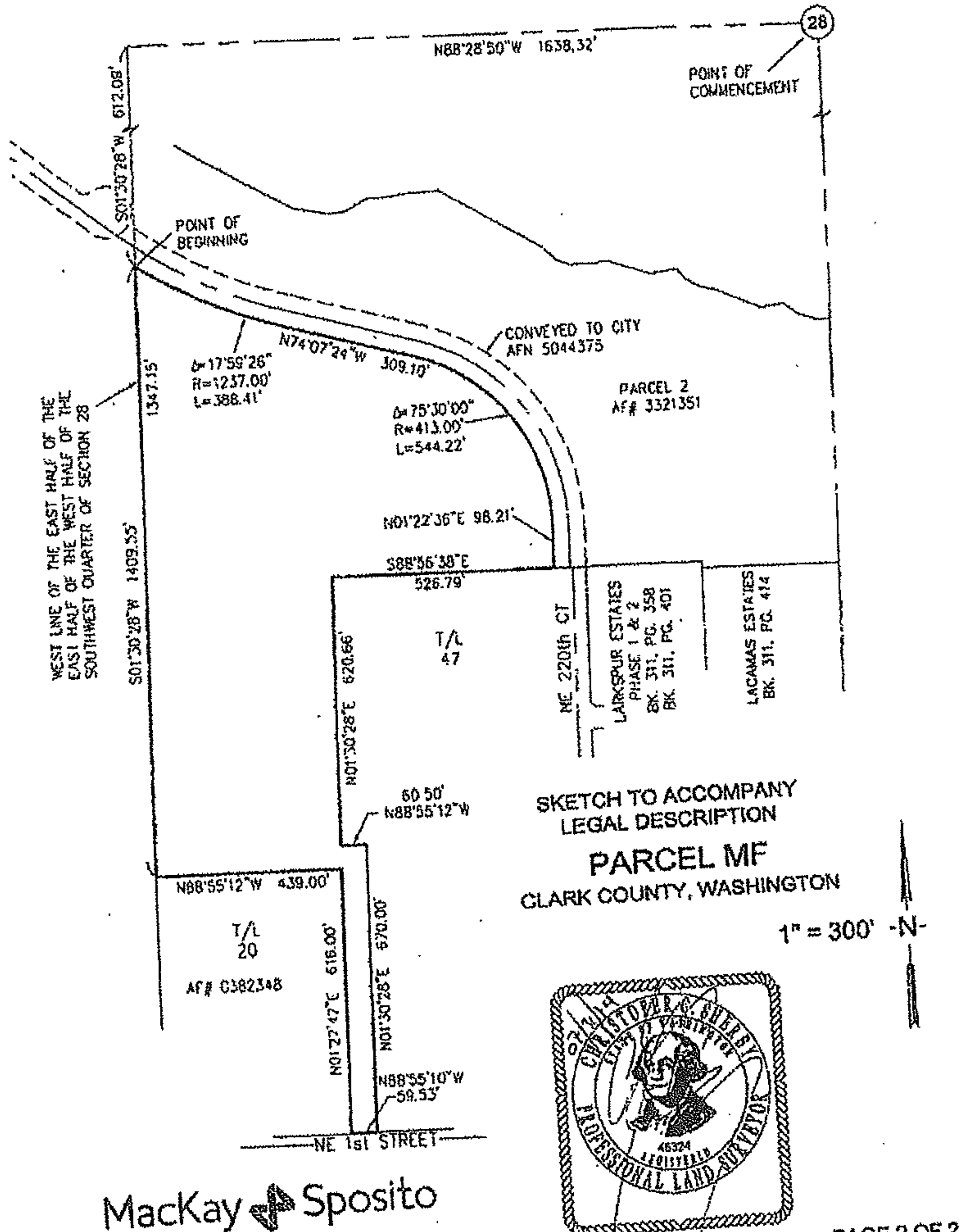
Commencing at the Northeast corner of the Southwest quarter of said Section 28; thence along the North line of said Southwest quarter North 88° 28' 50" West a distance of 1638.32 feet to the Northwest corner of the East half of the East half of the West half of said Southwest quarter; thence along the West line of said East half of the East half of the West half of said Southwest quarter South 01° 30' 28" West 612.09 feet to a point on the South line of that tract of land described in Auditor's File No. 5044375, said point being the **Point of Beginning**; thence continuing along said West line and along the East line of NW Payne Street and its Northerly Extension South 01° 30' 28" West 1409.55 feet to the Northwest corner of that tract of land described in Auditor's File No. G382348; thence along the North line of said tract of land described in Auditor's File No. G382348 South 88° 55' 12" East a distance of 439.00 feet to the Northeast corner thereof; thence along the East line of said tract of land described in Auditor's File No. G382348 South 01° 27' 47" West a distance of 616.00 feet to the North right of way line of NW Lake Road as described in Auditor's File No. 3653508; thence along said North right of way line South 88° 55' 10" East a distance of 59.53 feet to the West line of that tract of land described in Auditor's File No. G715221; thence along said West line North 01° 30' 28" East a distance of 670.00 feet to the Easterly extension of the South line of that tract of land described in Auditor's File No. G581015; thence along said South line and Easterly extension North 88° 55' 12" West a distance of 60.50 feet to the Southwest corner thereof; thence along the West line of said Auditor's File No. G581015 North 01° 30' 28" East a distance of 620.66 feet to the South line of said tract of land described in Auditor's File No. G394526; thence along said South line South 88° 56' 38" East a distance of 526.79 feet to the South line of said tract of land described in Auditor's File No. 5044375; thence along said South line the following four courses: North 01° 22' 36" East a distance of 98.21 feet to a point of curvature with a 413.00 foot radius curve; thence along said curve to the left, through a central angle of 75° 30' 00", an arc distance of 544.22 feet to a point of tangency; thence North 74° 07' 24" West a distance of 309.10 feet to a point of curvature with a 1237.00 foot radius curve; thence along said curve to the right, through a central angle of 17° 59' 26", an arc distance of 388.41 feet to the **Point of Beginning**.

CHRISTOPHER C. SOBERBY
PROFESSIONAL LAND SURVEYOR
40324

Containing 19.50 acres, more or less.

Subject to easements and restrictions of record.

Exhibit B



SKETCH TO ACCOMPANY LEGAL DESCRIPTION

PARCEL MF

CLARK COUNTY, WASHINGTON

1" = 300' -N-

MacKay Sposito

ENERGY PUBLIC WORKS LAND DEVELOPMENT

www.mackaysposito.com

PAGE 2 OF 2
15643SS6

5095692 D
RecFee - $77.00 Pages: 6 - VANCOUVER LAND LAW
Clark County, WA 08/13/2014 11:22

MAIL TAX STATEMENTS TO:
Unchanged

AFTER RECORDING RETURN TO:
Jordan Ramis, PC
Attn: James D. Howsley
1499 S.E. Tech Center Place, Suite 380
Vancouver, WA 98683

Real Estate Excise Tax
Ch. 11 Rev. Laws 1951
EXEMPT
Affd. # 713546 Date 8-13-14
For Details of tax paid see
Affd. #
Doug Lasher
Clark County Treasurer
By RZ
Deputy

INSTRUMENT TITLE: **QUIT CLAIM DEED**

GRANTOR(S): CHINOOK LAND OWNERS GROUP OF VANCOUVER, WASHINGTON, a Washington limited liability company

GRANTEE: CHINOOK LAND OWNERS GROUP OF VANCOUVER, WASHINGTON, a Washington limited liability company

ABBREVIATED LEGAL DESCRIPTION: #68 SEC 28 T2NR3EWM 20.89A

FULL LEGAL: See Exhibit A To This Document

ASSESSOR'S PROPERTY TAX PARCEL ACCOUNT NUMBER(S): 986031650

REFERENCE NUMBER OF RELATED DOCUMENTS:

After Recording Return to:
Jordan Ramis, PC.
Attn: James D. Howsley
1499 SE Tech Center Place, Suite 380
Vancouver, WA 98683

File No.: 51848-71561

QUIT CLAIM DEED

Whereas, the City of Camas acted, pursuant to RCW Chapter 36.70A, to apply new comprehensive plan and zoning designations to the Grantor's parent property that would have split-zoned the parent property; and

Whereas, the Grantor created Assessor's Property Number 986031650 in order to prevent the split-zoning of its parent property; and

Whereas, Assessor's Property Number 986031650, exceeds 20 acres in size and thus was exempt from land division requirements pursuant to Camas Municipal Code 17.01.030.B(4); and

Whereas, Grantor now desires to record the legal description of Assessor's Property Number 986031650;

Therefore, in consideration of value other than money, Chinook Land Owners Group of Vancouver, Washington, LLC, a Washington limited liability company, conveys and quitclaims to Chinook Land Owners Group of Vancouver, Washington, LLC, a Washington limited liability company, all interest in the real estate described in Exhibit A and depicted on Exhibit B.

Dated this 1 day of August, 2014 by

Max D. Hall
Chinook Land Owners Group of Vancouver, Washington, LLC, a Washington limited liability company

By: Max Dempsey Hall, its Secretary

STATE OF WASHINGTON)
) ss.
County of Clark)

I certify that I know or have satisfactory evidence that Max Dempsey Hall is the person who appeared before me, and he acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as the Secretary of Chinook Land Owners Group of Vancouver, Washington, LLC, a Washington limited liability company, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

DATED this 1 day of Aug, 2014.

Cassie N. Crawford
NOTARY PUBLIC FOR WASHINGTON
My Appointment Expires: 4/1/18

CASSIE N. CRAWFORD
COMMISSION EXP.
NOTARY
PUBLIC
APRIL 1, 2018
STATE OF WASHINGTON

15643 LD1-rev
9/24/13
CCS/btm

MacKay Sposito

VANCOUVER OFFICE

1325 SE Tech Center Drive, Suite 140 • Vancouver, WA 98683
360.695.3411 • info@mackaysposito.com

LEGAL DESCRIPTION
PARCEL R

Real property lying in the Southwest quarter of Section 28, Township 2 North, Range 3 East of the Willamette Meridian, Clark County, Washington, being a portion of Parcel 2 as described in Auditor's File No. 3321351, records of said County, more particularly described as follows:

Beginning at the Northeast corner of the Southwest quarter of said Section 28; thence along the East line of said Southwest quarter South 01° 19' 12" West for a distance of 785.99 feet; thence South 89° 35' 35" West a distance of 29.14 feet; thence North 71°34' 38" West a distance of 47.11 feet; thence North 53° 18' 01" West a distance of 43.59 feet; thence South 82° 39' 10" West a distance of 53.73 feet; thence North 66° 53' 58" West a distance of 128.52 feet; thence North 76° 43' 58" West a distance of 29.74 feet; thence North 59° 59' 57" West a distance of 34.09 feet; thence North 39° 25' 10" West a distance of 33.79 feet; thence South 83° 15' 20" West a distance of 62.85 feet; thence North 69° 52' 13" West a distance of 101.88 feet; thence South 89° 09' 13" West a distance of 93.39 feet; thence North 67° 01' 34" West a distance of 30.60 feet; thence North 47° 37' 22" West a distance of 53.15 feet; thence North 58° 11' 08" West a distance of 270.22 feet; thence South 88° 18' 12" West a distance of 81.99 feet; thence South 81° 47' 08" West a distance of 52.24 feet; thence North 88° 46' 55" West a distance of 37.93 feet; thence South 63° 53' 07" West a distance of 63.49 feet; thence South 85° 12' 00" West a distance of 32.11 feet; thence North 78° 03' 54" West a distance of 88.88 feet; thence North 59° 24' 23" West a distance of 430.71 feet to the West line of the East half of the East half of the West half of said Southwest quarter; thence along said West line North 01°30'28" East for a distance of 280.68 feet to the Northwest corner of said East half of the East half of the West half of said Southwest quarter; thence along the North line of said Southwest quarter South 88° 28' 50" East a distance of 1638.32 feet to the **Point of Beginning.**

TOGETHER WITH

A 60.00 foot access easement being the West 60.00 feet of the following described tract of land lying in the Southwest quarter of Section 28, Township 2 North, Range 3 East of the Willamette Meridian, Clark County, Washington :

Commencing at the Northeast corner of the Southwest quarter of said Section 28; thence along the East line of said Southwest quarter South 01° 19' 12" West a distance of 785.99 feet to the **Point of Beginning**; thence South 89° 35' 35" West a distance of 29.14 feet; thence North 71°34' 38" West a distance of 47.11 feet; thence North 53° 18' 01" West a distance of 43.59 feet; thence South 82° 39' 10" West a distance of 53.73 feet; thence North 66° 53' 58" West a distance of 128.52 feet; thence North 76° 43' 58" West a distance of 29.74 feet; thence North 59° 59' 57" West a distance of 34.09 feet; thence North 39° 25' 10" West a distance of 33.79 feet; thence South 83° 15' 20" West a distance of 62.85 feet; thence North 69° 52' 13" West a distance of 101.88 feet; thence South 89° 09' 13" West a distance of 93.39 feet; thence North 67° 01' 34" West a distance of 30.60 feet; thence North 47° 37' 22" West a distance of 53.15 feet; thence North 58° 11' 08" West a distance of 270.22 feet; thence South 88° 18' 12" West a distance of 81.99 feet; thence South 81° 47' 08" West a distance of 52.24 feet; thence North 88° 46' 55" West a distance of 37.93 feet; thence South 63° 53' 07" West a distance of 63.49 feet; thence South 85° 12' 00" West a distance of 32.11 feet; thence North 78° 03' 54" West a distance of 88.88 feet; thence North 59° 24' 23" West a distance of 430.71 feet to the West line of the East half of the East half of the West half of said Southwest quarter; thence along said West line South 01° 30' 28" West a distance of 242.66 feet to a point on the arc of a 1163.00 foot radius curve; thence leaving said West line, from a tangent bearing of South 53° 47' 31" East, along said curve to the left, through a central angle of 20° 19' 54", an arc distance of 412.69 feet to a point of tangency; thence South 74° 07' 24" East a distance of 309.10 feet to a point of curvature with a 487.00 foot radius curve; thence along said curve to the right, through a central angle of 75° 30' 00", an arc distance of 641.73 feet to a point of tangency; thence South 01° 22' 36" West a distance of 97.79 feet to a point on the North line of Larkspur Estates Phase 2 as recorded in Book 311 of Plats, at Page 401; thence along said North line and the North line of Larkspur Estates Phase 1 as recorded in Book 311 of Plats, at Page 358 South 88° 56' 38" East a distance of 274.38 feet to the Northeast corner thereof; thence along the East line of said Plat South 01° 03' 22" West 14.85 feet to the Northwest corner of Lacamas Estates as recorded in Book 311 of Plats, at Page 414; thence along the North line of said Lacamas Estates South 88° 53' 22" East a distance of 329.00 feet to the East line of said Southwest quarter of Section 28; thence along the East line of said Southwest quarter North 01° 19' 12" East a distance of 563.04 feet to the **Point of Beginning.**

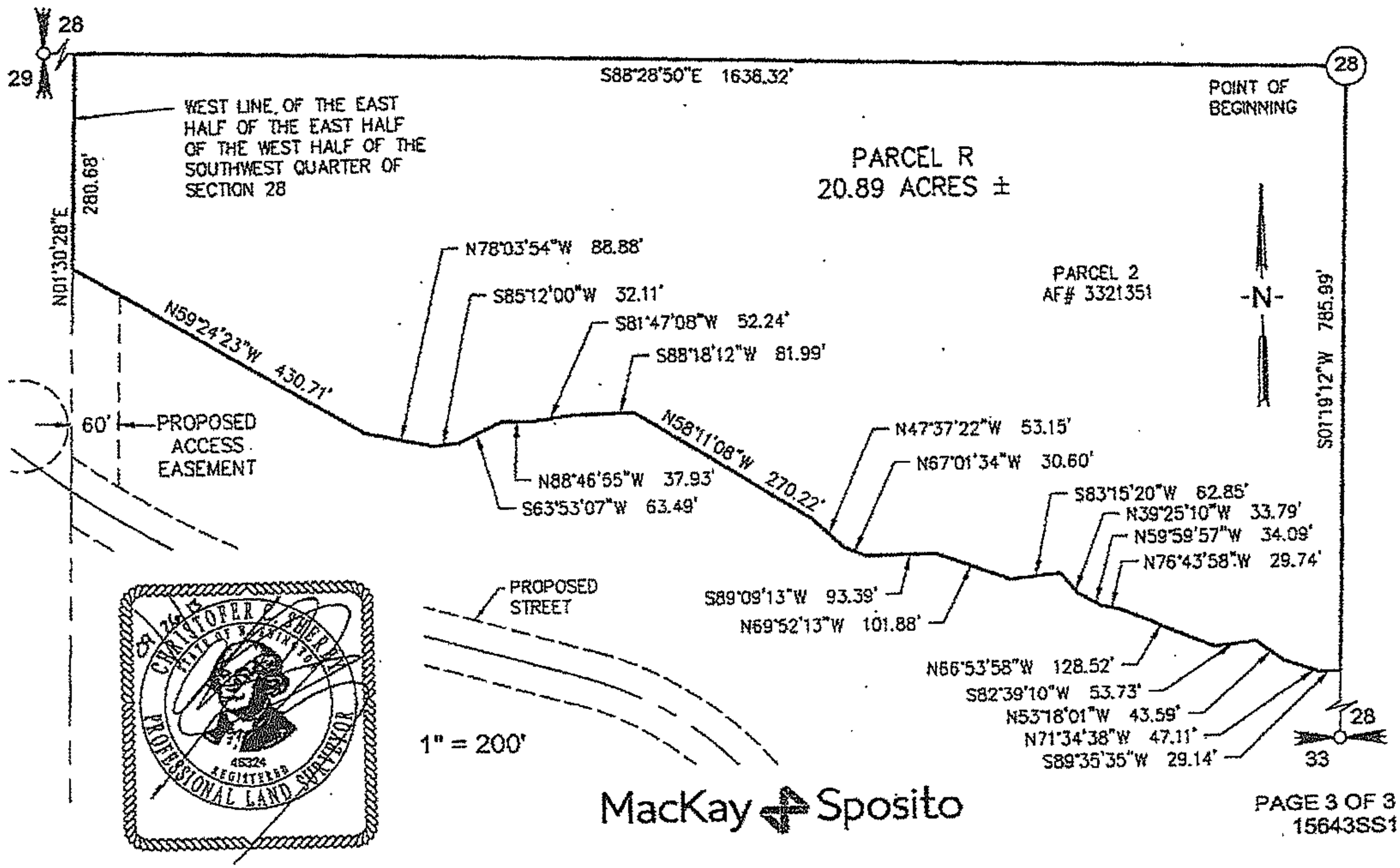
Containing 20.89 acres, more or less.

Subject to easements and restrictions of record.

SKETCH TO ACCOMPANY LEGAL DESCRIPTION

PARCEL R

CLARK COUNTY, WASHINGTON



MacKay Sposito

PAGE 3 OF 3
15643SS1

5095938 D
RecFee - $77.00 Pages: 6 - VANCOUVER LAND LAW CORP
Clark County, WA 08/13/2014 04:23

MAIL TAX STATEMENTS TO:
Unchanged

Real Estate Excise Tax
Ch. 11 Rev. Laws 1951
EXEMPT
Affd. #713606 Date 8-13-14
For Details of tax paid see
Affd. #
Doug Lasher
Clark County Treasurer
By RV Deputy

AFTER RECORDING RETURN TO:
Jordan Ramis, PC
Attn: James D. Howsley
1499 S.E. Tech Center Place, Suite 380
Vancouver, WA 98683

INSTRUMENT TITLE: **QUIT CLAIM DEED**

GRANTOR(S): CHINOOK LAND OWNERS GROUP OF VANCOUVER, WASHINGTON, a Washington limited liability company

GRANTEE: CHINOOK LAND OWNERS GROUP OF VANCOUVER, WASHINGTON, a Washington limited liability company

ABBREVIATED LEGAL DESCRIPTION: Portion #21 SEC 28 T2NR3EWM 15.54A

FULL LEGAL: See Exhibit A To This Document

ASSESSOR'S PROPERTY TAX PARCEL ACCOUNT NUMBER(S): 175948000

REFERENCE NUMBER OF RELATED DOCUMENTS: 5044375

After Recording Return to:
Jordan Ramis, PC
Attn: James D. Howsley
1499 SE Tech Center Place, Suite 380
Vancouver, WA 98683

File No.: 51848-71561

QUIT CLAIM DEED

Whereas, the Grantor, Chinook Land Owners Group of Vancouver, Washington, LLC, a Washington limited liability company, previously dedicated a road right-of way through its property to the City of Camas, recorded as AFN 5044375, which divided Assessor's Property Number 175948000; and

Whereas, the division of Assessor's Property Number 175948000 by dedication of public right-of-way was exempt from land division requirements pursuant to Camas Municipal Code 17.01.030.B(3); and

Whereas, Grantor consolidated the portion of Assessor's Property Number 175948000 south of the new road into Assessor's Property Number 175951000, leaving the remainder portion of Assessor's Property Number 175948000 north of the new road; and

Whereas, Grantor desires to record this deed for the remainder portion of Assessor's Property Number 175948000 north of the new road to confirm its new legal description;

Therefore, in consideration of value other than money and to facilitate the road dedication, Chinook Land Owners Group of Vancouver, Washington, LLC, a Washington limited liability company, conveys and quitclaims to Chinook Land Owners Group of Vancouver, Washington, LLC, a Washington limited liability company, all interest in the real estate described in Exhibit A and depicted on Exhibit B.

Dated this 1 day of August, 2014 by

Max D. Hall
Chinook Land Owners Group of Vancouver, Washington, LLC, a Washington limited liability company

By: Max Dempsey Hall, its Secretary

STATE OF WASHINGTON)
) ss.
County of Clark)

I certify that I know or have satisfactory evidence that Max Dempsey Hall is the person who appeared before me, and he acknowledged that he signed this instrument, on oath stated that he was authorized to execute the instrument and acknowledged it as the Secretary of Chinook Land Owners Group of Vancouver, Washington, LLC, a Washington limited liability company, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

DATED this 1 day of Aug., 2014.

