SECTION 011000

SUMMARY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Contract description.
   2. Work by Owner.
   3. Contractor use of site.
   4. Owner occupancy.
   5. Specifications conventions.

1.2 CONTRACT DESCRIPTION

A. Project Work includes exterior and interior renovations of the existing Camas Library.

B. Project Delivery Method: Design-Bid-Build.

1.3 WORK BY OWNER

A. Separate contracts include:
   1. Telecommunications: Terminal devices only.
      a. Wiring is included project scope by Contractor.

B. Items noted NIC - Not in Contract - will be furnished and installed by Owner.

C. Owner will remove the following before construction starts.
   1. Books, small furnishings, and items not indicated for removal by Contractor.

D. Coordinate all work under this contract to ensure efficient construction operations.

1.4 CONTRACTOR USE OF SITE

A. Limit use of existing facilities to areas shown on Drawings and designated by Owner.

B. Plan construction operations to accommodate:
   1. Owner and public occupancy.
   2. Owner construction, infection control, and safety regulations.
   3. Emergency egress.
   4. Work by separate contracts.
   5. Work by Owner.
   6. First responder and public access to public right-of-way, site, and existing facilities.

C. Prohibit smokeless tobacco, smoking, and vaping within buildings and within 25 feet of building exterior.
   1. Prohibited activities are permitted within designated areas only.

D. Prohibit controlled substances on site.

E. Existing Building Restrictions:
   1. On-Site Work Hours: Owner directed.
   2. Utility Interruptions: Give Owner minimum 72 hour notice. Obtain Owner written permission.
   3. Disruptive Operations: Give Owner minimum 72 hour notice before starting noisy, vibration causing, odorous, and other occupant disruptive operations. Obtain Owner written permission before proceeding.

1.5 OWNER OCCUPANCY

A. Owner will occupy site, existing building, and areas adjacent to construction area to conduct normal operations throughout construction.
   1. Minimize conflict with Owner operations.
   2. Schedule Work to accommodate Owner occupancy.
   3. Occupancy Interruptions: Give Owner minimum 72 hour notice. Obtain Owner written permission.

B. Develop plan, in cooperation with Owner, for taking and returning control of Owner occupied spaces. Incorporate plan into construction schedule.
   1. Return renovated areas to Owner for Owner occupancy.

1.6 SPECIFICATION CONVENTIONS

A. Specifications are written in imperative mood and streamlined form.
   1. Imperative sentences are Contractor requirements.
   2. Colons mean “shall be” in streamlined form sentences and phrases.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 012000

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Cash allowances.
2. Alternates.
3. Substitution procedures.
4. Contract modification procedures.
5. Schedule of values.
6. Progress payment procedures.
7. Final payment procedures.

1.2 ACTION SUBMITTALS

A. Allowance Submittals:
1. Supplier proposals.
2. Selected product purchase agreements.
3. Missing and damaged product claims.

B. Schedule of Values.

C. Applications for Payment.
1. Updated construction schedule.
2. Waivers.
3. Substantiating data.
4. Progress executive summary.
5. Time and material documentation.

D. Change Order Proposals.

E. Change Order Proposal Request Response:
1. Contractor estimate.

1.3 INFORMATIONAL SUBMITTALS

A. Transportation damage claims.

B. Name of individual authorized to receive change orders.

1.4 CASH ALLOWANCES

A. Costs Included: Invoiced product cost less trade discount, delivery to site, and applicable taxes.

B. Costs Excluded: Product handling, storage, protection, and installation.

C. Architect Responsibilities:
1. Identify products for consideration.
2. Coordinate product availability, pricing, and source with Contractor.
3. Select product and supplier. Notify Contractor.
4. Prepare Change Order adjusting Contract Sum for actual purchase price.

D. Contractor Responsibilities:
1. Identify product suppliers.
2. Obtain proposals and recommend preferred supplier.
3. Execute purchase agreement with Architect designated supplier.
4. Obtain and submit Shop Drawings, Product Data, and Samples.
5. Arrange product delivery.
6. Inspect products when delivered.
7. Prepare claim for missing products and transportation damage.

1.5 ALTERNATES

A. Alternates will be accepted or rejected at Owner option. Agreement identifies accepted alternates.

B. Coordinate related and surrounding Work to accommodate accepted alternates.

C. Alternates Schedule: See Drawings.

1.6 SUBSTITUTION PROCEDURES

A. Substitution Request Time Limits During Bidding: See Instructions to Bidders.

B. Substitution Request Time Limits After Bidding:
1. Within 30 days after start date established in Notice to Proceed.
2. Substitutions may be considered when products become unavailable beyond Contractor control.

C. Submitting substitution request represents that Contractor:
1. Has investigated and determined proposed product meets or exceeds specified requirements and quality.
2. Will provide specified warranty for proposed product.
3. Will coordinate installation and adjust Work to accommodate proposed product at no additional cost to Owner.
4. Waives claims for additional costs and time extensions discovered after proposed product acceptance.

5. Will reimburse Owner and Architect for review and redesign services required for re-approval by authority having jurisdiction.

D. Substitution requests will not be considered:
   1. When stated or implied on submittals, without separate written request.
   2. When acceptance will require Contract Document revisions.
   3. When request source is not Contractor.

E. Conditions for Consideration:
   1. Substitutions for Cause: Considered when:
      a. Specified product is unavailable.
      b. Specified product is not acceptable to authorities having jurisdiction.
      c. Use of specified product would delay progress of the Work.
      d. Contractor can provide significant cost or time savings.
   2. Substitutions for Contractor Convenience: Will be considered when submitted within 30 days of Notice to Proceed.

F. Substitution Submittal Procedure:
   1. Complete separate substitution request using Architect accepted form for each proposed substitution.
   2. Indicate Contract Sum and Contract time net reduction, if proposed substitution is accepted.
   3. Substantiate substitution requests with data confirming that proposed substitution complies with Contract Documents.
      a. Compare specified product requirements in tabular form against proposed substitution.
      b. Submit Shop Drawings, Product Data, Samples, and certified test results attesting to the proposed product equivalence.
   4. Architect will notify Contractor and Owner of estimated time and costs to evaluate proposed substitution.
      a. Contractor will notify Architect to proceed with review or not.
      b. Contractor agrees to reimburse Architect for actual time and costs to complete review.
   5. Architect will notify Contractor of substitution request acceptance or rejection.
   6. Architect will consider one substitution request for each product. When request is rejected, provide specified product.

G. Prepare Change Order for accepted substitution requests. Architect will review prior to acceptance.

1.7 CONTRACT MODIFICATION PROCEDURES

A. Receive and distribute change documents informing others affected by changes to the Work.

B. Architect will issue supplemental instructions for minor changes in Work without adjustment to Contract Sum and Contract Time. Execute supplemental instructions when received.
   1. Architect Supplemental Instruction Form: AIA Form G710.

C. Change Proposal Requests: The Architect may issue Proposal Requests for Owner directed changes. Prepare and submit response within 10 days. Proposal requests may include:
   1. Detailed description of proposed change.
   2. Drawings and specifications.
   3. Change in Contract Time for executing change.
   4. Required overtime work.
   5. Time period proposed price is considered valid.

D. Change Order Proposals: Contractor may propose changes to Architect. Prepare proposal request including:
   1. Rationale for proposed change.
   2. Detailed description of proposed change and effect on Work.
   3. Substitution documentation.
   4. Effect on Contract Sum and Contract Time.
   5. Effect on Work by separate contracts.

E. Stipulated Sum Change Order Basis:
   1. Architect Proposal Request and Contractor fixed price estimate.
   2. Contractor request for Change Order as approved by Architect and Owner.

F. Unit Price Change Order Basis:
   1. Contracted Unit Prices: Execute Change Order on fixed unit price basis.
   2. Other Unit Prices: Execute Work under Construction Change Directive.
   3. Contract Sum or Contract Time Changes will be computed per Time and Material Change Orders.

G. Construction Change Directive: Architect may issue directive, signed by Owner, describing changes in work and designating method of determining Contract Sum and Contract Time changes. Execute change directive Work when received while Change Order is processed.
   1. Construction Change Directive Form: AIA Form G714.

H. Time and Material Change Order: Submit itemized account and supporting data for each change. Architect will determine allowable Contract Sum and Contract Time Changes.
   1. Provide information required for change evaluation.
   2. Maintain detailed labor and material work records.
   3. Substantiate costs for changes.

I. Change Order Execution: Architect will issue Change Orders for Owner and Contractor signatures.
   1. Change Order Form: AIA G701 or other Architect accepted form.

J. Contractor Coordination:
   1. Record each executed Change Order as separate line item on Schedule of Values and Application for Payment forms. Adjust total Contract Sum.
   2. Revise progress schedules to reflect changes in each executed Change Order.
   3. Record changes in Project Record Documents.

1.8 SCHEDULE OF VALUES

A. Submit completed schedule of values.
   1. Schedule of Values Form: AIA Form G703 or Architect accepted form.

B. Submit Schedule of Values within 20 days after Agreement.

C. Format: Use Project Manual Table of Contents. Identify line items by specification section number and title.

D. Include Allowances amounts as part of associated line item.
   1. Unit Cost Allowances: Extend Contract quantities and unit costs as line item total.

E. Include Contractor overhead and profit and separate line items for:
   1. Site mobilization.
   2. Site demobilization.
   3. Bonds and insurance.

F. Revise Schedule of Values showing each approved Change Order.

1.9 PROGRESS PAYMENT PROCEDURES

A. Submit completed applications for payment with updated construction schedule, substantiating data, and executive summary.
   1. Payment Application Form: AIA Forms G702 and G703 or Architect accepted form.

B. Content and Format: Schedule of Values.

C. Substantiating Data:
   1. Partial release of liens from major subcontractors and vendors.
   2. Affidavits attesting to offsite stored and insured products.

D. Substantiating Data:
   1. Partial release of liens from major subcontractors and vendors.
   2. Affidavits attesting to offsite stored products.
   3. Certified payroll reports for Contractor and subcontractors.

E. Executive Summary: Highlight progress since previous Application for Payment.
   1. Include summary bar chart construction schedule, construction photographs, and other pertinent information for distribution to Board of Trustees.
   2. Coordinate summary content with Owner.

1.10 FINAL PAYMENT PROCEDURES

A. Submit final application for payment with substantiating data.
   1. Payment Application Form: AIA Forms G702 and G703 and Architect accepted form.

B. Content and Format: Schedule of Values.

C. Substantiating Data:
   1. Final certified Contractor and Subcontractor payroll reports.
   2. Final utility meter readings, fuel levels and other data for utilities when Substantial Completion occurred.
   3. Final statement accounting for all changes to the Contract Sum.
   4. Certified completion of punch list.
   5. Proof of payment of taxes, fees, and other obligations.
   6. Insurance certificates.
   7. Contractor Affidavit of Payment: AIA Form G706.
   8. Contractor Affidavit of Release of Liens: AIA Form G706A.
   9. Consent of Surety to Final Payment: AIA Form G707.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 013100

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Coordination and Project Conditions.
2. Coordination documents.
3. Coordination modeling.
4. Preconstruction meeting.
5. Site mobilization meeting.
6. Progress meetings.
7. Coordination meetings.
8. Preinstallation meetings.
9. Requests for Interpretation or Information, RFIs.
10. Project management website.

1.2 INFORMATIONAL SUBMITTALS

A. Coordination documents.
1. Initial completed documents.
2. Revisions, when completed.

1.3 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.
1. Include provisions to accommodate items installed later.

B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.

C. Coordinate space requirements, supports, and installation of fire protection, plumbing, mechanical, and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completing and cleaning work of separate sections in preparation for Substantial Completion.
   1. Coordinate completion of portions of work designated for Owner partial occupancy.

F. After Owner occupancy of premises, coordinate access to site for correction of defective work to minimize disruption of Owner activities.

1.4 COORDINATION DOCUMENTS

A. Prepare coordination drawings to organize installation of mechanical, plumbing, and electrical equipment and systems for using space efficiently, sequencing installation, and identifying potential conflicts and interferences.

B. Show systems for each area on one drawing. Indicate systems showing actual sizes, locations, and elevations.

C. Show clearances between systems and where systems cross structural framing.

D. Identify electrical power characteristics and control wiring required for equipment.

E. Revise drawings to eliminate conflicts preventing completion of Work.

F. Require each installer with work shown on coordination drawings to sign drawings indicating acceptance of coordinated work locations.

G. Maintain documents for the duration of the Work. Record changes during progress of Work.

H. Reproduce and distribute coordination documents to affected Parties.

1.5 PRECONSTRUCTION MEETING

A. Architect and Owner will schedule meeting after notice of award.

B. Required Attendees: Owner, Architect, and Contractor.

C. Agenda:
   1. Execution of Agreement.
   2. Submission of executed bonds and insurance certificates.
   3. Distribution of Contract Documents.
   4. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
   5. Designation of personnel representing parties in Contract, Architect, and consultants.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal requests, requests for information, Change Orders, and Contract closeout procedures.
   7. Scheduling.
   8. Scheduling activities of code required special inspections.

D. Record minutes and distribute within two days after meeting to meeting participants and others affected by decisions made in meeting.
   1. Format: PDF file.
   2. Distribution: Email or Project management website.

1.6 SITE MOBILIZATION MEETING

A. Contractor will schedule meeting at Project site before Contractor occupancy.

B. Required Attendees: Owner, Architect, consultants, Contractor, and Contractor superintendent.

C. Agenda:
   1. Use of premises by Owner and Contractor.
   2. Owner requirements and partial occupancy.
   3. Construction facilities and controls provided by Owner.
   4. Temporary utilities provided by Owner.
   5. Survey and Project layout.
   6. Security and housekeeping procedures.
   7. Schedules.
   8. Application for payment procedures.
   9. Testing procedures.
   10. Record documents maintenance procedures.
   11. Equipment startup requirements.
   12. Inspection and acceptance of equipment put into service during construction period.

D. Record minutes and distribute within two days after meeting to meeting participants and Others affected by decisions made in meeting.
   1. Format: PDF file.
   2. Distribution: Email or Project management website.

1.7 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at minimum weekly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, and record minutes.

C. Required Attendees: Job superintendent, suppliers, Owner, and Architect as appropriate to agenda topics for each meeting.

D. Agenda:
   1. Previous meeting minutes review.
   2. Work progress review.
   3. Field observations, problems, and decisions.
   4. Problems impeding planned progress identification.
   5. Submittal schedule and status review.
   6. Off-site fabrication and delivery schedules review.
   7. Progress schedule maintenance.

8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding time interval.
10. Projected progress coordination.
11. Quality and work standards maintenance.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

E. Record minutes and distribute within two days after meeting to meeting participants and others affected by decisions made in meeting.
   1. Format: PDF file.
   2. Distribution: Email or Project management website.

1.8 COORDINATION MEETINGS

A. Prepare separate coordination meetings for clash detection reconciliation. Schedule and administer meetings at minimum weekly intervals.

B. Begin coordination efforts before installation of the Work. Installation of the Work may occur simultaneously with the coordination meetings, provided known conflicts are resolved.

C. Required Attendees: Installer company representatives having authority to make decisions.
   1. Contractor Team: Project Manager and Site superintendent and applicable Subcontractors and material suppliers.
   2. Owner Team: Owner representative.
   3. Design Team: Architect and applicable consultants.

D. Record minutes and distribute within two days after meeting to meeting participants and others affected by decisions made in meeting.
   1. Content: Itemized lists of conflicts and their resolutions. Where no resolution was established, list required missing information.
   2. Format: PDF file.
   3. Distribution: Email or Project management website.

1.9 PREINSTALLATION MEETINGS

A. When required in individual Specification sections, convene preinstallation meetings before starting Work of specific section.
   1. Meeting Location: Project site, as directed by Owner, or as specified in individual Specification sections.

B. Require attendance of parties directly affecting or affected by work of the specification section.

C. Notify Architect four days in advance of meeting date.

D. Prepare agenda and preside at meeting.

E. Agenda Items:
   1. Delivery, storage, preparation, and installation procedures.

2. Installation sequencing.
3. Approved submittals review.
4. Manufacturers written recommendations and instructions review.
5. Related work coordination.
6. Compatibility of materials with previously installed work.
7. Field samples or mockups requirements.
8. Surrounding work protection.
9. Installation tolerances and their impact on preceding and subsequent work.
10. Testing and inspections.
11. Protection after installation.
12. Warranty requirements.
13. Other items required in individual specification sections.

F. Record minutes and distribute within two days after meeting to meeting participants and others affected by decisions made in meeting.
   1. Format: PDF file.
   2. Distribution: Email or Project management website.

1.10 REQUESTS FOR INTERPRETATION OR INFORMATION - RFI

A. RFIs will be accepted and processed by Architect regarding Architect Contract Documents, only.
   1. Make requests regarding preliminary drawings or specifications by normal correspondences, not by RFI. Architect responses to such requests do not constitute Contract requirements for Work.
   2. Architect will only respond to Contractor submitted RFIs.

B. Acceptable RFI Purposes:
   1. Errors, inconsistencies, or omissions are discovered in Contract Documents.
   2. Contract Documents or existing conditions do not comply with applicable codes or regulations.
   3. Existing conditions are not as described in Contract Documents or other available Project documents.
   4. RFIs for other purposes are not permitted.

C. Owner Documents: Make requests for information or interpretation of Owner prepared Contract Documents by normal correspondence, not by RFI. Owner is responsible for responding to such requests. Provide contemporaneous copies of such requests to Architect.

D. RFI submission constitutes representation that Contractor made good faith, careful study and comparison of Contract Documents, field conditions, other Project information, Contractor prepared coordination drawings, and prior project correspondence or documentation before submitting RFI.

E. Submit RFIs electronically and on Project management website using AIA Document G716 or Architect accepted form.
   1. Attach sketches, diagrams, product data sheets, and other supplementary information relevant to the RFI.
   2. Include Contractor suggested solution. If Contractor solution impacts the Contract Time or the Contract Sum, describe impact in the RFI.

F. Architect Action: Allow 10 working days for response. RFIs received by Architect after 2:00 PM will be considered as received on following day.
   1. Architect may request additional information or clarification, in which case Architect time for response will date from time of receipt of requested additional information or clarification from Contractor.

G. When Contractor believes Architect response requires change in Contract Time or Contract Sum, or when Contractor disagrees with Architect response, notify Architect in writing within three days of receipt of response.

H. RFI Log: Maintain tabular log of RFIs and submit copies at Progress Meetings. Include:
   1. Project name.
   2. Contractor name.
   3. RFI number.
   4. RFI subject.
   5. Submission date and time.
   6. Response date.

1.11 PROJECT MANAGEMENT WEBSITE

A. Provide and administer project management website for communication and documentation.
   1. Manufacturers and Products:
      a. Autodesk Construction Cloud.
      b. Autodesk PlanGrid.
      c. InEight Software Document.
      d. NewForma ConstructEX.
      e. Oracle Primavera.
      f. PMWeb.
      g. Procore Technologies Procore.
      h. Trimble ProjectSight.
   2. Types of Communication and Documentation on Project Management Website:
      a. Submittals and submittal logs.
      b. Schedules.
      c. Meeting minutes.
      d. RFI forms and logs.
      e. Project correspondence.
      f. Project directories.
      g. Photographic documentation.
      h. Payment applications.
      i. Project closeout documents.
      j. Contract modification forms and logs.

B. Contractor Furnished Project Management Website:
   1. Provide software user licenses in sufficient quantity for Project team, including Architect, Architect consultants, Owner, Construction Manager, Commissioning Authority, and Subcontractors.
   2. Provide software training for users.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 013200

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Critical path method schedule.
   2. Construction photographs.

1.2 INFORMATIONAL SUBMITTALS

A. Construction progress schedule.

B. Construction photographs.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. CPM Scheduler: Contractor personnel and Consultant specializing in CPM scheduling, and experienced in CPM scheduling comparable projects.
   2. Contractor Administrative Personnel: Five years minimum experience using and monitoring CPM schedules on comparable projects.

1.4 CRITICAL PATH METHOD PROGRESS SCHEDULE

A. Prepare network analysis diagrams and supporting mathematical analyses using Critical Path Method.

B. Format:
   1. Listings: Reading from left to right, in ascending order for each activity. Identify each activity with applicable specification section number.
   2. Print Sheet Size: Maximum 36 x 48 inches.
   3. Scale and Spacing: To allow for notations and revisions.

C. Illustrate sequence and interdependence of activities and sequence of work.

D. Illustrate complete sequence of construction by activity, identifying work of separate phases. Include legend for symbols and abbreviations used. Show the following information:
   1. Submittal dates.
   2. Submittal return dates.
   3. Long lead item procurement, delivery, and installation.
   4. Critical item procurement, delivery, and installation.

5. Owner furnished item procurement, delivery, and installation.
6. Testing dates.

E. Mathematical Analysis: Tabulate each activity on detailed network diagrams, using calendar dates, and identify for each activity:
1. Preceding and following event numbers.
2. Activity description.
3. Estimated duration of activity, in maximum 15 day intervals.
4. Earliest start date.
5. Earliest finish date.
6. Actual start date.
7. Actual finish date.
8. Latest start date.
9. Latest finish date.
10. Total and free float; accrue float time to Owner and to Owner benefit.
11. Monetary value of activity, keyed to schedule of values.
12. Percentage of activity completed.
13. Responsibility.

F. Analysis Program: Capable of compiling monetary value of completed and partially completed activities, of accepting revised completion dates, and recomputation of scheduled dates and float.

G. Required Reporting: List activities in sorts or groups.
1. Preceding Work item or event number from lowest to highest.
2. Longest float, then in order of early start.
3. Responsibility in earliest possible start date order.
4. Latest allowable start dates.
5. Latest allowable finish dates.
6. Contractor periodic payment request sorted by schedule of values listings.
7. Listing basic input data generating report.
8. Listing activities on critical path.

H. Submittals: Submit to Owner and Architect.
1. Within 10 days after date established in Notice to Proceed, submit proposed preliminary network diagram defining planned operations for first 60 days of Work, with general outline for remainder of Work.
2. Participate in reviewing preliminary and complete network diagrams jointly with Owner and Architect.
3. Within 20 days after joint review of proposed preliminary network diagram, submit draft of proposed complete network diagram. Include written certification that major and mechanical and electrical Subcontractor have reviewed and accepted proposed schedule.
4. Within 10 days after joint review, submit complete network analysis consisting of network diagrams and mathematical analysis.
5. Submit updated network schedules as follows:
    a. With each Application for Payment.

I. Review and Evaluation:
1. Participate in joint review and evaluation of network diagrams and analysis with Owner and Architect at each submittal.
2. Evaluate Project status to determine work behind schedule and work ahead of schedule.

3. After review, revise network diagrams and analysis incorporating results of review, and resubmit within 10 days.

J. Updating Schedule:
1. Maintain schedules; record completed activities actual start and finish dates.
2. Include activity progress to date of revision, with projected activity completion date. Update diagrams to graphically depict current Work status.
3. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
4. Include changes required to maintain Date of Substantial and Final Completion.
5. Submit sorts required to support recommended changes.
6. Prepare narrative report defining problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect.