Cassie N. Crawford
NOTARY PUBLIC FOR WASHINGTON
My Appointment Expires: 4/1/18

CASSIE N. CRAWFORD
COMMISSION EXP.
NOTARY
PUBLIC
APRIL 1, 2018
STATE OF WASHINGTON

Exh. A

MacKay Sposito

15643 LD4
9/23/13
CCS/btm

VANCOUVER OFFICE

1325 SE Tech Center Drive, Suite 140 • Vancouver, WA 98683
360.695.3411 • info@mackaysposito.com

LEGAL DESCRIPTION
PARCEL IND

Real property lying in the Southwest quarter of Section 28, Township 2 North, Range 3 East of the Willamette Meridian, Clark County, Washington, being a portion of Parcel 2 as described in Auditor's File No. 3321351, records of said County, more particularly described as follows:

Commencing at the Northeast corner of the Southwest quarter of said Section 28; thence along the East line of said Southwest quarter South 01° 19' 12" West a distance of 785.99 feet to the **Point of Beginning**; thence South 89° 35' 35" West a distance of 29.14 feet; thence North 71°34' 38" West a distance of 47.11 feet; thence North 53° 18' 01" West a distance of 43.59 feet; thence South 82° 39' 10" West a distance of 53.73 feet; thence North 66° 53' 58" West a distance of 128.52 feet; thence North 76° 43' 58" West a distance of 29.74 feet; thence North 59° 59' 57" West a distance of 34.09 feet; thence North 39° 25' 10" West a distance of 33.79 feet; thence South 83° 15' 20" West a distance of 62.85 feet; thence North 69° 52' 13" West a distance of 101.88 feet; thence South 89° 09' 13" West a distance of 93.39 feet; thence North 67° 01' 34" West a distance of 30.60 feet; thence North 47° 37' 22" West a distance of 53.15 feet; thence North 58° 11' 08" West a distance of 270.22 feet; thence South 88° 18' 12" West a distance of 81.99 feet; thence South 81° 47' 08" West a distance of 52.24 feet; thence North 88° 46' 55" West a distance of 37.93 feet; thence South 63° 53' 07" West a distance of 63.49 feet; thence South 85° 12' 00" West a distance of 32.11 feet; thence North 78° 03' 54" West a distance of 88.88 feet; thence North 59° 24' 23" West a distance of 430.71 feet to the West line of the East half of the East half of the West half of said Southwest quarter; thence along said West line South 01° 30' 28" West a distance of 242.66 feet to a point on the arc of a 1163.00 foot radius curve; thence leaving said West line, from a tangent bearing of South 53° 47' 31" East, along said curve to the left, through a central angle of 20° 19' 54", an arc distance of 412.69 feet to a point of tangency; thence South 74° 07' 24" East a distance of 309.10 feet to a point of curvature with a 487.00 foot radius curve; thence along said curve to the right, through a central angle of 75° 30' 00", an arc distance of 641.73 feet to a point of tangency; thence South 01° 22' 36" West a distance of 97.79 feet to a point on the North line of Larkspur Estates Phase 2 as recorded in Book 311 of Plats, at Page 401; thence along said North line and the North line of Larkspur Estates Phase 1 as recorded in Book 311 of Plats, at Page 358 South 88° 56' 38" East a distance of 274.38 feet to the Northeast corner thereof; thence along the East line of said Plat South 01° 03' 22" West 14.85 feet to the Northwest corner of Lacamas Estates as recorded in Book 311 of Plats, at Page 414; thence along the North line of said Lacamas Estates South 88° 53' 22" East a distance of 329.00 feet to the East line of said Southwest quarter of Section 28; thence along the East line of said Southwest quarter North 01° 19' 12" East a distance of 563.04 feet to the **Point of Beginning.**

Exh. A

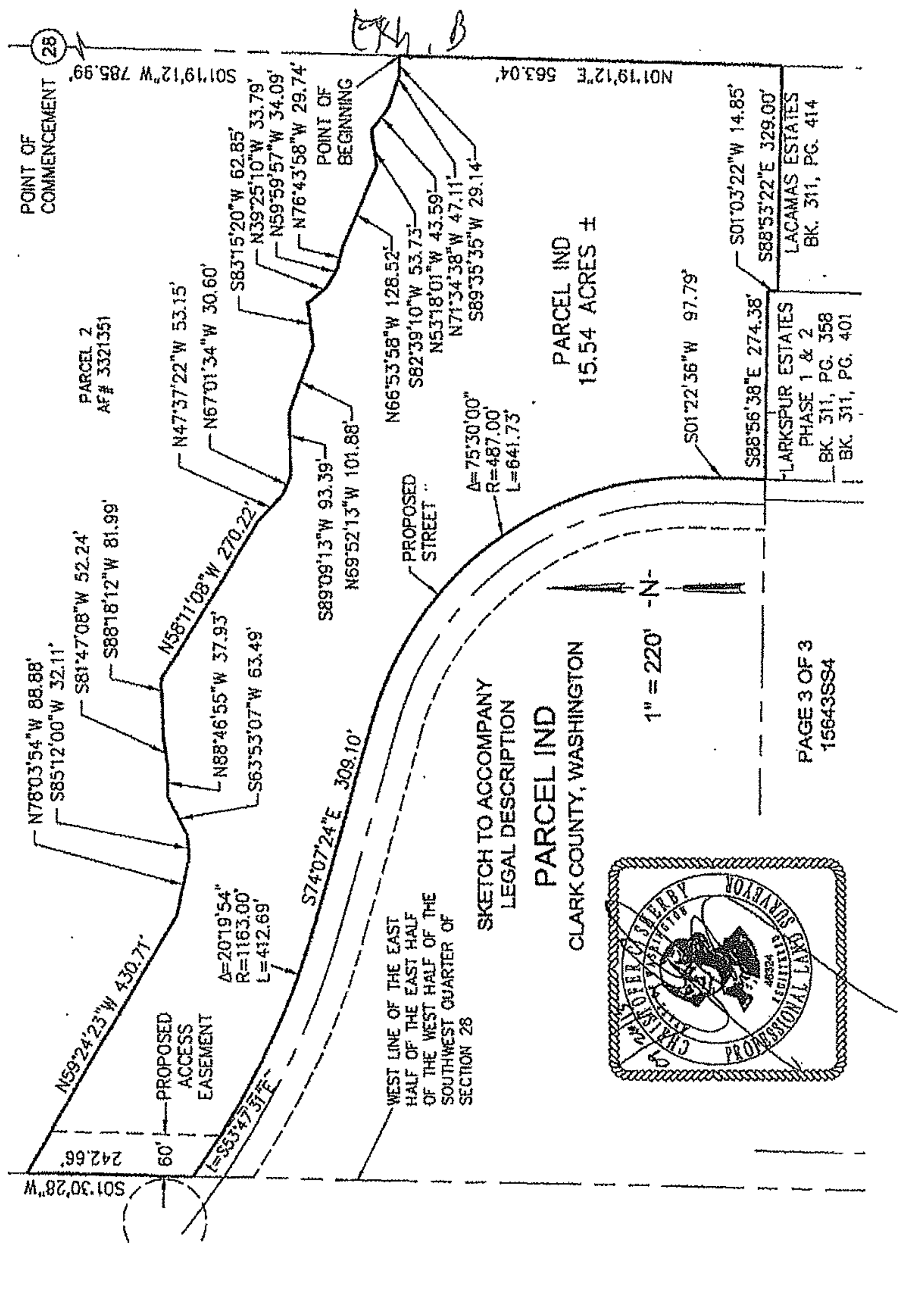
SUBJECT TO

A 60.00 foot access easement being the West 60.00 feet of the above described parcel.

Containing 15.54 acres, more or less.

Subject to easements and restrictions of record.

CHRISTOFER C. SHERRY
STATE OF WASHINGTON
48324
REGISTERED
PROFESSIONAL LAND SURVEYOR



POINT OF COMMENCEMENT
28
S01°19'12"W 785.99'
EXH. B
N01°19'12"E 563.04'
POINT OF BEGINNING
S83°15'20"W 62.85'
N39°25'10"W 33.79'
N59°59'57"W 34.09'
N76°43'58"W 29.74'
N66°53'58"W 128.52'
S82°39'10"W 53.73'
N53°18'01"W 43.59'
N71°34'38"W 47.11'
S89°35'35"W 29.14'
S01°03'22"W 14.85'
S88°53'22"E 329.00'
LACAMAS ESTATES
BK. 311, PG. 414
PARCEL 2
AF# 3321351
PARCEL IND
15.54 ACRES ±
N47°37'22"W 53.15'
N67°01'34"W 30.60'
S89°09'13"W 93.39'
N69°52'13"W 101.88'
S01°22'36"W 97.79'
S88°56'38"E 274.38'
LARKSPUR ESTATES
PHASE 1 & 2
BK. 311, PG. 358
BK. 311, PG. 401
PROPOSED STREET
Δ=75°30'00"
R=487.00'
L=641.73'
N58°11'08"W 270.22'
N78°03'54"W 88.88'
S85°12'00"W 32.11'
S81°47'08"W 52.24'
S88°18'12"W 81.99'
N88°46'55"W 37.93'
S63°53'07"W 63.49'
-N-
1" = 220'
PAGE 3 OF 3
15643SS4
S74°07'24"E 309.10'
Δ=20°19'54"
R=1163.00'
L=412.69'
SKETCH TO ACCOMPANY
LEGAL DESCRIPTION
PARCEL IND
CLARK COUNTY, WASHINGTON
N59°24'23"W 430.71'
PROPOSED ACCESS EASEMENT
WEST LINE OF THE EAST HALF OF THE EAST HALF OF THE WEST HALF OF THE SOUTHWEST QUARTER OF SECTION 28
60'
242.66'
S01°30'28"W
S53°47'31"E
CHRISTOPHER C. SHERBY
STATE OF WASHINGTON
46324
REGISTERED
PROFESSIONAL LAND SURVEYOR

EXHIBIT 28

Gmail

James Kessi <james.kessi@gmail.com>

Re: FW: Parklands Archery Subdivision and Engineering Application - Deviation Request

1 message

James Kessi <james.kessi@gmail.com> Mon, May 23, 2016 at 2:39 PM
To: Steve Wall <swall@cityofcamas.us>, Wes Heigh <WHeigh@cityofcamas.us>, Aaron Barr <abarrmail@gmail.com>, Kevin DeFord <ngdevelopment@gmail.com>

Hi Steve,

The applicant is requesting a deviation approval from the City Engineer in accordance with 10.d below. The deviation request is to allow the proposed private Street ROW widths, Paved widths, sidewalk on one side of shown streets, street frontage as low as 20' on certain cul-de-sac lots, and cul-de-sac lengths greater than maximum length as shown on the the 04 Preliminary Composite Utility Plan Sheet 04 dated 24 Jan 2016 (attached). These deviations are requested due to the topography limitations, limitations due to wetlands, and unusual site constraints and layout unique for the site. In addition, all the layouts and proposed design elements were previous given during design review and the proposed plan was accepted by City Council as part of the MXPD overlay process.

17.19.040.10-d

10. Street Layout. Street layout shall provide for the most advantageous development of the land development, adjoining area, and the entire neighborhood. Evaluation of street layout shall take into consideration potential circulation solutions for vehicle, bicycle and pedestrian traffic, and, where feasible, street segments shall be interconnected.

a. While it is important to minimize the impact to the topography from creating an integrated road system, improved site development and circulation solutions shall not be sacrificed to minimize the amount of cut and fill requirements of the proposal.

b. Where critical areas are impacted, the standards and procedures for rights-of-way in the critical areas overlay zone shall be followed.

c. When the proposed development's average lot size is seven thousand four hundred square feet or less, one additional off-street parking space shall be required for every five units, notwithstanding the requirements of CMC Chapter 18.11. These spaces are intended to be located within a common tract.

d. When, on the basis of topography, projected traffic usage or other relevant facts, it is unfeasible to comply with the foregoing right-of-way, tract and street width standards, the approval authority, upon recommendation from the city engineer, may permit a deviation from the standards of Table 17.19.040-1 and Table 17.19.040-2.

A. See responses in red and **purple** to each of City comments regarding the Engineering plans.
B. Is the lot ROW frontage requirement as low as 20 feet is also requested

1. Your utility note #6 for the sewer and storm indicate that minimum cover requirements can be avoided with a recommendation from the geotechnical engineer – this may not be an accurate statement and would require city approval. RESPONSE OK. We were trying to anticipate in the Final Engineering Plans the possibility of shallowing to the bare minimum some utilities, ONLY if hard bedrock was encountered, but we will change the final design to meet minimum cover requirements. A deviation is not requested

2. The standard individual residential STEP systems may not be able to overcome the total dynamic head of the system in Payne Road and will likely require high head pumps (probably not a favorable long term maintenance option for the city) or direction of flows into a pump station with more powerful pumps. RESPONSE : High head pumps will be necessary at each connection. There is not a local pump station with capacity to receive this flow. The system will be designed with appropriate pipe to convey the pressures needed to lift over the high point in Lake Road.

3. Based on the requirements of Table 17.19.040-1 in CMC 17.19 the westerly short cul-de-sac (NW 10th Fairway) will require Private Street standard C which consists of a 42 foot wide tract with 28 feet of pavement width with a detached 5 foot wide sidewalk on one side. RESPONSE- OK - Yes, in fact PVT 3 is proposed for NW 10th Fairway Drive, and meets these dimensions. The longer remaining private streets will require the Private Street standard D which consists of a 42 foot wide tract with two detached 5 foot sidewalks. Both private street sections restrict parking on one side. RESPONSE- OK - Yes, in fact PVT 4 is proposed for NW 16th Fairway Drive, NW Golf Drive and meets these dimensions. PVT 4 is proposed for NW 16th Fairway Drive, NW Golf Drive and meets these dimensions. Where NW Parklands Trail crosses on the upland between Wetland A and Wetland B, due to topographical constraints there is only being enough area to have an attached sidewalk on one side of the street, the connecting street is proposed as PVT 2 with 30' of ROW and a 5' attached sidewalk and 20 feet of paved width with no parking on BOTH sides. PVT 3 is proposed for NW 17th Green and , NW Parklands Trail south of the wetland to match having the sidewalk only on one side of the street, but the sidewalk has room to be detached. Note that all lots will be sprinklered and that No Parking signs will be located as required by the City.

4. The minimum paved cul-de-sac radius per the code is 35 feet. You are proposing 30 foot paved cul-de-sac widths. RESPONSE. The applicant agrees to provide a larger 35' paved radius design for the three cul-de-sacs. Per Dead End Turnaround Detail ST36, under guidelines for sprinklered Development (ALL lots will be sprinklered), the minimum Turning Radius (inside paved radius) is 30', and the Minimum (Outer) Turnaround Radius is 35'.

5. Please see CMC 17.19.040 (B) (10 d) if you are proposing to vary from the minimum street requirements of Table 17.19.040-1. RESPONSE We are proposing to vary slightly from the private road standards as proposed to fit the topographically limitations of the site and the constraints due to the existing wetlands and wetland buffers. The proposed variations to the streets and interpretation for the cul de sac dimensions are requested to be approved by the City Engineer as per 10.d above.

There are several areas on the plan where the water and sewer notes are swapped. RESPONSE OK. We will correct notes on final engineering plans as noted and needed.

7. The sewer notes on the plans refer to STEP and STEF systems, however the only possible STEF line that could work would be located in CM Drive and would then need to flow into the pump station near the clubhouse which could then overcome the TDH in Payne Road. RESPONSE: The existing Camas Meadows pump station (formerly known as Two Creeks #2) does not have capacity to accept flows from this proposed development. As a result, all of the lots/buildings will be served by individual STEP services with a common force main.

8. Other items that are non-engineering related would be the location of the parking lots serving the commercial uses (buildings should be up front and parking should be in the rear). RESPONSE – This issue been fully addressed in the preceeding MXPD Overlay and Rezone approvals by the City.
9. Also, are we providing adequate buffering between incompatible uses? Design review stuff – see CMC 18.19. RESPONSE – This issue been fully addressed in the preceeding MXPD Overlay and Rezone approvals by the City.

James Kessi P.E.

Kessi Engineering & Consulting
Civil Engineering - Stormwater - Planning
T (360) 991-9300 E James.Kessi@gmail.com

On Thu, Feb 25, 2016 at 3:38 PM, Wes Heigh <WHeigh@cityofcamas.us> wrote:

Hi James,

Thank you for the composite preliminary submittal for review.

Below are my quick initial review comments/concerns:

- Your utility note #6 for the sewer and storm indicate that minimum cover requirements can be avoided with a recommendation from the geotechnical engineer – this may not be an accurate statement and would require city approval.
- The standard individual residential STEP systems may not be able to overcome the total dynamic head of the system in Payne Road and will likely require high head pumps (probably not a favorable long term maintenance option for the city) or direction of flows into a pump station with more powerful pumps.
- Based on the requirements of Table 17.19.040-1 in CMC 17.19 the westerly short cul-de-sac (NW 10th Fairway) will require Private Street standard C which consists of a 42 foot wide tract with 28 feet of pavement width with a detached 5 foot wide sidewalk on one side. The longer remaining private streets will require the Private Street standard D which consists of a 42 foot wide tract with two detached 5 foot sidewalks. Both private street sections restrict parking on one side.
- The minimum paved cul-de-sac radius per the code is 35 feet. You are proposing 30 foot paved cul-de-sac widths.
- Please see CMC 17.19.040 (B) (10 d) if you are proposing to vary from the minimum street requirements of Table 17.19.040-1.
- There are several areas on the plan where the water and sewer notes are swapped.
- The sewer notes on the plans refer to STEP and STEF systems, however the only possible STEF line that could work would be located in CM Drive and would then need to flow into the pump station near the clubhouse which could then overcome the TDH in Payne Road.

Other items that are non-engineering related would be the location of the parking lots serving the commercial uses (buildings should be up front and parking should be in the rear). Also, are we providing adequate buffering between incompatible uses? Design review stuff – see CMC 18.19.

Regards,

Wes

Wes G. Heigh

Project Manager

City of Camas

616 NE 4th Ave.

Camas, WA 98607

(360) 817-7237

wheigh@cityofcamas.us

From: James Kessi [mailto:james.kessi@gmail.com]
Sent: Thursday, February 25, 2016 11:14 AM
To: Wes Heigh
Subject: Re: Parklands Archery Application - Camas Meadows Drive / Prelim Engineering Plan Discussion

Hi Wes,

I don't know if you saw the Composite Engineering Plan, but here it is.

It shows an overall STEP system connecting to the 10" Force Main in Payne as we had discussed

All stormwater facilities have been removed from the buffers and wetlands completely.

All Water quality will be accomplished with Filterra Treatment Vaults, and then stormwater is directed to level spreaders to spread it out and let it flow to the wetland. As we had previously discussed in the meeting with Steve Wall, direct release to 100 year flood fringe from Lacamas Lake that extends onto a portion of the wetlands on the site is unique for this site and demonstrates a connection to Lacamas Lake.

Give me a call and I can go over it with you and make sure your questions are answered.

thanks

James

James Kessi P.E.

Gmail by Google

EXHIBIT 29

Aaron Barr <abarrmail@gmail.com>

Fwd: FW: Parklands Archery Application - Camas Meadows Drive / Prelim Engineering Plan - Response to City Comments on Prelim Engineering Plans

7 messages

James Kessi <james.kessi@gmail.com> Thu, Mar 3, 2016 at 5:07 PM
To: Kevin DeFord <ngdevelopment@gmail.com>, Aaron Barr <abarrmail@gmail.com>, Paul Dennis <pdennis@cascadeplanninggroup.com>

Hi Paul, Aaron and Kevin,

Red - Wes
Purple - Chad @ Olson

A. Can you please quickly review these responses in red and **purple** to each of Wes' comments regarding the Engineering plans.
B. Do they need to be considered as part of the MXPD Overlay approval and DA, or do they wait until subdivision approval to be considered, especially the variations in the road dimensions, which require approval of the City Engineer?
C. Do they look adequate enough to forward to Phil or the Clity?
D. or what is the best way/approach to get any variations approved up front ?
E. Is the lot ROW frontage requirement as low as 20 feet already in the DA standards?

1. Your utility note #6 for the sewer and storm indicate that minimum cover requirements can be avoided with a recommendation from the geotechnical engineer – this may not be an accurate statement and would require city approval. RESPONSE OK. We were trying to anticipate in the Final Engineering Plans the possibility of shallowing to the bare minimum some utilities, ONLY if hard bedrock was encountered, but this can be changed if the City is unyielding on this point even with a geotechnical engineer recommendation, but it will add cost to the project, and possibly additional cost to the City Camas Meadows Drive section of road..
2. The standard individual residential STEP systems may not be able to overcome the total dynamic head of the system in Payne Road and will likely require high head pumps (probably not a favorable long term maintenance option for the city) or direction of flows into a pump station with more powerful pumps. RESPONSE : High head pumps will be necessary at each connection. There is not a local pump station with capacity to receive this flow. The system will be designed with appropriate pipe to convey the pressures needed to lift over the high point in Lake Road.
3. Based on the requirements of Table 17.19.040-1 in CMC 17.19 the westerly short cul-de-sac (NW 10th Fairway) will require Private Street standard C which consists of a 42 foot wide tract with 28 feet of pavement width with a detached 5 foot wide sidewalk on one side. RESPONSE- OK - Yes, in fact PVT 3 is proposed for NW 10th Fairway Drive, and meets these dimensions. The longer remaining private streets will require the Private Street standard D which consists of a 42 foot wide tract with two detached 5 foot sidewalks. Both private street sections restrict parking on one side. RESPONSE- OK - Yes, in fact PVT 4 is proposed for NW 16th Fairway Drive, NW Golf Drive and meets these dimensions. PVT 4 is proposed for NW 16th Fairway Drive, NW Golf Drive and meets these dimensions. Where NW Parklands Trail crosses on the upland between Wetland A and Wetland B, due to topographical constraints there is only being enough area to have an attached sidewalk on one side of the street, the connecting street is proposed as PVT 2 with 30' of ROW and a 5' attached sidewalk and 20 feet of paved width with no parking on BOTH sides. PVT 3 is proposed for NW 17th Green and , NW Parklands Trail south of the wetland to match having the sidewalk only on one side of the street, but the sidewalk has room to be detached.

4. The minimum paved cul-de-sac radius per the code is 35 feet. You are proposing 30 foot paved cul-de-sac widths. RESPONSE. Per Dead End Turnaround Detail ST36, under guidelines for sprinklered Developement (ALL lots will be sprinklered), the minimum Turning Radius (inside paved radius) is 30' , and the Minimum (Outer) Turnaround Radius is 35'. As noted on the plans, All cul-de-sacs for Sprinklered Development are to be 30' Paved AC radius plus a 5' Attached Thickened Driveable Sidewalk provides for a total driveable turnaround radius of 35 feet and each sac will also signed as no parking. This appears to meet the intent of the code to provide 35 foot radius of driveable width. If this interpretation is not acceptable, then a larger radius design may be necessary , but this will increase the impervious surface of the streets and also remove potential lot area from the City Tax base and make the lots smaller. The applicant

5. Please see CMC 17.19.040 (B) (10 d) if you are proposing to vary from the minimum street requirements of Table 17.19.040-1. RESPONSE We are proposing to vary slightly from the private road standards as proposed to fit the topographically limitation of the site. A traffic study would find that the proposed street widths as adequate. The proposed variations to the streets and interpretation fo the cul de sac dimensions will either need to be part of a DA or Master Plan or approved by the City Engineer as per 10.d below.

> ***10.d. When, on the basis of topography, projected traffic usage or other relevant facts, it is unfeasible to comply with the foregoing right-of-way, tract and street width standards, the approval authority, upon recommendation from the city engineer, may permit a deviation from the standards of Table 17.19.040-1 and Table 17.19.040-2.***

6. There are several areas on the plan where the water and sewer notes are swapped. RESPONSE OK. We will correct notes on final engineering plans as needed.

7. The sewer notes on the plans refer to STEP and STEF systems, however the only possible STEF line that could work would be located in CM Drive and would then need to flow into the pump station near the clubhouse which could then overcome the TDH in Payne Road. RESPONSE: The existing Camas Meadows pump station (formerly known as Two Creeks #2) does not have capacity to accept flows from this proposed development. As a result, all of the lots/buildings will be served by individual STEP services with a common force main.

8. Other items that are non-engineering related would be the location of the parking lots serving the commercial uses (buildings should be up front and parking should be in the rear). RESPONSE - Paul - is this still an issue or concern, or has this issue been fully addressed in the MXPD Overlay, Development Agreement or Master Plan

9. Also, are we providing adequate buffering between incompatible uses? Design review stuff – see CMC 18.19. RESPONSE - Paul - is this still an issue or concern, or has this issue been fully addressed in the MXPD Overlay, Development Agreement or Master Plan?

10. Here is a copy of the requested street cross sections and cul-de-sac call outs as noted on Sheet 1:

PRELIMINARY PLAT AND BINDING SITE PLAN:
REFER TO MASTER PLAN AND DEVELOPMENT AGREEMENT
D.A. FOR PROJECT SPECIFIC RESIDENTIAL AND BUSINESS
PARK DEVELOPMENT STANDARDS TABLE.

PRIVATE STREET PER PVT2
30' PRIVATE R/W
20' PAVED ROAD WITH CURB AND GUTTER
NO PARKING BOTH SIDES
5' ATTACHED SIDEWALK WEST SIDE
CENTERLINE 240 LF
NW PARKLANDS TRAIL DR ASPHALT PAVING = 4,927 SF
PER TABLE 17.19.040-1-B TO MINIMIZE BUFFER IMPACTS,
MINIMIZE STREET WIDTH & ATTACH SIDEWALK, ALL LOTS
SPRINKLERED AS > 100' IN LENGTH.

PRIVATE STREET PER PVT3
42' PRIVATE TRACT R/W
28' PAVED ROAD WITH CURB AND GUTTER
5' DETACHED SIDEWALK ONE SIDE
NW 10TH FAIRWAY DR ASPHALT PAVING = 11,151 SF
NW PARKLANDS TRAIL DR ASPHALT PAVING = 6,541 SF
NW 17TH GREEN DR ASPHALT PAVING = 10,815 SF
NO PARKING ONE SIDE

PRIVATE STREET PER PVT4
48' PRIVATE R/W
28' PAVED ROAD WITH CURB AND GUTTER
5' PLANTER BOTH SIDES
5' DETACHED SIDEWALK BOTH SIDES
CENTERLINE 1480 LF
NW 16TH FAIRWAY CT ASPHALT PAVING = 11,194 SF
NW GOLF DR ASPHALT PAVING = 28,860 SF

ALL CUL-DE-SAC TURNAROUNDS PER ST36
FOR SPRINKLERED DEVELOPMENT WITH 30'
PAVED & 5' ATTACHED SIDEWALK WITH OUTER
SIDEWALK TURNAROUND RADIUS BULB = 35'
35' RADIUS CUL-DE-SAC BULB
30' PAVED CUL-DE-SAC BULB

James Kessi P.E.
Kessi Engineering & Consulting
Civil Engineering - Stormwater - Planning
T (360) 991-9300 E James.Kessi@gmail.com

---------- Forwarded message ----------
From: **Chad McMurry** <chad@olsonengr.com>
Date: Fri, Feb 26, 2016 at 3:10 PM
Subject: Re: FW: Parklands Archery Application - Camas Meadows Drive / Prelim Engineering Plan Discussion
To: James Kessi <james.kessi@gmail.com>

See my responses below in purple.
–Chad

Chad McMurry, PE, CWRE
Olson Engineering
222 E. Evergreen Blvd.
Vancouver, WA 98660
(360) 695-1385
(360) 695-8117 fax
(503) 289-9936 from Portland
chad@olsonengr.com

On Thu, Feb 25, 2016 at 6:15 PM, James Kessi <james.kessi@gmail.com> wrote:

Hi Chad,
Can you just get me a response and reply to
#2 and
#7
Can we connect & discharge directly to the 10 inch force main in Payne? That is the current plan. The Camas Meadows Pump Station (formerly Two Creeks #2) doesn't have capacity to serve this development without significant upgrade.
Or do we still have to pump all the way to the Two Creeks pump station?
thanks
James

1. Your utility note #6 for the sewer and storm indicate that minimum cover requirements can be avoided with a recommendation from the geotechnical engineer – this may not be an accurate statement and would require city approval.
2. The standard individual residential STEP systems may not be able to overcome the total dynamic head of the system in Payne Road and will likely require high head pumps (probably not a favorable long term maintenance option for the city) or direction of flows into a pump station with more powerful pumps. High head pumps will be necessary at each connection. There is not a local pump station with capacity to receive this flow. The system will be designed with appropriate pipe to convey the pressures needed to lift over the high point in Lake Road.
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8. Other items that are non-engineering related would be the location of the parking lots serving the commercial uses (buildings should be up front and parking should be in the rear).
9. Also, are we providing adequate buffering between incompatible uses? Design review stuff – see CMC 18.19.

James Kessi P.E.
Kessi Engineering & Consulting
Civil Engineering - Stormwater - Planning
T (360) 991-9300 E James.Kessi@gmail.com

---------- Forwarded message ----------
From: **Wes Heigh** <WHeigh@cityofcamas.us>
Date: Thu, Feb 25, 2016 at 3:38 PM
Subject: FW: Parklands Archery Application - Camas Meadows Drive / Prelim Engineering Plan Discussion
To: James Kessi <james.kessi@gmail.com>
Cc: "Curleigh (Jim) Carothers" <jcarothers@cityofcamas.us>, Steve Wall <SWall@cityofcamas.us>, Robert

Maul <RMaul@cityofcamas.us>, Phil Bourquin <PBourquin@cityofcamas.us>

Hi James,

Thank you for the composite preliminary submittal for review.

Below are my quick initial review comments/concerns:

- Your utility note #6 for the sewer and storm indicate that minimum cover requirements can be avoided with a recommendation from the geotechnical engineer – this may not be an accurate statement and would require city approval.
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Other items that are non-engineering related would be the location of the parking lots serving the commercial uses (buildings should be up front and parking should be in the rear). Also, are we providing adequate buffering between incompatible uses? Design review stuff – see CMC 18.19.

Regards,

Wes

Wes G. Heigh

Project Manager

City of Camas

616 NE 4th Ave.

Camas, WA 98607

(360) 817-7237

wheigh@cityofcamas.us

City of Camas WASHINGTON

From: James Kessi [mailto:james.kessi@gmail.com]
Sent: Thursday, February 25, 2016 11:14 AM
To: Wes Heigh
Subject: Re: Parklands Archery Application - Camas Meadows Drive / Prelim Engineering Plan Discussion

Hi Wes,

I don't know if you saw the Composite Engineering Plan, but here it is.

It shows an overall STEP system connecting to the 10" Force Main in Payne as we had discussed

All stormwater facilities have been removed from the buffers and wetlands completely.

All Water quality will be accomplished with Filterra Treatment Vaults, and then stormwater is directed to level spreaders to spread it out and let it flow to the wetland. As we had previously discussed in the meeting with Steve Wall, direct release to 100 year flood fringe from Lacamas Lake that extends onto a portion of the wetlands on the site is unique for this site and demonstrates a connection to Lacamas Lake.

Give me a call and I can go over it with you and make sure your questions are answered.

thanks

James

James Kessi P.E.

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Civil Engineering - Stormwater - Planning

T (360) 991-9300 E James.Kessi@gmail.com

On Thu, Feb 25, 2016 at 10:04 AM, Steve Wall <SWall@cityofcamas.us> wrote:

Hi James,

Not any concerns per se, since as far as I know we haven't really started any reviews yet. Just wanted to try and stay ahead of things as much as possible. I think the biggest items would probably be stormwater and sewer. I'm not sure what you ended up with on final stormwater design approach, but it may be worth discussing with Wes if there's anything that's "non-traditional" in your design.

Also, the one item that caught my attention briefly was in regards to sewer service. My limited understanding is that the project has to be served by at least one of the pump stations in the area. As such, the pump station(s) should be analyzed to ensure that there is adequate capacity to handle the flows from the new development. From past experiences, that analysis can take some time and is often an iterative approach to make sure everything has been accounted for.

Again, it was really just an offer to talk through things prior to the land use review and plan review starting up to make sure everyone on our end really understands your thought process and proposals. I won't be completing the reviews, but I'm happy to coordinate with folks on our end to help out as needed. We'll take your lead...

Thanks,

Steve

Steve Wall, P.E.

Public Works Director

Ph: 360-817-7899

Cell: 360-624-2763

Email: swall@cityofcamas.us

City of Camas WASHINGTON

From: James Kessi [mailto:james.kessi@gmail.com]
Sent: Monday, February 22, 2016 8:50 PM
To: Steve Wall
Cc: Kevin DeFord; Aaron Barr
Subject: Re: Parklands Archery Application - Camas Meadows Drive / Larkspur discussion follow up

Hi Steve,

As a followup to my voice mail I left today, Kevin and Aaron asked me to also email you

and check with you to see if there were any overall storm, sanitary, water, or transportation engineering concerns or questions you had on the Parklands or Camas Meadows Drive projects?

I would be happy to have a phone conversation to go over the big picture design concepts and go over the latest engineering plans or meet with you to give you an update or answer any questions o as needed to give you a level of comfort that the big picture items are being addressed for the applications.

Please let me know what you are thinking.

Attached is a pdf the latest updated engineering composite plan - a hard paper copy was also submitted with the latest materials to the City.

thanks

James

James Kessi P.E.

Kessi Engineering & Consulting

Civil Engineering - Stormwater - Planning

T (360) 991-9300 E James.Kessi@gmail.com

On Thu, Aug 6, 2015 at 4:00 PM, Steve Wall <SWall@cityofcamas.us> wrote:

Hi James,

I appreciate the offer to be involved and I may be able to attend tomorrow depending on the time chosen. I'm sure you're aware I won't be completing any review myself and will be relying on engineering staff to review the storm design and ensure that it meets the City's requirements. If there's a complicated proposal that you'll be presenting tomorrow, more than likely we'll need to review internally anyway before providing any kind of response...similarly throughout the review process, if there are big picture items that crop up we'd likely review as a team.

That said, feel free to get a time set with Curleigh and Wes and I'll try and attend if I have availability.

EXHIBIT 30

1996 ~100yr flood Infrared Aerial Lacamas Lake

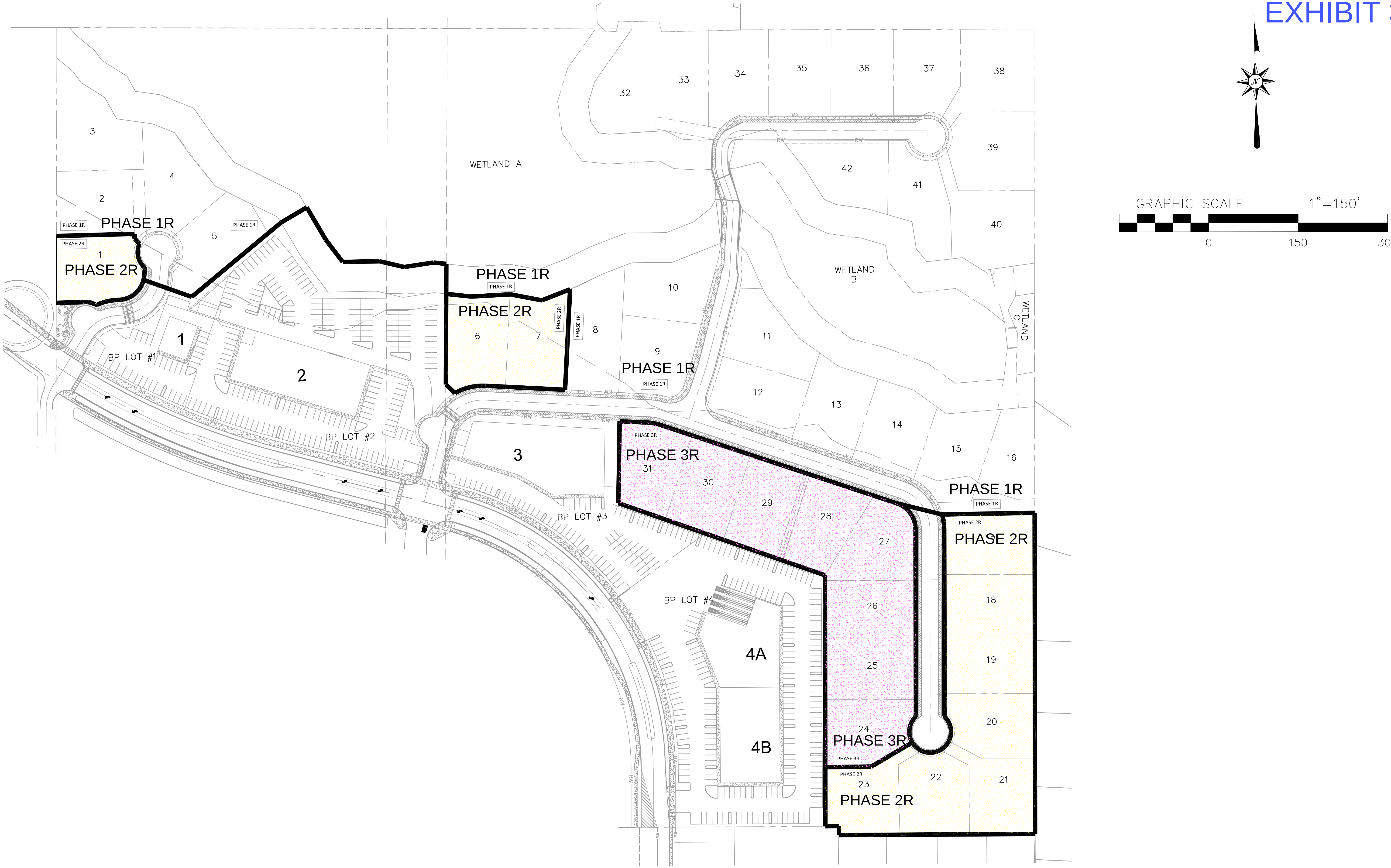
Legend
- Building Footprints
- Taxlots
- Cities Boundaries
- Urban Growth Boundaries

Notes:

0.3 0 0.13 0.3 Miles

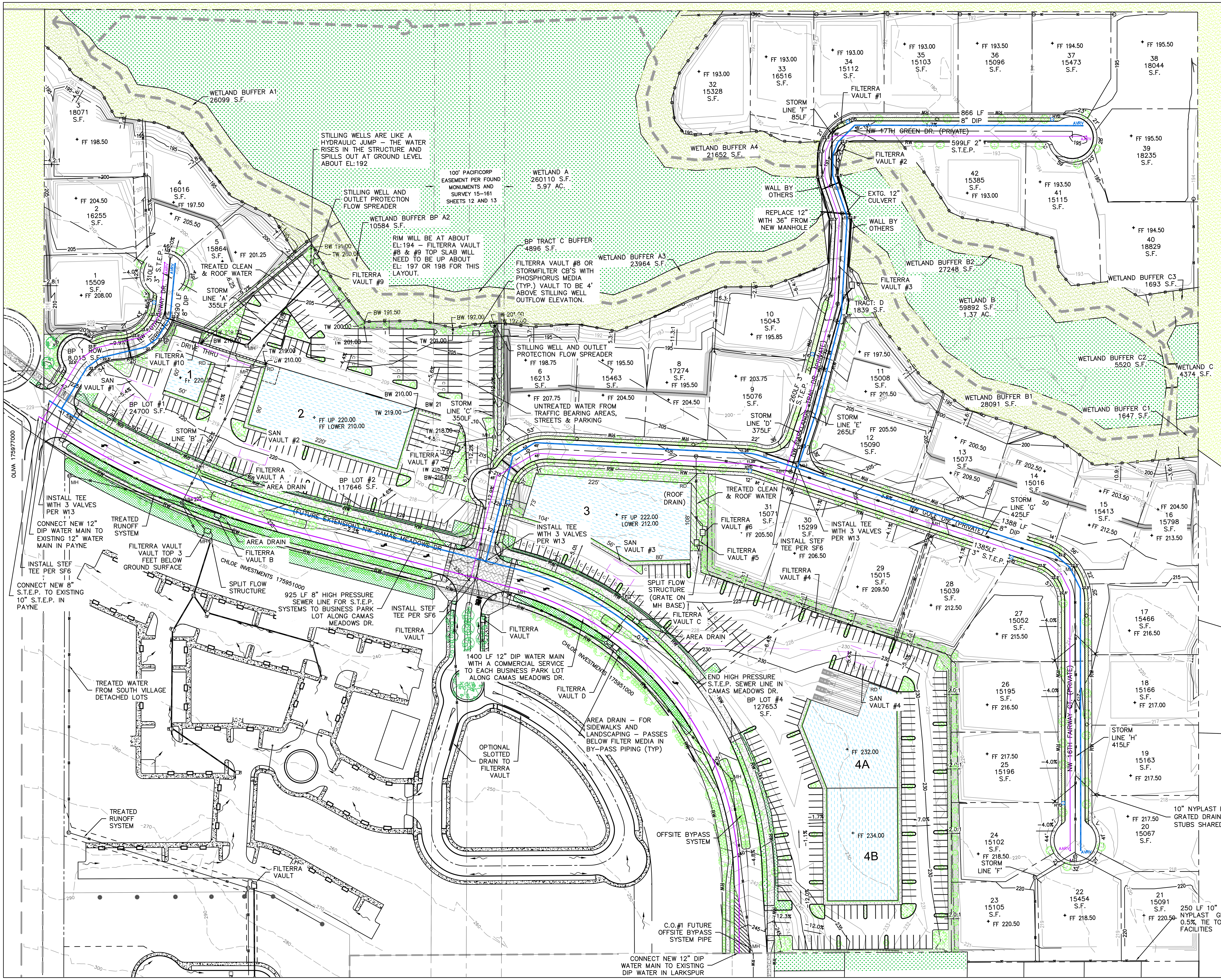
WGS_1984_Web_Mercator_Auxiliary_Sphere
Clark County, WA. GIS - http://gis.clark.wa.gov

EXHIBIT 31



04 PHASING

EXHIBIT 32



ENGINEERING INFORMATION:
ALL WATER, STORM AND SANITARY LINE SIZING IS APPROXIMATE AND FOR ESTIMATION PURPOSES ONLY. FINAL PIPE AND FACILITY SIZES TO BE DETERMINED FOR ALL PIPES AND VAULTS DURING FINAL ENGINEERING.

ALL TRENCH BACK FILL & BEDDING PER G3. COVER MAY BE REDUCED PER GEOTECH RECOMMENDATIONS IN AREAS OF SHALLOW BEDROCK NOT ALLOWING FOR AMOUNT OF COVER.

INSTALL UTILITIES PER ST34 WHERE POSSIBLE, WATER 6' FROM FACE CURB STORM DOWN CL, STEP/STEF 7' FROM FACE OF CURB

ALL HOMES TO BE SPRINKLERED AT TIME OF BUILDING PERMIT

WATER NOTES:
1. WATER SYSTEM TO BE SIZED AND INSTALLED PER CITY OF CAMAS DESIGN MANUAL.
2. FIRE HYDRANTS PER W11 TO BE PLACED EVERY 400LF ALONG STREET AND WITHIN 600FT TO FURTHEST BUILDING ENVELOPE AND MEET LOCAL FIRE JURISDICTION REQUIREMENTS.
3. INDIVIDUAL METERS AND SERVICES TO BE PROVIDED FOR EACH LOT AS 1" WATER SERVICE PER W2.
4. AN INDIVDUAL COMMERCIAL WATER SERVICE TO EACH BP BUILDING TO BE INSTALLED AS 2" WATER SERVICE PER W6 OR 3" PER W7 PLUS STANDARD DOUBEL CHECK VALVE PER W23A & W23B- TO BE SPECIFIED BY LOT OWNER PRIOR TO INSTALLATION. ALSO, AN IRRIGATION METER TO BE INSTALLED TO EACH LOT.
5. IRRIGATION METERS TO BE PROVIDED FOR LANDSCAPING IF REQUIRED.
6. 12" MAIIN MIN 3' OF COVER, LESS THAN 12" WATER MIN 2.5' COVER
7. AIR/VACCUM RELEASE VALVE (AVRV) PER W16, AT END OF EACH CUL-DE-SAC AND ALL HIGH POINTS.

SANITARY SEWER NOTES:
1. SANITARY SEWER SYSTEM TO BE S.T.E.P./S.T.E.F. SYSTEM, SIZED AND INSTALLED PER CITY OF CAMAS DESIGN MANUAL.
2. ALL LOTS TO HAVE INDIVIDUAL RESIDENTIAL TANK SYSTEMS AND PUMP TO SEWER MAIN.
3. ALL BUSINESS PARK LOTS TO HAVE COMMERCIAL SYSTEM AND PUMP TO SEWER MAIN.
4. EACH COMMERCIAL VAULT TO BE SIZED FOR EACH COMMERCIAL BUILDING AT TIME OF BUILDING PERMIT.
5. AARV PER SF10 OR SP6, AT END OF EACH CUL-DE-SAC AND ALL HIGH POINTS.
6. STEP MIN 5' OF COVER WITH LATERAL MIN 1.5' COVER STEF MN 6' OF COVER WITH LATERAL MIN 4.5' COVER. COVER MAY BE REDUCED PER GEOTECH RECOMMENDATIONS IN AREAS OF SHALLOW BEDROCK NOT ALLOWING FOR AMOUNT OF DESIGN COVER BUT IN NO CASE SHALL BE LESS THAN 3' OF COVER.
7. FOR EACH LOT INSTALL STEF SYSTEM STUBOUT PER SF 2 AND SF 3.
8. AT TIME OF BUILDING PERMIT, EACH LOT BUILDER TO INSTALL STEP CONNECTION & STEP TANK PER SP10.
9. STEP SYSTEM USE CITY'S STANDARD CLASS 200 PVC PIPE (EXPECTED MAXIMUM PRESSURE WILL BE ABOUT 105 PSI).

STORM NOTES:
6. ONSITE STORM (DOES NOT INCLUDE CAMAS MEADOWS DR.)
7. TOTAL APPROXIMATE LENGTH:
7.1. ASSUME ALL STORM IN STREETS 12"= 1958 LF
7.2. ASSUME ALL STORM TO LOTS IS 10"= 3330 LF

TRANSPORTATION:
1. VERTICAL CURVES PER AASHTO POLICY ON GEOMETRIC DESIGN OF HIGHWAY & STREETS, EXHIBIT 3-76, PG 274
2. ALL PROJECT TESTING REQUIREMENTS PER G4.
3. ON RESIDENTIAL STREETS, STREETLIGHTS LED ACORN POLE TYPE SYLE EVERY 150' PER CITY STANDARDS - ONE SIDE.
4. ON ARTERIAL STREETS, STREETLIGHTS LED STANDARD COBRA TYPE EVERY 170' PER CITY STANDARDS - ONE SIDE.

PRIVATE STREET PER PVT2
30' PRIVATE R/W
20' PAVED ROAD WITH CURB AND GUTTER
NO PARKING BOTH SIDES
5' ATTACHED SIDEWALK WEST SIDE
CENTERLINE 240 LF
NW PARKLANDS TRAIL DR ASPHALT PAVING = 4,927 SF
PER TABLE 17.19.040-1-B TO MINIMIZE BUFFER IMPACTS, MINIMIZE STREET WIDTH & ATTACH SIDEWALK, ALL LOTS SPRINKLERED AS > 100' IN LENGTH.

PRIVATE STREET PER PVT3
42' PRIVATE TRACT R/W
28' PAVED ROAD WITH CURB AND GUTTER
5' DETACHED SIDEWALK ONE SIDE
NW 10TH FAIRWAY DR ASPHALT PAVING = 11,151 SF
NW PARKLANDS TRAIL DR ASPHALT PAVING = 6,541 SF
NW 17TH GREEN DR ASPHALT PAVING = 10,815 SF
NO PARKING ONE SIDE

PRIVATE STREET PER PVT4
48' PRIVATE R/W
28' PAVED ROAD WITH CURB AND GUTTER
5' PLANTER BOTH SIDES
5' DETACHED SIDEWALK BOTH SIDES
CENTERLINE 1480 LF
NW 16TH FAIRWAY CT ASPHALT PAVING = 11,194 SF
NW GOLF DR ASPHALT PAVING = 28,860 SF

ALL CUL-DE-SAC TURNAROUNDS PER ST36 FOR SPRINKLERED DEVELOPMENT WITH 30' PAVED & 5' ATTACHED SIDEWALK WITH OUTER SIDEWALK TURNAROUND RADIUS BULB = 35'
35' RADIUS CUL-DE-SAC BULB
30' PAVED CUL-DE-SAC BULB

GRAPHIC SCALE 1"=60'
0 60 120

KESSI ENGINEERING
6400 NE HWY 99 #G-169
VANCOUVER, WA 98665
TEL: (360) 991-3300
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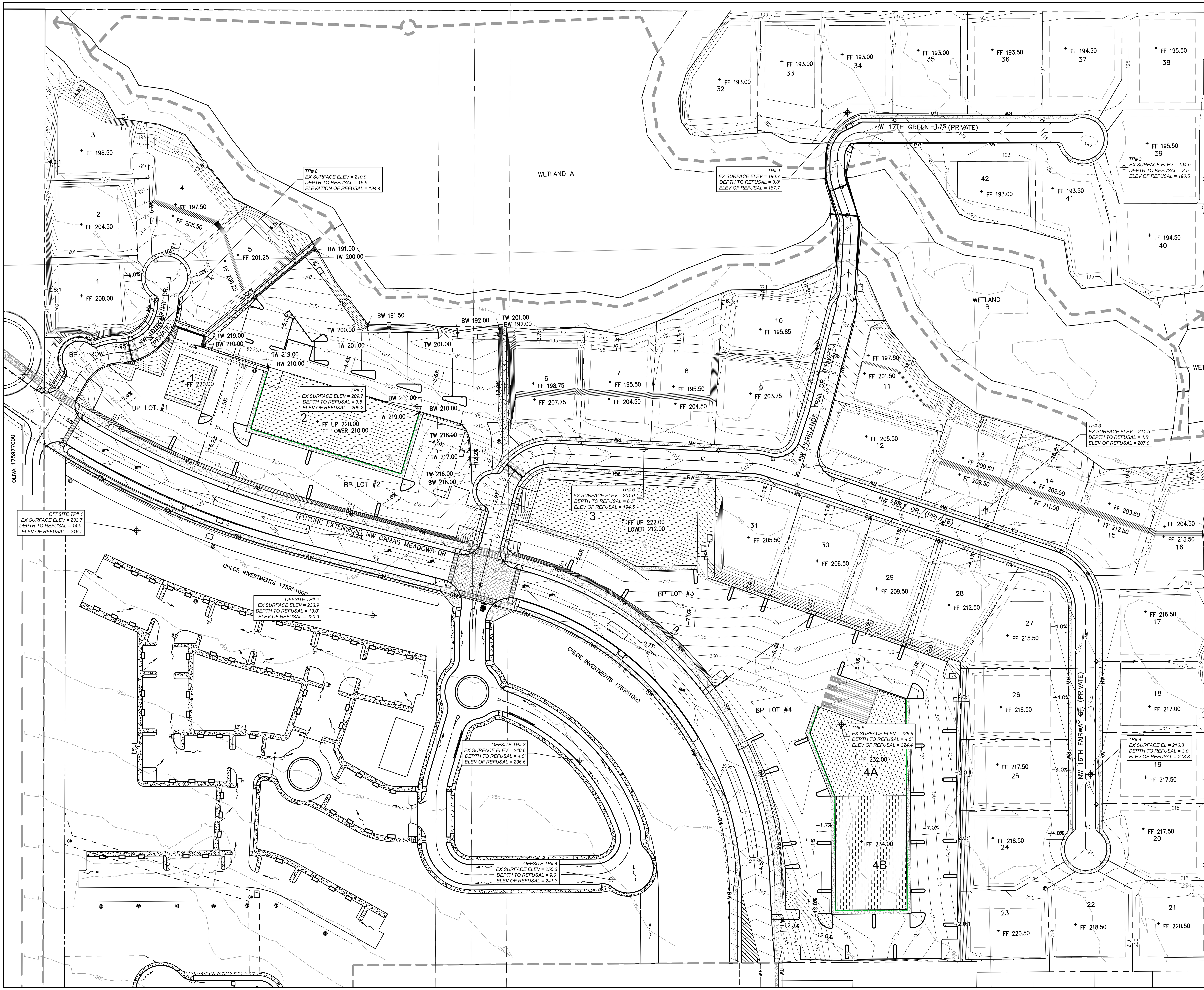
CONSULTING
PLANNING
CIVIL ENGINEERING
PROJECT MANAGEMENT

DATE: 24 JAN 2016

PARKLANDS EXECUTIVE SUBDIVISION AND THE ARCHERY BUSINESS PARK SITE PLAN AT CAMAS MEADOWS GOLF COURSE
PRELIMINARY COMPOSITE UTILITY PLAN

SHEET 4

EXHIBIT 33



APPROXIMATE EARTHWORK QUANTITIES:

ESTIMATED STRIPPINGS = 21,000 CY (ASSUMES 6" DEPTH CONTRACTOR TO VERIFY WITH GEOTECH AND ADJUST)

ESTIMATED CUT BEYOND STRIPPINGS = 28,000 CY
ESTIMATED FILL = 76,000 CY

ESTIMATED TRENCH EXCAVATION = 3200 CY
ASSUMES 3' WIDE TRENCH, USE TRENCH EXCAVATION FOR BACK FILL IF MATERIAL IS SUITABLE.

CONTRACTOR TO VERIFY ACCURACY.

GRAPHIC SCALE 1"=60'

0 60 120

PARKLANDS EXECUTIVE SUBDIVISION AND THE ARCHERY BUSINESS PARK SITE PLAN AT CAMAS MEADOWS GOLF COURSE

PRELIMINARY GRADING PLAN

DATE: 05 JAN 2015

CONSULTING
PLANNING
CIVIL ENGINEERING
PROJECT MANAGEMENT

KESSI ENGINEERING
6400 NE HWY 99 #G-169
VANCOUVER, WA 98665
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SHEET 2

EXHIBIT 34

Final Wetland Delineation Report
for

Parklands at Camas Meadows
Camas, Washington

Prepared for:

Parklands at Camas, LLC
20705 SE Evergreen Highway
Camas, Washington 98607
(360) 823-6222

Prepared by:

Ecological Land Services, Inc.
1157 3rd Avenue, Suite 220
Longview, Washington 98632
(360) 578-1371

Preliminary Draft August 2015
Interim Draft November 2015
Final Report December 2015 w/ Final Wetland Rating Summary
ELS Project #2255.01

SIGNATURES

The information and data in this report were compiled and prepared under the supervision and direction of the undersigned.