K. Distribution:
1. Following joint review, distribute copies of updated schedules to Contractor Project site file, to Subcontractors, suppliers, Architect, Owner, and other concerned parties.
2. Following joint review, upload updated schedules to Project website.
3. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

1.5 CONSTRUCTION PHOTOGRAPHS

A. Employ professional photographer or Assign a member of Contractor staff to take construction record photographs during construction.

B. Digital Camera: Sensor resolution of 10 megapixels minimum.

C. Format: 3200 by 2400 pixels minimum, in unaltered original JPEG or TIFF files, uncropped, date and time stamp watermark or in image file metadata, saved in folder named by date of photographs.
1. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimal distortion.

D. Required Photographs:
1. Existing conditions that might be misconstrued as damage from construction activities.
2. Take photographs monthly to record general progress at time of application for payment.
3. Mockups, Field Samples: Photograph each step of installation to record concealed conditions.
4. Accidents and damage to construction in process.
5. Substantial Completion: Photograph primary public areas and representative spaces.

E. Transmit electronic photograph files to Owner and Architect contemporaneously with monthly applications for payment.
1. Include list of photographs indication location and direction of view.

F. After transmittal, Owner and Architect may make prints or use the photograph files without limitation.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 013300

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Submittals schedule.
   2. Submittal procedures.
   3. Submittal processing.
   4. Proposed products list.
   5. Action submittals.
   6. Informational submittals.

1.2 SUBMITTALS SCHEDULE

A. Submit list of submittals with expected submittal dates. Coordinate with dates for start of related construction shown in the construction progress schedule.

B. Transmit submittals schedule electronically to Architect not later than date of first application for payment.
   1. No submittals will be reviewed until the initial submittals schedule is received.
   2. Revise submittals schedule as directed by Architect.
   3. Revise submittals schedule to be current with construction progress schedule revisions.

C. Submittals Schedule: Provide following information in tabular format with separate line items for each required type of submittal.
   1. Specification section number and title.
   2. Name of Subcontractor.
   3. Description of Work covered by submittals.
   4. Submittal type: action or informational.
   5. Scheduled date for first submittal.
   6. Scheduled date for Architect final release or approval.

1.3 SUBMITTAL PROCEDURES

A. Transmit submittals with AIA Form G810 or Architect accepted form.

B. Assemble submittals to show:
   1. Project, Contractor, Subcontractor, and Supplier identification.
   2. Pertinent drawing and detail number, and specification section number.
   3. Space for Contractor and Architect review stamps on first page.
   4. Variations from Contract Documents highlighted.

5. Product and system limitations potentially detrimental to Work highlighted.
6. Changes since previous submission.

C. Apply stamp and sign or initial certifying that review, approval, verification of required products, field dimensions, adjacent Work, and information coordination is per Work and Contract Documents.

D. Schedule submittals to expedite Project. Coordinate submission of related items for simultaneous submittal.
1. Submit action submittals and informational submittals for each Specification Section under separate transmittal.
2. Submit sustainable design submittals separately from other submittals.

E. Submit one native, editable PDF electronic file for each required submittal to Architect and Owner.
1. Page Size: 8-1/2 x 11 inches minimum; 30 x 42 inches maximum.
2. Submit PDF sample identification with image of each physical sample.
3. Bookmark PDF drawing files showing sheet numbers and titles.
4. Bookmark PDF product files showing product names and data types.
5. Annotated PDF electronic file will be returned to Contractor.

F. Distribute reviewed submittals to affected Parties.
1. Instruct parties to promptly report inability to comply with requirements.

1.4 SUBMITTAL PROCESSING

A. Allow 15 days for each initial submittal review.
1. Allow sufficient submittal, resubmittal and review time to avoid delaying Work.
2. When intermediate submittal is necessary, process as for initial submittal.

B. Architect will promptly notify Contractor when:
1. Submittal processing must be delayed for coordination with other submittals.
2. Additional information is required to process submittal.

C. Contract Time extension is not permitted from failing to make submittals sufficiently in advance of Work to permit processing.

1.5 PROPOSED PRODUCTS LIST

A. Submit initial proposed products list within 20 days after Notice to Proceed.
1. After review by Owner and Architect, resubmit list within 10 days.

B. Submit revised list with each Application for Payment until all required products are identified.

C. Include major products from each Specification section, with name of manufacturer, trade name, and model number.
1. Identify proposed products that are specified proprietary products.

D. When proposed products are one of the specified proprietary products identified by manufacturer, and model number, additional submittals for that product are not required except as follows:
   1. Shop Drawings are required for products specially fabricated to size or configuration to comply with project conditions.
   2. Samples are required for products where color, texture, finish, pattern and other selections are required.

E. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.6 ACTION SUBMITTALS

A. Submit action submittals for Architect review for conformance with Contract Documents.
   1. Provide additional information or clarification upon Architect request.
   2. Action submittals will be returned with Architect stamp indicating submittal status.
   3. Maintain one set of Architect reviewed submittals at Project site for reference.

B. Product Data:
   1. Clearly mark data files indicating applicable products, models, options, and other data.
   2. Supplement manufacturer standard data with Project specific information.
   3. When requested or specified, submit color charts or sample kits for initial color selections.
      a. Include full range of manufacturer standard colors, textures, and patterns.
      b. Include custom colors and other product characteristics where specified.
   4. Show product utility and electrical characteristics.
      a. Show utility connection types, sizes and locations.
      b. Show maintenance and service access locations and required clearances.
   5. Do not include Safety Data Sheets - SDS - in submittals.
      a. When requested by Owner, submit SDS directly to Owner.

C. Shop Drawings:
   1. Show product specific Project construction, including sizes, configurations, and details.
   2. Show product connections and anchorages to adjacent systems and building structure.
      a. Show location and magnitude of loads transferred to building structural systems.
   3. Show terminations and interface with adjacent systems and materials.
   4. Show product utility and electrical characteristics.
      a. Show utility connection types, sizes and locations.
      b. Show maintenance and service access locations and required clearances.
   5. Identify required tolerances for successful installation.
   6. Identify required and actual field measurements necessary for fabrication.

D. Samples:
   1. Submit three Samples, unless a greater number is specified in individual Specification sections.
      a. Attach printed PDF submittal transmittal and sample image to each sample.
   2. Show Project specific aesthetic, color, and finish selections.
   3. Show functional and aesthetic characteristics of the product, with integral parts and attachment devices.
   4. Submit Samples for interfacing Work at same time where aesthetic selection coordination

is required.
5. One sample will be retained by Architect. Remaining Samples will be returned.
6. Maintain one approved sample at Project site for Architect reference.

1.7 INFORMATIONAL SUBMITTALS

A. Submit informational submittals for Architect knowledge and for limited purpose of assessing conformance with Contract Documents.
   1. Provide additional information or clarification upon Architect request.
   2. Maintain one set of submittals at Project site for Architect reference.

B. Certificates: Prepared by manufacturer or independent third party attesting to product compliance with Contract Documents.
   1. Submit supporting reference data, affidavits, and certifications.
   2. Certificates may be recent or previous test results acceptable to Architect.

C. Delegated Design Submittals:
   1. Shop Drawings and calculations, signed and sealed by licensed professional responsible for designing Work shown on approved Shop Drawings.
      a. Submit in quantity and form suitable for submission to and approval by authority having jurisdiction.
      b. Revise submittal and provide additional information when required by authority having jurisdiction.
   2. Submit certificate of professional liability insurance from licensed professional responsible for design.

D. Test and Evaluation Reports: Manufacturer and Independent testing agency reports attesting to product compliance with Contract Documents.

E. Field Quality Control Submittals: Field test and inspection reports attesting to product compliance with Contract Documents.

F. Manufacturer Reports: Field test, instruction, and inspection reports recording outcome of site observation.
   1. Submit report within five days of site observation.

G. Special Procedure Submittals: Describe perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

H. Qualification Statements: Manufacturer, fabricator, and installer statements, quality manuals, and credentials showing compliance per Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 014000

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Quality Assurance.
2. Quality control and control of installation.
3. Delegated design services.
4. Tolerances.
5. References.
6. Labeling.
7. Mockups.
8. Field samples.
9. Testing and inspecting services.
10. Manufacturer field services.
11. Test reports and certifications.

1.2 REFERENCES

A. Definitions:
1. Experienced: An entity or individual who successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project, with a five year record of successful performance, and familiar with special requirements of product, assembly, project, and authorities having jurisdiction.

1.3 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturers: Experienced firms with sufficient production capacity to produce units required.
2. Fabricators and Finish Applicators: Experienced firms with sufficient production capacity to produce units required.
3. Installers: Experienced firms or individuals with sufficient manpower to produce Work required.
4. Testing Agencies: Experienced firms with sufficient capacity and necessary equipment to perform tests required, following one of the following programs.
   a. A nationally recognized testing laboratory per 29 CFR 1910.7.
   b. Accredited agency per NIST National Voluntary Laboratory Accreditation Program.
5. Licensed Professionals: Experienced individuals, licensed or otherwise legally qualified to practice in the jurisdiction where the Project is located.

1.4 QUALITY CONTROL AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Follow specified reference standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements include higher standards or more precise workmanship.

C. Measure in place and existing construction as needed for fabrication and execution. No changes to Contract Sum or Contract Time will be allowed for differences between Drawing dimensions and field measurements where no measurements were performed.

1.5 DELEGATED DESIGN SERVICES

A. Where delegated design is specified, follow specified performance and design criteria.
   1. If criteria are not sufficient, submit RFI for needed criteria.

1.6 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Follow manufacturer tolerances. When manufacturer tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.7 REFERENCE STANDARDS

A. Abbreviations and Acronyms: Names of trade associations, standards generating organizations, governing authorities, and other entities are frequently referred to in Contract Documents by acronyms and abbreviations. Request explanation of unknown terms from Architect.

B. For products or workmanship specified by association, trade, or other consensus standards, follow requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

C. Follow reference standards by date of issue current on date of Contract Documents, except where specific edition date is required by code.

D. Where specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

E. Provisions within cited reference standards changing Owner, Architect, and Contractor duties and responsibilities from contractual requirements are void.

1.8 LABELING

A. Attach labels from agencies approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.

B. Label Information: Include approved agency identification on each label. Install products with labels visible. Include:
   1. Manufacturer name.
   2. Model number.
   3. Serial number.
   4. Performance characteristics.

1.9 MOCKUPS

A. Definition:
   1. Mockups are constructed to demonstrate materials and workmanship for review by Architect and Owner.

B. Construct mockups at Project site in locations acceptable to Architect unless laboratory mockups are specified.

C. Construct mockups in compliance with applicable Specification sections.
   1. Design and construct foundations, supports, framing, and bracing for freestanding mockups.

D. Photograph construction to record concealed conditions per requirements of Section 013200. Make photographs available to Architect and Owner when requested.

E. Mockups are subject to testing specified for constituent products.

F. Approved mockups establish work results standard.

G. Protect mockups against damage until removal is authorized.

H. Mockups may remain as part of the Work only when so designated in individual Specification sections.

1.10 FIELD SAMPLES

A. Definition:
   1. Field samples are assemblies constructed to demonstrate materials and workmanship for review by Architect and Owner.
      a. Construct field samples in final locations in sizes described in technical Specifications sections.

B. Construct field samples in compliance with applicable Specification sections.

C. Approved field samples establish Work results standard.

D. Protect field samples against damage until Substantial Completion.

E. Approved, undamaged field samples may remain as part of the Work unless designated in individual Specification sections.

1.11 TESTING AND INSPECTION SERVICES

A. Except where specified as Owner responsibility, employ and pay for specified services of an independent firm to perform testing and inspections.
   1. Owner testing and inspecting agencies will be identified to Contractor.
   2. Copies of reports prepared by Owner testing and inspecting agencies will be sent to Contractor.

B. Include dates for agency testing and inspecting in Progress Schedule and provide minimum 15 days prior notice to agencies.
   1. Provide access to the Work as requested by testing and inspecting agencies.
   2. Provide samples of materials, design mixes, equipment, tools, storage for Samples, and assistance by incidental labor requested by agency.

C. Testing and employment of testing and inspecting agencies shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

D. Retest and reinspect defective work when required by Architect.
   1. Failed Test Retest Cost: Contractor responsibility.

E. Limits on testing and inspecting agencies:
   1. Agency does not have authority to release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency does not have authority to approve or accept any portion of Work.
   3. Agency may not assume duties of Contractor.
   4. Agency does not have authority to stop Work.

1.12 MANUFACTURER FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe and provide instructions when necessary for acceptable:
   1. Installation conditions.
   2. Workmanship quality.
   3. Equipment startup.
   4. Equipment test, adjust, and balance.

B. Submit qualifications of observer to Architect 30 days, minimum, in advance of required observations.

C. Report observations and site decisions or instructions that are supplemental or contrary to Contract Documents or manufacturers written instructions.

D. Submit written inspection reports per Section 013300.

1.13 TEST REPORTS AND CERTIFICATIONS

A. When specified in individual Specification sections, require material or Product suppliers or manufacturers to provide test reports and manufacturer certifications.

B. Show that material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Submittals may be recent or previous test results on material or Product, as acceptable to Architect.

D. Submit reports and certifications per Section 013300.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 015000

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Temporary utilities.
2. Access aids.
3. Elevator use.
4. Vehicle access and parking.
5. Temporary barriers, enclosures, and partitions.
6. Field offices and sheds.
7. Security.
8. Project identification.
9. Temporary controls.
10. Fire prevention controls.
11. Progress cleaning and waste removal.

1.2 TEMPORARY SANITARY FACILITIES

A. From start of operations on site, provide and maintain self contained toilet units and hand washing facilities of number, type, and capacity acceptable to authorities having jurisdiction.
1. Existing facilities will not be available for construction staff.

B. Provide safety shower and eyewash facilities.

C. Provide drinking water for construction staff.

1.3 TEMPORARY WATER AND SEWER SERVICE

A. Provide temporary water service of capacity and characteristics required for construction.
1. Useage Costs: Contractor.

B. Contractor is responsible for sewage costs during construction period.

1.4 TEMPORARY ELECTRICITY

A. Provide temporary electric feeder from existing building for construction use.
1. Usage Costs: Contractor; provide temporary meter.

B. Where electricity for construction operations is needed with characteristics different from that available from existing service, provide and pay for separate temporary source for such power.

C. Provide power outlets, with branch wiring and distribution boxes. Provide flexible power cords as required for portable construction tools and equipment.

D. Allow incidental use of temporary electricity without charge by Architect and its consultants, Owner, and testing and inspecting agencies.

E. Provide main service disconnect and over current protection at convenient location or feeder switch at source distribution equipment.

F. Permanent convenience receptacles may be utilized during construction.

1.5 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain minimum lighting levels per OSHA standard 1926.56(a) or local requirement, whichever is more stringent.

B. Provide additional temporary lighting as needed for construction activities, observations, and inspections.

C. Maintain lighting and provide routine repairs.

D. Permanent building lighting may be utilized during construction.
   1. Fixtures with Replaceable Lamps: Provide new lamps before inspection for Substantial Completion.

E. When requested by Architect, provide temporary lighting matching specified permanent lighting for observing finish colors.

1.6 TEMPORARY HEATING

A. Existing facilities may be utilized.

B. Provide maintenance and replacement of filters and worn or consumed components during construction period.

C. Before operating permanent equipment for construction period heating, verify that installation is approved for operation, equipment has been lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

D. Maintain minimum 50 deg F ambient temperature within the building where construction is in progress, unless higher temperature is specified in technical Specification sections.

1.7 TEMPORARY COOLING

A. Existing facilities may be utilized.

B. Before operating permanent equipment for construction period cooling, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for

operation, maintenance, and regular replacement of filters and worn or consumed parts.

C. Maintain maximum 80 deg F ambient temperature within the building where construction is in progress, unless lower temperature is specified in technical Specification sections.

D. Provide maintenance and replacement of filters and worn or consumed components during construction period.

1.8 TEMPORARY VENTILATION

A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Existing facilities may be utilized.

C. Provide maintenance and replacement of filters and worn or consumed components during construction period.

D. Supplement permanent equipment with temporary fans as needed to maintain clean air for construction operations.

1.9 TEMPORARY TELEPHONE AND DATA SERVICE

A. Existing WiFi in building is available for Contractor use.

1.10 ACCESS AIDS

A. Provide temporary ramps, stairs, ladders, hoists, scaffolding, platforms, walkways, and other access facilities as needed for execution, observation, and inspection of the Work.

B. Existing stairs will be designated for use by construction personnel. Contractor is responsible for cleaning and repair of damage resulting from construction use.

1.11 ELEVATOR USE

A. Existing Elevators: Designated elevator may be used for personnel and transporting materials. Provide panel protection on floors and install properly sized protective pads in the car.
   1. Elevator will still be in use by Owner and public; maintain in clean condition during library open hours.

1.12 VEHICLE ACCESS

A. Extend and relocate vehicular access as Work progress requires, provide detours as necessary for unimpeded traffic flow.

B. Location: Approved by Owner.

C. Provide unimpeded access for emergency vehicles.

D. Maintain 20 feet wide driveways with turning space between and around combustible materials.

E. Provide and maintain access to fire hydrants and control valves free of obstructions.

F. Existing onsite streets and driveways may be used for construction traffic. Prohibit tracked vehicles on pavements.
   1. Owner will designate roads available for construction use.

1.13 VEHICLE PARKING

A. Designated existing parking facilities may be used by construction personnel and for construction vehicles.
   1. Parking is subject to Owner restrictions and limitations of liability.
   2. Identify vehicles per Owner requirements.
   3. Prohibit heavy vehicles and construction equipment in parking areas.
   4. Maintain construction parking areas. free of construction soiling and debris, and for repairing damage resulting from use.

B. When site space is not adequate, provide additional offsite parking.

C. Maintenance:
   1. Maintain existing paved areas used for construction operations. Promptly repair damage. Remove standing water.

D. Removal, Repair:
   1. Repair existing facilities damaged by use, to original condition.

1.14 TEMPORARY BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
   1. Arrange for Owner continuous use of site.

B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights of way and for public access to existing building.

C. Protect non owned vehicular traffic, stored materials, site, and structures from damage.

D. Provide protection for plants designated to remain. Replace damaged plants.

E. Tree and Plant Protection:
   1. Protect existing trees and plants that are designated to remain.
   2. Employ qualified tree surgeon to remove roots and branches that interfere with construction.
   3. Provide temporary barriers around individual or groups of trees and plants.
      a. Barrier Height: 6 feet.

4. Do not permit vehicular traffic, parking, storage of materials, dumping of harmful chemicals or liquids, or standing or continuously running water within root zones.
5. Supervise earthwork operations to prevent damage to root zones.
6. Replace trees and plants that are damaged or destroyed by construction operations.

F. Fencing:
1. Provide temporary fencing for construction operations.
2. Construction: Commercial grade chain link or Solid wood, painted.
3. Height: 6 feet.
4. Location: As required to protect construction operations, materials, and equipment.
5. Gates: pedestrian, locking.

1.15 TEMPORARY ENCLOSURES

A. Provide temporary weathertight closures for exterior openings to provide acceptable interior working conditions, to allow for temporary heating and maintenance of ambient temperatures required in individual specification sections, to protect the Work, and to prevent entry of unauthorized persons.
1. Provide access doors with locking hardware.

1.16 TEMPORARY PARTITIONS

A. Provide temporary partitions to separate work areas from occupied areas of building, prevent penetration of dust and moisture into occupied areas, and protect Owner employees, equipment, and operations from construction activities.
1. Construction: Wood or metal framing with plywood or gypsum board covering on Owner occupied side.
2. Close joints between sheet materials and seal edges and intersections to prevent penetration of dust and moisture.
3. Where required by authorities having jurisdiction or Owner, use fire retardant materials or paint with fire retardant paint to provide fire hazard ratings required by applicable codes and regulations.
4. Paint surfaces exposed to view in Owner occupied areas.
5. Provide access doors with locking hardware.

1.17 FIELD OFFICES AND SHEDS

A. Provide temporary field offices and storage sheds needed for construction activities.

B. Designated existing spaces may be used for field offices and for storage.
1. Contractor is responsible for maintaining existing facilities used for construction support activities, including repair and cleaning.

C. Temporary Structures:
1. Portable or mobile buildings, weathertight, with floors raised above ground.
2. Insulated construction appropriate for use.
3. Provide connections for utility services when required.
4. Provide entrance steps and landings.

5. Storage Environmental Conditions: As required for stored materials to meet manufacturer limitations.

D. Field Office: Install within 15 Days after Notice to Proceed.
1. Electrical power, lighting, heating, and air conditioning.
2. Exterior lighting for entrance steps and landings.
3. Weekly janitorial service and trash removal.
4. Maintain accessway free of mud, water, and snow.

E. Remove temporary offices and sheds when authorized or directed by Architect or Owner.

1.18 SECURITY

A. Security Program:
1. Protect Work and existing premises from theft, vandalism, and unauthorized entry.
2. Initiate program at Project mobilization.
a. Coordinate with Owner to follow existing security programs.
3. Maintain program throughout construction period until Owner acceptance precludes need for Contractor security.

B. Entry Control:
1. Restrict entry of persons and vehicles into Project site.
2. Allow entrance only to authorized persons with proper identification.
3. Maintain log of workers and visitors, make available to Owner on request.
4. Coordinate access of Owner personnel to site in coordination with Owner security forces.

C. Personnel Identification:
1. Provide identification badge to each person authorized to enter premises.
2. Employee badges shall include photograph, name, employer, and expiration date.
3. Maintain list of accredited persons, submit copy to Owner on request.
4. Require return of badges at expiration of employment on the Work.

1.19 PROJECT IDENTIFICATION

A. Project Identification Sign:
1. Provide one painted or printed sign of construction, design, and content shown on Drawings in designated locations.
2. Content:
a. Project title, logo, and Owner name.
b. Names and titles of authorities.
c. Names and functions of Architect and its consultants.
d. Name and title of Contractor and major Subcontractors.
e. Color rendering of Project.
3. Graphic Design,Colors, Style of Lettering: Designated by Architect.

B. Project Informational Signs:
1. Informational signs of same colors and lettering as Project Identification sign, or standard products; size lettering for legibility at 40 feet distance.
2. Provide directional signs to direct trafficwithin site. Relocate as Work progress requires.

3. No other signs are allowed without Owner permission except those required by Law.

C. Sign Materials:
1. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inches thick, sizes to minimize joints.
2. Rough Hardware: Galvanized or stainless steel.
3. Banner: High quality printed image on vinyl.
4. Paint and Primers: Exterior quality, primer and two semigloss finish coats.

D. Installation:
1. Install Project identification sign within 15 days after date of Notice to Proceed.
2. Location: Owner directed.
3. Install sign surface plumb and level, with full contact butt joints. Anchor securely to support framing.

E. Removal: Remove signs and supports at completion of Project and restore area.

1.20 FIRE PREVENTION CONTROLS

A. Prohibit smoking within buildings under construction and demolition. Designate area on site where smoking is permitted and provide approved ash receptacles.

B. Establish fire watch for cutting and welding and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.

C. Standpipes: Maintain existing standpipes in usable condition to height within one floor of floor being demolished.

D. Portable Fire Extinguishers: NFPA 10; 10 pound capacity, 4A-60B:C UL rating.
1. Provide one fire extinguisher at each stair on each floor of buildings under construction and demolition.
2. Provide minimum one fire extinguisher in every construction trailer and storage shed.

E. Make permanent fire protection system operational as soon as is practicable, and maintain system in use during remaining construction period.

1.21 TEMPORARY CONTROLS

A. Roof Drainage:
1. Maintain roof drainage, either by installing permanent or temporary roof drainage system.

B. Water Control:
1. Grade site to drain. Prevent puddling or running water.
2. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
3. Provide water barriers to protect site from soil erosion.

C. Dust Control:
   1. Execute Work by methods to minimize dust from construction operations.
   2. Provide positive means to prevent airborne dust from dispersing into atmosphere.
   3. Clean interior spaces before start of finish painting and continue cleaning as needed until all painting is complete.
   4. Schedule operations so that dust and other contaminants resulting from cleaning processes will not fall onto wet or newly coated surfaces.

D. Mold and Mildew Control:
   1. Provide continuous measures to prevent formation of mold and mildew in construction.
   2. Do not install materials sensitive to mold and mildew growth until protection can be provided.
   3. Promptly remove and replace materials exhibiting mold and mildew growth.

E. Noise Control:
   1. Advise Owner at least 7 days in advance before starting activities that are very loud.
   2. Owner reserves right to have such activities performed outside its normal business hours.

F. Pest Control: Provide methods, means, and facilities to prevent pests, rodents, and insects from damaging the Work or infesting facility.
   1. Use waste receptacles with close fitting lids for food and other organic wastes.

G. Pollution Control:
   1. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.
   2. Follow pollution and environmental control requirements of authorities having jurisdiction.

1.22 WASTE REMOVAL

A. Collect and remove waste materials, debris, and rubbish from site weekly and dispose offsite.

B. Transport dusty and friable wastes through building in fully enclosed containers.

C. Open free fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.23 REMOVAL OF TEMPORARY FACILITIES AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials, before Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary Work.

C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 016000

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes.
   1. General product requirements.
   2. Product delivery.
   3. Product storage and handling requirements.
   4. Product selection.
   5. Owner supplied products.
   6. Equipment electrical characteristics and components.

1.2 GENERAL PRODUCT REQUIREMENTS

A. Supply products of new merchantable quality.

B. Supply products of each type from single manufacturer unless specified otherwise and regardless of how many subcontractors supply or install the product.
   1. Where appearance attributes may vary between manufacturing lots, supply items from a single lot.

C. Supply products complete with accessories, trim, fasteners, and other items needed for installation for indicated use and appearance.

D. Examine products before installation. Do not install damaged products.

E. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

F. Extra Materials:
   1. Supply extra materials from same manufacturing lots as installed products.
   2. Store extra materials in original packaging with intact labels. Mark packages with locations of installed products.
   3. Store extra materials in building where directed by Owner or Architect.

1.3 PRODUCT DELIVERY

A. Transport and handle products per manufacturer instructions.

B. Deliver in original manufacturer packaging with intact labels and instructions.

C. Promptly inspect shipments to verify products follow requirements, quantities are correct, and

products are undamaged.

1.4 PRODUCT STORAGE AND HANDLING

A. Store and protect products per manufacturer instructions.

B. Store products with seals and labels intact and legible.

C. Store products subject to water or temperature damage in weatherproof and climate controlled enclosures with environmental conditions within manufacturer recommendations.

D. Handle products to prevent soiling, disfigurement, or damage.

E. Exterior Storage:
   1. Store products off ground, sloped for drainage, and protected from soiling and staining.
   2. Cover products subject to moisture or UV deterioration and provide ventilation to allow condensation to dry.
   3. Store loose granular materials on solid surfaces and prevent mixing with foreign matter.

F. Provide bonded offsite storage and protection when site storage or protection is not practical.

G. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT SELECTION

A. Products Specified by Reference Standards or by Descriptions Only: Any product meeting those standards or descriptions.

B. Products Specified by Naming Two or More Acceptable Products: Any named Product.

C. Products Specified by Naming One or More Manufacturers: Product of named manufacturer meeting specified requirements, no options or substitutions allowed unless specifically permitted.

D. Products Specified by Required Performance or Attributes Without Naming a Manufacturer or Product: Any product meeting specified requirements.

E. Basis of Design: Supply named product.
   1. Where specification sections state that comparable or equivalent products may be submitted for consideration, provide Product Data documenting equivalency to named product and compliance with specified requirements.

F. Compatibility: Where more than one choice is available for Contractor selection of products, select products that are compatible with other products, including products previously selected or installed.
   1. Total compatibility among Contractor options is not assured by limitations within Contract Documents, but must be provided by the Contractor.

G. Appearance Attributes: Unless specifically waived, request selection of colors, textures,

patterns, or other appearance options from Architect for Products exposed to view in completed Work.

1.6 MANUFACTURER WARRANTIES

A. Write warranties for Owner benefit.

B. Warranty Period: See individual Specification sections.

C. Warranty Effective Date: Date of Substantial Completion or date of Product acceptance when after Substantial Completion.

1.7 OWNER-SUPPLIED, CONTRACTOR-INSTALLED PRODUCTS

A. Owner Responsibilities:
   1. Provide Product Data, Shop Drawings, Samples, and other submittals to Contractor.
   2. Provide copies of manufacturer installation instructions, SDS and other safety information.
   3. Arrange and pay for delivery to site.
   4. Notify Contractor of scheduled delivery dates.
   5. Inspect delivered products jointly with Contractor.
   6. Submit claims for transportation damage, and replace damaged, defective, and missing items.
   7. Arrange for manufacturer warranties, inspections, and services.

B. Contractor Responsibilities:
   1. Designate scheduled delivery dates for Owner supplied products in construction progress schedule.
   2. Review Owner provided submittals for compatibility, installation, and use requirements. Notify Architect and Owner of issues that relate to coordination or scheduling.
   3. Receive, unload, handle, and store delivered products.
      a. Products Received at Project Site: Inspect jointly with Owner for completeness and damage.
      b. Products Received at Contractor Warehouse: Inspect for completeness and damage. Submit report of missing or damaged Products to Owner within two days of receipt. Transport Products to Project site and unload for installation.
   4. Protect Owner supplied products against loss and damage after receipt.
   5. Repair or replace items damaged after delivery.
   6. Install and otherwise incorporate Owner supplied products into the Work.

C. Products supplied by Owner for installation by Contractor:
   1. Items noted as OSCI or OFCI.

PART 2 PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Wiring Terminations: Supply terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.

B. Cord and Plug: Supply minimum 6 foot cord and plug with grounding connector for connection to electric wiring system. Cords of longer length are specified in individual specification sections.

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 017000

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Execution Requirements.
2. Cutting and Patching.
3. Progress cleaning.
4. Closeout procedures.
5. Starting of systems.
6. Demonstration and instruction.
7. Testing, adjusting, and balancing.
8. Protecting installed construction.
9. Project record documents.
10. Operation and maintenance data.
11. Manual for materials and finishes.
12. Manual for equipment and systems.
13. Spare parts and maintenance products.
14. Product warranties and product bonds.
15. Maintenance service.
16. Final cleaning.

1.2 EXECUTION REQUIREMENTS

A. Examination:
1. Verify existing conditions are acceptable before starting subsequent Work.
2. Verify existing substrates can receive and support subsequent Work.
3. Examine and verify specific conditions described in individual specification sections.
4. Where possible, take field measurements before confirming product orders and beginning fabrication.
5. Verify utility services are available, correctly located, and correct characteristics.

B. Preparation:
1. Clean substrate surfaces before applying next material or substance.
2. Seal substrate cracks and openings before applying next material or substance.
3. Apply manufacturer required or recommended substrate primer, sealer, or conditioner before applying next material or substance.

C. General Installation Requirements:
1. Follow manufacturer instructions and recommendations, applicable reference standards, and other requirements in individual specification sections.

2. When manufacturer instructions conflict with Contract Documents, request clarification from Architect before proceeding.
3. Make vertical elements plumb and horizontal elements level.
4. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines.
5. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or damage.
6. Make consistent textures on surfaces, with seamless transitions.
7. Make neat transitions between different surfaces, maintaining textures and appearances.

1.3 CUTTING AND PATCHING

A. Whenever possible, execute the Work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:
1. Complete the Work.
2. Fit products together to integrate with other elements.
3. Provide openings for penetration of mechanical, electrical, and other services.
4. Match Work that has been cut to adjacent Work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new Work damaged by subsequent Work.
7. Remove Samples of installed Work for testing when requested.
8. Remove and replace defective and nonconforming Work.

C. Before cutting, examine existing conditions, including elements subject to damage or movement during cutting and patching.

D. Execute Work by methods that avoid damage to other Work and that will provide appropriate surfaces to receive patching and finishing. In existing Work, minimize damage and restore to original condition.

E. Employ experienced installers to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Obtain Architect and Owner approval for pneumatic tools use.

G. Restore Work with new products in accordance with requirements of Contract Documents.

H. Fit Work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material per Section 078400. Label sealed penetration per applicable code.

J. Patching:
1. Finish patched surfaces to match finish color, texture, and appearance that existed before patching.
   a. Continuous Surfaces: Refinish to nearest intersection or natural break.
   b. Assemblies: Refinish entire unit.

2. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching Work. If defects are due to condition of substrate, repair substrate before repairing finish.

1.4 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, crawl spaces, and other closed or remote spaces before enclosing spaces.

C. Broom and vacuum clean interior areas before start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, trash, and rubbish from site periodically and dispose offsite; do not burn or bury.

1.5 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect review.
   1. If Architect performs reinspections due to failure of Work to comply with claims of status of completion made by Contractor, Owner will compensate Architect for such additional services and will deduct the amount of such compensation from final payment to Contractor.

B. Provide submittals to Architect and Owner required by authorities having jurisdiction.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

D. Closeout Submittals:
   1. Evidence of compliance with requirements of governing authorities.
   2. Certificate of Occupancy.
   3. Project Record Documents.
   4. Operation and Maintenance Data.
   5. Warranties.
   6. Keys and keying schedule.
   7. Spare parts and maintenance materials.
   8. Evidence of payment of Subcontractors and suppliers.
   9. Final lien waiver.
   10. Certificate of insurance for products and completed operations.
   11. Consent of Surety to final payment.

1.6 SYSTEMS STARTUP

A. Coordinate schedule for startup of various equipment and systems.

B. Notify Architect and Owner seven days before starting each system.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute startup under supervision of applicable manufacturer representative, Contractors personnel, and Owner commissioning agent per manufacturer instructions.

G. Where specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation before startup, and to supervise placing equipment or system in operation.

1.7 DEMONSTRATION AND INSTRUCTION

A. Demonstrate operation and maintenance of products to Owner personnel 15 days before inspection for Substantial Completion.

B. Demonstrate Project equipment and instruct by qualified instructor and manufacturer representative who is knowledgeable about the Project.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner personnel in detail to explain all aspects of operation and maintenance.

E. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, shutdown, and emergency procedures for each item of equipment.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional information becomes apparent during instruction.

G. Required instruction time for each item of equipment and system is specified in individual sections.

1.8 TESTING, ADJUSTING, AND BALANCING

A. Employ and pay for services of independent firm to perform testing, adjusting, and balancing.

B. Independent firm will perform services specified in MEP Drawings or required by AHJ.

C. Reports will be submitted by independent firm to Architect, Owner, and Contractor indicating observations and results of tests and indicating compliance or noncompliance with requirements of Contract Documents.

1.9 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed products. Control activities in immediate work areas to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects with durable sheet materials or panels.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic on landscaped areas.

1.10 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents for recording revisions to the Work and locations of concealed work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other Contract Modifications.
   5. Reviewed Product Data, Shop Drawings, and Samples.
   6. Manufacturer instructions for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, but not less than weekly.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following data:
   1. Manufacturer names and models and numbers for installed products.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and Modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including following data.
   1. Measured depths of foundations in relation to finish ground floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances,

referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Contract Drawings.

G. Electronic Project Website Files: Submit archive of electronic files from project website to Architect and Owner in digital format acceptable to Owner.

H. Coordination Model: Provide digital data files of coordination model for use by Owner.

I. Submit documents to Architect with final application for payment.

1.11 OPERATION AND MAINTENANCE DATA

A. Electronic File Manuals: Submit manuals as composite electronic PDF file for each manual type.
1. Arrange files by system and subsystem with bookmarks and bookmarks for individual document files.
2. Include drawing files appropriate to content.

B. Paper Manuals: Submit manuals as printed documents in loose leaf notebooks labeled with title, subject of manual, and Project name and location.
1. Copies: Two.
2. Arrange documents by system and subsystem with durable tabbed dividers that list individual documents.
3. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages and place in clear plastic sleeves.

C. Table of Contents:
1. Part 1: Directory listing names, addresses, and telephone numbers of Architect and its consultants, Owner consultants, Contractor, subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions arranged by system and subdivided by Specification section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Include the following information:
a. Significant design criteria.
b. List of equipment.
c. Parts list for each component.
d. Operating instructions.
e. Maintenance instructions for equipment and systems.
f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
3. Part 3: Project documents and certificates, including the following:
a. Record Shop Drawings and Product Data.
b. Test and balance reports.
c. Certificates.
d. Warranty copy.
e. Bond copy.

1.12 MANUAL FOR MATERIALS AND FINISHES

A. Submit electronic PDF files and two paper copies of proposed format and outline of contents before start of Work. Architect will review draft and return annotated PDF file and one copy with comments.
   1. Include listing in Table of Contents for design data with space for insertion of data.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit one copy and electronic PDF files of completed manuals 15 days before final inspection. Draft copy will be reviewed and returned with Architect comments after final inspection. Revise content of document sets as required by review comments before final submission.

D. Submit electronic PDF files and two copies of manuals in final form within 10 days after final inspection.

E. Building Products, Applied Materials, and Finishes: Include record Product Data, with catalog number, size, composition, and color and texture designations.
   1. Include information for reordering custom manufactured products.

F. Instructions for Care and Maintenance: Include manufacturer recommendations for cleaning products and methods, precautions against detrimental cleaning products and methods, and recommended schedule for cleaning and maintenance.

G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

H. Additional Requirements: Specified in individual specification sections.

1.13 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit electronic PDF files and two paper copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return annotated PDF file and one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit one copy and electronic PDF files of completed manuals 15 days before final inspection. Draft copy will be reviewed and returned with Architect comments after final inspection. Revise content of document sets as required by review comments before final submission.

D. Submit electronic PDF files and two copies of manuals in final form within 10 days after final inspection.

E. Each Item of Equipment and Each System:
   1. Include description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

F. Panelboard Circuit Directories: Provide printed electrical service characteristics, controls, and communications.

G. Include color coded wiring diagrams as installed.

H. Operating Procedures:
   1. Include startup, break-in, and routine normal operating instructions and sequences.
   2. Include regulation, control, stopping, shutdown, and emergency instructions.
   3. Include seasonal and special operating instructions.

I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

J. Include servicing and lubrication schedule, and list of lubricants required.

K. Include manufacturer printed operation and maintenance instructions.

L. Include sequence of operation by controls manufacturer.

M. Include original manufacturer parts list, illustrations, assembly drawings, and diagrams required for maintenance.

N. Include control diagrams by controls manufacturer as installed.

O. Include Contractor coordination drawings, with color coded piping diagrams as installed.

P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

Q. Include list of original manufacturer spare parts, current prices, and recommended quantities to be maintained in storage.

R. Additional Requirements: As specified in individual product specification sections.

S. Include listing in Table of Contents for design data with space for insertion of data.

1.14 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Supply spare parts, maintenance, and extra products in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed by Owner; obtain receipt before final payment.

1.15 PRODUCT WARRANTIES

A. Obtain warranties from responsible subcontractors, suppliers, and manufacturers within 10 days after completion of applicable item of Work.

B. Include copies of standard manufacturer warranties that do not require execution.

C. Execute and assemble transferable warranty documents from subcontractors, suppliers, and manufacturers.

D. Verify documents are in proper form, contain full information, and, where signed, are notarized.

E. Assemble product warranties in loose leaf notebook with table of contents.
   1. Scan warranties and submit as composite PDF file with table of contents and bookmarks for Specification sections.
   2. Arrange warranties by Specification section.

F. Submit warranties before final Application for Payment.

G. Time of Submittals:
   1. For equipment or component parts of equipment put into service during construction with Owner permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion and before final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing date of acceptance as beginning of warranty period.

1.16 MAINTENANCE SERVICE

A. Provide maintenance service of Work included in Specification sections for specified periods and during correction of Work period.

B. Examine system components at frequency recommended by manufacturer for reliable operation. Clean, adjust, and lubricate as needed.

C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.

D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

1.17 FINAL CLEANING

A. Perform final cleaning before inspection for Substantial Completion.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces, damp mop hard surface flooring.

C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.

D. Replace filters of operating equipment.

E. Clean debris from roofs and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from site.

PART 2 PRODUCTS

2.1 PATCHING MATERIALS

A. New Materials: Specified in product sections; match existing products and Work for patching and extending Work.

B. Existing Products: Determine type and quality by inspection and testing. Refer to existing as work results standard.

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 017419

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Construction waste management plan.
   2. Construction waste recycling.
   3. Construction waste adaptive reuse.

1.2 INFORMATIONAL SUBMITTALS

A. Construction Waste Management Plan: Submit plan describing implementation and compliance monitoring including:
   1. Construction waste hauling company.
   2. Landfill facility.
   3. Recycling and adaptive reuse processing facilities. Indicate waste type facilities will accept.
   4. Construction waste materials anticipated for recycling and adaptive reuse.
   5. On site sorting and site storage methods.

B. Substantiation Report: Submit report with each application for payment and before Substantial Completion. Show construction waste management plan compliance status.
   1. Trash: Quantity by weight deposited in landfills. Include associated fees, transportation costs, container rentals, and taxes for total cost of disposal.
   2. Salvaged Material: Quantity by weight with destination for each material salvaged for resale, recycling, or adaptive reuse. Include associated fees, transportation costs, container rentals, and taxes for total cost of disposal. Also include reimbursements from salvage resale.
   3. Total Cost: Indicate total cost or savings for construction waste management plan.

1.3 CLOSEOUT SUBMITTALS

A. Project Record Documents: Submit report indicating diverted waste quantity, total waste quantity and percentage of waste diverted from landfills.
   1. Include tipping tickets from landfill and recycling facility showing material quantity disposed.

1.4 CONSTRUCTION WASTE MANAGEMENT PLAN

A. Develop and implement construction waste management plan to divert 75 percent of construction waste from landfills.
   1. Divert construction waste from landfill disposal.
   2. Redirect recyclable material back to manufacturing process.
   3. Calculate cost savings to Project for waste disposal.

B. Implement construction waste management plan at start of construction.

C. Review construction waste management plan at preconstruction meeting and progress meetings.

D. Distribute approved construction waste management plan to affected parties.

E. Oversee plan implementation, instruct construction personnel for plan compliance, and document plan results.

F. Purchase products to minimize waste.
   1. Ensure correct quantity is delivered to site.
   2. Choose products with minimal or no packaging.
   3. Require returnable pallets and containers.
   4. Require suppliers to take or buy back rejected and unused items.

1.5 CONSTRUCTION WASTE RECYCLING

A. Use source separation method or co-mingling method suitable to sorting and processing method of selected recycling center.

B. Separate recyclable materials from trash. Dispose trash separately into landfill.

C. Source Separation Method: Sort recyclable materials into separate bins by waste type, before transporting to recycling center.

D. Co-Mingling Method: Place recyclable materials in bins for sorting at recycling center.

E. Materials designated for recycling:
   1. Packing materials including paper, cardboard, foam plastic, and sheeting.
   2. Recyclable plastics.
   3. Organic plant debris.
   4. Earth materials.
   5. Natural stone and granular fill.
   6. Asphalt and concrete paving.
   7. Wood.
   8. Glass.
   9. Metals.
   10. Gypsum board.
   11. Acoustic ceiling panels.
   12. Carpet.

1.6 CONSTRUCTION WASTE ADAPTIVE REUSE

A. Arrange with adaptive reuse processing facility for construction waste processing for reuse.

B. Materials designated for adaptive reuse:
1. Concrete and crushed concrete.
2. Masonry units.
3. Lumber suitable for resawing or refinishing.
4. Casework and millwork.
5. Doors and door frames.
6. Windows.
7. Window glass and insulating glass units.
8. Hardware.
9. Acoustical ceiling panels.
10. Equipment and appliances.
11. Fluorescent light fixtures and lamps.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONSTRUCTION WASTE COLLECTION

A. Collect construction waste and arrange for transportation to recycling centers or adaptive reuse processing facilities.

B. Maintain construction waste storage and collection area in orderly manner. Prevent co-mingling of trash, recyclable, and reusable materials.

C. Store construction waste to prevent environmental pollution, fire hazards, hazards to persons and property, and contamination.

D. Cover construction waste to prevent loss and degradation.

3.2 RECYCLING DEMOLITION WASTE

A. Fluorescent Fixtures and Lamps:
1. Handle fluorescent fixtures and lamps with care. Prevent fluorescent lamp breakage.
2. Carefully remove fluorescent lamps from fixtures before removing fixtures.
3. Package fluorescent lamps to protect lamps from breakage during storage and shipment.
4. Dispose of lamps at recycling center specifically qualified to recycle fluorescent lamps.

3.3 CONSTRUCTION WASTE DISPOSAL

A. Deliver construction waste to waste processing facilities. Obtain receipt for deliveries.

B. Dispose construction waste not capable of being recycled or adaptively reused by delivery to landfill, incinerator, or other legal disposal facility. Obtain receipts for deliveries.

END OF SECTION

SECTION 024119

SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Selective demolition.

B. Principal Products:
   1. Requirements for demolition activities.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordinate utility and building service interruptions with Owner.
   1. Notify Owner seven days, minimum, before disrupting building fire protection and life safety systems.
   2. Schedule tie ins to existing systems to minimize disruption.
   3. Coordinate Work so fire protection and life safety systems remain continuously operational in occupied areas.

B. Preinstallation Meeting Attendees and Procedures:
   1. Conduct meeting one month, minimum, before starting Work of this Section.

C. Owner will conduct salvage operations before demolition begins to remove materials Owner chooses to retain.

D. Schedule demolition Work to coincide with new construction.

E. Perform noisy, malodorous, and dusty Work:
   1. Outside hours of regular library operation.

F. Cooperate with Owner in scheduling noisy operations and waste removal that may impact Owner operation and work in or occupancy of adjoining spaces.

1.3 ACTION SUBMITTALS

A. Shop Drawings:
   1. Indicate demolition and removal sequence.
   2. Indicate location of items designated for reuse or Owner retention.
   3. Indicate location and construction of temporary partitions.

B. Demolition Schedule: Indicate overall schedule and interruptions required for utility and building services.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Accurately record actual locations of capped utilities, concealed utilities discovered during demolition, and subsurface obstructions.

1.5 FIELD CONDITIONS

A. Conduct demolition to minimize interference with adjacent occupied building areas.

B. Cease operations immediately if structure appears to be in danger and notify Owner and Architect. Do not resume operations until directed.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Follow the following reference standards:
1. ANSI/ASSP A10.6.
2. NFPA 241.