Timothy Haderly
Principal/Ecologist

Rachel Allison
Biologist

TABLE OF CONTENTS

INTRODUCTION

Ecological Land Services, Inc. (ELS) has completed a wetland delineation for Parklands at Camas, LLC on NW 218th Avenue, in Camas, Washington. The study area consists of Tax Parcels 175948-000 and 986031-650, and is located in Section 28, Township 2 North, Range 3 East, of the Willamette Meridian in the City of Camas Water Resources Inventory Area 28 (Figure 1). This report summarizes the findings of the wetland determination according to the *City of Camas Municipal Code (CMC) Chapter16.53 – Wetlands.*

METHODOLOGY

ELS conducted a site visit on April 28, 2015 to delineate the onsite critical areas, assess wetland functions, and gather vegetation, soils, and hydrology data within the study area. Wetlands were delineated onsite with consecutively numbered wetland boundary flagging. The wetland boundaries were primarily determined by topographical changes and the presence of hydric soils, hydrology, and hydrophytic vegetation. Vegetation, soil, and hydrology data were collected from seven test plots within the study area to verify the presence and boundaries of the wetlands (Figure 2 and Appendix A). Soil colors in test plots were evaluated by hue, value, and chroma using the Munsell Soil Color Chart (Munsell 2000).

Wetlands A, B and C were delineated using the Routine Determination Method according to the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), the *Final Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (2010). The Routine Determination Method examines vegetation, hydrology, and soils to determine if wetlands exist in a given area. The presence of hydrology is critical in determining what qualifies as a wetland; however, since hydrologic conditions can change periodically (hourly, daily, or seasonally) it is necessary to determine if hydrophytic vegetation and hydric soils exist, indicating water is present long enough to support a wetland plant community. By definition, wetlands are those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands are regulated by the United States Army Corps of Engineers (Corps) as "Waters of the United States," by the Washington State Department of Ecology (Ecology) as "Waters of the State," and locally by the *City of Camas Municipal Code (CMC) Chapter 16.53 - Wetlands.*

SITE DESCRIPTION

The approximate 36-acre study area consists of mainly deciduous and coniferous forested wetlands, with small areas of forested upland hummocks interspersed. The area slopes gently to the northwest and currently there are no buildings or structures located in the study area.

Area surrounding the parcels consists of residential housing developments to the southeast, private land use (pasture) and private single-family residences to the southwest, open grassland

and a golf course to the northwest and northeast, with Lacamas Creek and Lacamas Lake on the other side of the golf course. The property is accessed from NW Camas Meadows Drive and NW Payne Street, along the western property boundary.

SOILS

The soils within the study area are mapped as Cove silty clay loam, 0 to 3 percent slopes (CvA), Hesson clay loam, 0 to 8 percent slopes (HcB), Hesson clay loam, 8 to 20 percent slopes (HcD), Hesson clay loam, 20 to 30 percent slopes (HcE), and Lauren gravelly loam, 0 to 8 percent slopes (LgB) (Figure 3).

Cove silty clay loam soil is found in concave drainage ways and in large, flat, old lakebeds. The slope is generally less than 1 percent. In a typical profile the surface layer is very dark gray silty clay loam about 4 inches thick. Below this is firm clay about 32 inches thick. Surface runoff is very slow, and ponding is common in winter unless drainage is provided. The Cove series consists of deep, poorly drained, mostly nearly level soils. The Hesson clay loam series soils are generally found on terraces and are formed from alluvium. The slopes range from 0 to 30 percent. In typical profiles, Hesson clay loams consist of clay loam from 0 to 12 inches below ground surface (BGS) and clay from 12 to 60 inches BGS. Hesson clay loam (HcE) differs slightly, in that a typical profile consists of clay loam from 0 to 9 inches BGS, and clay from 9 to 60 inches BGS. This soil series is well drained and has a very low tendency, to no tendency of ponding. Lauren gravelly loam is found on terraces and is formed from alluvium with volcanic ash. In a typical profile, the surface layer is gravelly medial loam from 0 to 6 inches, very gravelly medial loam from 6 to 33 inches, very gravelly coarse sandy loam from 33 to 44 inches, and very gravelly loamy coarse sand from 44 to 60 inches BGS. This soil is somewhat excessively drained, and has a very low tendency, to no tendency of ponding.

Cove silty clay loam is listed as a hydric soil on the *Washington State Hydric Soils List* (NRCS 2014). The presence or absence of hydric soil does not conclude that an area is wetland or upland; along with hydric soils, hydrology and wetland vegetation must also be present to determine an area as jurisdictional wetland. Because of localized, micro-variations in topography and hydrology, wetlands may be found in areas where hydric soils have not been mapped by the soil survey.

Site evaluated wetland soils generally ranged from very dark brown (10YR 2/2) clay to black (10YR 2/1) and dark gray (10YR 4/1) silty clay loams exhibiting redoximorphic features of dark yellowish brown (10YR 3/6) and dark red (2.5YR 3/6). The wetland soils were generally consistent with the mapped soil types, as the wetland generally follows the mapped Cove silty clay loam from the NRCS.

Site evaluated upland soils generally consisted of dark brown (10YR 3/3) silt loams and clays, and exhibited no redoximorphic features. The upland soils were generally consistent with the mapped soil types bordering Cove silty clay loam, as mapped by the NRCS.

VEGETATION

Wetlands

Dominant hydrophytic vegetation within the wetland areas onsite includes Oregon ash (*Fraxinus latifolia*, FACW), bigleaf maple (*Acer macrophyllum*, FACU), red alder (*Alnus rubra*, FAC), vine maple (*Acer circinatum*, FAC), red-osier dogwood (*Cornus sericea*, FACW), Douglas spiraea (*Spiraea douglasii*, FACW), salmonberry (*Rubus spectabilis*, FAC), California false hellebore (*Veratrum californicum,* FAC), water parsley (*Oenanthe sarmentosa*, OBL), reed canarygrass (*Phalaris arundinacea*, FACW), and skunk cabbage (*Symplocarpus foetidus*, OBL).

Uplands

Dominant vegetation within the upland areas onsite includes bigleaf maple, western redcedar (*Thuja plicata*, FAC), Douglas fir (*Pseudotsuga menziesii*, FACU), non-native cedar species (NI), saxifrage species (NI), Himalayan blackberry (*Rubus armeniacus*, FACU), trailing blackberry (*Rubus ursinus*, FACU), sword fern (*Polystichum munitum*, FACU), oceanspray (*Holodiscus discolor,* FACU), beaked hazelnut (*Corylus cornuta*, FACU), Indian plum (*Oemleria cerasiformis*, FACU), and threepetal bedstraw (*Galium trifidum*, FACW).

The dominant species of vegetation in each test plot have been recorded on the attached wetland delineation data sheets (Appendix A). The indicator categories following the common and scientific names indicate the likelihood of a species to be found in wetlands. Listed from most-likely to least-likely to be found in wetlands, the indicator categories are:

- **OBL** (obligate wetland) – Almost always occur in wetlands.
- **FACW** (facultative wetland) – Usually occur in wetlands, but may occur in non-wetlands.
- **FAC** (facultative) – Occur in wetlands and non-wetlands.
- **FACU** (facultative upland) – Usually occur in non-wetlands, but may occur in wetlands.
- **UPL** (obligate upland) – Almost never occur in wetlands.
- **NI** (no indicator) – Status not yet determined.

HYDROLOGY

Wetlands A,B, and C are hydrologically influenced primarily by precipitation (including stormwater discharge) and secondarily by a high groundwater table; hydrology into Wetlands A, B, and C can be attributed primarily to precipitation, but also from stormwater runoff from surrounding housing developments, agricultural land use, and golf courses. Wetland C is mostly hydrologically influenced by precipitation, but stormwater runoff from the housing development located directly to the southeast can be an attributing factor as well. Cumulative water flow within all wetlands follows a northwest trend, following the topography of the study area. Wetlands A, B, and C are depressional wetlands, with Wetland A and B occurring throughout the northern portion of the study area, and Wetland B occurring along the eastern border of the northern portion (Figure 2). Both wetlands have highly constricted outlets.

WETLANDS INVENTORY

National Wetlands Inventory

The U.S. Fish and Wildlife Service's National Wetlands Inventory (2014; NWI) map indicates the presence of a PFOA[1] wetland within the northern portion of the study area (Figure 4). A R2UBH[2] water body (Lacamas Lake) is mapped directly to the northeast of the study area. ELS agrees with the NWI, as two depressional, forested wetlands were delineated in generally the same location as the NWI mapped wetland.

Clark County Critical Areas

The Clark County Critical Areas (CCCA) (Figure 5) map indicates no presence of wetlands or other critical areas within the study boundary. The CCCA map does however; indicate the presence of a water body (Lacamas Lake) to the northeast, and not within the confines of the study area. ELS does not agree with the CCCA map, as a depressional, forested wetland was delineated in the northern portion of the study area.

NWI and CCCA maps are typically used to gather wetland information about a region and, because of the large scale necessary for regional mapping, are limited in accuracy for localized analyses.

CONCLUSIONS

WETLANDS

ELS staff delineated Wetlands A, B, and C within the study area encompassing Tax Parcels 175948-000 and 986031-650 on April 28, 2015 (Figure 2). All three wetlands are hydrologically connected through culverts observed onsite and locations mapped with a GPS unit and therefore were rated as one wetland unit according to the Ecology's *Wetland Rating Form (Rating Form) for Western Washington-Revised* (Hruby 2014). The wetland unit is a non-tidal, freshwater, palustrine depressional wetland and supports both emergent and forested vegetation. The outlet for the wetland unit is unconstricted and permanently flowing, so long as hydrology is present and in sufficient quantity to maintain flows periods. When inundation is present, water depths range from 6 to 20 inches. Hydrologic functions may consist of some water retention on surface depressions during high flow events. Overall, drainage is slow in the wetland, but flow does eventually and directly reach Lacamas Lake.

The wetland unit is considered to have low to moderate habitat potential onsite based on the plant community's interspersion and species richness (presence and diversity of emergent, scrub-shrub, and forested vegetation), a landscape that supports multiple hydroperiods (seasonal inundation, occasional inundation, and saturation), and the presence of "special habitat features".[3] Accessibility of habitat provided by the wetland unit to other wetlands or forested

---

[1] **P**=palustrine, **FO**=forested, **A**=temporarily flooded

[2] **R**=riverine, **2**=lower perennial, **UB**=unconsolidated bottom, **H**=permanently flooded

[3] "…certain habitat features in a wetland provide refuge and resources for many different species. The presence of these features increases the potential that a given wetland will provide a wide range of habitats" (Hruby, 2014)

area in the local vicinity is limited by adjacent residential, commercial, and agricultural land uses. Somewhat undisturbed connectivity between the wetland unit and Lacamas Lake can be seen from aerial photography: a narrow band of relatively unmanaged vegetation (Figure 7). With consideration of the adjacent and management practices and limited connectivity, the wetland unit provides low habitat value despite being a relatively well-developed forested wetland system. Foraging opportunities are available for small mammals, common resident and migratory song birds, and birds of prey. Larger mammals, such as deer, coyotes, raccoons, and other transitory species accustomed to urbanized or developed conditions may use the wetland for short-term refuge, grazing, or hunting. There was no evidence (browse, rubs, tracks, etc.) observed by ELS during the onsite wetland assessments.

Wetland Categorization and Buffer Requirements

The wetland unit was categorized according to CMC using the Department of Ecology *Washington State Wetland Rating System for Western Washington, Revised* (Hruby, 2014). Wetlands A, B, and C are Category III wetlands. Buffer widths are based on wetland category, wetland characteristics, and land use intensity (CMC 16.53.040(b)). In this case, the proposed land use activity is a residential subdivision, a structure that meets the criteria for high land use intensity (CMC 16.53.040-4). Category III wetlands with a habitat score of 5 and a high land use intensity proposal receive a designated buffer width of one hundred twenty feet (CMC 16.53.040-4 and Table 1).

Table 1. *Summary of Critical Areas On-site.*

Wetland	Hydrogeomorphic Classification	Cowardin[1] Class	Area (acres onsite)	Category[2]	Starting Buffer Width[3] (feet)	Mitigated Buffer Width[4] (feet)
Wetland A	Depressional	Forested	5.90	III	120	50
Wetland B	Depressional	Forested	1.33	III	120	50
Wetland C	Depressional	Forested	0.12	III	120	50

[1]Cowardin *et al.* 1979
[2]Ecology *Rating Form* (Hruby 2014).
[3] According to CMC Table 16.53.040-3
[4] According to CMC 16.53.050(C)(1)(c)

BUFFER WIDTH REDUCTION JUSTIFICATION NARRATIVE

This narrative addresses the process used to establish buffers on wetlands at the Parklands at Camas Meadows project near the Camas Meadows Golf Course. Parklands at Camas is a mixed use development including 42 single-family residential lots with an adjacent professional business park consisting of four or five buildings of varying size.

Wetland buffers at the proposed Parklands at Camas Meadows project are required according to Camas Municipal Code (CMC) Chapter 16.53 – WETLANDS. The wetlands at Parklands at Camas Meadows are Category III wetlands based on the 2014 Wetland Rating System for Western Washington.

The applicant is proposing a 50-foot wide buffer based on CMC 16.53.050(C)(1)(c) *Combined Reductions. Buffer width reductions allowed under subsections (C)(1)(a) and (C)(1)(b) of this section may be added provided that minimum buffer widths shall never..., or less than fifty feet for Category III wetlands,...*

CMC 16.53.050(C)(1)(a)(i) requires a 100 foot wide relatively undisturbed, vegetated corridor between the wetland and any other priority habitats. Given the configuration of the subject site, the fact that the property to the north is controlled by another entity (golf course), and the Priority Habitat is more than 1,000 feet away; this section is not applicable to the wetland buffer requirements on the subject site.

CMC 16.53.050(C)(1)(a)(ii) requires measures to minimize impacts to the land adjacent to the wetland to help reduce impacts to the wetland. The project applicants have agreed to implement the following measures to assure the on-site wetland is protected from the proposed adjacent developments:

1. CCR's will be written, recorded, and enforced as applicable to uses within and adjacent to wetlands and buffers.
2. Storm water from streets and traffic bearing surfaces will be collected, treated, and conveyed in facilities outside of the from wetlands and the associated buffers. The wetlands and buffers will **NOT be used for storm water treatment or detention/retention facilities.**
3. Native vegetation and soils will be retained in the wetland buffer areas.
4. Outdoor lighting will be designed to reduce the encroachment of light into the resource area. Use of green LED low watt bulbs and shielding will be encouraged.
5. Noise will be controlled by implementing an evening curfew quiet time period. All fireworks and other noise making devices will be strictly prohibited.
6. Wetland buffers will be demarcated be erecting black wrought iron or similar fencing with an open spacing design.
7. No personal gates will be allowed from back yards into the wetland buffer area.
8. Fertilizers, pesticides, and herbicides use in back yards will be discouraged.
9. Backyard landscaping will be focused on using native trees, shrubs, and ground covers to increase habitat and reduce to need for chemicals and irrigation.
10. Informational signage will be installed along the outer edge of the wetland buffer to further demarcate the resource area.

CMC 16.53.050(C)(1)(b) requires a 100 foot wide relatively undisturbed, vegetated corridor between the wetland and any other priority habitats. Given the configuration of the subject site, the fact that the property to the north is controlled by another entity (golf course), and the Priority Habitat is more than 1,000 feet away; this section is not applicable to the wetland buffer requirements on the subject site.

It is our opinion that a 50-foot wide buffer on the Category III wetland at the Parklands at Camas project site (1) meets the code requirements of CMC Chapter 16.53 and (2) will adequately protect the wetland from proposed developments at the site. With proper enhancements and protections outlined previously, we believe that a 50-foot wide buffer will provide functions equal to or greater than the standard 120-foot wide buffer.

LIMITATIONS

ELS personnel base the conclusions contained within this report on standard scientific methodology and best professional judgment. In our opinion, local, state, and federal regulatory agencies should agree with the findings presented in this report.

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. There are no other warranties, express or implied. The services preformed were consistent with our agreement with our client. This report is prepared solely for the use of our client and may not be used or relied upon by a third party for any purpose. Any such use or reliance will be at such party's risk.

The opinions and recommendations contained in this report apply to conditions existing when services were performed. ELS is not responsible for the impacts of any changes in environmental standards, practices, or regulations after the date of this report. ELS does not warrant the accuracy of supplemental information incorporated in this report that was supplied by others.

REFERENCES

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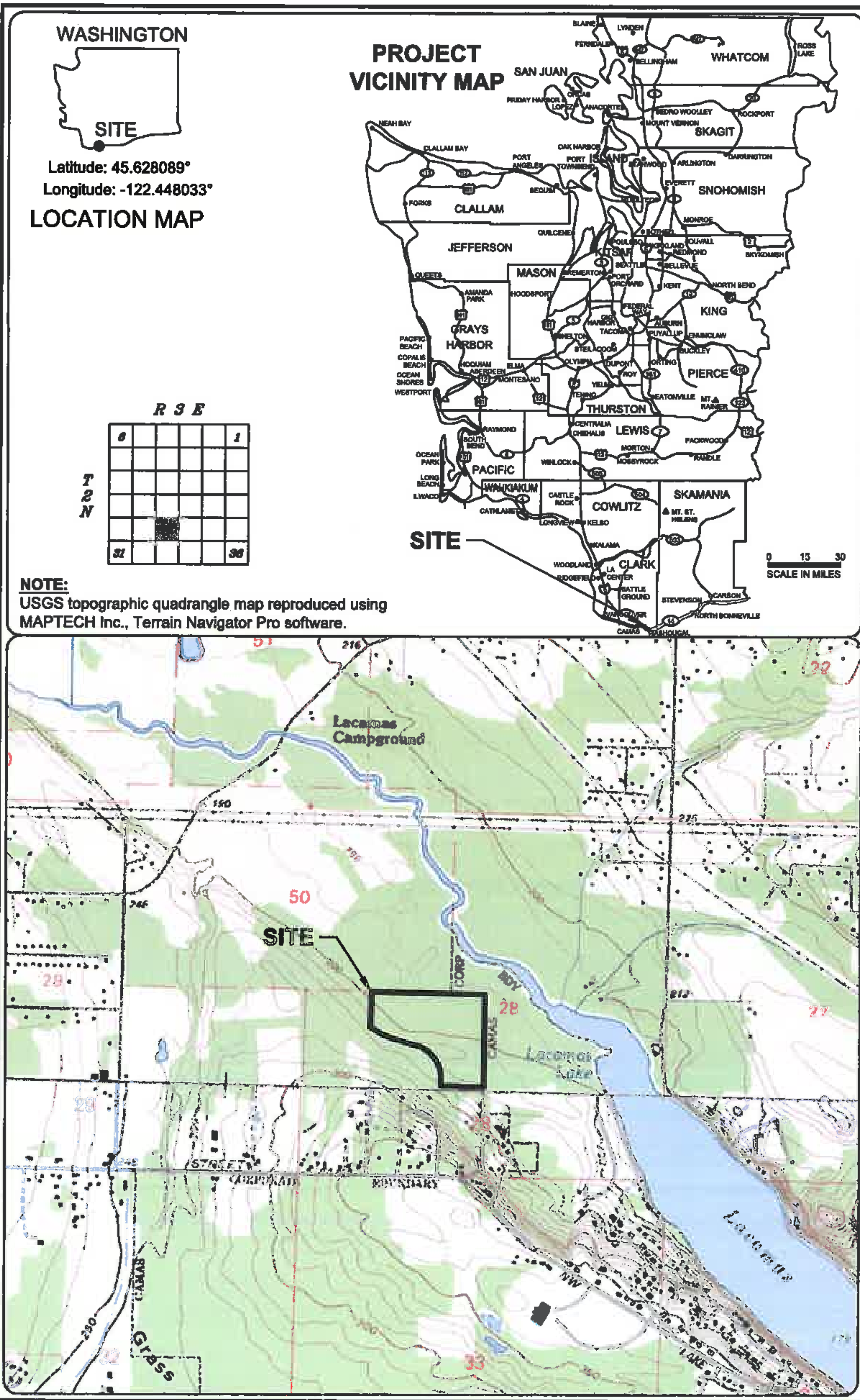
FIGURES



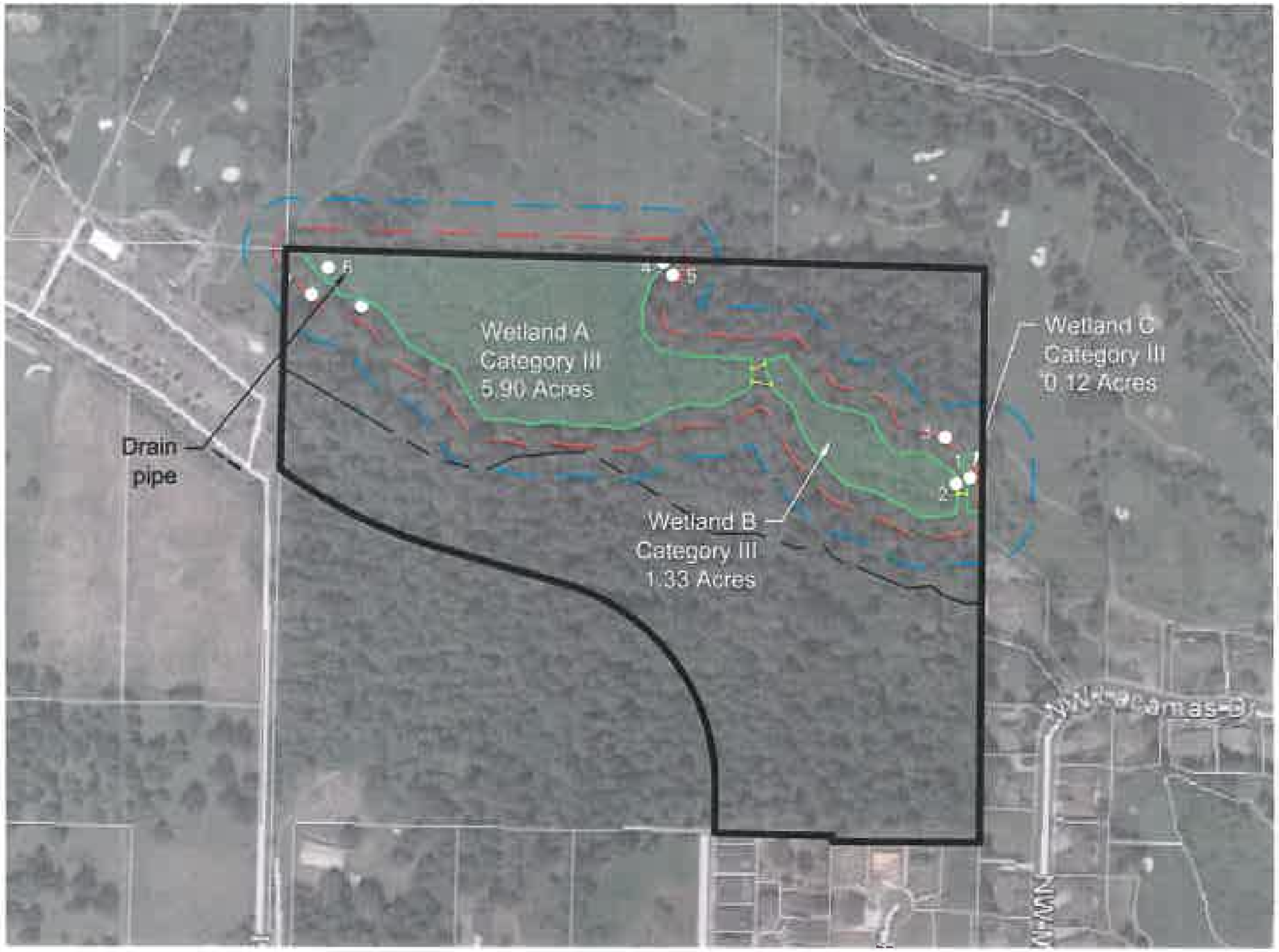
NOTE:
USGS topographic quadrangle map reproduced using MAPTECH Inc., Terrain Navigator Pro software.

Figure 1
VICINITY MAP
Parklands at Camas Meadows
Parklands at Camas LLC.
Camas, Clark County, WA
Section 28, Township 2 N, Range 3 E, W.M.

DATE: 8/12/15
DWN: CDP
REQ. BY: RA
PRJ. MGR: TH
CHK:
PROJECT NO: 2255.01

ECOLOGICAL LAND SERVICES, INC.
1157 3rd Ave., Suite 220
Longview, WA 98632
Phone: (360) 578-1371 Fax: (360) 414-9305

8/12/2015 3:21 PM s:\ELS\WA\Clark\Camas\2255-parklands at camas llc\2255.01-chinook property\2255.01-figures\2255.01 GPS.dwg cpayne



LEGEND:

- Site Boundary
- Wetland
- 120' Buffer
- 50' Reduced Buffer
- 1 ● Test Plot Location
- Culvert
- Parcel Boundary

NOTE(S):

1. Base map from ***Google Earth*.™**

N W E S

0 400 800
SCALE IN FEET

ECOLOGICAL LAND SERVICES, INC.
1157 3rd Ave., Suite 220
Longview, WA 98632
Phone: (360) 578-1371 Fax: (360) 414-9305

DATE: 8/12/15
DWN: CDP
REQ. BY: RA
PRJ. MGR: TH
CHK:
PROJECT NO: 2255.01

Figure 2
SITE MAP
Parklands at Camas Meadows
Parklands at Camas LLC.
Camas, Clark County, WA
Section 28, Township 2 N, Range 3 E, W.M.