B. Follow applicable code for demolition Work, dust control, and for products requiring utility disconnection and reconnection.

C. Notify Owner and Architect if suspected hazardous or contaminated materials are discovered.

D. Obtain required permits from authorities having jurisdiction.

E. Perform Work in accordance with State of Washington standard.

3.2 PREPARATION

A. Notify affected utility companies before starting Work; follow their requirements.

B. Mark location and termination of utilities.

C. Erect, and maintain temporary barriers and security devices at locations shown, including warning signs and lights, and similar measures, for protection of the public, the Owner, and existing improvements indicated to remain.

D. Erect and maintain weatherproof closures for exterior openings.

E. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy.

F. Prevent movement of structure; provide temporary bracing and shoring required to ensure

safety of existing structure.

G. Provide appropriate temporary signage including signage for exit or building egress.

H. Do not close or obstruct building egress paths.

3.3 SALVAGE REQUIREMENTS

A. Coordinate with Owner to identify building components and equipment required to be removed and delivered to Owner.
   1. Contractor to remove bookshelves and reinstall in areas where new flooring is installed.

B. Tag components and equipment Owner designates for salvage.

C. Protect designated salvage items from demolition operations until items can be removed.

D. Carefully remove building components and equipment indicated to be salvaged.

E. Disassemble as required to permit removal from building.

F. Package small and loose parts to avoid loss.

G. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.

H. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.

I. Deliver salvaged items to Owner. Obtain signed receipt from Owner.

3.4 DEMOLITION

A. Conduct demolition to minimize interference with adjacent occupied or unaffected building areas.

B. Maintain protected egress from and access to adjacent existing buildings at all times.

C. Do not close or obstruct roadways and sidewalks without permits.

D. Disconnect and remove designated utilities within demolition areas.

E. Cap and identify abandoned utilities at termination points when utility is not completely removed. Annotate Record Drawings indicating location and type of service for capped utilities remaining after demolition.

F. Demolish in orderly and careful manner. Protect existing improvements supporting structural members.

G. Carefully remove building components indicated to be reused.
   1. Disassemble components as required to permit removal.

2. Package small and loose parts to avoid loss.
3. Mark components and packaged parts to permit reinstallation.
4. Store components, protected from construction operations, until reinstalled.

H. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.

I. Transport friable and dusty demolished materials through building in enclosed containers.

J. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.

K. Remove temporary partitions.

END OF SECTION

SECTION 061053

MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Concealed blocking and nailers.

B. Principal Products:
   1. Fire retardant treated lumber and panels.
   2. Preservative treated lumber.

C. Related Requirements.
   1. Section 092116: Interior non-structural metal framing.

1.2 ACTION SUBMITTALS

A. Product Data:
   1. Wood preservative treatment.
   2. Fire retardant treatment.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
   1. Store lumber indoors, protected from elements.
   2. Store lumber elevated above grade, protected from moisture.

PART 2 PRODUCTS

2.1 MATERIALS

A. Lumber: DOC PS 20. Grading rules certified by ALSC Board of Review.
   1. Maximum Moisture Content: 19 percent.

B. Plywood: DOC PS 1, Exterior A-C, fire retardant treated.
   1. Thickness: See Drawings.

C. Fire Retardant by Pressure Process:
   1. Exterior Type: ASTM C2898.
   2. Interior Type A: ASTM D3201, 28 percent maximum moisture content at 92 percent relative humidity.

3. Surface Burning Characteristics per ASTM E84.
    a. Flame Spread: 25.
    b. Smoke Developed: 450.
4. Labeling: Testing agency classification.
5. Kiln dry after treatment.
    a. Lumber: 19 percent maximum moisture content.
    b. Plywood: 15 percent maximum moisture content.
6. Applications:
    a. Concealed blocking.
    b. Plywood utility backing panels.
    c. Items shown on Drawings.

D. Wood Preservative, Pressure Treatment: AWPA U1 Category UC2 and Category UC3b.
1. SBX Borate Preservative: Waterborne borate oxide preservative.
2. Applications:
    a. Roofing and Exterior Wall Assemblies: Wood cants, nailers, curbs, and blocking; Category UC2.
    b. Concrete and Masonry Adjacent: Wood plates, sills, blocking, and furring; Category UC3b.
    c. Items shown on Drawings.
3. Kiln dry after treatment.
    a. Lumber: 19 percent maximum moisture content.
    b. Plywood: 15 percent maximum moisture content.

2.2 INSTALLATION ACCESSORIES

A. Fasteners and Anchors:
1. General: Follow requirements for wood member size and type.
    a. All Applications: Type 304 stainless steel.
2. Nails, Brads, and Staples: ASTM F1667.
3. Power-Driven Fasteners: NES NER-272.
4. Wood Screws: ASME B18.6.1.
5. Screws for Fastening to Metal Framing:
    a. Cold-Formed Metal Framing: ASTM C954.
    b. Other Metal Framing: ASTM C1002.
6. Anchors:
    a. Toggle bolt type for anchorage to hollow masonry.
    b. Expansion shield and lag bolt type for anchorage to solid masonry or concrete.
    c. Bolt or ballistic fastener for anchorages to steel.

B. Separation Layer: Butyl Rubber flashing sheet membrane.

PART 3 EXECUTION

3.1 INSTALLATION

A. Set members level and plumb, in correct position.

B. Place horizontal members crown side up.

C. Construct curb members of solid wood sections.

D. Space furring 16 inches on center.

E. Install continuous flexible flashing separator as follows:
   1. Without Preservative Treatment: Between wood and concrete or masonry.

F. Follow AWPA M4 for site applied preservative treatment to cut surfaces of SBX preservative treated lumber.

END OF SECTION

SECTION 064000

ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Exterior window and door trim- new and repair.
2. Cabinetry.
3. Interior wood trim.
4. Upholstered seating and stair risers.
5. Plywood platforms and walls at children's play area.

B. Principal Products:
1. Exterior wood trim.
2. PVC trim.
3. Wood veneer base and wall cabinets.
4. Cabinet hardware.
5. Wood paneling.
6. Upholstery fabric and foam.
7. Casework for banquette and shelving.
8. Shop finishing of interior architectural woodwork.

C. Related Requirements.
1. Section 061053: Miscellaneous rough carpentry.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.
2. Additional Agenda Items:
a. Play wall.
b. Exterior wood restoration.

1.3 ACTION SUBMITTALS

A. Submittals - General: AWI 100.

B. Product Data:
1. Panel products.
2. Adhesives.
3. Manufactured trim profiles and ornamental components.
4. Hardware.

5. Finish materials.
6. Fire retardant treatment.
7. Initial selection color Samples.

C. Shop Drawings:
1. Dimensioned plans and elevations showing architectural woodwork elements locations.
2. Show materials, profiles, assembly methods, joint details, fastening methods, hardware locations, sizes and locations of cutouts, and concealed blocking locations and finishes.
3. Veneered Wall Paneling: Show and dimension panel sizes, veneer leaves, and grain direction.

D. Samples:
1. Finished Material: Provide Samples for each wood species and finish.
a. Range Samples: Submit three each of light, medium and dark stain Samples for selection.
b. Linear Elements: 12 inches long.
c. Veneer Panels: 12 by 12 inches.
1) Provide a sample of finished joint with stainable wood filler.
2. Hardware: Each type and finish.
3. Fabricated Samples:
a. Wood veneer applied to core material with edge banding, 8 by 10 inches, minimum.
b. Cabinet corners: Illustrate joints between side panels, frames, doors, and drawers.

1.4 INFORMATIONAL SUBMITTALS

A. Woodworker Quality Certificates: See Quality Assurance article.

B. Test and Evaluation Reports: Independent testing agency test results showing:
1. Fire-retardant-treated wood performance.
2. Casework structural performance.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For architectural woodwork.

1.6 QUALITY ASSURANCE

A. Qualifications:
1. Fabricator:.
a. Experience: Provide details of company history, number of years in millwork manufacturing. Include a portfolio of 5 projects highlighting similar completed projects, including the budget, timeline, materials and techniques used.
b. Expertise and Craftsmanship: Describe team expertise and the level of craftsmanship employed in manufacturing process. Include information about the materials, finishes, and techniques used to ensure high quality millwork.
c. Quality Control: Explain quality control measures and how the company ensures each millwork item meets or exceeds industry standards and client specifications. Provide details about any relevant certifications, quality assurance programs, or

inspection processes.

d. Project Management: Describe project management approach, including project scheduling, coordination, and communication. Include information on ability to meet deadlines and flexibility in accommodating changes or unforeseen circumstances.

e. References: Provide 3 references from previous clients on similar projects. Include contact information. Feedback will be requested on performance, reliability, and overall satisfaction.

2. Installer: Woodwork fabricator.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements: AWI 200.

1.8 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations.
1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

B. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.
1. Locate concealed framing, blocking, and reinforcements supporting cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 WOODWORK GENERAL REQUIREMENTS

A. Quality Standard: Follow AWI Standards for aesthetic and performance grades.

B. Woodwork Grade: Premium.

2.2 EXTERIOR TRIM - OPAQUE FINISH

A. Exterior Wood Components:
1. Door and window casings and sills.
2. Crown molding.
3. Corbels.

B. Wood Species: [See Drawings or match existing].
1. Wood Preservative Treatment: WDMA I.S. 4.
2. Wood Moisture Content: AWI 200.

C. Synthetic Components: Wood-look composite material.
1. Manufacturers:
a. Azek.

b. Boral.
c. Fypon.
d. Trex.
2. Shop Finishing: Primer.

D. Fabrication:
1. Linear Trim Members: Groove backs.
2. Flat Members: Kerf backs.

E. Wood Repair and Refinishing: AWMAC/WI North American Architectural Woodwork Standards.
1. Remove paint to bare wood.
2. Repair wood by consolidation, replacement, partial replacement, and patching.
a. Wood-Patching Compound: Two-part, epoxy-resin.
b. Wood Consolidant: Penetrating, consolidating, and strengthening soft fibers of weathered wood, and enhances the bond of wood-patching compound to existing wood.
3. Sand, prime, fill, sand again, and prime surfaces again for refinishing.

2.3 INTERIOR TRIM - TRANSPARENT FINISH

A. Interior Trim:
1. Base.
2. Balls at play wall.

B. Hardwood Lumber:
1. Wood Species: Baltic birch.

C. Softwood Lumber:
1. Wood Species: Pine.

D. Wood Moisture Content: AWI 200.

E. Fabrication:
1. Wood Base: Use solid lumber; glue for width if base height exceeds available lumber.
2. Wood Trim Other than Base: Solid lumber.

2.4 WOOD CASEWORK - TRANSPARENT FINISH

A. Wood Casework General Requirements: ANSI/AWI 0641, Duty Level 3.

B. Casework Construction: Frameless.

C. Panel Cores: MDF.

D. Door and Drawer Configuration: Flush overlay.
1. Reveal Dimension: See Drawings.

E. Exposed Wood:
1. Species: Ash

2. Slice: Quarter.
3. Veneer Matching: Book.
4. Panel Veneer Matching: Center balance.
5. Grain Direction: Vertical.
6. Thickness: 3/4 inch, unless noted otherwise.

F. Blueprint Matching: Align cabinet face veneer matching with made to order sequenced sets on wall and door panels within space.

G. Semi-Exposed Surfaces: Same as exposed wood.
1. Edge Banding: Wood veneer matching exposed wood.

H. Drawer Semi-Exposed Surfaces: Same as exposed wood.
1. Edge Banding: Wood veneer matching exposed wood.

I. Drawer Construction: Match cabinet duty level.
1. Box Material: Any product meeting performance requirements.
a. Thickness: 3/4 inch, minimum.
2. Joinery: Join drawer sides, backs, and subfronts with glued rabbeted joints and mechanical fasteners.

2.5 WOOD PANELING - TRANSPARENT FINISH

A. Exposed Wood:
1. Species: Baltic birch.
2. Grain Direction: See Drawings.

2.6 UPHOLSTERED SEATING AND STAIRS

A. Performance Requirements:
1. Fire-Test-Response Characteristics of Upholstered Seating:
a. Fire Performance: ASTM E84, Class A and California Technical Bulletin 117.
b. Fabric: DOC CS 191-1953, Class 1 or California Technical Bulletin 117, 16 CFR 1610.
c. Padding: Comply with California Technical Bulletin 117.
d. Full-Scale Fire Test: Comply with California Technical Bulletin 133.
2. Strength and Durability Performance: Pass BIFMA X5.4 for seating and components.
3. Durability and Strength: Abrasion, ASTM D7255; Breaking force, ASTM D2208; Flex, ASTM D2097; Tearing Strength, ASTM D4705; Crocking, ASTM D5053; Light Fastness, ISO 105-B02 72 hours.
4. Finish: Pretreated stain resistant finish.
5. Mold and mildew resistant.

B. Upholstered Seating and Stairs: Fabricate to shapes indicated on Drawings.
1. Upholstery Fabric: See Drawings. Obtain fabric of a single dye lot for each color and pattern of fabric required.
2. Foam Padding, UF-1: NFPA 261, flexible, cellular, molded or slab polyurethane foam.
a. Dimensions and Density: See Drawings.
b. Pounding Fatigue Performance: ASTM D3453 Grade AP for seats and BP for backs.

c. Provide boxed cushion with welted seams indicated. Provide 5/32 inch cord where welt cord seams are indicated. Except where otherwise noted, stitching color is to match field color of upholstery fabric.

2.7 CABINET HARDWARE AND ACCESSORIES

A. General: BHMA A156.9 and ANSI/AWI 0641.

B. Cabinet Hinges: Concealed European self-closing type.
1. Opening Angle: 135 to 170 degrees.

C. Door and Drawer Pulls:
1. Manufacturers and Products:
a. Richelieu BP87312890 Contemporary Metal Pull 5-7/16 inch, matte black finish; as basis of design.
b. Or approved equal.

D. Cabinet Shelf Supports:
1. Adjustable Shelf Standards: BHMA A156.9, B04071 standards with shelf rests B04081.
2. Shelf Rests: BHMA A156.9 B04013, match cabinet Duty Level.

E. Drawer Slides: BHMA A156.9. Side mounted extending under bottom edge of drawer; with polymer rollers, zinc-plated steel, full extension type.
1. Box Drawers 6 inches by 24 inches: Grade 1HD-100.
2. File Drawers 12 inches by 24 inches: Grade 1HD-100.
3. Keyboard Slides: Grade 1HD-100.
4. Trash Bin Slides: Grade 1HD-200.

F. Locks: Provide complete system for each lock, including removable lock core, cylinder body, and strike plates.
1. Cabinet Door Locks: BHMA A156.11, E07121.
a. Basis-of-Design: Schlage CL777R/Olympus 777 with Schlage original FSIC cylinders (Part # 23-030 626) in E, F or EF cylinder keyways as required.
b. For two door cabinets, install lock on right door. Left door automatically secured by closing of the right door using the CompX/Timberline D200DL-BLK double door latch kit.
c. Or approved equal.
2. Drawer Locks: BHMA A156.11, E07041.
3. Provide two keys for each lock.

G. Joint Sealant: Clear, mildew resistant type, see Section 079200.

H. Screw Covers: Match adjacent surface in color and texture.

2.8 PERFORMANCE

A. Delegate Children's Interactive Play Element design to fabricator's licensed Professional Engineer.

B. Structural Loads: See Drawings and Applicable code compliant.

C. Allowable Deflection: 1/360, maximum.

D. Fire Resistance:
1. NFPA 80.
2. ASTM E119.

E. Surface Burning Performance: ASTM E84 Class A.
1. Flame Spread Index: 25, maximum.
2. Smoke Developed Index: 450, maximum.

F. Accessibility Requirements: Applicable provisions in Department of Justice publication 2010 ADA Standards for Accessible Design, ICC/ANSI A117.1, and state accessibility code.

2.9 MATERIALS

A. Wood Materials, General: AWI 300 for grade specified.

B. Panel Products:
1. Hardwood Plywood, Veneer Core, and Veneers: ANSI HPVA HP-1.
2. Medium Density Fiberboard: ANSI A208.2, Grade 130.

C. Interior Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber.

D. Adhesives: Recommended by facing material manufacturers, complying with VOC limitations.

E. Fasteners: Type, size, and material to suit each application.

2.10 LUMBER AND PANEL MATERIAL TREATMENT

A. Wood Preservative Pressure Treatment:
1. Exterior Items: AWPA N1.

B. Fire Retardant Treatment:
1. Chemically treated and pressure impregnated.
2. Flame Spread: 25, maximum per ASTM E84.
3. Label or otherwise identify fire retardant treated material.
4. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.

2.11 FABRICATION

A. Shop assemble Work for delivery to site, permitting passage through building openings.

B. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.

C. Construct cabinets without integral base. Construct separate structural cabinet bases of 3/4 inch marine grade plywood, glued and screwed. Provide reinforcing blocks as required for maximum strength. Set base on floor where casework is to be installed. Level top surface and scribe bottom surface to floor line; height as indicated on Drawings.

D. Provide marine-grade plywood at countertops within 24 inches of sinks or other water sources.

E. Use waterproof adhesives and glues in veneer construction at areas subject to moisture or humidity.

F. Fabrication Tolerances: ANSI/AWI 0641, specified grade.

G. Upholstery: Install fabrics and foam over fire-retardant treated wood structure and paneling.

H. Children's Interactive Play Element:
1. Fabricate following shop drawings to provide product performance required by this Section.
2. Upholstery fabrics and foam shall be installed over fire-retardant treated wood structure and paneling.
3. Transparent wood finished areas shall not include lumber or panel markings. Use solid wood that follows requirements for Premium grade fabrications following AWI standards.

2.12 FINISHES

A. Shop Priming Exterior Wood: Prepare wood and shop prime materials with wood primer specified in Section 099000 Painting and Coating.

B. Shop Finishing - General:
1. Grade: Same as item being finished.
2. Sand Work smooth and set exposed nails and screws.
3. Apply wood filler in exposed nail and screw indentations.
4. Use wood filler matching surrounding surfaces and of types recommended for applied finishes.
5. Backpriming: Compatible with finish coats; apply two coats to concealed surfaces of paneling and to end grain surfaces.

C. Transparent Finish:
1. Finish: System 5, conversion varnish.
2. Finish: System 12, water based polyurethane.
3. Stain Color: Architect selected.
4. Sheen: Flat.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with woodwork.

3.2 PREPARATION

A. Surface Preparation: ANSI/AWI 0620.

B. Clean existing wood of mildew, algae, moss, plant material, loose paint, grease, dirt, and other debris by scrubbing with bristle brush or sponge and detergent solution. Scrub mildewed areas with mildewcide. After cleaning, rinse thoroughly with fresh water. Allow to dry before repairing or painting.

C. Conditioning:
   1. Acclimate products to installation environment per AWI 200 and ANSI/AWI 0620.

3.3 INSTALLATION - GENERAL

A. Follow ANSI/AWI 0620.

B. Installation Grade: Same as item being installed.

3.4 INSTALLATION

A. Install woodwork plumb and level.

B. Scribe Work abutting other components. Gaps per ANSI/AWI 0620, specified aesthetic grade. Do not use additional overlay trim to conceal larger gaps.

C. Install trim with adhesive and fine, finishing nails.

D. Casework:
   1. Anchor wall cabinets per ANSI/AWI 0641, specified duty level.
   2. Secure units to floor using appropriate angles and anchorages.
   3. Install finish hardware not installed in shop.

E. Wall Paneling: Install with concealed Z-clips mounted to panels and substrate.

F. Site Finishing Exterior Wood: Section 099000.

3.5 WOOD REPAIR

A. General: Patch wood with depressions, holes, and limited amounts of rotted or decayed wood.
   1. Verify surfaces are clean and free of paint residue.
   2. Remove rotted or decayed wood down to sound wood.
   3. Treat wood with wood consolidant prior to application of patching compound. Coat wood surfaces by brushing, applying multiple coats until wood is saturated and refuses to absorb more. Allow treatment to harden before filling void with patching compound.

B. Apply wood patching compound to fill depressions, nicks, cracks and voids.
   1. Apply patching compound in layers as recommended by manufacturer until void is completely filled.
   2. Sand patch surface smooth and flush with adjacent wood, without voids in patch material, and matching contour of wood member.

C. Replace parts of or entire wood items at locations where damaege is too extensive to patch.
   1. Remove broken, rotted, and decayed wood down to sound wood.
   2. Custom fabricate new wood to replace missing wood; either replace entire wood member or splice new wood part into existing member.
   3. Secure new wood using finger joints, multiple dowels, or splines with adhesive and nailing. Use only concealed fasteners. Fill nail holes and patch surface to match surrounding sound wood.

3.6 ADJUSTING

A. Test installed Work for rigidity and ability to support loads.

B. Lubricate and adjust hardware so doors and drawers operate smoothly.

3.7 CLEANING

A. Cleaning: Clean exposed and semi-exposed surfaces of woodwork.

B. Touch up shop-applied finishes. Replace damaged items that cannot be repaired.

3.8 PROTECTION

A. Protection: Protect installed items from damage due to subsequent construction operations.

END OF SECTION

SECTION 078400

FIRESTOPPING

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Joint firestopping in or between fire-resistance-rated assemblies.
   2. Penetration firestopping in or between fire-resistance-rated assemblies.

B. Principal Products:
   1. Joint firestopping.
   2. Penetration firestopping.

C. Related Requirements:
   1. Section 079200: Joint sealants.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
   1. Coordinate joint construction and penetrations to accommodate firestopping.

B. Preinstallation Meeting Attendees and Procedures:
   1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data:
   1. Product characteristics, performance and limitation criteria.
   2. Repair procedures.
   3. Describe use of product in each tested design.

B. Schedule: List opening locations and sizes, penetrating items, and testing agency system design listings.

C. Engineering Judgements: For conditions not covered by listed designs, provide stamped judgements on systems or assemblies to meet fire protection requirements by a licensed professional engineer, for presentation to authority having jurisdiction.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates:
   1. Manufacturer: Certify products meet or exceed specified requirements and applicable code requirements.

B. Qualification Statements:
   1. Applicator UL Qualified Firestop Contractor certification, FM Global Approval certification, FCIA Membership certification, or approval letter from manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For Firestopping.

B. Warranty Documentation: For Firestopping.

C. Fire-Resistance Inventory: Provide locations and details of firestop installations, with Listed Systems, engineering judgments, and equivalent fire-resistance rated assemblies, on record Life Safety Drawings and Operations and Maintenance manuals.

1.6 QUALITY ASSURANCE

A. Qualifications:
   1. Specialty Firestop Contractor: Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single sole source firestop specialty contractor with one of the following qualifications:
      a. Firm approved per FM Global 4991 or UL Qualified Firestop Program.
      b. FCIA Contractor Member in good standing.
      c. Manufacturer approval.
   2. Licensed Professionals: Registered in state in which Project is located.

B. Certifications: From Installer that firestopping is installed properly.

C. Field Samples: Construct example of each different firsetop system. Demonstrate qualities of materials and execution, and acceptance criteria.
   1. Obtain AHJ acceptance of field samples before start of Work.
   2. Approved Samples establish work results standard.

1.7 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations:
   1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Firestopping Product Manufacturers:
   1. 3M Fire Protection Products.
   2. Hilti, Inc.
   3. HOLDRITE.
   4. RectorSeal.
   5. Specified Technologies, Inc.

2.2 PENETRATION AND JOINT FIRESTOPPING

A. General:
   1. Firestopping: Materials manufactured and installed to resist the spread of fire, smoke, and gasses, that maintain the fire resistance ratings of the horizontal and vertical assemblies into which they are installed.
   2. Firestopping Materials and Systems: Compatible with each other and substrates where installed.

B. Fire Rated Wall Penetrations: Firestopping rated per ASTM E814 or UL 1479, positive pressure differential tested at 0.01 inch wg.
   1. Wall Types: Fire partitions.
   2. F-Rating: Equal to or greater than assembly where installed.

C. Fire Rated Horizontal Assembly Penetrations: Firestopping rated per ASTM E814 or UL 1479, positive pressure differential tested at 0.01 inch wg.
   1. Horizontal Assembly Types: Floors and Floor/ceiling assemblies.
   2. F-Rating: Equal to or greater than assembly where installed, 1 hour minimum.
   3. T-Rating: Equal to or greater than assembly where installed, 1 hour minimum except floor penetrations that occur within a wall cavity.

D. Fire Rated Joint Assemblies: Firestopping rated per ASTM E1966 or UL 2079.
   1. Fire Resistance Rating: Equal to or greater than assembly where installed.

E. Exposed Firestopping Materials: ASTM E84; Flame Spread 25, Smoke Developed 450, maximum.
   1. Color: Architect selected.

F. Accessory Materials: Firestopping manufacturer materials and components, approved by qualified testing and inspection agency, required for complete installation and fire rating of each firestopping assembly.
   1. Forming and Backing Materials:
      a. Rock wool and mineral wool insulation.
      b. Sealants.
      c. Form boards.
      d. Sealant backers or fillers.
      e. Temporary forms.
   2. Primers.

3. Collars.
4. Sleeves.

2.3 PERFORMANCE

A. Provide firestopping systems that are tested by a qualified testing agency acceptable to authorities having jurisdiction.

B. Mark firestopping systems with classification markings by one of the following, as acceptable to authorities having jurisdiction.
   1. UL Fire Resistance Directory.
   2. Intertek Group Directory of Building Products.

2.4 MATERIALS AND COMPONENTS

A. Collars and Sleeves: Factory assembled collars and sleeves, consisting of a metal outer sleeve lined with intumescent material, and flanges and gaskets to mount the unit and seal the ends.

B. Sealants:
   1. Latex: Single component, moisture resistant after curing.
   2. Silicone: Single component, neutral curing, pourable for horizontal and nonsag for vertical or sloped applications.

C. Intumescent Sheets: Composite sheets of galvanized steel and intumescent material designed for various opening sizes.

D. Wrap Strips: Foil faced, intumescent, elastomeric sheets.

E. Pillows: Compressible, intumescent cases.

F. Putties: Non-hardening, water-resistant, dielectric materials containing no inorganic fibers, silicones, or solvents.

G. Mortars: Prepackaged dry mixes of hydraulic cement, binders, and lightweight aggregates, mixed with water at installation site.

H. Silicone Foam: Multicomponent, site mixed elastomer that expands and cures in place as a stable, flexible foam.

2.5 MIXING

A. Mix materials to produce product characteristics required by manufacturer and testing agency.

2.6 SOURCE QUALITY CONTROL

A. Single Source Responsibility: Obtain firestop systems for each kind of penetration and construction condition from a single primary firestop systems manufacturer, to the greatest extent possible.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Verify pipes, conduit, cable, ductwork, and other items have been permanently installed.
   2. Verify field dimensions are as shown tested systems or Engineering Judgments.
   3. Verify system components are dry, clean, and ready for installation.

3.2 PREPARATION

A. Surface Preparation:
   1. Mask surfaces that will remain exposed after installation of firestopping.

3.3 INSTALLATION

A. Forming Materials: Install to retain and properly shape installed firestopping to achieve required fire rating.
   1. Remove combustible or temporary forming materials after curing firestopping.

B. Install firestopping materials to achieve required fire ratings.
   1. Apply materials to adhere to all contact surfaces.
   2. Fill all voids around openings.
   3. Finish firestopping that will be exposed after curing.

3.4 IDENTIFICATION

A. Permanently attach identification labels within 6 inches of edge of firestopping installations. Make labels visible toward the direction from which a person might approach to remove or alter the firestopping.

B. Provide labels that contain the following:
   1. Required Text: "Warning - Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
   2. Installing Contractor Company name, contact information.
   3. Firestopping testing agency design designation.
   4. Installation date.
   5. Manufacturer name.
   6. Installer name.

3.5 FIELD QUALITY CONTROL

A. Field Tests and Inspections: Engage inspectors to perform tests and inspections and prepare reports. Allow inspectors access to Work areas.
   1. Failed Test Retest Cost: Contractor responsibility.
   2. Do not begin construction until inspectors have verified compliance of materials.
   3. Do not use materials that fail tests and inspections.

B. Tests and Inspections:
   1. Joint Firestopping: ASTM E2393.
   2. Penetration firestopping: ASTM E2174.

C. Repair or replace firestopping that is damaged or removed during inspection and testing.

D. Non-Conforming Work: Make corrections or replace, and retest.

E. Enclose firestopping after inspection reports confirm firestopping follows requirements.

3.6 CLEANING AND PROTECTION

A. Remove excess firestopping materials. Do not damage adjacent materials.

B. Protect firestopping installations from damage or deterioration. Repair or replace firestopping that is damaged or removed before Substantial Completion.

END OF SECTION

SECTION 079200

JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Exterior joint seals.
   2. Interior joint seals.

B. Principal Products:
   1. Exterior silicone sealant.
   2. Silane modified polymer sealant.
   3. Butyl sealant.
   4. Silicone air barrier sealant.
   5. Interior color sealant.
   6. Sanitary sealant.
   7. Paintable caulking.

C. Related Requirements.
   1. Section 078400: Firestopping.
   2. Section 092116: Acoustical sealant.

1.2 ACTION SUBMITTALS

A. Submittal Procedures:
   1. Provide submittals for all sealants, exterior and interior, in a single group, regardless of how many subcontractors will install sealants. Multiple submittals for sealants are not acceptable.

B. Product Data:
   1. Each sealant type.
   2. Expanding tape seals.
   3. Initial selection color charts and Samples.

C. Joint Sealant Schedule:
   1. Joint types.
   2. Joint locations.
   3. Sealant types and proprietary products.
   4. Joint sealant colors.

D. Samples:
   1. Cured sealant custom color ribbons; 12 inches minimum length.

1.3 INFORMATIONAL SUBMITTALS

A. Certificates:
   1. Provide written verification and list of products for Work under subsequent work packages that the same proprietary sealants will be used that were used for previous work packages.

B. Test and Evaluation Reports: Manufacturer testing results.
   1. Compatibility between sealant and substrate and priming requirements for each substrate and sealant; test per ASTM C794.
   2. Staining potential; test per ASTM C1248.

C. Field Quality Control Submittals: Field test and inspection reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data.

B. Warranty Documentation: Sealants.

1.5 QUALITY ASSURANCE

A. Qualifications:
   1. Installers: Skilled workers experienced in applying specified sealants and backing materials.

B. Preconstruction Testing: Complete testing 30 days minimum before scheduled field installation or as recommended by manufacturer.
   1. Adhesion: Field Test exterior wall sealants for adhesion to metal, stone, masonry, and concrete per ASTM C794 to determine need for primer and substrate preparation.
   2. Staining: Laboratory Test exterior wall sealants for staining of metal, stone, masonry, and concrete per ASTM C1248.

C. Field Samples: Construct sealant samples, 36 inches, minimum size. Demonstrate color and appearance.
   1. Approved Samples establish work results standard.
   2. Adhesion: Test exterior wall sealant joints per ASTM C1193, Method A in Appendix X1.1 or ASTM C1521, Method A. At joints between different materials, test each joint surface separately.

1.6 FIELD CONDITIONS

A. Ambient Conditions: Perform work within following limitations.
   1. Temperature: Perform work within sealant manufacturer published temperature limits.
   2. Precipitation: None occurring and none predicted within 24 hours.

1.7 WARRANTY

A. Manufacturer Warranty:
   1. Exterior Sealants: Warrant joint sealants will provide a watertight weather seal for the Warranty duration.
      a. Failure includes loss of elastomeric properties and required performance attributes.
      b. For porous substrates, failure also includes discoloration of substrates.
      c. Warranty Period, Silicones: 20 years.

PART 2 PRODUCTS

2.1 SEALANTS - GENERAL

A. Source Control: Provide one proprietary product for each type of sealant required, regardless of what Subcontractor installs the sealant.
   1. Installers of joint sealants under subsequent work packages must use the same proprietary sealants used in the first work package that includes joint sealants.

B. Select proprietary sealants for compatibility with other construction products that the sealants will contact.

C. Multiple colors may be required for exposed sealants to coordinate with substrate colors.

2.2 EXTERIOR EXPOSED NONTRAFFIC SEALANTS

A. Class 100/50 Silicone Nonstaining Sealant: Single component, nonsag, neutral curing; ASTM C920, Type S, Grade NS, Class 100/50, Use NT; classed as nonstaining when tested per ASTM C1248.
   1. Manufacturers and Products:
      a. Dow DOWSIL 790.
      b. GE Construction Sealants s SCS2700 SilPruf. LM.
      c. Pecora Corporation 890FST.
      d. Sika Sikasil WS-290 FPS.
      e. Tremco Spectrem 1.
   2. Colors: Architect selected.
   3. Applications: Exterior penetrations and joints around doors and windows.

B. Paintable Silane-Modified Polymer Sealant: ASTM C920, Type S, Grade NS, Class 50, Use NT, G, M, A and O.
   1. Products of this type include STPE silyl-terminated polyether, STPU silyl-terminated polyurethane, polyurea, and other silane-modified polymer formulations.
   2. Manufacturers and Products:
      a. Pecora Corporation DynaTrol 1-XL.
      b. Sika Sikaflex HY 150.
      c. Tremco Dymonic FC.

2.3 EXTERIOR CONCEALED SEALANTS

A. Butyl Sealant: ASTM C1311.
   1. Manufacturers and Products:
      a. Pecora Corporation BC-158.
      b. Tremco Butyl Sealant.
      c. C.R. Laurence 888.
   2. Applications: Metal flashing lap joints.

B. Silicone Air Barrier Sealant: Single component, nonsag, neutral curing; ASTM C920, Type S, Grade NS, Class 25, Use NT.
   1. Manufacturers and Products:
      a. Dow DOWSIL 758 Silicone Weather Barrier Sealant.
      b. Pecora Corporation AVB Silicone Sealant.
   2. Applications:
      a. Primary air barrier sealant joint between frame of fenestration, door or louver and the air/water resistive membrane within the rough opening, located towards innermost plane of the frame.

2.4 INTERIOR SEALANTS AND CAULKING

A. Interior Color Sealant: Silane-modified polymer sealant or urethane; ASTM C920, Type S, Grade NS, Class 50, Uses T and NT.
   1. Manufacturers and Products:
      a. Pecora Corporation DynaTrol I XL Hybrid.
      b. Sika Sikaflex HY 150.
      c. Tremco Dymeric 240FC.
   2. Colors: Architect selected.
   3. Applications:
      a. Interior joints noted as sealant on Drawings.
      b. Control and expansion joints in tile, except where sanitary sealant is shown.
      c. Terminations of wall coverings at tile and other materials.

B. Sanitary Sealant: Mildew-resistant silicone; ASTM C920, Type S, Grade NS, Class 25 or greater, Use NT.
   1. Manufacturers and Products:
      a. Dow DOWSIL 786 SILICONE SEALANT.
      b. Pecora Corporation; 898 NST.
      c. Tremco Incorporated Tremsil 200 Sanitary.
   2. Colors: Architect selected.
   3. Applications:
      a. Joints around plumbing fixtures and fittings.
      b. Perimeters of lavatory counters.

C. Paintable Caulking: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
   1. Manufacturers and Products:
      a. Pecora Corporation AC20.
      b. Sika MasterSeal NP 520.
      c. Tremco Tremflex 834.

2. Applications:
    a. Interior joints noted as caulking.
    b. Joints, crevices, and irregularities wider than hairline joints in or between dissimilar materials and painted surfaces.
    c. Perimeters of door frames, frames and trim for glazing, and frames or trim for other wall and ceiling openings at painted surfaces.

2.5 INSTALLATION ACCESSORIES

A. Primer: As required by sealant manufacturer.

B. Backer Rod: ASTM C1330, Type C, closed-cell or Type O, open-cell, manufacturer recommended types.

C. Bond Breaker Tape: Self-adhesive plastic tape to prevent sealant from adhering to back of joint.

D. Cleaners: Manufacturer recommended types.

E. Masking: Non-staining, self-adhesive.

2.6 MIXES

A. Multicomponent Sealants: Mix components immediately before use.

B. Field-Tinted Products: Mix colorant with base to uniform consistency and custom color.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean joint surfaces for optimum adhesion. Remove dirt, moisture, and incompatible substances.

B. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.

C. Remove laitance and form release agents from concrete.

D. Existing Joints: Cut out and remove existing joint sealants down to original substrate. Small amounts of elastomeric sealants left in surface irregularities of concrete and masonry may be left in place subject to Architect approval, provided that they are securely bonded to surface, are compatible with new sealant, and are tested to demonstrate that suitable adhesion with new sealant can be achieved. Where these conditions cannot be met, remove existing sealants completely.

E. Prime joint surfaces where recommended by sealant manufacturer. Protect adjacent surfaces from misapplication or spillage of primer.

F. Mask surfaces adjacent to joints to receive elastomeric sealants. Remove masking after tooling.

3.2 INSTALLATION

A. Installation Reference Standard: Follow ASTM C1193.

B. General Installation Requirements:
   1. Exterior Joint Sealants: Provide continuous, weatherproof seals to prevent infiltration of air and water through the joints.
   2. Interior Joint Sealants: Provide continuous seals to prevent air and smoke infiltration through the joints in which they are installed. Install sanitary sealant to prevent water infiltration.
   3. Appearance: Apply sealants with smooth surfaces free of gaps, voids, bubbles, lumps, crevices, runs, drips, striations, and other irregularities.

C. Set joint filler units at uniform depths in joints to support sealants and maintain proper sealant cross section shape and depth recommended by manufacturer for each application.

D. Set joint filler for sealant neck dimension 1/3 of joint width, maximum, or as recommended by manufacturer for application.

E. Install joint fillers under compression and friction fit. Do not install filler units that have absorbed water.
   1. Do not leave voids or gaps between ends of joint filler units.
   2. Do not stretch, twist, puncture, or tear joint fillers.
   3. Remove joint fillers that have absorbed moisture or which have ruptured gas cells and install suitable new fillers before sealant application.

F. Install bond breaker tape where shown on Drawings or where joint filler is not used to prevent adhesion to back of joint.

G. Deposit sealants in uniform, continuous ribbons without gaps or air pockets.

H. Tool sealants to ensure full adhesion. Form smooth, slightly concave surface.

I. Cure joint sealants.

3.3 FIELD QUALITY CONTROL

A. Field Tests and Inspections: Engage inspectors to perform tests and inspections and prepare reports. Allow inspectors access to work areas.
   1. Failed Test Retest Cost: Contractor responsibility.
   2. Do not use materials that fail tests and inspections.

B. Adhesion Testing: ASTM C1521, Method A.
   1. Perform two tests.
   2. Report Content:
      a. Presence of voids and discontinuities.

b. Sealant dimensions and seal shape.
c. Failures in adhesion and cohesion.

C. Non Conforming Work: Remove sealants that do not pass tests, reapply sealant, and retest.

3.4 CLEANING

A. Clean spills, misapplications, and material migrations immediately as they occur.

B. Clean marred surfaces by whatever means are necessary to eliminate evidence of spillage.

END OF SECTION

SECTION 088000

GLAZING

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Glazing at storefront doors.
   2. Safety glazing at cabinets.

B. Principal Products:
   1. Insulated glazing units.
   2. Monolithic glazing, tempered.
   3. Glazing film.

C. Related Requirements.
   1. Section 081433 Stile and Rail Wood Doors.
   2. Section 084113 Aluminum Framed Entrances and Storefronts.
   3. Section 085200 Wood Windows: Glass in factory-glazed windows.

1.2 REFERENCES

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
   1. Coordinate Work results of this section with frames for glazing installation.

B. Preinstallation Meeting Attendees and Procedures:
   1. Conduct meeting one week, minimum, before starting Work of this Section.

1.4 ACTION SUBMITTALS

A. Product Data:
   1. Each type of glass.

B. Samples: 12 by 12 inch Samples of each glass type except clear monolithic.

1.5 INFORMATIONAL SUBMITTALS

A. Test and Evaluation Reports: Independent testing agency test results showing:

1.6 CLOSEOUT SUBMITTALS

A. Warranty Documentation: For insulating glass.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: NACC certified Contractor or certified under National Glass Association Certified Glass Installer Program.

1.8 FIELD CONDITIONS

A. Ambient Conditions:
   1. Temperature: Minimum 40 degrees F and rising.
   2. Install glass only when glazing frames are free of moisture, including condensation, frost, and ice.

1.9 WARRANTY

A. Manufacturer Warranty:
   1. Coated Glass: Warrant against peeling, cracking, or other coating deterioration.
      a. Warranty Period: Ten years.
   2. Insulating Glass: Warrant against the following:
      a. Edge seal failure.
      b. Internal condensation that does not dissipate.
      c. Spacer delamination.
      d. Warranty Period: Ten years.

PART 2 PRODUCTS

2.1 BASE GLASS

A. Clear Glass: ASTM C1036, Type I, Class 1, Quality-Q3.

B. Manufacturers:
   1. Guardian.
   2. Oldcastle Building Envelope.
   3. Pilkington.
   4. Vitro.

2.2 HEAT TREATED GLASS

A. Heat Treated Glass: ASTM C1048, Type 1, Quality Q3; free of mosaic or pattern distortion visible from fixed viewpoint and other defects caused by roller pick.
   1. Tempered Glass: Kind FT.

B. Roll Ripple Surface Wave Tolerances:
   1. Tempered Glass: 0.005 inch, maximum.

C. Roll Ripple Orientation: Horizontal.

D. Fabricate heat treated units with permanent label in consistent location at either lower corner.

2.3 COATED GLASS

A. Vacuum Deposition Coated Glass: ASTM C1376.
   1. Insulating Glass: Delete or omit coating from glass edges where spacer sealant is applied.

2.4 INSULATING GLASS

A. Insulating Glass Units: Factory assembled double pane units tested per ASTM E2190 and certified by IGCC.

B. Warm Edge Spacer Strips: Stainless steel with desiccant fill.
   1. Manufacturers and Products:
      a. Quanex Building Products Duraseal.
      b. Technoform TGI-Spacer M.
      c. Viracon VTS.
      d. Vitro Intercept.

C. Space Fill: Dehydrated air.

D. Edge Seals:
   1. Primary Seal: Black polyisobutylene.
   2. Secondary Seal: Silicone.
   3. Structural Silicone Glazing: Edge seals tested for compatibility with silicone glazing sealant used on Project.

2.5 GLAZING FILM

A. Glazing Film: Polyester film with pressure sensitive, clear adhesive back and releasable protective backing.
   1. Manufacturers and Products:
      a. 3M.
      b. Avery Dennison Graphics.
      c. FDC Graphic Films, Inc.
   2. Application: Signage lettering on door glazing.

2.6 GLASS TYPES

A. Glass at Interior Casework: 6 mm clear glass, tempered.

B. Glass at Exterior Storefront Doors: Insulating unit.
   1. Manufacturers and Products:
      a. Vitro Solarban 60 Clear + Clear, as basis of design.
   2. Thickness: 1 inch.
   3. Outer Lite: 6 mm tempered glass.
      a. Tint: Clear.
      b. Vacuum Deposition Coating: Low Emissivity, #2 surface.
   4. Inner Lite: 6 mm tempered glass.
      a. Tint: Clear.
   5. Optical and Thermal Performance:
      a. Visible Light Transmittance: 70 percent, maximum.
      b. Summer U-Factor: 0.027, maximum.
      c. Winter U-Factor: 0.029, maximum.
      d. Solar Heat Gain Coefficient: 0.38, maximum.
      e. Shading Coefficient: 0.44, maximum.

2.7 INSTALLATION MATERIALS

A. Setting Blocks: ASTM C864, neoprene or EPDM, or ASTM C1115, silicone; 80 to 90 Shore A durometer hardness.

B. Spacers: ASTM C864, neoprene or EPDM, or ASTM C1115, silicone; 50 to 60 Shore A durometer hardness.

C. Glazing Gaskets: Specified with framing system.

D. Interior Glazing Tape: ASTM C1281 and AAMA 800; butyl based elastomeric tape with integral resilient tube spacer, 10 to 15 Shore A durometer hardness, coiled on release paper; widths required for installation.
   1. Color: Black.

2.8 PERFORMANCE

A. Impact:
   1. Safety Glazing: 16 CFR 1201, Category II.

2.9 FABRICATION

A. Fabricate before delivering glass to site.

B. Provide code required permanent labels in locations that will be visible but inconspicuous after installation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Framing is ready to receive glazing.
   2. Weep systems are unblocked and functional.
   3. Face and edge clearances are sufficient.
   4. Framing joints are properly sealed.

B. Examine glass lites for damage and defects before installation.

C. Do not install tempered glass with noticeable roller pick optical distortion.

3.2 PREPARATION

A. Clean glazing channels and rabbets; remove loose materials and moisture.

B. Remove protective coatings on metal surfaces.

C. Clean glass just before installation.

3.3 INSTALLATION - GENERAL

A. Install glass without direct contact on framing surfaces.

B. Maintain manufacturer recommended edge and face clearances between glass and frame members.

C. Set glass centered in openings on setting blocks.

D. Provide edge blocking needed to prevent sideways movement of glass in framing.

E. Set glass with correct orientation of exterior side.

3.4 INSTALLATION - GASKET GLAZING

A. Fabricate gaskets to fit openings.

B. Install gaskets in single pieces on each side of opening with joints only at corners.

C. Where recommended by framing system manufacturer, seal corners watertight.

D. Compress gaskets to produce weathertight seal without causing bending stresses in glass.

3.5 INSTALLATION - TAPE GLAZING

A. Install tape on fixed stop form continuous airtight seals. Do not stretch tapes to make them fit.

B. Butt tape corners with full contact.

C. Install tape projecting slightly above sight line.

D. Insert spacer shims between glass and applied stops at 24 inch intervals, but not less than 2 per side, and 1/4 inch below sight line.

E. Install removable glazing stops in full contact with tape.

F. Trim protruding tape edges flush with stops.

3.6 CLEANING

A. Remove nonpermanent labels and clean surfaces after installation.

B. Clean glass on both sides shortly before inspection for Substantial Completion.

3.7 PROTECTION

A. Protect glass vulnerable to damage with streamers attached to framing.

B. Exterior Glass:
1. Protect glass from contact with contaminating substances and overspray of water repellent on adjacent surfaces.
2. Examine glass surfaces below concrete or masonry for alkaline deposits and dirt, and remove such soiling when observed.
3. Provide new replacement units for damaged glass, including glass with stains or etching that cannot be removed.