LEGEND:

CvA	Cove silty clay loam, 0 to 3 percent slopes. **Hydric**.
HcD	Hesson clay loam, 8 to 20 percent slopes. Not hydric.
HcB	Hesson clay loam, 0 to 8 percent slopes. Not hydric.
HcE	Hesson clay loam, 20 to 30 percent slopes. Not hydric.
LgB	Lauren gravelly loam, 0 to 8 percent slopes. Not hydric.

NOTE(S):

1. Map provided on-line by NRCS at web address: *http://websoilsurvey.nrcs.usda.gov/app/*

Figure 3
SOIL SURVEY MAP
Parklands at Camas Meadows
Parklands at Camas LLC.
Camas, Clark County, WA
Section 28, Township 2 N, Range 3 E, W.M.

DATE: 8/12/15
DWN: CDP
REQ. BY: RA
PRJ. MGR: TH
CHK:
PROJECT NO: 2255.01

ECOLOGICAL LAND SERVICES, INC.
1157 3rd Ave., Suite 220
Longview, WA 98632
Phone: (360) 578-1371 Fax: (360) 414-9305

0 500 1000
SCALE IN FEET

N
W E
S

Wetlands indicated onsite by US Fish & Wildlife Service.

LEGEND:

- Freshwater Forested/Shrub Wetland
- Riverine

R2UBH Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded.

PFOA Palustrine, forested, temporarily flooded.

NOTE(S):

1. Map provided on-line by US Fish & Wildlife Service at web address: *http://www.fws.gov/wetlands/data/index.html*

Figure 4
NATIONAL WETLANDS INVENTORY MAP
Parklands at Camas Meadows
Parklands at Camas LLC.
Camas, Clark County, WA
Section 28, Township 2 N, Range 3 E, W.M.

DATE: 8/12/15
DWN: CDP
REQ. BY: RA
PRJ. MGR: TH
CHK:
PROJECT NO: 2255.01

ECOLOGICAL LAND SERVICES, INC.
1157 3rd Ave., Suite 220
Longview, WA 98632
Phone: (360) 578-1371 Fax: (360) 414-9305

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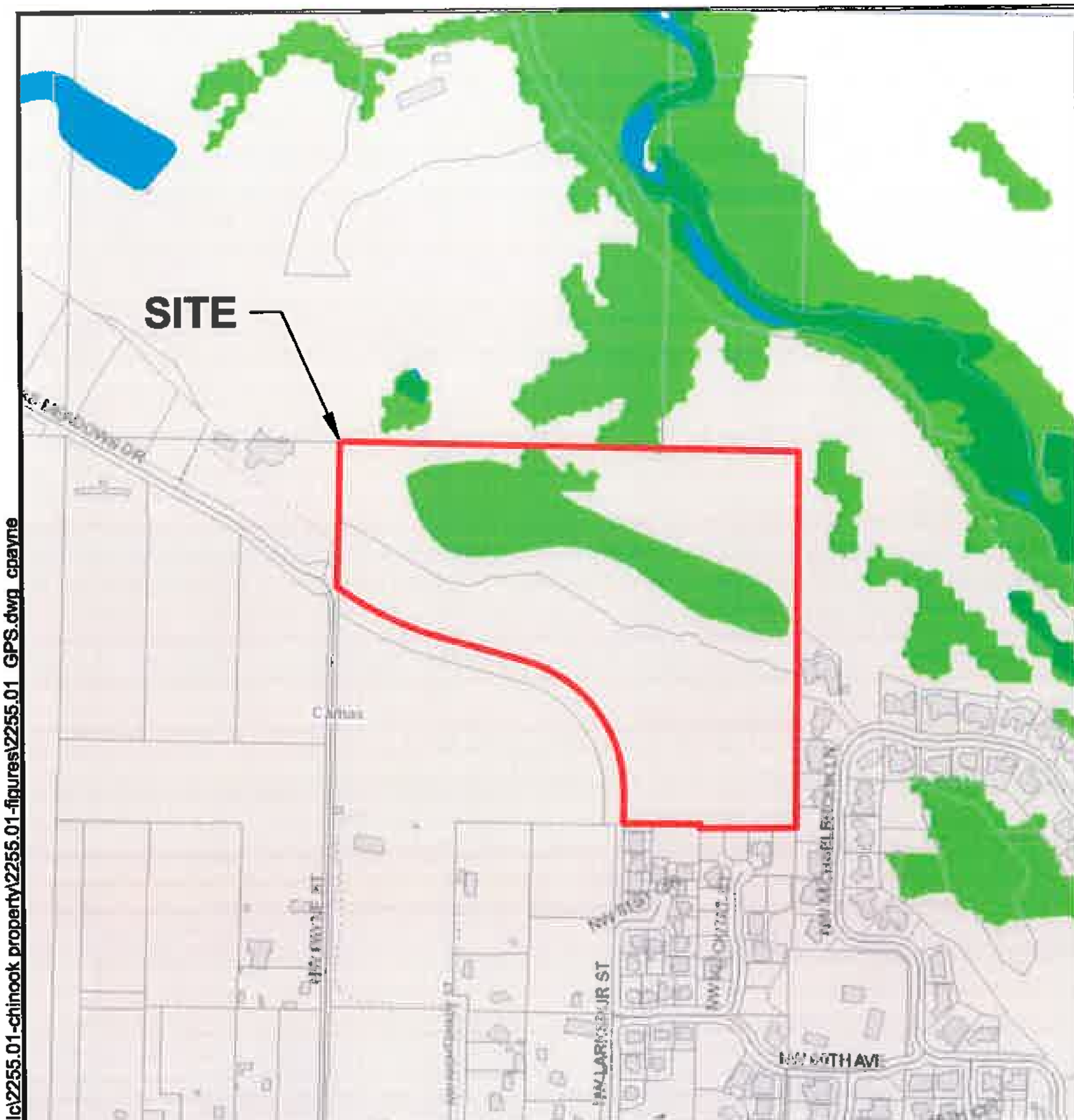
SCALE IN FEET

N W E S

8/12/2015 3:21 PM s:\ELSWA\Clark\Camas\2255-parklands at camas llc\2255.01-chinook property\2255.01-figures\2255.01_GPS.dwg cpayne



Wetlands indicated onsite by Clark County.

LEGEND:

Site Boundary

NOTE: Map provided on-line by Clark County, Washington at web address: *http://gis.clark.wa.gov/imf/imf.jsp?site=zoning*
This map combines NWI, mapped, permit and modeled wetlands in a single class. Identical to WETINV, except lacking its attribute data. Also excludes any of the modeled wetlands that were field verified to not possess wetland characteristics.

Figure 5
CLARK COUNTY CRITICAL AREAS
Parklands at Camas Meadows
Parklands at Camas LLC.
Camas, Clark County, WA
Section 28, Township 2 N, Range 3 E, W.M.

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SCALE IN FEET

N W E S

APPENDIX A- WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Parklands at Camas Meadows City/County: Camas/Clark Sampling Date: 4/28/2015
Applicant/Owner: Parklands at Camas, LLC/Chinook Land Owners Group, LLC State: WA Sampling Point: TP-1
Investigator(s): T. Haderly & R.Allison Section, Township, Range: S28,T2N,R3E
Landform (hillslope, terrace, etc.): Terrace Local relief: Concave Slope (%): 20-30%
Subregion (LRR): A Lat: 45.3736 Long: -122.2654 Datum: NAD83
Soil Map Unit Name: HcE NWI classification: PFOA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Area "Normal Circumstances" present? Yes ☐ No ☒
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	Is the Sampled Area within a Wetland? Yes ☒ No ☐
Hydric Soils Present?	Yes ☐	No ☒	
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks: Although hydric soils are not present, TP-1 is determined to be within a wetland due to a strong presence of hydrophytic vegetation and wetland hydrology indicators.

VEGETATION (*Use scientific names*)

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:30 ft radius)			
1. *Fraxinus latifolia*	20%	yes	FACW
2.	%		
3.	%		
4.	%		
Total Cover:	20%		
Sapling/Shrub Stratum (Plot size: 5 ft. radius)			
1. *Spiraea douglasii*	70%	yes	FACW
2. *Cornus sericea*	30%	yes	FACW
3.	%		
4.	%		
5.	%		
Total Cover:	100%		
Herb Stratum (Plot size: 5 ft radius)			
1. *Symplocarpus foetidu*	30%	yes	OBL
2. *Phalaris arundinacea*	10%	yes	FACW
3.	%		
4.	%		
5.	%		
6.	%		
7.	%		
8.	%		
Total Cover:	40%		
Woody Vine Stratum (Plot size: 30 ft radius)			
1.	%		
2.	%		
Total Cover:	%		
% Bare Ground in Herb Stratum 60%			

Dominance Test Worksheet

Number of Dominant Species That Are OBL, FACW, or FAC: ______ (A)
Total Number of Dominant Species Across All Strata: ______ (B)
Percent of Dominant Species That Are OBL, FACW, or FAC ______ (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:
OBL species		x 1=
FACW species		x 2=
FAC species		x 3=
FACU species		x 4=
UPL species		x 5=
Column Totals:	(A)	(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- ☒ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: TP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/2	100%		%			Clay	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosal (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Minerals (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: ____

Depth (inches):

Hydric Soil Present? Yes ☐ No ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (min. of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, & 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)
- ☐

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D4

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (Inches):
Water Table Present?	Yes ☒	No ☐	Depth (Inches): 0
Saturation Present? (Includes Capillary fringe)	Yes ☒	No ☐	Depth (Inches): 0

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Parklands at Camas Meadows City/County: Camas/Clark Sampling Date: 4/28/2015
Applicant/Owner: Parklands at Camas, LLC/Chinook Land Owners Group, LLC State: WA Sampling Point: TP-2
Investigator(s): T. Haderly & R.Allison Section, Township, Range: S28,T2N,R3E
Landform (hillslope, terrace, etc.): Terrace Local relief: Concave Slope (%): 0-3%
Subregion (LRR): A Lat: 45.3736 Long: -122.2654 Datum: NAD83
Soil Map Unit Name: CvA NWI classification: PFOA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Area "Normal Circumstances" present? Yes ☐ No ☒
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☒ No ☐		
Hydric Soils Present? Yes ☐ No ☒	Is the Sampled Area within a Wetland?	Yes ☒ No ☐
Wetland Hydrology Present? Yes ☒ No ☐		

Remarks: Although hydric soils are not present, TP-1 is determined to be within a wetland due to a strong presence of hydrophytic vegetation and wetland hydrology indicators.

VEGETATION (*Use scientific names*)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus latifolia*	20%	yes	FACW
2. *Alnus rubra*	20%	yes	FACW
3.	%		
4.	%		
Total Cover:	40%		
Sapling/Shrub Stratum (Plot size: 5 ft. radius)			
1. *Acer circinatum*	30%	yes	FAC
2. *Spiraea douglasii*	20%	yes	FACW
3.	%		
4.	%		
5.	%		
Total Cover:	50%		
Herb Stratum (Plot size: 5 ft radius)			
1. *Symplocarpus foetidus*	80%	yes	OBL
2. *Oenanthe sarmentosa*	15%	no	OBL
3. *Athyrium felix-femina*	5%	no	FAC
4.	%		
5.	%		
6.	%		
7.	%		
8.	%		
Total Cover:	100%		
Woody Vine Stratum (Plot size: 30 ft radius)			
1.	%		
2.	%		
Total Cover:	%		
% Bare Ground in Herb Stratum %			

Dominance Test Worksheet

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet

Total % Cover of:	Multiply by:
OBL species	x 1=
FACW species	x 2=
FAC species	x 3=
FACU species	x 4=
UPL species	x 5=
Column Totals: (A)	(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☒ 2 – Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: TP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/2	%		%			Clay	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosal (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Minerals (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: ____

Depth (inches):

Hydric Soil Present? Yes☐ No☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (min. of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, & 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)
- ☐

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D4

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (Inches):
Water Table Present?	Yes ☒	No ☐	Depth (Inches): 0
Saturation Present? (Includes Capillary fringe)	Yes ☒	No ☐	Depth (Inches): 0

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Parklands at Camas Meadows City/County: Camas/Clark Sampling Date: 4/28/2015
Applicant/Owner: Parklands at Camas, LLC/Chinook Land Owners Group, LLC State: WA Sampling Point: TP-3
Investigator(s): T. Haderly & R.Allison Section, Township, Range: S28,T2N,R3E
Landform (hillslope, terrace, etc.): Terrace Local relief: None Slope (%): 0-3%
Subregion (LRR): A Lat: 45.3736 Long: -122.2654 Datum: NAD83
Soil Map Unit Name: CvA NWI classification: PFOA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes☒ No☐ (If no, explain Remarks.)
Are Vegetation☐, Soil☐, or Hydrology☐ significantly disturbed? Area "Normal Circumstances" present? Yes☒ No☐
Are Vegetation☐, Soil☐, or Hydrology☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?** Yes☐ No☒
Hydric Soils Present?	Yes ☐	No ☒	
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks:

VEGETATION (*Use scientific names*)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	20%	yes	FAC
2. *Pseudotsuga menziesii*	20%	yes	FACU
3.	%		
4.	%		
Total Cover:	40%		
Sapling/Shrub Stratum (Plot size: 5 ft. radius)			
1. ***Symphoricarpos albus***	**15%**	**yes**	FACU
2. *Holodiscus discolor*	15%	yes	FACU
3. *Gaultheria shallon*	15%	yes	FACU
4. Rubus parviflorus	15%	yes	FAC
5.	%	yes	FACU
Total Cover:	60%		
Herb Stratum (Plot size: 5 ft radius)			
1.	%		
2.	%		
3.	%		
4.	%		
5.	%		
6.	%		
7.	%		
8.	%		
Total Cover:	%		
Woody Vine Stratum (Plot size: 30 ft radius)			
1. *Rubus armeniacus*	40%	yes	FACU
2.	%		
Total Cover:	40%		

% Bare Ground in Herb Stratum %

Dominance Test Worksheet

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 13 (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:
OBL species		x 1=
FACW species		x 2=
FAC species		x 3=
FACU species		x 4=
UPL species		x 5=
Column Totals:	(A)	(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes☐ No☒

Remarks:

SOIL

Sampling Point: TP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/3	100%		%			Clay	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

☐ Histosal (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Minerals (S1)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)
☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
☐ Loamy Gleyed Matrix (F2)
☐ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches):

Hydric Soil Present? Yes☐ No☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (min. of one required; check all that apply)

☐ Surface Water (A1)
☐ High Water Table (A2)
☐ Saturation (A3)
☐ Water Marks (B1)
☐ Sediment Deposits (B2)
☐ Drift Deposits (B3)
☐ Algal Mat or crust (B4)
☐ Iron Deposits (B5)
☐ Surface Soil Cracks (B6)
☐ Inundation Visible on Aerial Imagery (B7)
☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, & 4B)**
☐ Salt Crust (B11)
☐ Aquatic Invertebrates (B13)
☐ Hydrogen Sulfide Odor (C1)
☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Presence of Reduced Iron (C4)
☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Stunted or Stressed Plants (D1) **(LRR A)**
☐ Other (Explain in Remarks)
☐

Secondary Indicators (2 or more required)

☐ Water Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) **(LRR A)**
☐ Frost-Heave Hummocks (D4

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (Inches):
Water Table Present?	Yes ☐	No ☒	Depth (Inches):
Saturation Present? (Includes Capillary fringe)	Yes ☐	No ☒	Depth (Inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Parklands at Camas Meadows City/County: Camas/Clark Sampling Date: 4/28/15
Applicant/Owner: Parklands at Camas, LLC/Chinook Land Owners Group, LLC State: WA Sampling Point: TP-4
Investigator(s): T. Haderly & R.Allison Section, Township, Range: S28,T2N,R3E
Landform (hillslope, terrace, etc.): Terrace Local relief: Concave Slope (%): 0-3%
Subregion (LRR): A Lat: 45.3736 Long: -122.2654 Datum: NAD83
Soil Map Unit Name: CvA NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes☒ No☐ (If no, explain Remarks.)
Are Vegetation☐, Soil☐, or Hydrology☐ significantly disturbed? Area "Normal Circumstances" present? Yes☒ No☐
Are Vegetation☐, Soil☐, or Hydrology☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒	No ☐	Is the Sampled Area within a Wetland? Yes☒ No☐
Hydric Soils Present?	Yes ☒	No ☐	
Wetland Hydrology Present?	Yes ☒	No ☐	

Remarks:

VEGETATION (*Use scientific names*)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus latifolia*	30%	yes	FACW
2. *Alnus rubra*	20%	yes	FAC
3.	%		
4.	%		
Total Cover:	50%		
Sapling/Shrub Stratum (Plot size: 5 ft. radius)			
1. *Cornus sericea*	20%	yes	FACW
2. *Rubus spectabilis*	15%	yes	FAC
3.	%		
4.	%		
5.	%		
Total Cover:	35%		
Herb Stratum (Plot size: 5 ft radius)			
1. *Oenanthe sarmentosa*	40%	yes	OBL
2. *Symplocarpus foetidus*	30%	yes	OBL
3. *Phalaris arundinacea*	30%	yes	FACW
4.	%		
5.	%		
6.	%		
7.	%		
8.	%		
Total Cover:	100%		
Woody Vine Stratum (Plot size: 5 ft radius)			
1.	%		
2.	%		
Total Cover:	%		

% Bare Ground in Herb Stratum %

Dominance Test Worksheet

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)
Total Number of Dominant Species Across All Strata: 7 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:	
OBL species		x 1=	
FACW species		x 2=	
FAC species		x 3=	
FACU species		x 4=	
UPL species		x 5=	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

☐ 1 – Rapid Test for Hydrophytic Vegetation
☒ 2 – Dominance Test is >50%
☐ 3 - Prevalence Index is ≤3.0[1]
☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants[1]
☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes☒ No☐

Remarks:

SOIL

Sampling Point: TP-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 2/1	80%	10YR 3/6	20%	C	M	Clay silt loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosal (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Minerals (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: ____

Depth (inches):

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (min. of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, & 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)
- ☐

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D4

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (Inches):
Water Table Present?	Yes ☒	No ☐	Depth (Inches): 0
Saturation Present? (Includes Capillary fringe)	Yes ☒	No ☐	Depth (Inches): 0

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Parklands at Camas Meadows City/County: Camas/Clark Sampling Date: 4/28/2015
Applicant/Owner: Parklands at Camas, LLC/Chinook Land Owners Group, LLC State: WA Sampling Point: TP-5
Investigator(s): T. Haderly & R.Allison Section, Township, Range: S28,T2N,R3E
Landform (hillslope, terrace, etc.): Terrace Local relief: Convex Slope (%): 0-3%
Subregion (LRR): A Lat: 45.3736 Long: -122.2654 Datum: NAD83
Soil Map Unit Name: CvA NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes☒ No☐ (If no, explain Remarks.)
Are Vegetation☐, Soil☐, or Hydrology☐ significantly disturbed? Area "Normal Circumstances" present? Yes☒ No☐
Are Vegetation☐, Soil☐, or Hydrology☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	Is the Sampled Area within a Wetland? Yes☐ No☒
Hydric Soils Present?	Yes ☐	No ☒	
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks:

VEGETATION (*Use scientific names*)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Corylus cornuta*	20%	yes	FACU
2.	%		
3.	%		
4.	%		
Total Cover:	20%		
Sapling/Shrub Stratum (Plot size: 5 ft. radius)			
1. *Holodiscus discolor*	10%	yes	FACU
2. *Oemleria cerasiformis*	5%	yes	FACU
3.	%		
4.	%		
5.	%		
Total Cover:	15%		
Herb Stratum (Plot size: 5 ft radius)			
1. *Galium trifidum*	40%	yes	FACW
2. *Polystichum munitum*	30%	yes	FACU
3. *Claytonia perfoliata*	10%	no	FAC
4.	%		
5.	%		
6.	%		
7.	%		
8.	%		
Total Cover:	80%		
Woody Vine Stratum (Plot size: 30 ft radius)			
1. *Rubus ursinus*	5%	yes	FACU
2.	%		
Total Cover:	5%		

% Bare Ground in Herb Stratum 20%

Dominance Test Worksheet

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 6 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 17 (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:
OBL species		x 1=
FACW species		x 2=
FAC species		x 3=
FACU species		x 4=
UPL species		x 5=
Column Totals:	(A)	(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☐ 2 – Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes☐ No☒

Remarks:

SOIL

Sampling Point: TP-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/3	100%		%			Silt loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosal (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Minerals (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: ____

Depth (inches):

Hydric Soil Present? Yes☐ No☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (min. of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, & 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)
- ☐

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D4

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (Inches):
Water Table Present?	Yes ☐	No ☒	Depth (Inches):
Saturation Present? (Includes Capillary fringe)	Yes ☐	No ☒	Depth (Inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Parklands at Camas Meadows City/County: Camas/Clark Sampling Date: 4/28/2015
Applicant/Owner: Parklands at Camas, LLC/Chinook Land Owners Group, LLC State: WA Sampling Point: TP-6
Investigator(s): T. Haderly & R.Allison Section, Township, Range: S28,T2N,R3E
Landform (hillslope, terrace, etc.): Terrace Local relief: Concave Slope (%): 8-20%
Subregion (LRR): A Lat: 45.3736 Long: -122.2654 Datum: NAD83
Soil Map Unit Name: HcD NWI classification: PFOA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain Remarks.)
Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Area "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☒ No ☐
Hydric Soils Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☒ No ☐		

Remarks:

VEGETATION (*Use scientific names*)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Fraxinus latifolia*	20%	yes	FACW
2. *Acer macrophyllum*	10%	yes	FACU
3.	%		
4.	%		
Total Cover:	30%		
Sapling/Shrub Stratum (Plot size: 5 ft. radius)			
1. *Cornus sericea*	30%	yes	FACW
2.	%		
3.	%		
4.	%		
5.	%		
Total Cover:	30%		
Herb Stratum (Plot size: 5 ft radius)			
1. *Veratrum californicum*	40%	yes	FAC
2. *Oenanthe sarmentosa*	20%	yes	OBL
3. *Mentha arvensis*	10%	no	FACW
4.	%		
5.	%		
6.	%		
7.	%		
8.	%		
Total Cover:	70%		
Woody Vine Stratum (Plot size: 30 ft radius)			
1.	%		
2.	%		
Total Cover:	%		

% Bare Ground in Herb Stratum 30%

Dominance Test Worksheet

Number of Dominant Species That Are OBL, FACW, or FAC:	4	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC	80	(A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:	
OBL species		x 1=	
FACW species		x 2=	
FAC species		x 3=	
FACU species		x 4=	
UPL species		x 5=	
Column Totals:	(A)		(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☒ 2 – Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: TP-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/1	80%	2.5 YR 3/6	20%	C		Silt clay loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosal (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Minerals (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches):

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (min. of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, & 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)
- ☐

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D4

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (Inches):
Water Table Present?	Yes ☒	No ☐	Depth (Inches): 4
Saturation Present? (Includes Capillary fringe)	Yes ☒	No ☐	Depth (Inches): 0

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys and Coast Region

Project/Site: Parklands at Camas Meadows City/County: Camas/Clark Sampling Date: 4/28/2015
Applicant/Owner: Parklands at Camas, LLC/Chinook Land Owners Group, LLC State: WA Sampling Point: TP-7
Investigator(s): T. Haderly & R.Allison Section, Township, Range: S28,T2N,R3E
Landform (hillslope, terrace, etc.): Terrace Local relief: Convex Slope (%): 8-20%
Subregion (LRR): A Lat: 45.3736 Long: -122.2654 Datum: NAD83
Soil Map Unit Name: HcD NWI classification: PFOA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes☒ No☐ (If no, explain Remarks.)
Are Vegetation☐, Soil☐, or Hydrology☐ significantly disturbed? Area "Normal Circumstances" present? Yes☒ No☐
Are Vegetation☐, Soil☐, or Hydrology☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒	**Is the Sampled Area within a Wetland?** Yes☐ No☒
Hydric Soils Present?	Yes ☐	No ☒	
Wetland Hydrology Present?	Yes ☐	No ☒	

Remarks:

VEGETATION (*Use scientific names*)

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Thuja plicata*	20%	yes	FAC
2. *Pseudotsuga menziesii*	20%	yes	FACU
3. *(non- native) Cedar sp.*	20%	yes	
4. *Acer macrophyllum*	10%	no	FAC
Total Cover:	70%		
Sapling/Shrub Stratum (Plot size: 5 ft. radius)			
1.	%		
2.	%		
3.	%		
4.	%		
5.	%		
Total Cover:	%		
Herb Stratum (Plot size: 5 ft radius)			
1. *Saxifrage sp*	20%	yes	
2.	%		
3.	%		
4.	%		
5.	%		
6.	%		
7.	%		
8.	%		
Total Cover:	20%		
Woody Vine Stratum (Plot size: 30 ft radius)			
1. *Rubus armeniacus*	40%	yes	FACU
2.	%		
Total Cover:	40%		

% Bare Ground in Herb Stratum 40%

Dominance Test Worksheet

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 20 (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:
OBL species		x 1=
FACW species		x 2=
FAC species		x 3=
FACU species		x 4=
UPL species		x 5=
Column Totals:	(A)	(B)

Prevalence Index = B/A=

Hydrophytic Vegetation Indicators:

☐ 1 – Rapid Test for Hydrophytic Vegetation
☐ 2 – Dominance Test is >50%
☐ 3 - Prevalence Index is ≤3.0[1]
☐ 4 - Morphological Adaptations[1] (Provide supporting data In Remarks or on a separate sheet)
☐ Wetland Non-Vascular Plants[1]
☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology Must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes☐ No☒

Remarks:

SOIL

Sampling Point: TP-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/3	100%		%			Silt loam	
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				
		%		%				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosal (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Minerals (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and Wetland hydrology must be present