END OF SECTION

SECTION 090561

COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Test concrete floor slabs for moisture and alkalinity.
   2. Prepare existing concrete slabs for the following flooring types:
      a. Tile carpet.
   3. Remediate concrete floor slabs due to unsatisfactory moisture or alkalinity conditions.

B. Principal Products:
   1. Testing apparatus.
   2. Patching and self-leveling compounds.
   3. Remedial floor coatings.

C. Related Requirements:
   1. Section 096813: Tile carpeting.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting Attendees and Procedures:
   1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data:
   1. Floor Covering and Adhesive Manufacturer Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
      a. Moisture and alkalinity limits and test methods.
      b. Manufacturer required bond/compatibility test procedure.
   2. Remedial Materials:
      a. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.

1.4 INFORMATIONAL SUBMITTALS

A. Visual Observation Report: For existing floor coverings to be removed.

B. Testing Agency Report:
   1. Description of areas tested; include floor plans and photographs if helpful.
   2. Summary of conditions encountered.

3. Moisture and alkalinity test reports.
4. Copies of specified test methods.
5. Recommendations for remediation of unsatisfactory surfaces.
6. Include certification of accuracy by authorized official of testing agency.
7. Submit report to Architect and Owner two Business Days, maximum after conclusion of testing.

C. Adhesive Bond and Compatibility Test Report.

D. Specimen Warranty: Issued by remedial material manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Warranty Documentation: For remedial floor coatings.

1.6 QUALITY ASSURANCE

A. Testing Agency: Employ and pay for an independent testing agency to perform moisture and alkalinity testing.
   1. Qualifications: Experienced in specified testing methods.
   2. Contractor Responsibility Relating to Independent Agency Testing:
      a. Provide access for and cooperate with testing agency.
      b. Confirm date of start of testing at least 10 days before actual start.
      c. Allow at least 4 Business Days on site for testing agency activities.
      d. Achieve and maintain specified ambient conditions.
      e. Notify Owner when specified ambient conditions have been achieved and when testing will start.

B. Mockup: Construct and test mockup per ASTM F3010.

C. Remedial Coating Installer Qualifications: Flooring preparation specialist company, trained or employed by coating manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store materials in manufacturer packaging; include installation instructions.

B. Keep materials from freezing.

1.8 FIELD CONDITIONS

A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours before testing, at not less than 65 degrees F or more than 85 degrees F.

B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours before testing, at not less than 40 percent and not more than 60 percent.

PART 2 PRODUCTS

2.1 FLOORING PREPARATION MATERIALS

A. Patching and Self-Leveling Compound:
   1. Cementitious moisture, mildew, and alkali resistant compound, compatible with floor, floor covering, and floor covering adhesive, capable of being installed to thicknesses shown, and feathered to nothing at edges.
   2. Compressive Strength: 4000 psi, minimum after 28 days per ASTM C109/C109M or ASTM C472, whichever is appropriate.

B. Flooring Adhesive: Floor covering or adhesive manufacturer recommended product, suitable for the moisture and pH conditions present.
   1. VOC Content: 50 g/L, maximum.

C. Remedial Floor Coating: Single or multilayer coating or coating/overlay combination.
   1. Manufacturers and Products: Testing agency recommended.
   2. Primer: Manufacturer recommended for selected assembly.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Follow ASTM F3010.

3.2 CONCRETE SLAB PREPARATION - NORMAL WEIGHT CONCRETE

A. Follow recommendations of testing agency and ASTM F3010.

B. Perform following operations in this order:
   1. Existing on-grade and elevated concrete slabs with existing floor coverings:
      a. Observe existing floor covering for adhesion, water damage, alkaline deposits, and other defects.
      b. Remove existing floor covering.
   2. Existing concrete slabs with coatings or penetrating sealers/hardeners/dustproofers:
      a. Do not attempt to remove coating or penetrating material.
      b. Do not abrade surface.
   3. Perform preliminary cleaning.
   4. Internal Relative Humidity Testing: Three tests in the first 1000 square feet and one test in each additional 1000 square feet, or flooring manufacturer recommended frequency.
   5. Alkalinity Tests: Relative humidity test locations.
   6. Specified remediation, if required due to relative humidity test result.
   7. Patching, smoothing, and leveling.
   8. Other preparation specified in finish flooring sections.
   9. Adhesive bond and compatibility test.
   10. Apply protection.

C. Remediations:
   1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct before doing any other remediation; retest after correction.
   2. Excessive Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating over entire suspect floor area.
   3. Excessive Alkalinity:
      a. If remedial floor coating is necessary to address excessive moisture, no additional remediation is required for pH.
      b. If an adhesive that is resistant to the pH level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

3.3 EXISTING FLOOR COVERINGS REMOVAL

A. Follow local, State, and federal regulations and RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, applicable to floor covering being removed.

3.4 PRELIMINARY CLEANING

A. Clean floors, remove adhesion inhibiting substances.

B. Do not use solvents for cleaning.

3.5 INTERNAL RELATIVE HUMIDITY TESTING

A. Where the floor covering manufacturer requirements conflict with either the referenced test method or this Specification, follow the manufacturer requirements.

B. Testing: ASTM F2170 Procedure A. Calcium Chloride and electrical impedance or resistance testing may not be substituted.

C. If test values exceed floor covering manufacturer limits, perform remediation. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.

D. Report the information required by the test method.

3.6 ALKALINITY TESTING

A. Where the floor covering manufacturer requirements conflict with either the referenced test method or this Specification, follow the manufacturer requirements.

B. Use a wide range alkalinity test paper, its associated chart, and distilled or deionized water.

C. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1

inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity test paper into the water, remove it, and compare immediately to chart to determine alkalinity reading.

D. In the event that test values exceed floor covering manufacturer limits, perform remediation. In the absence of manufacturer limits, perform remediation if alkalinity test value exceeds 10.

3.7 PREPARATION

A. See individual floor covering sections for additional requirements.

B. Follow recommendations of testing agency.

C. Fill and smooth surface cracks, grooves, depressions, control joints and other nonmoving joints, and other irregularities with patching compound.

D. Do not fill expansion joints, isolation joints, or other moving joints.

3.8 ADHESIVE BOND AND COMPATIBILITY TESTING

A. Follow requirements and recommendations of floor covering manufacturer.

3.9 APPLICATION OF REMEDIAL FLOOR COATING

A. Mix and apply remedial floor coating.
   1. Prohibit traffic during application.
   2. Honor substrate control, isolation and expansion joints.
   3. Prime substrate, and apply floor coating in layers as recommended by manufacturer.
   4. Allow coating to cure before applying finish flooring.

3.10 PROTECTION

A. Cover prepared floors with building paper or other durable covering until finish flooring is installed.

END OF SECTION

SECTION 092116

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Gypsum board assemblies for interior walls and ceilings.

B. Principal Products:
   1. Interior metal partition framing.
   2. Gypsum board.
   3. Tile backer panels.
   4. Sound attenuation blanket.
   5. Installation materials.

C. Related Requirements.
   1. Section 093000: Tiling.
   2. Section 099000: Painting and coatings.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting:
   1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data.

B. Shop Drawings:
   1. Grid suspension system.

C. Samples:
   1. Trim Accessories: 12-inch lengths of trim other than edge beads and control joints.

1.4 INFORMATIONAL SUBMITTALS

A. Delegated Design Submittals:
   1. Non-structural metal framing, for deflection limits under horizontal loading. Indicate the following for each partition type and height:
      a. Stud size.
      b. Stud thickness.
      c. Spacing.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements: ASTM C840.

PART 2 PRODUCTS

2.1 FRAMING - GENERAL

A. Framing Members and Components - General: AISI S220.
   1. Protective Coating: ASTM A653/A653M, G60, hot-dip galvanized. EQ coatings following AISI S220 that have ICC-ES Evaluation Reports are acceptable.

2.2 PARTITION FRAMING

A. Standard Studs and Tracks:
   1. Depth: See Drawings.
   2. Thickness: As required by horizontal deflection performance.

B. Deflection Top Track: If adjustable-height deflection studs are not used,Provide the following:
   1. Single Long-Leg Track: Steel top track with 2 inch deep flanges; studs friction fit.
   2. Steel Thickness: Match studs.

C. Factory Curved Track: Prefabricated, factory-curved members, cut to length.
   1. Manufacturers and Products:
      a. ClarkDietrich 360TRAK.
      b. Flex-Ability Concpets, Flex-C Trac.
      c. Radius Track Corp Curved-Right.
      d. The Steel Network, CirclTrak.
   2. Curve Type: See Drawings.
   3. Arc Radius: See Drawings.

D. Hat-Shaped Furring Channels:
   1. Minimum Thickness: 33 mils.
   2. Depth: See Drawings.

E. Bridging: Cold-rolled steel channels, 54 mil thick, with minimum 1/2 inch wide flanges.
   1. Depth: 1-1/2 inches.

2.3 SUSPENSION SYSTEMS

A. Anchorage Devices: Power-actuated fasteners, fabricated with loops for attaching wire hangers.

B. Wire Hangers: ASTM A641, zinc coated, 0.16 inch minimum diameter.

C. Rigid Hangers: One of the following types.
   1. Rods: Mild steel, minimum 1/4 inch diameter, hot-dip galvanized per ASTM A153.
   2. Flat Strap: Mild steel, minimum 1 by 1/8 inch size, hot-dip galvanized per ASTM A153.

3. Angles: Formed steel sheet, minimum 7/8 inch legs and 0.040 thickness, G90 hot-dip galvanized per ASTM A653.

D. Cold-Rolled Carrying Channels:
1. Minimum Thickness: 54 mils.
2. Depth: See Drawings.

E. Hat-Shaped Furring Channels:
1. Minimum Thickness: 33 mils.
2. Depth: See Drawings.

F. Grid Suspension System: Direct-hung, pre-engineered ceiling suspension system.
1. Manufacturers and Products:
a. Armstrong World Industries Drywall Grid Systems.
b. Rockfon Chicago Metallic Drywall Grid.
c. USG Drywall Grid.
d. Comparable product submitted and accepted.

2.4 GYPSUM BOARD

A. Moisture- and Mold-Resistant Gypsum Board: ASTM C1396.
1. Manufacturers and Products:
a. CertainTeed M2Tech Mold Resistant.
b. Georgia-Pacific Gypsum ToughRock Mold-Guard.
c. National Gypsum Gold Bond XP.
d. USG Corp Sheetrock MoldTough.
2. Core: 5/8 inch Type X.
3. Mold Resistance: 10 per ASTM D3273.

2.5 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Gypsum Backing Board: ASTM C1178/C1178M.
1. Core: 5/8 inch, Type X.
2. Mold Resistance: 10 per ASTM D3273.

2.6 BACKING

A. Contractor Option: Use manufactured, preformed sheet steel backing, manufactured flexible wood backing system, or flat strap backing plates.

B. Manufactured, Preformed Sheet Steel Backing: 6 inch wide, 68 mil steel, formed to fit stud spacing.
1. Manufacturers and Products:
a. Perfect Wall, Inc. Flush-Mount Flat Reinforced Backing.

C. Wood Backing System: Fire-retardant treated wood and predrilled steel clips.
1. Manufacturers and Products:
a. ClarkDietrich Danback.

b. SCAFCO Kwik-Back.

D. Flat Strap Backing Plates: Steel sheet screwed to studs.
1. Width: 6 inches minimum or as needed for secure anchorage of wall-mounted items.
2. Thickness: 63 mils minimum where supporting the following items.
a. Handrails, grab bars, and other items that support live loads.
b. Wall-supported counter tops and cabinets.
c. Electrical panels.
d. Electrically-operated fixtures, furnishings, or equipment.
e. Large lighting fixtures.
f. Wall mounted televisions and monitor screens.
g. Large artwork.
3. Thickness: 33 mils minimum where supporting the following items.
a. Small lighting fixtures.
b. Anchorage for base cabinets.
c. Small artwork.

2.7 PERFORMANCE

A. Delegate stud framing to manufacturer licensed Structural Engineer.
1. Select stud thicknesses and spacing from manufacturer load and deflection tables to meet performance requirements, including wall-mounted element supports such as handrails and wall cabinets.

B. Structural Design Criteria:
1. Horizontal Partition Load: 5 psf.
2. Vertical Ceiling Load: Supported material dead load.
3. Partition Horizontal Deflection Limits:
a. Partitions: 1/240 of wall height.
4. Ceiling Vertical Deflection Limits: 1/360 of span.

C. Fire Resistance: Assemblies tested per ASTM E119.
1. Fire Ratings: See Drawings.

D. Acoustic Performance:
1. STC: Tested per ASTM E90, classified per ASTM E413. See Drawings for STC ratings.

2.8 FIRESTOPPING COMPONENTS

A. Wall Head Joint Firestopping: Section 078400.

B. Firestop Track: One of the following types.
1. Top track manufactured to accommodate structural deflection while maintaining fire-resistance-rated assembly continuity.
a. Manufacturers and Products:
1) CEMCO FAS-Track.
2) ClarkDietrich BlazeFrame DL 2.
3) Fire Trak Corp Fire Trak System.
4) Metal-Lite The System.

5) Comparable product submitted and accepted.

2. Intumescent Firestop Seal: One-piece, pre-formed foam seal fitting over top tracks.
   a. Manufacturers and Products:
      1) Hilti, Inc. Model CFS-TTS, Firestop Top Track Seal.
   b. Width: Accommodating track depth.

2.9 ACOUSTICAL FRAMING COMPONENTS

A. Resilient Furring Channels: Asymmetrical, 1/2 inch deep.

B. Acoustical Furring Clips: Molded rubber and galvanized steel mount clip used to attach furring and gypsum wallboard wall or floor/ceiling assemblies.
   1. Manufacturers and Products:
      a. PAC International RSIC-1.
      b. Pliteq Inc. GenieClip.
      c. Comparable product submitted and accepted.

2.10 INSTALLATION COMPONENTS

A. Framing Installation:
   1. Anchors: Framing manufacturer recommended types for substrates.
   2. Fasteners: ASTM C1002; Type S or GA-216; length to suit application.
   3. Tie Wire: ASTM A641, zinc coated, 0.062 inch diameter, minimum.
   4. Acoustic Gaskets: Closed-cell foam self-adhesive strips allowing fastener penetration without foam displacement, 1/8 inch thick minimum, widths to match stud sizes.
   5. Exterior Wall Isolation Strips:
      a. Asphalt-Saturated Organic Felt: ASTM D226, Type I, #15 asphalt felt, nonperforated.
      b. Foam Gaskets: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, stud-appropriate width.

B. Interior Trim: ASTM C1047.
   1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, and plastic.
   2. Shapes: Cornerbead.

C. Aluminum Trim: Extruded units.
   1. Manufacturers:
      a. Fry Reglet Corp.
      b. Gordon, Inc.
      c. Pittcon Industries.
   2. Finish: Clear anodized.
   3. Profiles: See Drawings.

D. Sound Attenuation Blankets: ASTM C665, Type I, unfaced semi rigid mineral wool or fiberglass, thickness shown on Drawings, sized for friction fit.
   1. Surface Burning Characteristics: ASTM E84.
      a. Flame Spread: 25 maximum.
      b. Smoke Developed: 50 maximum.
   2. Fire Rated Partitions: Insulation type required by fire resistance designs referenced on

Drawings.

E. Acoustic Sealant: ASTM C834; nonsag, paintable, nonstaining, butyl-free, latex sealant.
   1. Manufacturers and Products:
      a. Accumetric LLC BOSS 824 Acoustical Sound Sealant.
      b. GE Construction Sealants RCS20.
      c. Grabber Construction Products Acoustical Sealant GSC.
      d. Hilti, Inc. CP509 Smoke and Acoustical Sealant.
      e. Pecora Corporation AC-20 FTR.
      f. Specified Technologies, Inc. Smoke N Sound Acoustical Sealant.
      g. USG Corporation SHEETROCK Acoustical Sealant.
   2. Fire Rated Partitions: Acoustical sealant type required or permitted by fire resistance designs shown on Drawings.

F. Electrical Box Pads: Moldable non-curing one component, intumescent, fire-rated material for through-penetration fire stop systems and sound attenuation systems; self-adhering; 1/8 inch thick, minimum.
   1. Manufacturers and Products:
      a. Kinetics Noise Control Fire-Rated Isobacker.
      b. Specified Technologies, Inc. SpecSeal Firestop Putty Pads.
      c. Comparable product submitted and accepted.

G. Gypsum Board Fasteners:
   1. Metal Framing 33 mils Thick and Less: ASTM C1002, Type S.
   2. Metal Framing Greater than 33 mils Thick: ASTM C954.

H. Tile Backer Board Fasteners: Board manufacturer standard, corrosion resistant steel.

I. Joint Materials:
   1. Interior Gypsum Board: ASTM C475/C475M; products compatible with substrate and other coatings applied to surface.
      a. Skim Coat For Final Coat of Level 5 Finish: Spray-applied high-build coating.
   2. Tile Backer Board: Product recommended by backer unit manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify rough-in utilities in are proper locations.

B. Examine panels for moisture and mold; discard damaged panels.

3.2 INSTALLATION - PARTITION FRAMING

A. Framing to Structure: Extend partition framing to underside of structure. Attach ceiling track to structure.

B. Framing to Ceiling: Extend framing to ceiling. Attach ceiling track to ceiling framing.

C. Brace stud framing system rigid; attach bridging to prevent stud rotation.

D. Orient stud flanges the same direction within wall assembly.

E. Stud Spacing:
   1. Single-Layer Applications: See Drawings.
   2. Tile Backer Applications: See Drawings.

F. Install backing where shown and where supporting wall-mounted fixtures, furniture, equipment, or other construction.

G. Fire-Resistance-Rated Partitions: Tested assembly requirements.

H. Firestop Track: Tested assembly requirements.

I. Acoustic Accessories and STC-Rated Assemblies: Follow tested assembly requirements.
   1. Acoustical Sealant Beads: ASTM C919. Close off sound-flanking paths.
   2. Electrical Box Seals:
      a. Install seals before installing gypsum board.
      b. Overlap front edge of box so that seals will be compressed around edges of box as gypsum panels are installed.
   3. Sound Attenuation Blankets:
      a. Install after one side of gypsum is installed and mechanical and electrical work is complete in framing spaces.
      b. Fit tight around cut openings and penetrations, and behind and around electrical and mechanical items.
      c. Pack around door and window frames, between jamb studs, in boxed headers, and in other voids.

J. Deflection Accommodation: Install deflection top track systems to prevent axial loading of finished assemblies.

K. Framed Openings:
   1. Install two studs at each jamb or as shown on Drawings.
   2. Headers: Install track on top of header for installation of cripple studs.

L. Curved Partitions:
   1. Bend track to uniform curve of radius shown on Drawings.

M. Direct Furring:
   1. Anchor furring channels spaced 16 inches to substrate.
      a. Exterior Walls: Install isolation strip between furring and exterior walls.

3.3 INSTALLATION - SUSPENSION SYSTEMS

A. Suspension System Spacing:
   1. Hangers: 48 inches.
   2. Main Runners: 48 inches.
   3. Furring Channels: 16 inches.

B. Isolate suspension systems from building structure and other objects within ceiling plenum.

C. Wire, Flat, and Rod Hangers: Install plumb.
   1. Splay hangers where required to avoid contact with obstructions.
   2. Attach securely to building structural elements.
   3. Do not attach to steel roof deck.
   4. Do not connect or suspend from ducts, pipes, or conduit.

D. Large Obstructions: Install supplemental suspension members and hangers, sized to span across objections and support ceiling loads.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Install per ASTM C636.
   1. Install additional hanger wires or metal supports at lighting fixtures air vents, and other ceiling-mounted equipment.

3.4 INSTALLATION - FRAMING TOLERANCES

A. Deviation from Indicated Position: 1/8 inch in 10 feet, maximum.

B. Deviation from Plumb and Level: 1/8 inch in 12 feet, maximum.

3.5 INSTALLATION - ELECTRICAL BOX SEALS

A. Install seals before installing gypsum board.

B. Overlap front edge of box so that seals will be compressed around edges of box as gypsum panels are installed.

C. Applications:
   1. Electrical boxes in fire barriers, smoke barriers, and STC-rated walls.
   2. Electrical boxes at interior gypsum board faces of exterior walls.

3.6 INSTALLATION - INTERIOR GYPSUM BOARD

A. Follow ASTM C840.
   1. Fire-Rated Partitions: Install per tested designs referenced on Drawings.
   2. Acoustically-Rated Partitions: Install per tested designs referenced on Drawings.

B. Cut panels to fit obstructions and openings without tearing face paper or cracking core.

C. Install panels with face side out with lightly butted joints.

D. Stagger joints on opposite sides of partitions.

E. Locate panel ends over support framing.

F. Fit panels to ducts, pipes, conduit, and other penetrations and obstructions with maximum 1/4

inch joints.

G. Attach gypsum board to framing and to supplementary framing and blocking provided for additional support at openings and cutouts.

H. Form control joints and expansion joints with space between edges of boards, prepared to receive trim accessories.

I. Isolate perimeter of non-loadbearing drywall partitions from structural members. Provide 1/4 to 1/2-inch space and trim edge with edge bead. Seal joints with acoustical sealant.

J. Single Layer Installation:
   1. Install panels vertically with long edges on continuous supports.
   2. Attach panels to framing with screws.

K. Curved Surfaces:
   1. Apply flexible gypsum board in two layers with joints staggered one stud space, minimum.
   2. Extend curved boards one stud space minimum onto adjacent flat wall area.
   3. Screw both layers independently to framing.

3.7 INSTALLATION - TRIM

A. Control Joints: Install where shown on Drawings and per ASTM C840 and as follows.
   1. Locations of control and expansion joints in substrate or framing.
   2. Walls:
      a. At changes in backup material.
      b. Above one jamb of doors.
      c. Maximum 30 feet on center.
   3. Ceilings:
      a. At locations where ceiling framing or furring changes direction.
      b. Maximum 50 feet on center.

B. Corner Bead: Outside corners.

C. Casings: Install at termination joints with other construction or where edges are exposed.

D. Reveals: Install trim plumb, level, accurately aligned, and fitted neatly with hairline joints.
   1. Cut trim with sharp power saw and file cut edges to remove burrs.
   2. Miter joint at changes in direction or plane, except that inside corners may be coped.
   3. Apply masking tape or other protection to reveal surfaces before starting drywall finishing.
   4. Rated Fire and Smoke Barriers and Non-Rated Smoke Partitions: Install reveals to maintain rating.
   5. Routing of gypsum board to create reveals is not acceptable.

3.8 GYPSUM BOARD FINISHING

A. Reference Standard: ASTM C840.

B. Finish panel joints, inside corners, trim flanges, fastener heads, and surface defects to provide smooth, continuous surfaces of monolithic appearance that are suitable for applied finishes.

C. Do not fill spaces around penetrations through fire resistive assemblies with joint compound. Leave space for firestopping.