Restrictive Layer (if present):

Type: _____

Depth (inches):

Hydric Soil Present? Yes☐ No☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (min. of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, & 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)
- ☐

Secondary Indicators (2 or more required)

- ☐ Water Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D4

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches):
Water Table Present?	Yes ☐	No ☒	Depth (inches):
Saturation Present? (Includes Capillary fringe)	Yes ☐	No ☒	Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (Stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX B- WETLAND RATING FORM AND FIGURES

Wetland name or number A,B & C

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetlands A,B & C Date of site visit: 4/28/2015

Rated by Rachel Allison Trained by Ecology? Yes No Date of training March 2015

HGM Class used for rating Depressional Wetland has multiple HGM classes?___Y X N

NOTE: Form is not complete without the figures requested *(figures can be combined).*

Source of base aerial photo/map Google Earth (2014)

OVERALL WETLAND CATEGORY III (based on functions X or special characteristics___)

1. Category of wetland based on FUNCTIONS

_______ **Category I** – Total score = 23 – 27

_______ **Category II** – Total score = 20 – 22

X **Category III** – Total score = 16 – 19

_______ **Category IV** – Total score = 9 – 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
		Circle the appropriate ratings		
Site Potential	H M L	H M L	H M L	
Landscape Potential	H M L	H M L	H M L	
Value	H M L	H M L	H M L	TOTAL
Score Based on Ratings	6	5	5	16

Score for each function based on three ratings
(order of ratings is not important)

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	Not Applicable

Wetland name or number A,B & C

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet *(can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of **dense** trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of **dense, rigid** trees, shrubs, and herbaceous plants *(can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

   NO – go to 2 **YES** – the wetland class is **Tidal Fringe** – go to 1.1

   1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

   NO – Saltwater Tidal Fringe (Estuarine) **YES – Freshwater Tidal Fringe**

   *If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

   NO – go to 3 **YES** – The wetland class is **Flats**

   *If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

   __The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;

   __At least 30% of the open water area is deeper than 6.6 ft (2 m).

   NO – go to 4 **YES** – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

   ___The wetland is on a slope (*slope can be very gradual*),

   ___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,

   ___The water leaves the wetland **without being impounded.**

   NO – go to 5 **YES** – The wetland class is **Slope**

   NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

   ___The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,

   ___The overbank flooding occurs at least once every 2 years.

Wetland name or number A,B &C

NO – go to 6 YES – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7 **YES** – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number A,B &C

DEPRESSIONAL AND FLATS WETLANDS **Water Quality Functions** - Indicators that the site functions to improve water quality	
D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	1
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions)*. Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	5
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	4
Total for D 1 Add the points in the boxes above	10

Rating of Site Potential If score is: ___12-16 = H _X_ 6-11 = M ___0-5 = L *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source: Nearby subdivision Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	1

Rating of Landscape Potential If score is: ___3 or 4 = H _X_ 1 or 2 = M ___0 = L *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? Yes = 1 No = 0	1
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	0
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	0
Total for D 3 Add the points in the boxes above	1

Rating of Value If score is: ___2-4 = H _X_ 1 = M ___0 = L *Record the rating on the first page*

Wetland name or number A,B &C

DEPRESSIONAL AND FLATS WETLANDS **Hydrologic Functions** - Indicators that the site functions to reduce flooding and stream degradation	
D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	0
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire wetland is in the Flats class points = 5	3
Total for D 4 Add the points in the boxes above	6

Rating of Site Potential If score is:___**12-16 = H** _X_**6-11 = M** ___**0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	1
Total for D 5 Add the points in the boxes above	2

Rating of Landscape Potential If score is:___**3 = H** _X_**1 or 2 = M** ___**0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): • Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 • Surface flooding problems are in a sub-basin farther down-gradient. points = 1 Flooding from groundwater is an issue in the sub-basin. points = 1 The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* ______ points = 0 There are no problems with flooding downstream of the wetland. points = 0	0
D 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan? Yes = 2 No = 0	0
Total for D 6 Add the points in the boxes above	0

Rating of Value If score is:___**2-4 = H** ___**1 = M** _X_**0 = L** *Record the rating on the first page*

Wetland name or number A,B &C

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class.* Check the Cowardin plant classes in the wetland. *Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

____Aquatic bed	4 structures or more: points = 4
__X__Emergent	3 structures: points = 2
__X__Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
__X__Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

__X__The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon

4

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

____Permanently flooded or inundated	4 or more types present: points = 3
__X__Seasonally flooded or inundated	3 types present: points = 2
__X__Occasionally flooded or inundated	2 types present: points = 1
__X__Saturated only	1 type present: points = 0
____Permanently flowing stream or river in, or adjacent to, the wetland	
____Seasonally flowing stream in, or adjacent to, the wetland	
____**Lake Fringe wetland**	**2 points**
____**Freshwater tidal wetland**	**2 points**

2

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

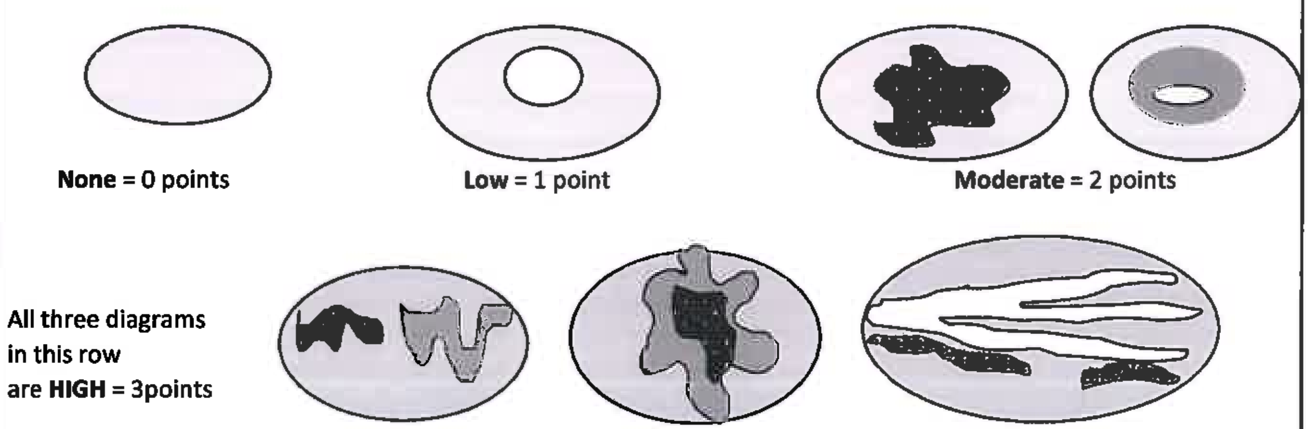
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species	points = 2
5 - 19 species	points = 1
< 5 species	points = 0

1

H 1.4. Interspersion of habitats

Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



3

Wetland name or number A,B &C

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* _X_ Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). _X_ Standing snags (dbh > 4 in) within the wetland ____ Undercut banks are present for at least 6.6 ft (2 m) **and/or** overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m) ____ Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet weathered where wood is exposed)* _X_ At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ____ Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 — Add the points in the boxes above	**13**

Rating of Site Potential If score is:___**15-18 = H** _X_**7-14 = M** ___**0-6 = L** *Record the rating on the first page*

H 2.0. Does the landscape have the potential to support the habitat functions of the site?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* % undisturbed habitat _7_ + [(% moderate and low intensity land uses)/2] _7.5_ = _14.5_ % If total accessible habitat is: > $^1/_3$ (33.3%) of 1 km Polygon — points = 3 20-33% of 1 km Polygon — points = 2 10-19% of 1 km Polygon — points = 1 < 10% of 1 km Polygon — points = 0	1
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* % undisturbed habitat _28_ + [(% moderate and low intensity land uses)/2] _7.5_ = _35.5_ % Undisturbed habitat > 50% of Polygon — points = 3 Undisturbed habitat 10-50% and in 1-3 patches — points = 2 Undisturbed habitat 10-50% and > 3 patches — points = 1 Undisturbed habitat < 10% of 1 km Polygon — points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use — points = (- 2) ≤ 50% of 1 km Polygon is high intensity — points = 0	-2
Total for H 2 — Add the points in the boxes above	0

Rating of Landscape Potential If score is:___**4-6 = H** ___**1-3 = M** _X_**< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?

H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.*

Site meets ANY of the following criteria: points = 2

- __ It has 3 or more priority habitats within 100 m (see next page)
- __ It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists)
- __ It is mapped as a location for an individual WDFW priority species
- __ It is a Wetland of High Conservation Value as determined by the Department of Natural Resources
- __ It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan

Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1

Site does not meet any of the criteria above points = 0

Rating of Value If score is:___**2 = H** _X_**1 = M** ___**0 = L** *Record the rating on the first page*

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. http://wdfw.wa.gov/publications/00165/wdfw00165.pdf or access the list from here: http://wdfw.wa.gov/conservation/phs/list/)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: ***NOTE:*** *This question is independent of the land use between the wetland unit and the priority habitat.*

— **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).

— **Biodiversity Areas and Corridors**: Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).

— **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.

— **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.

X **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).

— **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

— **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).

— **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.

— **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page).*

— **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.

— **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.

— **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

— **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number A,B &C

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	Category
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt Yes –Go to **SC 1.1** No= **Not an estuarine wetland**	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = **Category I** No - Go to **SC 1.2**	**Cat. I**
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are *Spartina*, see page 25) — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to **SC 2.2** No – Go to **SC 2.3** SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes = **Category I** No = **Not a WHCV** SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes – **Contact WNHP/WDNR and go to SC 2.4** No = **Not a WHCV** SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes = **Category I** No = **Not a WHCV**	**Cat. I** **Note***
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to **SC 3.3** No – Go to **SC 3.2** SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to **SC 3.3** No = **Is not a bog** SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = **Is a Category I bog** No – Go to **SC 3.4** **NOTE:** If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = **Is a Category I bog** No = **Is not a bog**	**Cat. I**

Note: Contact was made with Joe Rocchio, Vegetation Ecologist, Washington Dept. of Natural Resources, Natural Heritage Program, on 6/15/2015. Mr. Rocchio confirmed the wetlands were not included in the list of Wetlands of High Conservation Value.

Wetland name or number A, B&C

SC 4.0. Forested Wetlands Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.*** — **Old-growth forests** (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more. — **Mature forests** (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm). Yes = **Category I** No = **Not a forested wetland for this section**	**Cat. I**
SC 5.0. Wetlands in Coastal Lagoons Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* Yes – Go to **SC 5.1** No = **Not a wetland in a coastal lagoon** SC 5.1. Does the wetland meet all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2) Yes = **Category I** No = **Category II**	**Cat. I** **Cat. II**
SC 6.0. Interdunal Wetlands Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.*** In practical terms that means the following geographic areas: — Long Beach Peninsula: Lands west of SR 103 — Grayland-Westport: Lands west of SR 105 — Ocean Shores-Copalis: Lands west of SR 115 and SR 109 Yes – Go to **SC 6.1** No = **not an interdunal wetland for rating** SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)? Yes = **Category I** No – Go to **SC 6.2** SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger? Yes = **Category II** No – Go to **SC 6.3** SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac? Yes = **Category III** No = **Category IV**	**Cat I** **Cat. II** **Cat. III** **Cat. IV**
Category of wetland based on Special Characteristics If you answered No for all types, enter "Not Applicable" on Summary Form	**Not Applicable**

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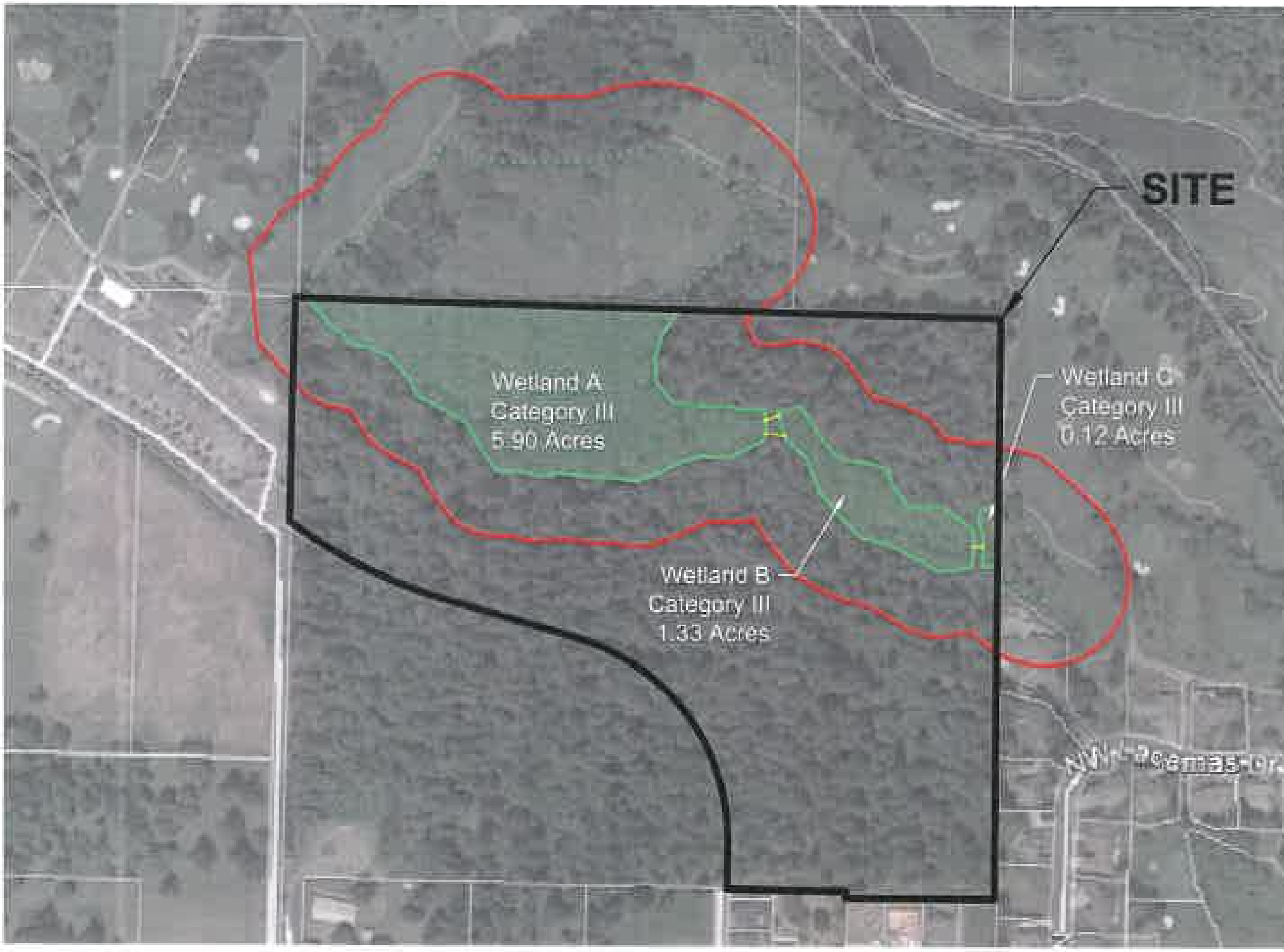

LEGEND:

- Site Boundary
- Onsite portion of Wetland unit
- Offsite portion of Wetland unit
- Wetland 150' offset

D 2.2->10% of area within 150ft. of wetland in land uses that generate pollutants.

D 5.2- <10% of area within 150ft. of the wetland in land uses that generate excess runoff.

NOTE(S):

1. Base map from ***Google Earth***.™

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Longview, WA 98632
Phone: (360) 578-1371 Fax: (360) 414-9305

DATE: 8/12/15
DWN: CDP
REQ. BY: RA
PRJ. MGR: TH
CHK:
PROJECT NO:
2255.01

Figure 6
150' OFFSET RATING FORM
Parklands at Camas Meadows
Parklands at Camas LLC.
Camas, Clark County, WA
Section 28, Township 2 N, Range 3 E, W.M.

LEGEND:

- Site Boundary
- Onsite portion of Wetland Unit
- Offsite portion of Wetland Unit
- 1 KM Offset

Accessible Land Uses: 7%
Moderate/Low intensity land uses: 13%
Undisturbed Land Uses: 28%
High intensity land uses: 52%

H 2.1- Accessible habitat directly abutting wetland <10% of 1 KM polygon.
H 2.2- Undisturbed habitat within 1KM polygon (10-50% and in 1-3 patches).
H 2.3- >50% of 1KM polygon is high intensity land use.

NOTE(S):
1. Base map from ***Google Earth***.™

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0 1500 3000
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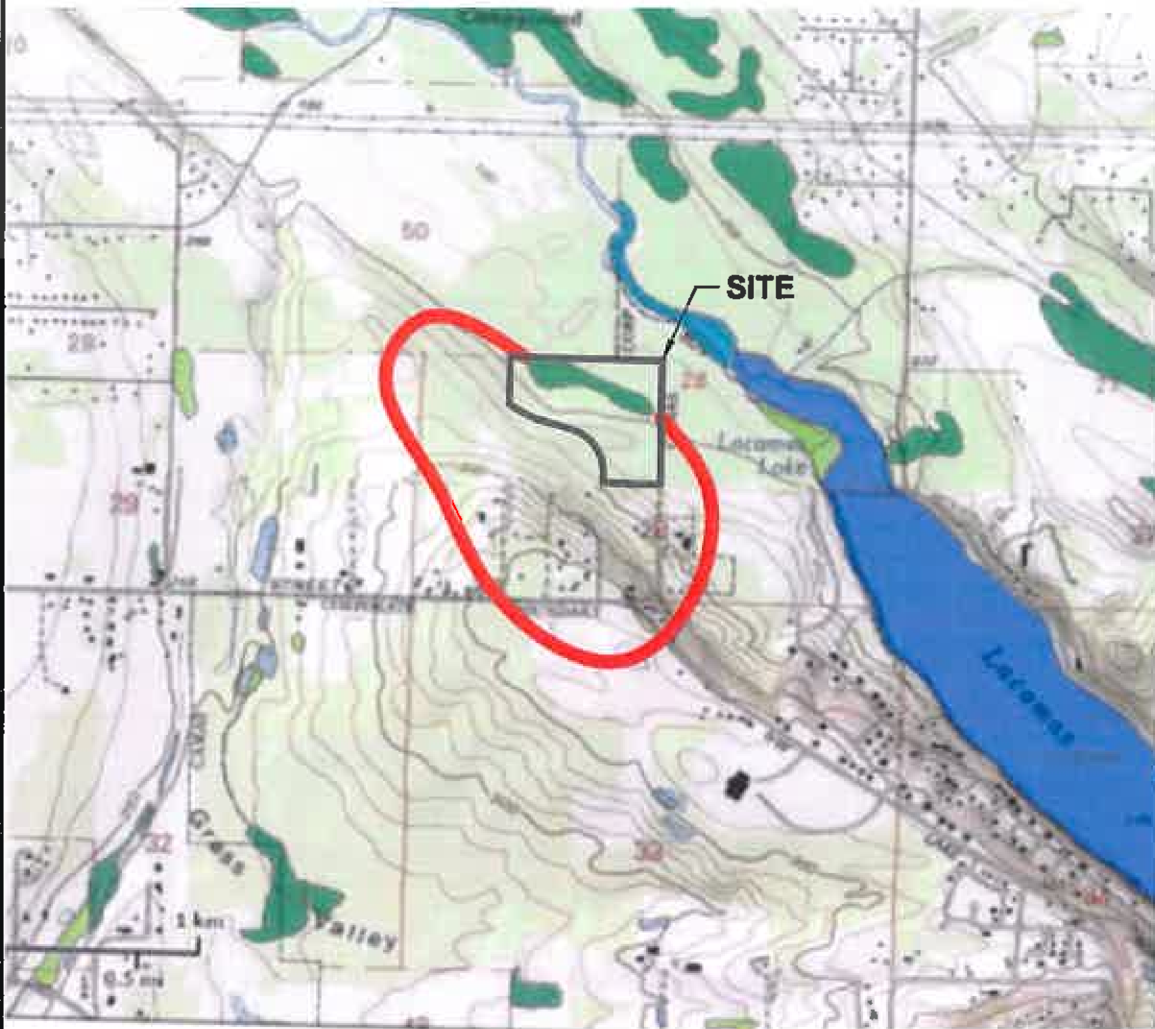
Figure 7
1 KM OFFSET RATING FORM
Parklands at Camas Meadows
Parklands at Camas LLC.
Camas, Clark County, WA
Section 28, Township 2 N, Range 3 E, W.M.



Wetlands indicated onsite by US Fish & Wildlife Service.

LEGEND:

Site Boundary

Contributing Basin

Freshwater Forested/Shrub Wetland

Freshwater Emergent Wetland

Riverine

Freshwater Pond

Lake

NOTE(S):

1. Map provided on-line by US Fish & Wildlife Service at web address: *http://www.fws.gov/wetlands/data/index.html*

Figure 8
CONTRIBUTING BASIN MAP
Parklands at Camas Meadows
Parklands at Camas LLC.
Camas, Clark County, WA
Section 28, Township 2 N, Range 3 E, W.M.

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0 2000 4000
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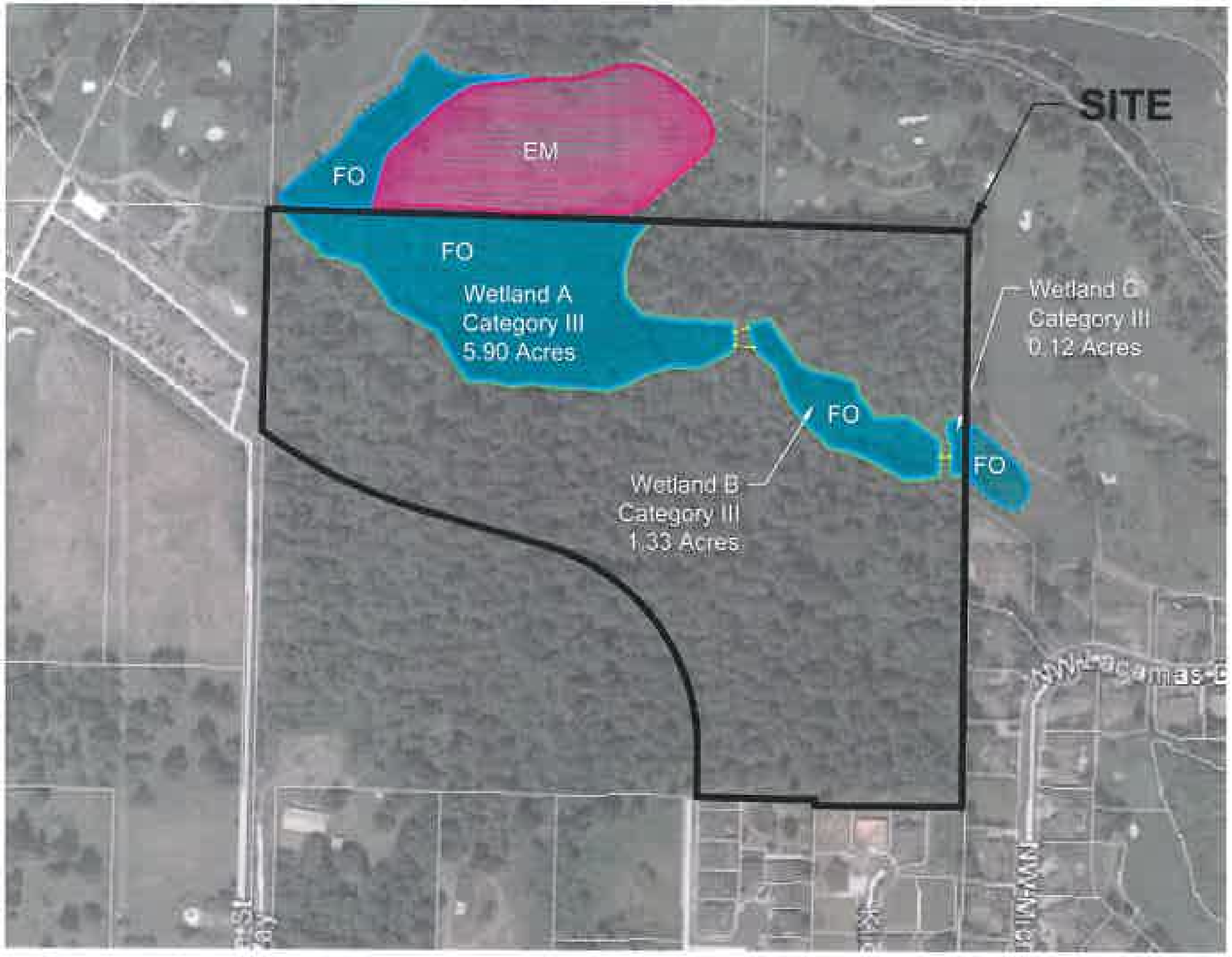
8/12/2015 3:21 PM s:\ELS\WA\Clark\Camas\2255-parklands at camas llc\2255.01-chinook property\2255.01-figures\2255.01_GPS.dwg cpayne



LEGEND:

- Site Boundary
- Onsite portion of Wetland Unit
- Offsite portion of Wetland Unit
- Cowardin Classes

FO- Forested
EM- Emergent

D 1.3- Wetland has persistent, ungrazed plants >95% of area.
D 4.3- The area of the contributing basin is 10-100 times the area of the unit.
D 5.3- >25% of the contributing basin of the wetland is covered with intensive human land uses.
H 1.1- Emergent, scrub-shrub, forested and forested class has 3 out of 5, strata (moss-ground cover, herbaceous, shrubs, canopy).
H 1.4- Moderately interspersed.

NOTE(S):
1. Base map from ***Google Earth*.™**

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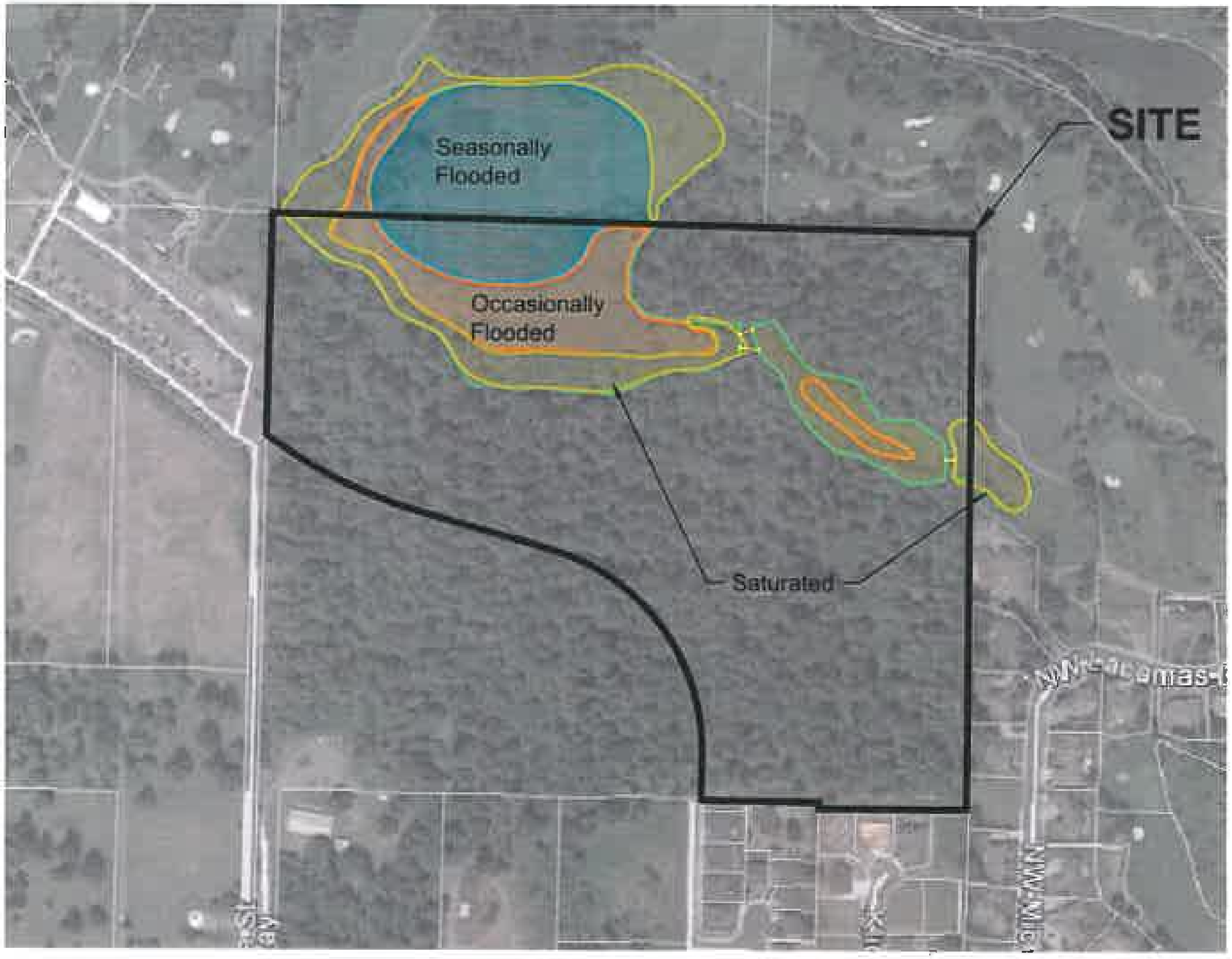
Figure 9
COWARDIN CLASSES MAP
Parklands at Camas Meadows
Parklands at Camas LLC.
Camas, Clark County, WA
Section 28, Township 2 N, Range 3 E, W.M.



LEGEND:

- Site Boundary
- Wetland
- Saturated
- Occasionally Flooded
- Seasonally

D 1.1 Wetland has an unconstructed outlet.

D 1.4 Area seasonally ponded is >¼ of total wetland area.

H 1.2 Seasonally flooded or inundated occasionally flooded or inundated saturated only.

NOTE(S):

1. Base map from ***Google Earth***.™

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Figure 10
HYDROPERIODS MAP
Parklands at Camas Meadows
Parklands at Camas LLC.
Camas, Clark County, WA
Section 28, Township 2 N, Range 3 E, W.M.

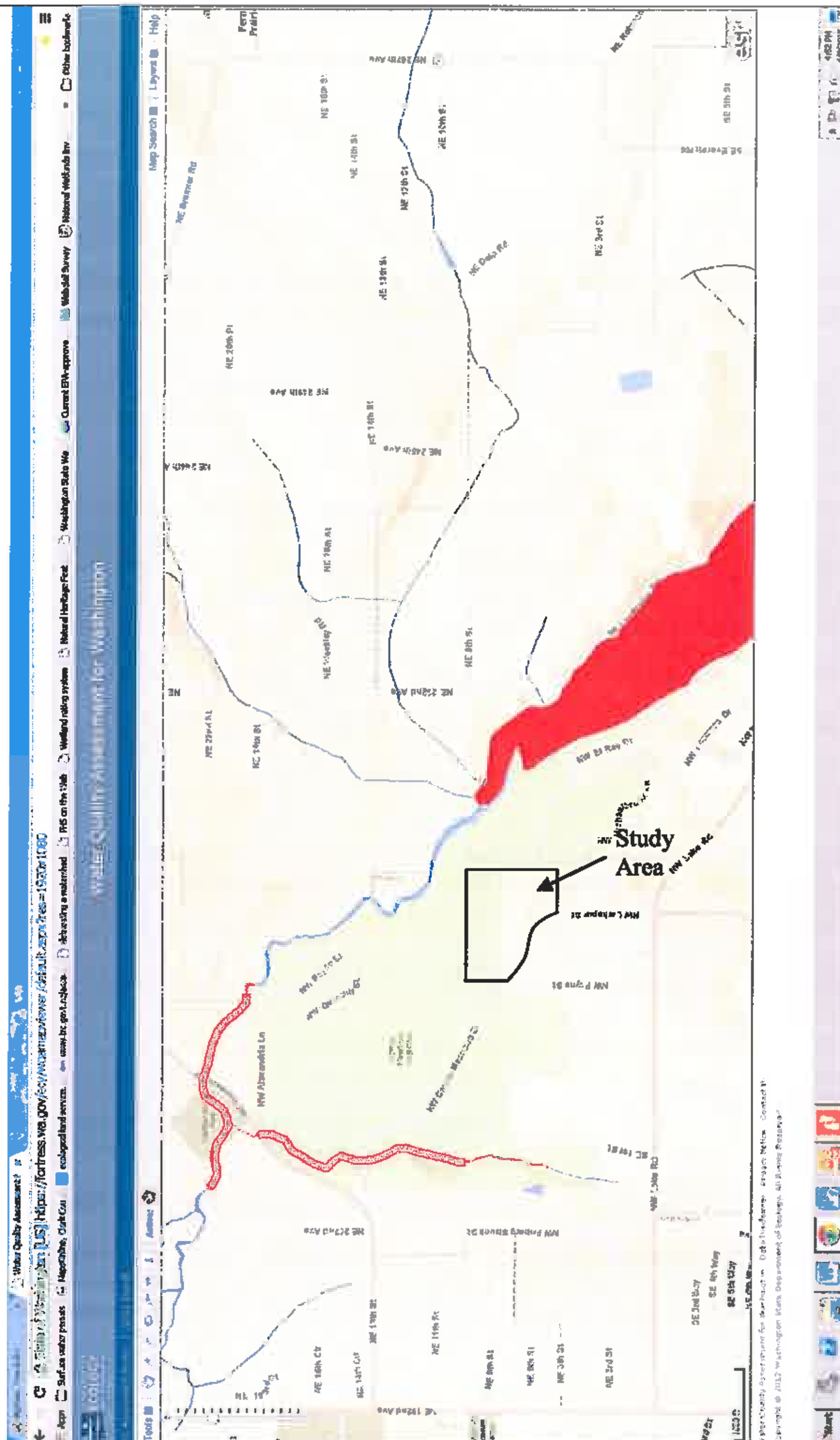

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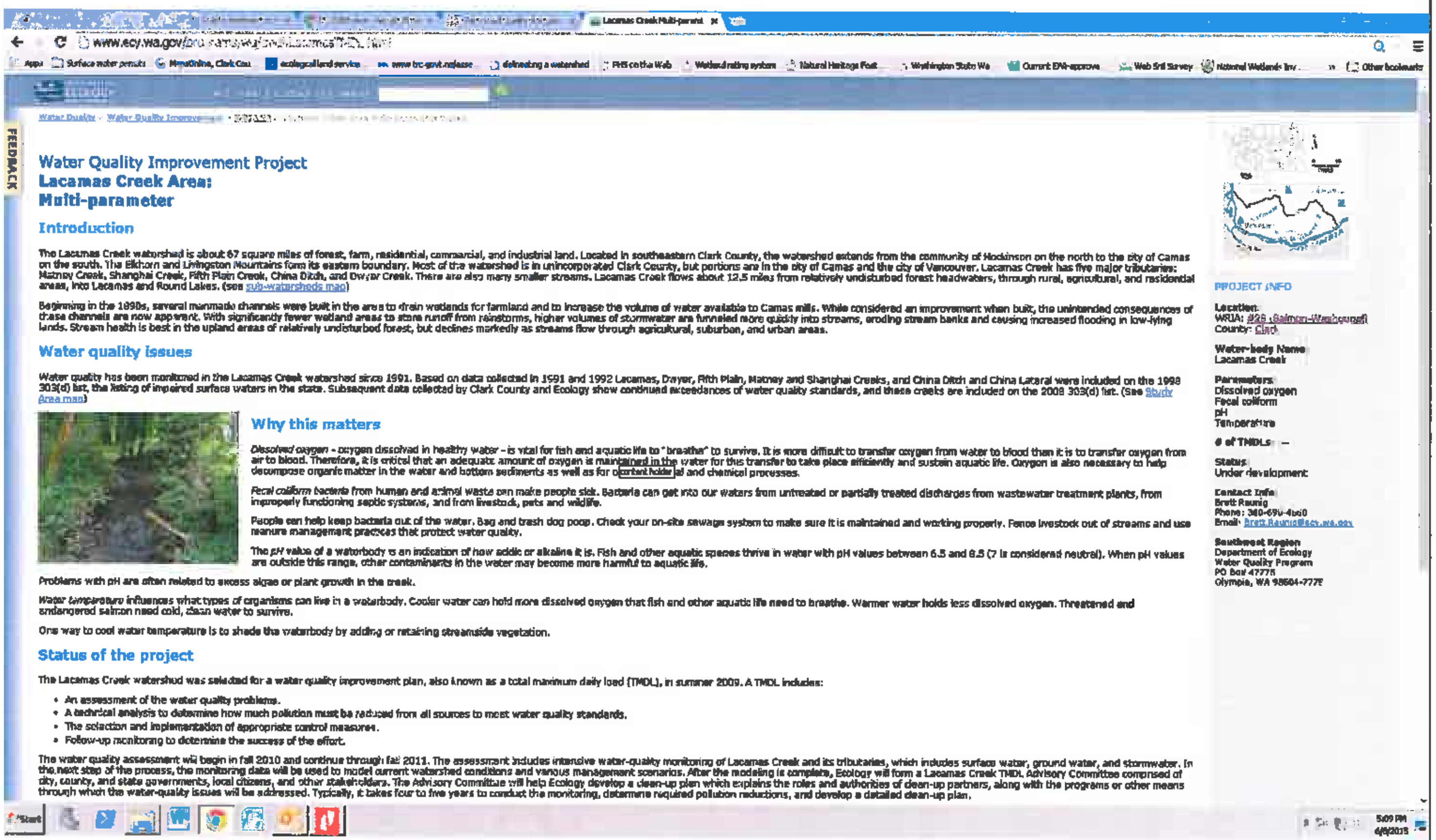
Figure 11
303(d) Listed Waters in Basin



www.ecy.wa.gov

FEEDBACK

Water Quality Improvement Project
Lacamas Creek Area:
Multi-parameter

Introduction

The Lacamas Creek watershed is about 67 square miles of forest, farm, residential, commercial, and industrial land. Located in southeastern Clark County, the watershed extends from the community of Hockinson on the north to the city of Camas on the south. The Elkhorn and Livingston Mountains form its eastern boundary. Most of the watershed is in unincorporated Clark County, but portions are in the city of Camas and the city of Vancouver. Lacamas Creek has five major tributaries: Matney Creek, Shanghai Creek, Fifth Plain Creek, China Ditch, and Dwyer Creek. There are also many smaller streams. Lacamas Creek flows about 12.5 miles from relatively undisturbed forest headwaters, through rural, agricultural, and residential areas, into Lacamas and Round Lakes. (see sub-watersheds map)

Beginning in the 1890s, several manmade channels were built in the area to drain wetlands for farmland and to increase the volume of water available to Camas mills. While considered an improvement when built, the unintended consequences of these channels are now apparent. With significantly fewer wetland areas to store runoff from rainstorms, higher volumes of stormwater are funneled more quickly into streams, eroding stream banks and causing increased flooding in low-lying lands. Stream health is best in the upland areas of relatively undisturbed forest, but declines markedly as streams flow through agricultural, suburban, and urban areas.

Water quality issues

Water quality has been monitored in the Lacamas Creek watershed since 1991. Based on data collected in 1991 and 1992 Lacamas, Dwyer, Fifth Plain, Matney and Shanghai Creeks, and China Ditch and China Lateral were included on the 1998 303(d) list, the listing of impaired surface waters in the state. Subsequent data collected by Clark County and Ecology show continued exceedances of water quality standards, and these creeks are included on the 2008 303(d) list. (See Study Area map)

Why this matters

Dissolved oxygen - oxygen dissolved in healthy water - is vital for fish and aquatic life to "breathe" to survive. It is more difficult to transfer oxygen from water to blood than it is to transfer oxygen from air to blood. Therefore, it is critical that an adequate amount of oxygen is maintained in the water for this transfer to take place efficiently and sustain aquatic life. Oxygen is also necessary to help decompose organic matter in the water and bottom sediments as well as for o[content holder]al and chemical processes.

Fecal coliform bacteria from human and animal waste can make people sick. Bacteria can get into our waters from untreated or partially treated discharges from wastewater treatment plants, from improperly functioning septic systems, and from livestock, pets and wildlife.

People can help keep bacteria out of the water. Bag and trash dog poop. Check your on-site sewage system to make sure it is maintained and working properly. Fence livestock out of streams and use manure management practices that protect water quality.

The *pH* value of a waterbody is an indication of how acidic or alkaline it is. Fish and other aquatic species thrive in water with pH values between 6.5 and 8.5 (7 is considered neutral). When pH values are outside this range, other contaminants in the water may become more harmful to aquatic life.

Problems with pH are often related to excess algae or plant growth in the creek.

Water temperature influences what types of organisms can live in a waterbody. Cooler water can hold more dissolved oxygen that fish and other aquatic life need to breathe. Warmer water holds less dissolved oxygen. Threatened and endangered salmon need cold, clean water to survive.

One way to cool water temperature is to shade the waterbody by adding or retaining streamside vegetation.

Status of the project

The Lacamas Creek watershed was selected for a water quality improvement plan, also known as a total maximum daily load (TMDL), in summer 2009. A TMDL includes:

- An assessment of the water quality problems.
- A technical analysis to determine how much pollution must be reduced from all sources to meet water quality standards.
- The selection and implementation of appropriate control measures.
- Follow-up monitoring to determine the success of the effort.

The water quality assessment will begin in fall 2010 and continue through fall 2011. The assessment includes intensive water-quality monitoring of Lacamas Creek and its tributaries, which includes surface water, ground water, and stormwater. In the next step of the process, the monitoring data will be used to model current watershed conditions and various management scenarios. After the modeling is complete, Ecology will form a Lacamas Creek TMDL Advisory Committee comprised of city, county, and state governments, local citizens, and other stakeholders. The Advisory Committee will help Ecology develop a clean-up plan which explains the roles and authorities of clean-up partners, along with the programs or other means through which the water-quality issues will be addressed. Typically, it takes four to five years to conduct the monitoring, determine required pollution reductions, and develop a detailed clean-up plan.

PROJECT INFO

Location:
WRIA: #28 Salmon-Washougal
County: Clark

Water-body Name
Lacamas Creek

Parameters
Dissolved oxygen
Fecal coliform
pH
Temperature

# of TMDLs —

Status
Under development

Contact Info
Brett Raunig
Phone: 360-690-4660
Email: Brett.Raunig@ecy.wa.gov

Southwest Region
Department of Ecology
Water Quality Program
PO Box 47775
Olympia, WA 98504-7775

Ecological Land Services
1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371
Fax: (360) 414-9305

DATE: 6/9/15
DWN: LH
PRJ. MGR: TH
PROJ.#: 2255.01

Figure 12
TMDLs for WRIA in Unit

PHOTOPLATES 1 & 2

Photo 1: Southern border of Wetland A looking West.

Photo 2: TP6 in Wetland A.

Photo 3: Southern border of Wetland A looking East.

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Photo 4: Example of large ash tree in buffer.

Photo 5: Wetland B southern border looking northeast.

Photo 6: Photo of Himalayan blackberry in buffer.

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Street & Apt. No., or PO Box No. P.O. Box 130
City, State, ZIP+4 Tokeland, WA 98590

PS Form 3800, July 2014 See Reverse for Instructions

EXHIBIT 36

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

January 26, 2016

Mr. Phil Bourquin
Director
Community Development
City of Camas
BOX 1055
616 NE Fourth Ave.
Camas, WA98607-0055

In future correspondence please refer to:
Project Tracking Code: 2016-01-00290
Property: SEPA15-14 Parklands at Camas Meadows
Re: Archaeology - Concur with Survey, Please add Inadvertent Language

Dear Mr. Bourquin:

We have reviewed the predetermination report for the Parklands at Camas project. Two isolated precontact artifacts (isolates) were located during the survey. Additional survey indicated that these isolates were not part of a large site. No permits from DAHP are required. We agree that no further archaeological work is necessary at this time. If plans change and any development takes place outside of the areas surveyed during this predetermination study (see figure), further archaeological predetermination work should take place. The following inadvertent discovery procedures should be followed in case of an inadvertent find:

Should archaeological materials (e.g. bones, shell, stone tools, beads, ceramics, old bottles, hearths, etc.) be observed during project activities, all work in the immediate vicinity should stop and the State Department of Archaeology and Historic Preservation (360-586-3065), the County planning office, and the affected Tribe(s) should be contacted immediately. If any human remains are observed, all work should cease and the immediate area secured. Local law enforcement, the county medical examiner (360-397-8405), State Physical Anthropologist, Department of Archaeology and Historic Preservation (360-586-3534), the County planning office, and the affected Tribe(s) should be contacted immediately. Compliance with all applicable laws pertaining to archaeological resources (RCW 27.53, 27.44 and WAC 25-48) and human remains (RCW 68.50) is required. Failure to comply with this requirement could constitute a Class C Felony.

The Cowlitz Tribe has also requested that inadvertent discovery language be added to the permit (see attached). Thank you for the opportunity to review and comment. Should you have any questions, please feel free to contact me.

Sincerely,

Gretchen A Ka

Gretchen Kaehler
Assistant State Archaeologist, Local Governments
(360) 586-3088
gretchen.kaehler@dahp.wa.gov

cc. Bill Reoulette, Principal, AAR
dAVe Burlingame, Cultural Resources, Cowlitz Tribe
James Gordon, Cultural Resources, Cowlitz Tribe
Jordan Mercier, THPO, Grand Ronde Tribes
Richard Bellon, THPO, Chehalis Tribe
Jennifer Doney, Cultural Resources, Warm Springs Tribes
Johnson Meninick, Cultural Resources, Yakama Nation
Tony Johnson, Cultural Resources, Chinook Tribe

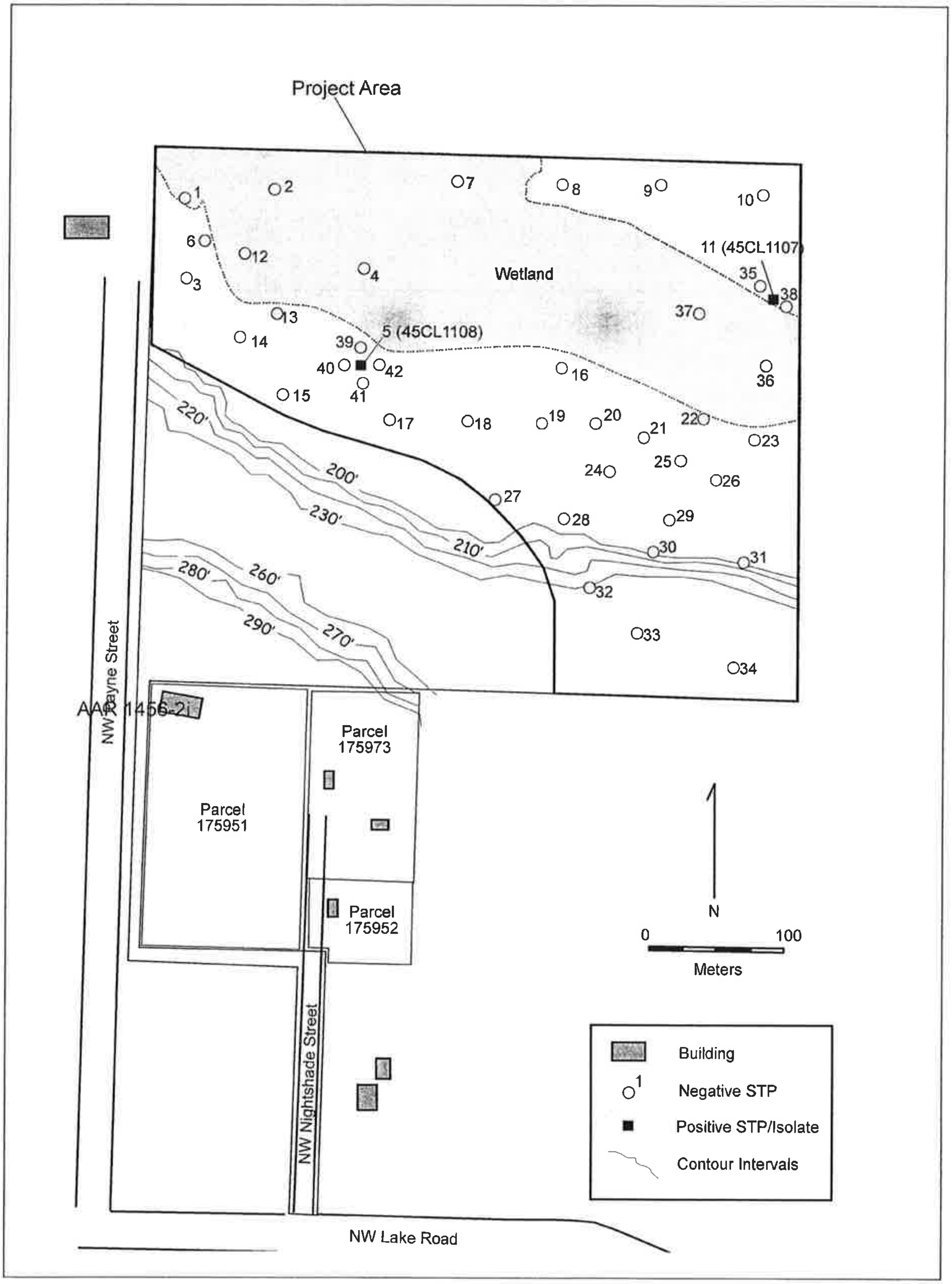

Figure 2. Map of project area, STP locations, and isolate locations.

COWLITZ INDIAN TRIBE

Cultural Resources Department

P.O. Box 2547 • 1055 9th Ave. Suite C • Longview, WA 98632

360.577.6962 • 577.6207 (f) • cowlitz.org

INADVERTENT DISCOVERY LANGUAGE

[revised 130708]

In the event any archaeological or historic materials are encountered during project activity, work in the immediate area (initially allowing for a 100' buffer; this number may vary by circumstance) must stop and the following actions taken:

1. Implement reasonable measures to protect the discovery site, including any appropriate stabilization or covering; and
2. Take reasonable steps to ensure the confidentiality of the discovery site; and,
3. Take reasonable steps to restrict access to the site of discovery.

The project proponent will notify the concerned Tribes and all appropriate county, state, and federal agencies, including the Department of Archaeology and Historic Preservation (SHPO in Oregon). The agencies and Tribe(s) will discuss possible measures to remove or avoid cultural material, and will reach an agreement with the project proponent regarding actions to be taken and disposition of material.

If human remains are uncovered, appropriate law enforcement agencies shall be notified first, and the above steps followed. If the remains are determined to be Native, consultation with the affected Tribes will take place in order to mitigate the final disposition of said remains.

See the Revised Code of Washington, Chapter 27.53, "Archaeological Sites and Resources," for applicable state laws and statutes. See also Washington State Executive Order 05-05, "Archaeological and Cultural Resources." Additional state and federal law(s) may also apply.

It is strongly encouraged copies of this plan are retained on-site while project activity is underway.