D. Finish Levels:
   1. Level 1: Surfaces in plenums and other concealed areas.
   2. Level 4: Surfaces that receive flat or low sheen paint.
   3. Level 5: Surfaces that receive semigloss or gloss paint, surfaces that are in edge-lit locations, and Surfaces to receive wallcovering.

3.9 IDENTIFICATION

A. Identify fire rated walls and partitions and other walls required to have protected openings or penetrations.
   1. Locations: Within 4 ft of corners and maximum 12 feet between on both sides.
      a. In spaces without ceilings, locate signs minimum 10 ft above finish floor and not blocked from view by ducts, structure, or other elements.
   2. Signs: Painted stencil signs with minimum 4-inch high letters and 1/2-inch strokes, or as required by authorities having jurisdiction, or approved self-adhesive signs.
   3. Text: Use following or as required by authorities having jurisdiction.
      a. 1-HOUR FIRE BARRIER – FIRESTOP ALL PENETRATIONS.
      b. NON-RATED SMOKE PARTITION – SEAL ALL PENETRATIONS.

3.10 ADJUSTING

A. Water-Exposed Products: Remove entire panels; do not cut and patch gypsum board.

3.11 CLEANING

A. Remove spills, spatters, and misapplications of finishing materials as they occur.

B. Repair other finish surfaces damaged during drywall operations.

3.12 PROTECTION

A. Protect adjacent surfaces from gypsum panel compounds, adhesives, and sealants.

B. Protect finished gypsum panels from being marred from ongoing work.

END OF SECTION

SECTION 095400

SPECIALTY CEILINGS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Felt panel ceiling.

B. Principal Products:
   1. Felt panels.

1.2 ACTION SUBMITTALS

A. Product Data:
   1. Panel fabrication and acoustical properties.

B. Shop Drawings.
   1. Show grid layout and panel identification for each ceiling.
   2. Include mechanical and electrical items installed in ceilings.

C. Samples:
   1. Each panel type, full size.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data.

B. Warranty Documentation.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials:
   1. Ceiling Finish Components: Unused panels plus 2 percent, minimum, of installed materials.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Handle factory finished products to avoid damaging units and finishes.

1.6 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations.
   1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

B. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

1.7 WARRANTY

A. Manufacturer Warranty: Warrant against warping, and fabric sagging, distortion, or delamination.
   1. Warranty Period: 20 years.

PART 2 PRODUCTS

2.1 SOUND ABSORBING PANELS

A. Solid PET Panels, PET-1: Non-woven formed polyester felt (PET) fiber panels with color throughout
   1. Manufacturers and Products:
      a. FSorb
   2. Thickness: 1 inch.
   3. Size and Color: 48” x 96”, White #100, see Drawings for layout
   4. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
   5. NRC: 0.70, minimum.
   6. Accessories: Provide fasteners, adhesive, and components as required for installation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that fastener layout will not interfere with other Work.

B. Verify that major Work at ceiling is complete and inspected before installing.

C. Do not begin installation until substrates have been properly prepared.

3.2 INSTALLATION

A. Locate system in accordance to the reflected plan and/or elevations. Install acoustical panels in location indicated. Follow the installation recommendations of the manufacturer. Align panels accurately, with edges plum and top edges level.

B. Install panels to construction tolerance of plus or minus 1/8 inch for the following:
   1. Plumb and level
   2. Flatness
   3. Width of joints

C. Cutting Acoustical Units: Make field cut edges of same profile as factory edges

D. Fit units in place, free from damaged edges or other defects detrimental to appearance and function.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Install units using adhesives and mechanical fasteners to ceilings per manufacturers installation recommendation.

G. Lay directional pattern units with pattern running as shown on Drawings.

3.3 TOLERANCES

A. Plane: 1/8 inch variation in 10 feet, maximum, measured in any direction.

3.4 ADJUSTING

A. Touch up minor scratches and abrasions to match factory finish.

B. Provide new components to replace damaged components that cannot be satisfactorily cleaned or repaired.

3.5 CLEANING

A. Remove loose threads.

B. Remove dust and soiling without disturbing fabric texture.

END OF SECTION

SECTION 096500

RESILIENT FLOORING

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Resilient wall base.

B. Principal Products:
   1. Rubber wall base.
   2. Installation materials.

C. Related Requirements.
   1. Section 096813: Tile carpeting.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting Attendees and Procedures:
   1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data:
   1. Installation materials.

B. Product Schedule: Resilient flooring products.

C. Samples:
   1. Resilient Base: 12 inch length of each product.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For resilient flooring.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
   1. Store resilient flooring indoors and within ambient temperature range recommended by manufacturer.

1.6 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations.
   1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.
   2. Establish ambient conditions 48 hours, minimum before and maintain conditions during and 48 hours, minimum after installation.

PART 2 PRODUCTS

2.1 RESILIENT BASE

A. Rubber Base, RB-1: ASTM F1861 Type TP.
   1. Manufacturers and Products:
      a. Roppe, as basis of design.
      b. Or approved equal.
   2. Style: D, Sculptured.
   3. Height: 4 inches.
   4. Construction: Solid.
   5. Length: 8 feet.
   6. Inside Corners: Job formed.
   7. Outside Corners: Job formed.
   8. Color: See Drawings.

2.2 PERFORMANCE REQUIREMENTS

A. Fire Test Response Characteristics:
   1. Class I per ASTM E648 and NFPA 253, Critical Radiant Flux Classification.

2.3 INSTALLATION MATERIALS

A. Patching and Leveling Materials: Flooring manufacturer recommended products for applicable substrates.

B. Edge Strips: Rubber; profiles shown on Drawings.
   1. Colors: Architect selected.

C. Adhesives: Flooring manufacturer recommended water based product.
   1. VOC Content: 50 g/L, maximum.

PART 3 EXECUTION

3.1 PREPARATION

A. Preparing Concrete Substrates: See Section 090561.

3.2 BASE INSTALLATION

A. Installation:
   1. Form tight joints.
   2. Align the tops of bases with adjacent units.
   3. Ensure continuous contact between base and substrate. Fill voids between base and substrate with manufacturer recommended filler material.
   4. Do not stretch base.
   5. Do not install base in lengths less than 6 feet from corners. For base installations 6 feet or less, cover entire length of wall in a single piece.

B. Job Formed Corners:
   1. Outside Corners: Form bends without discoloration in corners.
   2. Inside Corners: Miter.

3.3 CLEANING AND PROTECTION

A. Remove excess adhesive.

B. Do not allow traffic on flooring until adhesives have fully set.

C. Provide surface protection during construction period.

END OF SECTION

SECTION 096813

TILE CARPETING

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Tile carpeting.

B. Principal Products:
   1. Tile carpet.
   2. Installation accessories.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting Attendees and Procedures:
   1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data:
   1. Each type of modular carpet tile.
   2. Edgings.

B. Shop Drawings: Mark information on copies of floor plans.
   1. Starting points for layout and alignment of tiles.
   2. Pattern directions.
   3. Type, color, and location of insets and borders.
   4. Type, color, and location of edge, transition, and other accessory strips.

C. Schedule: Modular carpet tile types and patterns.

D. Samples:
   1. Carpet Tiles: Full sized samples of each type.
   2. Edging: 12 inch long sections.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. Warranty documentation.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials:
   1. Carpet Tile: One full carton for each 50 cartons installed, but not less than one carton.
      a. Obtain from same runs as installed carpet tiles.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: International Certified Flooring Installers Commercial II certification.

B. Field Samples: Each type of carpet tile.
   1. Size: 12 x 12 feet, minimum.
   2. Locate where directed.
   3. Approved samples establish work results standard.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
   1. Store products inside building.

1.8 FIELD CONDITIONS

A. Do not start installation until painting and similar finish Work are complete.

B. Ambient Conditions:
   1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

1.9 WARRANTY

A. Manufacturer Warranty:
   1. Carpet Tile: Warrant against product failure, including:
      a. Defective materials.
      b. Excessive fading.
      c. Loss of static control.
      d. Edge raveling.
      e. Runs.
      f. Loss of tuft bind strength.
      g. Loss of face fiber.
      h. Excessive wear.
   2. Warranty Period: 10 years.

PART 2 PRODUCTS

2.1 CARPET TILE

A. Carpet Tile, CPT-1, CPT-2, CPT-3, CPT-4, and CPT-5:
   1. Manufacturers and Products: See Finish Legend on Drawings.
   2. Backing: Manufacturer standard.
   3. Installation Pattern: See drawings.

2.2 PERFORMANCE

A. Emissions: CRI Green Label Plus compliant products.

B. Fire Characteristics:
   1. Critical Radiant Flux Classification: Class I, 0.45 W/sq. cm.
   2. Flammability: Pass DOC FF-1 Pill Test.

2.3 INSTALLATION MATERIALS

A. Substrate Patching and Leveling: Latex modified hydraulic cement product.

B. Adhesive: Waterproof, mildew resistant, latex based adhesive formulated specifically for installing carpet tiles.
   1. VOC Content: 50 g/L, maximum.

C. Edgings:
   1. Profiles: See Drawings.
   2. Material: Rubber.
      a. Color: Architect selected.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that concrete floors have cured minimum 28 days.

B. Moisture and Alkalinity Testing: Section 090561.

3.2 PREPARATION

A. Concrete Substrates: Section 090561.

B. Wood Substrates:
   1. Sand to remove ridges and high areas.
   2. Vacuum clean.

3.3 INSTALLATION

A. Follow CRI 104 Section 18, Modular Carpet Modules.
   1. Installation Method: Glue down; install every tile with releasable adhesive.

B. Lay out each room or area. Minimize tiles less than one half size.

C. Mix carpet tiles from different cartons.

D. Cut tile clean. Fit tiles tight to intersection with vertical surfaces without gaps.

E. Lay carpet tiles with pile direction as shown on Drawings.

F. Lay carpet tile in selected pattern parallel to enclosing walls.

G. Locate change of color or pattern between rooms under door centerline.

H. Bind exposed cut edges or conceal under edge trim.

I. Edges:
   1. Install edge strips where carpet tiles abut dissimilar flooring materials.
   2. Center strips under doors where carpet tiles terminate at door openings.
   3. Adhere strips to subfloor in longest practical lengths; butt ends tight.
   4. Scribe to abutting surfaces.

3.4 CLEANING

A. Remove soiling and stains.

B. Cut loose threads flush with top surface.

C. Clean with commercial vacuum cleaner.

3.5 PROTECTION

A. Protect carpet tile against soiling and wear during remaining construction period.

B. Provide hardboard or other rigid panel protection where subject to wheeled or heavy foot traffic.

END OF SECTION

SECTION 097200

WALL COVERINGS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Wall coverings.

B. Principal Products:
   1. Wall covering.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting Attendees and Procedures:
   1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data: Each type of wall covering.

B. Shop Drawings: Wall elevations with seaming layout.
   1. Include location schedule by room number and wall covering type.

C. Samples:
   1. Wall Coverings: 24 inches by full width.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: Cleaning recommendations.

1.5 MAINTENANCE MATERIALS

A. Extra Stock Materials:
   1. Wall Covering: 5 percent of installed materials; remainder of installation roll, minimum.

1.6 QUALITY ASSURANCE

A. Field Samples: Apply wall covering; full height, 2 rows wide. Demonstrate pattern and seams.
   1. Approved samples establish work results standard.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials indoors.

B. Protect packaged adhesive from temperature cycling and cold temperatures.

C. Do not store roll goods on end.

1.8 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations.
   1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.
   2. Lighting: Permanent lighting or temporary illumination providing 80 footcandles at mid-height of wall, minimum.

PART 2 PRODUCTS

2.1 WALL COVERINGS

A. Wall Covering, WC-1 and WC-2: Vinyl.
   1. Manufacturers and Products: See Finish Legend on Drawings.

2.2 PERFORMANCE

A. Surface Burning: ASTM E84 Class A.
   1. Flame Spread Index: 25, maximum.
   2. Smoke Developed Index: 450, maximum.

2.3 INSTALLATION MATERIALS

A. Adhesive: Manufacturer recommended type to suit application, mildew resistant.
   1. VOC Content: 50 g/L, maximum.

B. Substrate Primer and Sealer: Section 099000.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrate surfaces are prime painted and ready to receive Work.

B. Preinstallation Testing: Test moisture content of substrate does not exceed the following:
   1. Gypsum Board: 12 percent.

3.2 PREPARATION

A. Wash impervious surfaces with tetrasodium or trisodium phosphate, rinse and neutralize; wipe dry.

B. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings before preparing surfaces or finishing.

C. Surfaces: Correct defects and clean surfaces. Remove existing coatings that exhibit loose surface defects.

D. Vacuum surfaces.

3.3 INSTALLATION

A. Install wall covering in pattern sequence.

B. Razor trim edges on flat work table, changing blade often to prevent rough cut edges. Do not razor cut on gypsum board surfaces.

C. Apply covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface. Butt edges tight.

D. Match pattern 72 inches above finished floor.

E. Horizontal seams are not acceptable.

F. Do not seam within 2 inches of internal corners nor within 6 inches of external corners.

G. Install wall covering before installation of bases, cabinets, hardware, and wall mounted items Install 1/4 inch, minimum, below top of resilient base.

H. Where wall covering tucks into reveals, or metal wallboard or plaster stops, apply wall covering with contact adhesive within 6 inches of wall covering termination. Ensure full contact bond.

I. Remove excess adhesive. Wipe clean with dry cloth.

3.4 CLEANING

A. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.

B. Reinstall wall plates and accessories removed before Work of this section.

END OF SECTION

SECTION 097713

STRETCHED-FABRIC WALL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Stretched fabric wall system.

B. Principal Products:
   1. Stretched fabric system with tackable core.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting Attendees and Procedures:
   1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data:
   1. Panel fabrication and acoustical properties.
   2. Fabric facing selection information.

B. Shop Drawings:
   1. Installation elevations.
   2. Panel edge, core, dimensions.
   3. Fabric weave direction and matching.

C. Samples:
   1. Fabric: Full width by 24 inches; each type.
   2. Plastic Frame: Each profile, 6 inches long.
   3. Core Material: 6 by 6 inches.

1.4 INFORMATIONAL SUBMITTALS

A. Test and Evaluation Reports: Independent testing agency test results showing:
   1. Assembled panel noise reduction coefficient.
   2. Assembled panel flame spread and smoke developed indices.

B. Qualification Statements: Installer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data:
   1. Fabric manufacturer recommendations for cleaning and stain removal.
   2. System manufacturer recommendations for stretching fabric.

B. Warranty documentation.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials:
   1. Facing Fabric: Same dye lot as installed product; 10 percent of amount installed.

B. Tools: Manufacturer tool to stretch fabric.

1.7 QUALITY ASSURANCE

A. Qualifications:
   1. Installers: Manufacturer trained.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
   1. Do not deliver panels until HVAC system is operating at occupancy levels.
   2. Protect panels from exposure to smoke and other odor contamination.
   3. Condition fabrics to ambient temperature and humidity for 24 hours before installation.

1.9 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations:
   1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.
   2. Installation area permanent lighting is operational.

B. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

1.10 WARRANTY

A. Manufacturer Warranty: Warrant against core warping, fabric sagging, distortion, or fabric releasing from panel edge.
   1. Warranty Period: 2 years.

PART 2 PRODUCTS

2.1 STRETCHED-FABRIC WALL SYSTEM

A. Stretched-Fabric Wall System, AWC-1: Extruded plastic frame with panel core and site installed fabric facing.
   1. Manufacturers and Products, Frame:
      a. SnapTex International, as basis of design.
      b. Fabricmate Systems.
      c. FabriTrak Systems, Inc.
      d. Novawall.
      e. Whisper Walls.
   2. Core:
      a. Mineral fiber board.
   3. Thickness: 3/4 inch.
   4. Frame Profile, Perimeter: Square.
   5. Frame Color: White.
   6. Facing Material: See Drawings.
      a. Color: See Drawings.
   7. Acoustical Performance: 0.80 NRC, minimum, per ASTM C423.
   8. Surface Burning Characteristics: ASTM E84 Class A.
      a. Flame Spread Index: 25 maximum.
      b. Smoke Developed Index: 450, maximum.

2.2 MATERIALS

A. Core Products:
   1. Mineral Fiber Board: Surface perforated; 13 lb/cu. ft density.
   2. Tackable Overlay: Manufacturer standard 1/8 inch thick fiber board laminated to core.

B. Fabric Treatments: Manufacturer standard flame retardant and stain resistant non appearance modifying product.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify layout of panels will not interfere with other Work.

3.2 INSTALLATION

A. Install frames and core panels level and in plane with adjacent panels.

B. Install adjacent panels with butt joints.

C. Fabric Application: Install monolithically, stretched tightly without puckers, ripples, or distortions.
   1. Fabric Direction: Architect selected.

D. Installation Tolerances: Plus or minus 1/16 inch for following measurements:
   1. Thickness.
   2. Edge straightness.
   3. Joint Width.
   4. Length and width.
   5. Variation in diagonal measurements.

3.3 CLEANING

A. Remove loose threads.

B. Remove dust and soiling without disturbing fabric texture.

END OF SECTION

SECTION 099000

PAINTING AND COATING

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Exterior painting and coating.
   2. Interior painting and coating.

B. Principal Products:
   1. Exterior paints.
   2. Interior paints.

C. Related Requirements.
   1. Section 092116: Gypsum board finishing.

1.2 REFERENCES

A. Definitions:
   1. Sheen Levels: ASTM D523.
      a. Flat: Five gloss units at 60 degrees and 10 gloss units at 85 degrees, maximum.
      b. Eggshell: 10 to 25 gloss units at 60 degrees and 10 to 35 gloss units at 85 degrees.
      c. Semigloss: 35 to 70 gloss units at 60 degrees.
      d. Gloss: 70 gloss units at 60 degrees, minimum.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting:
   1. Conduct meeting one week, minimum, before starting Work of this Section.

1.4 ACTION SUBMITTALS

A. Product Data.
   1. Initial selection color charts.

B. Samples:
   1. Draw Down Samples: Each type of paint system and each topcoat color and gloss.
      a. Label each Sample for paint type, location, and substrate.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data:
   1. Cleaning, touch up, and repair instructions for painted and coated surfaces.
   2. Area summary with finish schedule and Samples, designating where each product, color and finish was used.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials:
   1. Paint from same product run as installed materials.
      a. Quantity: 5 percent, but not less than 1 gallon of each material and color.

1.7 QUALITY ASSURANCE

A. Field Samples: Apply each paint systems to substrates shown on Drawings, as directed by Architect, and 100 square feet, minimum. Demonstrate texture, color, pattern, and application quality.
   1. Approved Samples establish work results standard.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
   1. Store paint products in sealed containers until ready for use.

1.9 FIELD CONDITIONS

A. Apply materials only when surface and ambient temperatures are within temperature ranges required by paint product manufacturer.

B. Apply exterior coatings when rain or snow are not occurring or forecasted, and when relative humidity is inside humidity ranges, and moisture content of surfaces is within acceptable levels required by paint product manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Colors by Basis of Design Manufacturer Designations: See Finish Legend on Drawings.

B. Manufacturers:
   1. Benjamin Moore.
   2. PPG Paints.
   3. Sherwin-Williams.

C. Products: Scheduled in this Section.

2.2 PAINT, GENERAL

A. Paint Systems: Primers, intermediate coats and topcoats compatible with substrates and one another.

B. Coatings: Ready mixed or field catalyzed.

C. Preparation:
   1. Mix to soft paste consistency, capable of being readily and uniformly dispersed to homogenous coating.
   2. Blend tints and catalyzers to uniform consistency and color, capable of drying or curing free of streaks or sags.

2.3 SUSTAINABILITY CHARACTERISTICS

A. VOC Content: Follow VOC limits of authorities having jurisdiction and as follows:
   1. Flat Paints and Coatings: 50 g/L, maximum.
   2. Nonflat Paints and Coatings: 50 g/L, maximum.
   3. Primers, Sealers, and Undercoaters: 100 g/L, maximum.

B. Low Emitting Materials: Follow California Department of Public Health, Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.

2.4 SOURCE QUALITY CONTROL

A. Tests:
   1. Testing: Owner may engage a qualified testing agency to sample paint materials delivered to Project site or taken from Supplier facility.
   2. Acceptance Criteria: Products follow specified requirements.

B. Non-Conforming Work: Remove materials from substrates, pay for testing of replacement products, and repaint surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify substrates are ready to receive Work.

B. Preinstallation Testing: Test moisture content of substrate does not exceed the following:
   1. Wood: 15 percent.
   2. Gypsum Board: 12 percent.

C. Gypsum Board: Verify that finishing compound is dried and sanded smooth.

3.2 PREPARATION

A. Surface Preparation: Remove electrical plates, hardware, trim, escutcheons, and fittings. Correct defects in substrates capable of affecting Work.

B. Cleaning: Remove substances that could impair paint bond, including dust, oil, grease, and incompatible coatings.
   1. Impervious Surfaces: Remove mildew by scrubbing with cleaning solution recommended by finish coating manufacturer. Rinse with clean water and allow surface to dry.
   2. Asphalt, Creosote, or Bituminous Surfaces: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.
   3. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
   4. Non-Passivated Galvanized Surfaces: Smooth and hand or power tool clean per ASTM D6386.
   5. Passivated Galvanized Surfaces: Remove soluble and insoluble contaminants and corrosion. Sweep blast per ASTM D6386 to achieve uniform 1.0 to 2.0 mil anchor profile.
   6. Wood Surfaces:
      a. Wipe off dust and grit. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried.
      b. Backprime concealed surfaces.

3.3 APPLICATION

A. Follow manufacturer instructions for application method, thickness of coatings, and number of coats.
   1. Apply finishes when surfaces are dry. Allow applied coats to dry before next coat is applied.
   2. Apply each coat of paint slightly darker than preceding coat.
   3. Apply coatings to uniform appearance.
   4. Sand wood and metal surfaces lightly between coats.
   5. Leave testing agency, equipment identification, and performance labels unpainted.

B. Appearance:
   1. Apply paints without imperfections.
   2. Edges and Color Breaks: Produce sharp edges.

3.4 PAINTING MECHANICAL EQUIPMENT

A. Paint the following equipment when exposed in occupied spaces:
   1. Electrical panelboards and switchgear.
   2. Piping.
   3. Ductwork.
   4. Pipe hangers.
   5. Conduit.
   6. Shop-primed equipment.

B. Paint interior surfaces of air ducts visible through grilles with one coat of flat black paint.

3.5 FIELD QUALITY CONTROL

A. Field Tests and Inspections: Engage inspectors to perform tests and inspections and prepare reports. Allow inspectors access to Work areas.
   1. Failed Test Retest Cost: Contractor responsibility.