Contact information:

dAVe burlingame
Director, Cultural Resources
360.577.6962
508.1677 cell
577.6207 fax
culture@cowlitz.org

EXHIBIT 37

Technical Memorandum

otak

700 Washington Street
Suite 401
Vancouver, WA 98660
Phone (360) 737-9613
Fax (360) 737-9651

To:	James Carothers, Wes Heigh, City of Camas
From:	Tim Kraft
Prepared By:	Tim Kraft, Ryan Billen
Copies:	
Date:	June 7, 2016
Subject:	Review of Parkland Executive Residential Subdivision and Parklands Business Park
Project No.:	18061

Otak has reviewed the preliminary TIR and associated documents and have provided comments in this memorandum. Note that this project is to follow the Camas Stormwater Design Standards and the 2012 Stormwater Management Manual for Western Washington.

Section E: Onsite stormwater management
The 2012 SMMWW requires on-site stormwater management to be used to the maximum extent practicable and has specific steps to be followed to determine the feasibility of using LID BMPs. Note that along with roof downspouts, Ecology considers BMP T5.13 Post-Construction Soil Quality and Depth feasible for all sites.

Section F: Runoff Treatment and Design
The TIR states "There are no pollution-generating pervious surfaces (PGPS) on this project". Page 2-6, Volume I of the SMMWW defines PGPS as including "lawns, landscaped areas,….".

Section G: Flow Control Analysis and Design/ Section H: Flow Control System Plan
This section states" Flow control facilities are not required for this project since the discharge is to an exempt water body – Lacamas Lake". To use this exemption, Page 2-31, Volume I of the SMMWW states:

> "The project site must be drained by a conveyance system that is comprised entirely of manmade conveyance elements (e.g. pipes, ditches, outfall protection, etc.) and extends to the ordinary high water line of the exempt receiving water, and
>
> The conveyance system between the project site and the exempt receiving water shall have sufficient hydraulic capacity to convey discharges from future build-out condition;

The discharge from this project does not meet these two criteria; therefore, this project is not exempt from Minimum Requirement 7.

This section mentions “soil amendment or replacement to replicate HSG B soil characteristics”. It’s not clear how this being applied; however the SMWW provides criteria on how to obtain credit for the use of soil amendments for meeting Minimum Requirement 7.

This section discusses the use of bioretention systems to attenuate flows; however, it’s not clear if bioretention systems are proposed for this project.

Section I: Wetland Protection
Page 11 of the TIR references two sources for wetland protection measures:

- “Guide Sheet 1B in Appendix I-D” of the 2012 SMMWW, and
- “Section 4 Management of Freshwater Wetlands in the Central Puget Sound Basin, Chapter 13”.

The following comments have been developed after reviewing these two sources of guidance on wetland protection for the project:

i. The Parkland TIR references “Guide Sheet 1B in Appendix I-D” of the 2012 SMMWW. In the 2012 manual, the applicable guide sheet is “Guide Sheet 3: Wetland Projection Guidelines, and is comprised of three different guide sheets: 3a, 3b, and 3c. It is anticipated that these guidelines from the 2012 manual will be applicable to the project.

ii. Guide sheet 3B provides guidance on protecting wetlands from impacts of changes in water flows, and states:

> “Use the Western Washington Hydrology Model (WWHM), or other models approved by Ecology, for estimating the increases of decreases in total flows (volume) into a wetland that can result from the development project”

Guide Sheet 3B also provides specific modeling criteria for demonstrating that monthly or daily discharge volumes associated with the project will fall within an acceptable range.

iii. The Parkland TIR uses the 2012 WWHM to calculate volumes, but does not use the methodology outline in Guide Sheet 3B to demonstrate that daily or monthly volumes will fall within the acceptable range. The Parkland TIR also contains a single event hydrology model to demonstrate compliance with the duration standard; however, single-event models are generally not approved by Ecology for hydrologic modeling applications such as wetland hydroperiods. Furthermore, the single event model is unnecessary to show compliance with regulatory standards since an acceptable method using WWHM is outlined in Guide Sheet 3B.

iv. The TIR's reference to "Section 4 Management of Freshwater Wetlands in the Central Puget Sound Basin, Chapter 13" provides background on the water frequency level approach utilized in the Parkland TIR in conjunction with the single event duration model. However, Guide Sheet 3B in Appendix I-D of the 2012 SMMWW states:

> It is difficult, to estimate if stormwater discharges to a wetland will meet the criteria for protection developed by the Puget Sound Wetland and Stormwater Research Program. The criteria developed by that program apply only to depressional wetlands. They are not applicable to riverine, slope, or lake-fringe wetlands.

Based on the wetland description in the TIR, it appears that the wetlands on the project site might be slope wetlands rather than depressional wetlands. In such case, the water frequency level approach outlined in Section 4 Management of Freshwater Wetlands in the Central Puget Sound Basin, Chapter 13 would not provide suitable guidance for evaluating the wetland hydroperiod on the project site.

v. The Parkland TIR states that "The watershed area to this portion of the wetland complex had been reduced from about historically 94 acres to a current area of about 71 acres" as a rationale for using ~94 acres as the predeveloped basin area for modelling purposes, however, there was no discussion regarding how long ago the basin boundaries changed and if the wetlands have adjusted to the current basin conditions.

Appendix B

This appendix discusses how each minimum requirement is being met. For Minimum Requirement 7, the following statement is made: *"The wetland area discharges northerly through the continuation of the wetland complex to the ordinary high water line of the exempt receiving water."*

Minimum Requirement 7 states: *"The project site must be drained by a conveyance system that is* ***comprised entirely of manmade conveyance elements*** *(e.g. pipes, ditches, outfall protection, etc.) and extends to the ordinary high water line of the exempt receiving water*".

The wetland is not a "manmade conveyance element", and the site does not discharge stormwater through manmade conveyance elements to the ordinary high water line of Lacamas Lake. Therefore, the project is not exempt from Minimum Requirement 7.

It does not appear that the wetland complex discharges to Lacamas Lake, but rather to Lacamas Creek as short distance upstream of Lacamas Lake. Lacamas Creek is not listed as a flow control exempt water body.

Appendix C
More information is needed here on the applicability of the modeling results included in this appendix to meeting MR 7 and MR 8.

EXHIBIT 38

Lauren Hollenbeck

From:	Wes Heigh
Sent:	Tuesday, May 24, 2016 8:40 AM
To:	Robert Maul
Subject:	FW: FW: Parklands Archery Subdivision and Engineering Application - Deviation Request
Attachments:	04 Parklands Storm & Composite Engineering 24 Jan 2016 (1).pdf

Here it is.

W

From: James Kessi [mailto:james.kessi@gmail.com]
Sent: Monday, May 23, 2016 2:40 PM
To: Steve Wall; Wes Heigh; Aaron Barr; Kevin DeFord
Subject: Re: FW: Parklands Archery Subdivision and Engineering Application - Deviation Request

Hi Steve,

The applicant is requesting a deviation approval from the City Engineer in accordance with 10.d below. The deviation request is to allow the proposed private Street ROW widths, Paved widths, sidewalk on one side of shown streets, street frontage as low as 20' on certain cul-de-sac lots, and cul-de-sac lengths greater than maximum length as shown on the the 04 Preliminary Composite Utility Plan Sheet 04 dated 24 Jan 2016 (attached). These deviations are requested due to the topography limitations, limitations due to wetlands, and unusual site constraints and layout unique for the site. In addition, all the layouts and proposed design elements were previous given during design review and the proposed plan was accepted by City Council as part of the MXPD overlay process.

17.19.040.10-d

10. Street Layout. Street layout shall provide for the most advantageous development of the land development, adjoining area, and the entire neighborhood. Evaluation of street layout shall take into consideration potential circulation solutions for vehicle, bicycle and pedestrian traffic, and, where feasible, street segments shall be interconnected.

a. While it is important to minimize the impact to the topography from creating an integrated road system, improved site development and circulation solutions shall not be sacrificed to minimize the amount of cut and fill requirements of the proposal.

b. Where critical areas are impacted, the standards and procedures for rights-of-way in the critical areas overlay zone shall be followed.

c. When the proposed development's average lot size is seven thousand four hundred square feet or less, one additional off-street parking space shall be required for every five units, notwithstanding the requirements of CMC Chapter 18.11. These spaces are intended to be located within a common tract.

d. When, on the basis of topography, projected traffic usage or other relevant facts, it is unfeasible to comply with the foregoing right-of-way, tract and street width standards, the approval authority, upon recommendation from the city engineer, may permit a deviation from the standards of Table 17.19.040-1 and Table 17.19.040-2.

A. See responses in **red** and **purple** to each of City comments regarding the Engineering plans.
B. Is the lot ROW frontage requirement as low as 20 feet is also requested

1. Your utility note #6 for the sewer and storm indicate that minimum cover requirements can be avoided with a recommendation from the geotechnical engineer – this may not be an accurate statement and would require city approval. RESPONSE OK. We were trying to anticipate in the Final Engineering Plans the possibility of shallowing to the bare minimum some utilities, ONLY if hard bedrock was encountered, but we will change the final design to meet minimum cover requirements. A deviation is not requested

2. The standard individual residential STEP systems may not be able to overcome the total dynamic head of the system in Payne Road and will likely require high head pumps (probably not a favorable long term maintenance option for the city) or direction of flows into a pump station with more powerful pumps. RESPONSE : High head pumps will be necessary at each connection. There is not a local pump station with capacity to receive this flow. The system will be designed with appropriate pipe to convey the pressures needed to lift over the high point in Lake Road.

3. Based on the requirements of Table 17.19.040-1 in CMC 17.19 the westerly short cul-de-sac (NW 10th Fairway) will require Private Street standard C which consists of a 42 foot wide tract with 28 feet of pavement width with a detached 5 foot wide sidewalk on one side. RESPONSE- OK - Yes, in fact PVT 3 is proposed for NW 10th Fairway Drive, and meets these dimensions. The longer remaining private streets will require the Private Street standard D which consists of a 42 foot wide tract with two detached 5 foot sidewalks. Both private street sections restrict parking on one side. RESPONSE- OK - Yes, in fact PVT 4 is proposed for NW 16th Fairway Drive, NW Golf Drive and meets these dimensions. PVT 4 is proposed for NW 16th Fairway Drive, NW Golf Drive and meets these dimensions. Where NW Parklands Trail crosses on the upland between Wetland A and Wetland B, due to topographical constraints there is only being enough area to have an attached sidewalk on <u>one</u> side of the street, the connecting street is proposed as PVT 2 with 30' of ROW and a 5' attached sidewalk and 20 feet of paved width with no parking on BOTH sides. PVT 3 is proposed for NW 17th Green and , NW Parklands Trail south of the wetland to match having the sidewalk only on one side of the street, but the sidewalk has room to be detached. Note that all lots will be sprinklered and that No Parking signs will be located as required by the City.

4. The minimum paved cul-de-sac radius per the code is 35 feet. You are proposing 30 foot paved cul-de-sac widths. RESPONSE. The applicant agrees to provide a larger 35' paved radius design for the three cul-de-sacs. Per Dead End Turnaround Detail ST36, under guidelines for sprinklered Development (ALL lots will be sprinklered), the minimum Turning Radius (inside paved radius) is 30' , and the Minimum (Outer) Turnaround Radius is 35'.

5. Please see CMC 17.19.040 (B) (10 d) if you are proposing to vary from the minimum street requirements of Table 17.19.040-1. RESPONSE We are proposing to vary slightly from the private road standards as proposed to fit the topographically limitations of the site and the constraints due to the existing wetlands and wetland buffers. The proposed variations to the streets and interpretation for the cul de sac dimensions are requested to be approved by the City Engineer as per 10.d above.

There are several areas on the plan where the water and sewer notes are swapped. RESPONSE OK. We will correct notes on final engineering plans as noted and needed.

7. The sewer notes on the plans refer to STEP and STEF systems, however the only possible STEF line that could work would be located in CM Drive and would then need to flow into the pump station near the clubhouse which could then overcome the TDH in Payne Road. RESPONSE: The existing Camas Meadows pump station (formerly known as Two Creeks #2) does not have capacity to accept flows from this proposed development. As a result, all of the lots/buildings will be served by individual STEP services with a common force main.

8. Other items that are non-engineering related would be the location of the parking lots serving the commercial uses (buildings should be up front and parking should be in the rear). RESPONSE – This issue been fully addressed in the preceeding MXPD Overlay and Rezone approvals by the City.
9. Also, are we providing adequate buffering between incompatible uses? Design review stuff – see CMC 18.19. RESPONSE – This issue been fully addressed in the preceeding MXPD Overlay and Rezone approvals by the City.

James Kessi P.E.
Kessi Engineering & Consulting
Civil Engineering - Stormwater - Planning
T **(360) 991-9300** E **James.Kessi@gmail.com**

On Thu, Feb 25, 2016 at 3:38 PM, Wes Heigh <WHeigh@cityofcamas.us> wrote:

Hi James,

Thank you for the composite preliminary submittal for review.

Below are my quick initial review comments/concerns:

- Your utility note #6 for the sewer and storm indicate that minimum cover requirements can be avoided with a recommendation from the geotechnical engineer – this may not be an accurate statement and would require city approval.

- The standard individual residential STEP systems may not be able to overcome the total dynamic head of the system in Payne Road and will likely require high head pumps (probably not a favorable long term maintenance option for the city) or direction of flows into a pump station with more powerful pumps.

- Based on the requirements of Table 17.19.040-1 in CMC 17.19 the westerly short cul-de-sac (NW 10th Fairway) will require Private Street standard C which consists of a 42 foot wide tract with 28 feet of pavement width with a detached 5 foot wide sidewalk on one side. The longer remaining private streets will require the Private Street standard D which consists of a 42 foot wide tract with two detached 5 foot sidewalks. Both private street sections restrict parking on one side.

- The minimum paved cul-de-sac radius per the code is 35 feet. You are proposing 30 foot paved cul-de-sac widths.

- Please see CMC 17.19.040 (B) (10 d) if you are proposing to vary from the minimum street requirements of Table 17.19.040-1.

- There are several areas on the plan where the water and sewer notes are swapped.

- The sewer notes on the plans refer to STEP and STEF systems, however the only possible STEF line that could work would be located in CM Drive and would then need to flow into the pump station near the clubhouse which could then overcome the TDH in Payne Road.

Other items that are non-engineering related would be the location of the parking lots serving the commercial uses (buildings should be up front and parking should be in the rear). Also, are we providing adequate buffering between incompatible uses? Design review stuff – see CMC 18.19.

Regards,

Wes

Wes G. Heigh

Project Manager

City of Camas

616 NE 4th Ave.

Camas, WA 98607

(360) 817-7237

wheigh@cityofcamas.us

From: James Kessi [mailto:james.kessi@gmail.com]
Sent: Thursday, February 25, 2016 11:14 AM
To: Wes Heigh
Subject: Re: Parklands Archery Application - Camas Meadows Drive / Prelim Engineering Plan Discussion

Hi Wes,

I don't know if you saw the Composite Engineering Plan, but here it is.

It shows an overall STEP system connecting to the 10" Force Main in Payne as we had discussed

All stormwater facilities have been removed from the buffers and wetlands completely.

All Water quality will be accomplished with Filterra Treatment Vaults, and then stormwater is directed to level spreaders to spread it out and let it flow to the wetland. As we had previously discussed in the meeting with Steve Wall, direct release to 100 year flood fringe from Lacamas Lake that extends onto a portion of the wetlands on the site is unique for this site and demonstrates a connection to Lacamas Lake.

Give me a call and I can go over it with you and make sure your questions are answered.

thanks

James

James Kessi P.E.

Kessi Engineering & Consulting

Civil Engineering - Stormwater - Planning

T **(360) 991-9300** E **James.Kessi@gmail.com**

On Thu, Feb 25, 2016 at 10:04 AM, Steve Wall <SWall@cityofcamas.us> wrote:

> Hi James,
>
> Not any concerns per se, since as far as I know we haven't really started any reviews yet. Just wanted to try and stay ahead of things as much as possible. I think the biggest items would probably be stormwater and sewer. I'm not sure

what you ended up with on final stormwater design approach, but it may be worth discussing with Wes if there's anything that's "non-traditional" in your design.

Also, the one item that caught my attention briefly was in regards to sewer service. My limited understanding is that the project has to be served by at least one of the pump stations in the area. As such, the pump station(s) should be analyzed to ensure that there is adequate capacity to handle the flows from the new development. From past experiences, that analysis can take some time and is often an iterative approach to make sure everything has been accounted for.

Again, it was really just an offer to talk through things prior to the land use review and plan review starting up to make sure everyone on our end really understands your thought process and proposals. I won't be completing the reviews, but I'm happy to coordinate with folks on our end to help out as needed. We'll take your lead…

Thanks,

Steve

Steve Wall, P.E.

Public Works Director

Ph: 360-817-7899

Cell: 360-624-2763

Email: swall@cityofcamas.us

From: James Kessi [mailto:james.kessi@gmail.com]
Sent: Monday, February 22, 2016 8:50 PM
To: Steve Wall
Cc: Kevin DeFord; Aaron Barr
Subject: Re: Parklands Archery Application - Camas Meadows Drive / Larkspur discussion follow up

Hi Steve,

As a followup to my voice mail I left today, Kevin and Aaron asked me to also email you

and check with you to see if there were any overall storm, sanitary, water, or transportation engineering concerns or questions you had on the Parklands or Camas Meadows Drive projects?

I would be happy to have a phone conversation to go over the big picture design concepts and go over the latest engineering plans or meet with you to give you an update or answer any questions o as needed to give you a level of comfort that the big picture items are being addressed for the applications.

Please let me know what you are thinking.

Attached is a pdf the latest updated engineering composite plan - a hard paper copy was also submitted with the latest materials to the City.

thanks

James

James Kessi P.E.

Kessi Engineering & Consulting

Civil Engineering - Stormwater - Planning

T **(360) 991-9300**   E **James.Kessi@gmail.com**

On Thu, Aug 6, 2015 at 4:00 PM, Steve Wall <SWall@cityofcamas.us> wrote:

Hi James,

I appreciate the offer to be involved and I may be able to attend tomorrow depending on the time chosen. I'm sure you're aware I won't be completing any review myself and will be relying on engineering staff to review the storm design and ensure that it meets the City's requirements. If there's a complicated proposal that you'll be presenting tomorrow, more than likely we'll need to review internally anyway before providing any kind of response…similarly throughout the review process, if there are big picture items that crop up we'd likely review as a team.

That said, feel free to get a time set with Curleigh and Wes and I'll try and attend if I have availability.

Thanks,

Steve

Steve Wall, P.E.

Public Works Director

Ph: 360-817-7899

Cell: 360-624-2763

Email: swall@cityofcamas.us

From: James Kessi [mailto:james.kessi@gmail.com]
Sent: Thursday, August 06, 2015 2:32 PM
To: Curleigh (Jim) Carothers; Steve Wall
Cc: Wes Heigh; Gus (guss@harbengineering.com); George Embleton; Brian Groth
Subject: Re: Camas Meadows Drive / Larkspur discusison follow up

Jim, Wes and Steve,

We were hoping to have Steve there as well to make sure Steve was also ok with the overall storm concept.

Steve - is there a time tomorrow that will work for you?

thanks

James

James Kessi P.E.

Kessi Engineering & Consulting

Civil Engineering - Stormwater - Planning

T **(360) 991-9300** E **James.Kessi@gmail.com**

On Thu, Aug 6, 2015 at 12:40 PM, Curleigh (Jim) Carothers <jcarothers@cityofcamas.us> wrote:

James,

Wes and I could probably meet at around 4:00 today or we could meet tomorrow. Let me know. Thanks.

James E. Carothers, P.E.
Engineering Manager/City Engineer

City of Camas WASHINGTON

616 NE 4th Avenue
Camas, WA 98607
360-817-7230
360-834-1535 FAX
jcarothers@cityofcamas.us

From: James Kessi [mailto:james.kessi@gmail.com]
Sent: Wednesday, August 05, 2015 5:35 PM
To: Steve Wall; Curleigh (Jim) Carothers; Wes Heigh
Cc: Gus (guss@harbengineering.com); George Embleton; Brian Groth
Subject: Re: Camas Meadows Drive / Larkspur discusion follow up

Hi Steve, Curleigh, and Wes,

Can you check with you three and name a time either tomorrow Thurs the 6th, or on Friday the 7th that works with you three with just us storm engineers can meet for 30-45 minutes to go over our Prelim Storm Plan design concepts for Parklands/Camas Meadows Drive and the Village at Camas Meadows? I dont think the planners or maintenance folks need to be there at this point, just the design reviewers to go over the basic storm design concepts.

If there is any way we can please do it this week that would be best as I am out of town next week and we desperately want to get your feedback on the concept before we go any further and so it can keep progressing or we can make some adjustments as needed.

We will be able to email a Prelim Storm Plan and Basin Plans tomorrow and will also bring some full size copies to our meeting.

thanks

James

James Kessi P.E.

Kessi Engineering & Consulting

Civil Engineering - Stormwater - Planning

T **(360) 991-9300**   E **James.Kessi@gmail.com**

On Fri, Jan 23, 2015 at 1:07 PM, Robert Maul <RMaul@cityofcamas.us> wrote:

I have heard back from most of you that this day and time will work. Please advise if there are conflicts that cannot be avoided.

EXHIBIT 39

Lauren Hollenbeck

From: MIZAR, TAYLOR (DNR) <TAYLOR.MIZAR@dnr.wa.gov>
Sent: Tuesday, June 07, 2016 12:28 PM
To: Robert Maul
Subject: RE: Parklands

This is exactly what I needed. Thank you Robert!

Taylor Mizar
Forest Practices Coordinator
Office: 360-575-5039
Mobile: 360-957-8145

From: Robert Maul [mailto:RMaul@cityofcamas.us]
Sent: Tuesday, June 07, 2016 12:13 PM
To: MIZAR, TAYLOR (DNR) <TAYLOR.MIZAR@dnr.wa.gov>
Subject: RE: Parklands

Thanks, Taylor. I have attached two emails and associated letters from DAHP and Cowlitz. Please let me know if you need anything else, or have other questions.

Regards,

Robert

From: MIZAR, TAYLOR (DNR) [mailto:TAYLOR.MIZAR@dnr.wa.gov]
Sent: Tuesday, June 07, 2016 12:09 PM
To: Robert Maul
Subject: RE: Parklands

Hello Robert,

I just spoke with Phil regarding the Parklands project. I believe he will be talking to you about the discussion we had, but in summary, I was inquiring as to whether the Dept. of Archeological & Historic Preservation (DAHP) had indicated they would be requiring a permit for this proposal. Have you heard back from either the tribes or DAHP on this project? If so, could I get a copy of their response for our FPA file?

My inquiry stems from the DNR's process of reviewing Forest Practices Applications (DNR just received the timber harvest application for this parcel). DNR's process includes contacting DAHP if there are archeological resources in the vicinity of a proposal. In this case, there are several archeological sites within the proposal area.

I appreciate your help.

Thank you,

Taylor Mizar
Forest Practices Coordinator

Pacific Cascade Region
Washington Department of Natural Resources (DNR)
Office: 360-575-5039
Mobile: 360-957-8145
taylor.mizar@dnr.wa.gov
www.dnr.wa.gov

From: Robert Maul [mailto:RMaul@cityofcamas.us]
Sent: Tuesday, June 07, 2016 11:45 AM
To: MIZAR, TAYLOR (DNR) <TAYLOR.MIZAR@dnr.wa.gov>
Subject: Parklands

Good morning, Taylor.

Sarah Fox mentioned that you had some questions on the Parklands project. Is there something I can help you with? Thanks for reaching out.

Regards,

Robert Maul
Planning Manager
City of Camas
616 NE 4th Ave.
Camas, WA 98607
rmaul@cityofcamas.us
(360) 817-1568 Ext. 4255

EXHIBIT 40

Lauren Hollenbeck

From:	Robert Maul
Sent:	Wednesday, June 08, 2016 2:17 PM
To:	'dlofstead@nalco.com'
Subject:	Parklands at Camas Meadows SUB15-03

Good afternoon, Mr. Lofstead.

I have talked to one of the developers on the project and he indicated it is their intent to remove the chain link/barbed wire fence where their lots abut other single family home sites. I can't speak to if they are going to install new fencing or not since it is not a development requirement in our municipal code. Given the nature of the development I would be surprised if the home builders didn't install some sort of decorative fencing at the side and rear lot lines of the new lots since they will be high end housing. As a courtesy I have included contact information for Aaron Barr on this email so you can talk to him directly. As you may know he is one of the developers of the site and can speak more directly on this issue. (abarrmail@gmail.com)

I hope this helps. If you need any additional information please do not hesitate to ask.

Regards,

Robert Maul
Planning Manager
City of Camas
616 NE 4th Ave.
Camas, WA 98607
rmaul@cityofcamas.us
(360) 817-1568 Ext. 4255

From: Lofstead, David [mailto:dlofstead@nalco.com]
Sent: Monday, June 06, 2016 6:29 AM
To: Community Development Email
Subject: Parklands at Camas Meadows SUB15-03

Does the application under review address the developers plan for the current chain link/barbed wire fence that runs allow a large part of the site? If no, why not? If yes, what will the city of Camas require for a fence?

Thank you,

David Lofstead
834-5288

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EXHIBIT 41

Lauren Hollenbeck

From: Chris <Chris@planningsolutionsinc.com>
Sent: Wednesday, June 08, 2016 3:33 PM
To: Robert Maul
Subject: Parklands Oak Tree Mitigation

Hi Robert – does the below help?

Eight (8) two inch caliper White Oaks (Quercus Garryana) are proposed as mitigation for the removal of four (4) existing oak trees. This mitigation planting is proposed at the rate of two (2) new trees for each tree to be removed. New oak planting will be within the wetland buffers.

Chris Baumann, LA
President, Director of Landscape Architecture

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