B. Testing: Dry film thickness.

C. Non-Conforming Work: Remove and replace or apply additional coats, and retest.

3.6 CLEANING

A. Remove rubbish, empty cans, rags, and other discarded materials.

B. Remove splattered paints. Protect adjacent surfaces from damage.

3.7 PROTECTION

A. Protect painted surfaces from subsequent Work. Touch up and restore damaged painted surfaces.

3.8 INTERIOR PAINTING SCHEDULE

A. Gypsum Board Walls:
   1. Latex Primer:
      a. Benjamin Moore: Ultra Spec 500 Interior Latex Primer N534.
      b. PPG Paints: SPEEDHIDE zero Interior Latex Sealer 6-4900XI.
      c. Sherwin-Williams: ProMar 200 Zero VOC Interior Latex Primer B28W02600.
   2. Acrylic Latex Enamel: Eggshell finish.
      a. Benjamin Moore: Ultra Spec 500 Series.
      b. PPG Paints: SPEEDHIDE Zero Interior Latex.
      c. Sherwin-Williams: ProMar 200 Zero VOC Interior Latex.
   3. Epoxy Topcoat: Eggshell finish.
      a. Benjamin Moore: Corotech Pre Catalyzed Epoxy.
      b. PPG Paints; PITT-GLAZE WB1 Interior Pre-Catalyzed Water-Borne Acrylic Epoxy.
      c. Sherwin-Williams: Pro Industrial Pre-Catalyzed Water Based Epoxy.

B. Gypsum Board Ceilings:
   1. Latex Primer:
      a. Benjamin Moore: Ultra Spec 500 Interior Latex Primer N534.
      b. PPG Paints: SPEEDHIDE zero Interior Latex Sealer 6-4900XI.
      c. Sherwin-Williams: ProMar 200 Zero VOC Interior Latex Primer B28W02600.
   2. Acrylic Latex Enamel: Flat finish.
      a. Benjamin Moore: Ultra Spec 500 Series.
      b. PPG Paints: SPEEDHIDE Zero Interior Latex.
      c. Sherwin-Williams: ProMar 200 Zero VOC Interior Latex.

C. Wood Doors, Frames, and Trim:
   1. Latex Primer:
      a. BEHR: Drywall Plus Interior Primer & Sealer 73.
      b. Benjamin Moore: Advance Waterborne Interior Alkyd Primer 790.
      c. PPG Paints: Seal-Grip Interior/Exterior Universal Primer/Sealer 17-921XI.
      d. Sherwin-Williams: PrepRite ProBlock Interior/Exterior Latex Primer/Sealer B51-600.
   2. Acrylic Latex Enamel: Eggshell finish.
      a. BEHR: Behr Pro i300 Interior.
      b. Benjamin Moore: Ultra Spec 500 Series.
      c. PPG Paints: SPEEDHIDE Zero Interior Latex.
      d. Sherwin-Williams: ProMar 200 Zero VOC Interior Latex.
   3. Epoxy Topcoat: Eggshell finish.
      a. BEHR: Behr Pro Pre-Catalyzed Waterborne Epoxy.
      b. Benjamin Moore: Corotech Pre Catalyzed Epoxy.
      c. PPG Paints; PITT-GLAZE WB1 Interior Pre-Catalyzed Water-Borne Acrylic Epoxy.
      d. Sherwin-Williams: Pro Industrial Pre-Catalyzed Water Based Epoxy.

3.9 SPECIALTY INTERIOR PAINTING SCHEDULE

A. Magnetic Dry Erase Coatings:
   1. Magnetic Primer:
      a. IdeaPaint: Magnetic Primer.
      b. Rustoleum: Specialty Magnetic Primer.
   2. Topcoat: Manufacturer recommended product for colors shown on Finish Legend.
   3. Dry Erase Paint - Clear Coat:
      a. Benjamin Moore: Notable Dry Erase Paint 0500.
      b. IdeaPaint: CREATE Clear Interior Dry Erase Paint.
      c. Sherwin-Williams: Dry Erase Clear Gloss Coating.

3.10 EXTERIOR PAINTING SCHEDULE

A. Galvanized Steel:
   1. Primer:
      a. BEHR: Multi-Surface Interior/Exterior Primer & Sealer 436.
      b. Benjamin Moore: Ultra Spec HP D.T.M. Acrylic HP29.
      c. PPG Paints: Pitt-Tech Plus DTM Primer 4020PF.
      d. Sherwin-Williams: Pro Industrial ProCryl Universal Primer B66-1300 Series.
      e. Tnemec: Series 115 UniBond DF.
   2. Latex Topcoat: Semigloss finish.
      a. BEHR: PREMIUM Direct to Metal Semi-Gloss Paint 3200.
      b. Benjamin Moore: Ultra Spec HP D.T.M. Acrylic HP29.
      c. PPG Paints: Pitt-Tech Plus EP DTM 90-1610.
      d. Sherwin-Williams: A-100 Series.
      e. Tnemec: Series 1029 Enduratone.

B. Wood Trim, Doors, and Window Sills:
   1. Latex Primer:
      a. PPG Paints: Seal-Grip Interior/Exterior Universal Primer/Sealer 17-921XI.

b. Sherwin-Williams: Exterior Latex Wood Primer B42W08041.

2. Exterior Acrylic Latex Topcoat: Semigloss finish.
   a. PPG Paints: SPEEDHIDE Exterior Latex.
   b. Sherwin-Williams: A-100 Exterior Acrylic Latex.

C. Elastomeric Coating: One-component, elastomeric, silicone, high-solids, UV resistant, coating.
   1. Manufacturers:
      a. Dowsil AllGuard.
      b. GE Momentive SilShield 3100.
   2. Primer: Compatible with surfaces and coating, approved by manufacturer if required. Verify coating adhesion to substrate in field.
   3. Elongation, ASTM D412, 395 percent.

END OF SECTION

SECTION 102600

WALL AND DOOR PROTECTION

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Corner protection.

B. Principal Products:
   1. Corner guard.

1.2 ACTION SUBMITTALS

A. Product Data:
   1. Show physical dimensions, features, anchorage details, and rough-in measurements.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wall and door protection, describing cleaning and repair procedures.

PART 2 PRODUCTS

2.1 CORNER GUARDS

A. Surface Mounted Corner Guards: Rigid plastic adhesive applied.
   1. Manufacturers:
      a. Construction Specialties, Inc.
      b. InPro Corporation.
      c. Korogard.
   2. Configuration:
      a. Leg Length: 2 inches.
   3. Color: Architect selected.

2.2 MATERIALS

A. Adhesives: Manufacturer recommended products.
   1. VOC Content: 50 g/L, maximum.

B. Fasteners: Type, size, and material to suit each application.

2.3 FABRICATION

A. General: Factory assemble components to greatest extent possible to minimize field assembly.

B. Fabricate components with tight joints, corners and seams.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify wall conditions follow manufacturer recommendations.

3.2 INSTALLATION

A. Install wall and door protection plumb and level.

B. Mounting Height from Finished Floor:
1. Corner Guards: Top of base to ceiling.

3.3 CLEANING

A. Clean Work after installation. Remove excess adhesive.

END OF SECTION

SECTION 104400

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Fire extinguisher and cabinet.

B. Principal Products:
   1. Fire extinguisher.
   2. Fire extinguisher cabinet.

1.2 ACTION SUBMITTALS

A. Product Data:
   1. Initial selection color Samples and finish.
   2. Bracket type.

B. Shop Drawings.
   1. Show cabinet dimensions, details, fire ratings, and wall bracket mounting.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:
   1. Deliver fire protection specialties in manufacturers undamaged packaging.
   2. Obtain bill of lading. Verify delivery is complete and products are undamaged.

1.5 WARRANTY

A. Manufacturer Warranty:
   1. Fire Extinguishers: Warrant against product failure.
      a. Failure includes material and workmanship.
      b. Warranty Period: 5 years.

PART 2 PRODUCTS

2.1 FIRE EXTINGUISHERS

A. Fire Extinguishers, General:
   1. Fire Extinguisher Fabrication and Labeling: NFPA 10.
   2. FM Global approved.

B. Multipurpose Dry Chemical:
   1. Manufacturers and Products:
      a. Amerex Model B424.
      b. J.L. Industries Cosmic 5E.
      c. Larsen's Manufacturing Company MP5.
      d. Potter Roemer 3005.
   2. UL Rating: 2A:10-B:C.
   3. Nominal Capacity: 5 pounds.
   4. Container: Enameled steel container with chrome plated brass valve.

2.2 FIRE EXTINGUISHER CABINETS

A. Cabinet Construction:
   1. Nonrated.

B. Flush Framed Door Fire Extinguisher Cabinets:
   1. Manufacturers and Products:
      a. J.L. Industries Ambassador 1012, as basis of design.
      b. Larsen's Manufacturing Company 2409 Series.
      c. Potter-Roemer Alta 7000 Series.
      d. Safety One Industries Murano Series.
   2. Cabinet: Cold rolled steel, sized for extinguisher; semirecessed type.
      a. Interior Finish: White baked enamel.
   3. Door: Steel, powder coated, 0.048 inch thick, minimum.
   4. Frames: Hollow metal, 1/2 inch thick.
   5. Glazing: None.
   6. Hardware: Piano hinge and Recessed door pull.
   7. Trim: Material to match door, rolled edge, depth to suit mounting conditions.

2.3 PERFORMANCE

A. Fire Resistance:
   1. Fire Rated Extinguisher Cabinets: ASTM E814; match rating of walls where installed.

2.4 MATERIALS

A. Steel Sheet: Cold rolled steel, ASTM A1008.

B. Aluminum Extrusions: ASTM B221.

C. Aluminum Sheet: ASTM B221, Alloy 6063-T5 minimum strength and durability.

2.5 FABRICATION

A. Shop Fabrication: Provide cabinets with trim, frame, door, and hardware.

2.6 FINISHES

A. Shop Finishing Methods: Follow NAAMM AMP 500.

2.7 ACCESSORIES

A. Mounting Brackets: Steel, sized for specified fire extinguishers.

B. Cabinet Signs:
   1. Lettering: Architect selected.
   2. Arrangement: Architect selected.
   3. Color: Architect selected.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Verify rough openings and blocking for cabinets are correctly sized and located.

3.2 INSTALLATION - GENERAL

A. General: NFPA 10.

B. Secure cabinets in place.

C. Place extinguishers in cabinets.

D. Apply signage.

3.3 ADJUSTING

A. Adjust fire protection cabinet doors for smooth operation.

3.4 CLEANING

A. Clean interior and exterior surfaces.

END OF SECTION

SECTION 123600

COUNTERTOPS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Countertops.

B. Principal Products:
   1. Solid surface.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
   1. Coordinate locations of utilities and accessories penetrating countertops.
   2. Coordinate sizes and layouts with base cabinets.

B. Preinstallation Meeting Attendees and Procedures:
   1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Submittals, General: AWI 100.

B. Product Data:
   1. Countertop materials.
   2. Adhesives.

C. Shop Drawings:
   1. Dimensioned plans and elevations showing countertop locations.
   2. Show materials, profiles, assembly methods, joint details, fastening methods, cutout sizes and locations, and finishes.

D. Samples:
   1. Countertop Material: 6 inches square.
   2. Grommets: Each type and color.

1.4 INFORMATIONAL SUBMITTALS

A. Test and Evaluation Reports: Independent testing agency test results showing:
   1. Performance of fire retardant treated wood.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For stone countertops.

1.6 QUALITY ASSURANCE

A. Qualifications:
   1. Installer: Woodwork fabricator.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements: AWI 200.

1.8 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations:
   1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

B. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 COUNTERTOP GENERAL REQUIREMENTS

A. Quality Standard: AWI 300 Materials and ANSI AWI 620 Installation for aesthetic grades and performance.

B. Grade: Premium.

2.2 SOLID SURFACE COUNTERTOPS

A. Solid Surface Countertops, SS-1: IFSA 2-01, homogeneous resin sheets.
   1. Manufacturers and Products: See Finish Legend on Drawings.
   2. Configuration: See Drawings.
   3. Thickness: 1/2 inch self supporting.

B. Installation Materials:
   1. Adhesives: Countertop fabricator recommended, VOC compliant.
   2. Fasteners: Type, size, and material to suit each application.

2.3 COUNTERTOP HARDWARE

A. Grommets: Plastic spring loaded cover and outer ring.
   1. Color: Architect selected.

2.4 MATERIALS

A. Fire Retardant Treated Wood:
   1. Chemically treated and pressure impregnated.
   2. Flame Spread: 25, maximum per ASTM E84.
   3. Label or otherwise identify fire retardant treated material.
   4. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.

2.5 FABRICATION

A. Shop assemble Work for delivery to site, permitting passage through building openings.

B. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.

C. Fabrication Tolerances:
   1. Wood Based and Solid Surface Countertops: ANSI/AWI 0620, specified grade.

D. Finish exposed edges of countertops and back and end splashes.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify adequacy of blocking and base cabinets to support countertops.

B. Verify location and sizes of utility rough in associated with countertops.

3.2 PREPARATION

A. Surface Preparation: Follow ANSI/AWI 0620.

B. Conditioning:
   1. Acclimate products to installation environment per AWI 200 and ANSI/AWI 0620.

3.3 INSTALLATION

A. Follow ANSI/AWI 0620.

B. Installation Grade: Same as item being installed.

C. Cut openings for plumbing fixtures and electrical devices.

D. Install countertop fasteners in concealed locations. Use Z or angle bracket anchors to base cabinets.

E. Align edge surfaces. Provide supports to prevent deflection and lippage.

F. Interface with Adjacent Work: Seal gaps between tops, splashes, and walls with mildew resistant sealant specified in Section 079200.

3.4 CLEANING

A. Clean countertops and splashes; remove excess sealant from adjacent surfaces.

3.5 PROTECTION

A. Protect countertops from soil and damage during remainder of construction.

END OF SECTION

SECTION 260000

ELECTRICAL BASIC REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A Work included in 26 00 00, Electrical Basic Requirements applies to Division 26, Electrical work to provide materials, labor, tools, permits, incidentals, and other services to provide and make ready for Owner's use of electrical systems for proposed project.

B Contract Documents include, but are not limited to, Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Drawings, Addenda, Owner/Architect Agreement, and Owner/Contractor Agreement. Confirm requirements before commencement of work.

C Definitions:
1. Provide: To furnish and install, complete and ready for intended use.
2. Furnish: Supply and deliver to project site, ready for unpacking, assembly and installation.
3. Install: Includes unloading, unpacking, assembling, erecting, installation, applying, finishing, protecting, cleaning and similar operations at project site as required to complete items of work furnished.
4. Approved or Approved Equivalent: To possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity. For equipment/products defined by the Contractor as "equivalent", substitution requests must be submitted to Engineer for consideration, in accordance with Division 01, General Requirements, and approved by the Engineer prior to submitting bids for substituted items.
5. Authority Having Jurisdiction (AHJ): Indicates reviewing authorities, including local fire marshal, Owner's insurance underwriter, Owner's Authorized Representative, and other reviewing entity whose approval is required to obtain systems acceptance.

1.2 RELATED SECTIONS

A Contents of Section applies to Division 26, Electrical Contract Documents.

B Related Work:
1. Additional conditions apply to this Division including, but not limited to:
   a. Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements.
   b. Drawings
   c. Addenda
   d. Owner/Architect Agreement
   e. Owner/Contractor Agreement

f. Codes, Standards, Public Ordinances and Permits

1.3 REFERENCES AND STANDARDS

A References and Standards per Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, individual Division 26, Electrical Sections and those listed in this Section.

B Codes to include latest adopted editions, including current amendments, supplements and local jurisdiction requirements in effect as of the date of the Contract Documents, of/from:
1. State of Washington:
   a. IBC - International Building Code
   b. IFC - International Fire Code
   c. IMC - International Mechanical Code
   d. NEC - National Electrical Code
   e. UPC - Uniform Plumbing Code
   f. WAC - Washington Administrative Code
   g. WSEC - Washington State Energy Code

C Reference standards and guidelines include but are not limited to the latest adopted editions from:
1. ABA - Architectural Barriers Act
2. ADA - Americans with Disabilities Act
3. ANSI - American National Standards Institute
4. APWA - American Public Works Association
5. ASCE - American Society of Civil Engineers
6. ASHRAE Guideline 0, the Commissioning Process
7. ASTM - ASTM International
8. CFR - Code of Federal Regulations
9. EPA - Environmental Protection Agency
10. ETL - Electrical Testing Laboratories
11. FCC - Federal Communications Commission
12. FM - FM Global
13. IBC - International Building Code
14. IEC - International Electrotechnical Commission
15. IEEE - Institute of Electrical and Electronics Engineers
16. IES - Illuminating Engineering Society
17. ISO - International Organization for Standardization
18. MSS - Manufacturers Standardization Society
19. NEC - National Electric Code
20. NECA - National Electrical Contractors Association
21. NEMA - National Electrical Manufacturers Association
22. NETA - National Electrical Testing Association
23. NFPA - National Fire Protection Association
24. OSHA - Occupational Safety and Health Administration
25. UL - Underwriters Laboratories Inc.

D See Division 26, Electrical individual Sections for additional references.

1.4 SUBMITTALS

A See Division 01, General Requirements for Submittal Procedures as well as individual Division 26, Electrical Sections.

B Provide drawings in format and software release equal to the design documents. Drawings to be the same sheet size and scale as the Contract Documents.

C In addition:

1. "No Exception Taken" constitutes that review is for general conformance with the design concept expressed in the Contract Documents for the limited purpose of checking for conformance with information given. Any action is subject to the requirements of the Contract Documents. Contractor is responsible for the dimensions and quantity and will confirm and correlate at the job site, fabrication processes and techniques of construction, coordination of the work with that of all other trades, and the satisfactory performance of the work.
2. Provide product submittals and shop drawings in electronic format only. Electronic format must be submitted via zip file via e-mail or posted to ftp site. For electronic format, provide one file per division containing one bookmarked PDF file with each bookmark corresponding to each Specification Section. Provide a table of contents identifying the products being submitted for each specification section. Arrange bookmarks in ascending order of Specification Section number. Individual submittals sent piecemeal in a per Specification Section method will be returned without review or comment. All transmissions/submissions to be submitted to Architect. Deviations will be returned without review.
    a. Provide separate submittals for lighting control cutsheets, and for lighting control shop drawings.
3. Product Data: Provide manufacturer's descriptive literature for products specified in Division 26, Electrical Sections.
4. Identify/mark each submittal in detail. Note what differences, if any, exist between the submitted item and the specified item. Failure to identify the differences will be considered cause for disapproval. If differences are not identified and/or not discovered during the submittal review process, Contractor remains responsible for providing equipment and materials that meet the Specifications and Drawings.
    a. Label submittal to match numbering/references as shown in Contract Documents. Highlight and label applicable information to individual equipment or cross out/remove extraneous data not applicable to submitted model. Clearly note options and accessories to be provided, including field installed items. Highlight connections by/to other trades.
    b. Include technical data, installation instructions and dimensioned drawings for products, fixtures, equipment and devices installed, furnished or provided. Reference individual Division 26, Electrical specification Sections for specific items required in product data submittal outside of these requirements.
    c. See Division 26, Electrical individual Sections for additional submittal requirements outside of these requirements.

5. Maximum of two reviews of complete submittal package. Arrange for additional reviews and/or early review of long-lead items; Bear costs of these additional reviews at Engineer's hourly rates. Incomplete submittal packages/submittals will be returned to contractor without review.
6. Resubmission Requirements: Make corrections or changes in submittals as required, and in consideration of Engineer’s comments. Identify Engineer’s comments and provide an individual response to each of the Engineer’s comments. Cloud changes in the submittals and further identify changes which are in response to Engineer’s comments.
7. Structural/Seismic: Provide weights, dimensions, mounting requirements and like information required for mounting, seismic bracing, and support. Indicate manufacturer's installation and support requirements to meet ASCE 7-16 requirements for non-structural components. Provide engineered seismic drawings and equipment seismic certification. Equipment Importance Factor as specified in Division 01 and in Structural documents.
8. Trade Coordination: Include physical characteristics, electrical characteristics, device layout plans, wiring diagrams, and connections as required per Division 26, Electrical Coordination Documents. For equipment with electrical connections, furnish copy of approved submittal for inclusion in Division 26, Electrical submittals. Electric motors are supplied and installed by Division 23 unless otherwise specified. During shop drawing stage of the project, verify correct disconnect sizes, conductor sizes, etc., and bring any discrepancies to the attention of the Mechanical trade. Be responsible for any modifications to electrical equipment or installations as a result of equipment incompatibility discovered after shop drawing review.
9. Make provisions for openings in building for admittance of equipment prior to start of construction or ordering of equipment.
10. Substitutions and Variation from Basis of Design:
    a. The Basis of Design designated product establishes the qualities and characteristics for the evaluation of any comparable products by other listed acceptable manufacturers if included in this Specification or included in an approved Substitution Request as judged by the Design Professional.
    b. If substitutions and/or equivalent equipment/products are being proposed, it is the responsibility of parties concerned, involved in, and furnishing the substitute and/or equivalent equipment to verify and compare the characteristics and requirements of that furnished to that specified and/or shown. If greater capacity and/or more materials and/or more labor is required for the rough-in, circuitry or connections than for the item specified and provided for, then provide compensation for additional charges required for the proper rough-in, circuitry and connections for the equipment being furnished. No additional charges above the Base Bid, including resulting charges for work performed under other Divisions, will be allowed for such revisions. Coordinate with the requirements of "Submittals." For any product marked "or approved equivalent", a substitution request must be submitted to Engineer for approval prior to purchase, delivery or installation.
11. Shop Drawings: Provide coordinated shop drawings which include physical characteristics of all systems, device layout plans, and control wiring diagrams. Reference individual Division 26, Electrical specification Sections for additional requirements for shop drawings outside of these requirements.
    a. Provide Shop Drawings indicating access panel locations, size and elevation for approval prior to installation.
12. Samples: Provide samples when requested by individual Sections.
13. Resubmission Requirements:

a. Make any corrections or change in submittals when required. Provide submittals as specified. The Engineer will not be required to edit and/or interpret the Contractor's submittals. Indicate changes for the resubmittal in a cover letter with reference to page(s) changed and reference response to comment. Cloud changes in the submittals.
b. Resubmit for review until review indicates no exception taken or "make corrections as noted."

14. Operation and Maintenance Manuals, Owner's Instructions:
    a. Submit, at one time, electronic files (PDF format) of manufacturer's operation and maintenance instruction manuals and parts lists for equipment or items requiring servicing. Submit data when work is substantially complete and in same order format as submittals. Include name and location of source parts and service for each piece of equipment.
        1) Include copy of approved submittal data along with submittal review letters received from Engineer. Data to clearly indicate installed equipment model numbers. Delete or cross out data pertaining to other equipment not specific to this project.
        2) Include copy of manufacturer's standard Operations and Maintenance for equipment. At front of each tab, provide routine maintenance documentation for scheduled equipment. Include manufacturer's recommended maintenance schedule and highlight maintenance required to maintain warranty. Furnish list of routine maintenance parts, including part numbers, sizes, quantities, relevant to each piece of equipment.
        3) Include Warranty per Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.
        4) Include product certificates of warranties and guarantees.
        5) Include copy of complete parts list for equipment. Include available exploded views of assemblies and sub assemblies.
        6) Include commissioning reports.
        7) Include copy of startup and test reports specific to each piece of equipment.
        8) Engineer will return incomplete documentation without review. Engineer will provide one set of review comments in Submittal Review format. Contractor must arrange for additional reviews; Contractor to bear costs for additional reviews at Engineer's hourly rates.
    b. Thoroughly instruct Owner in proper operation of equipment and systems. Where noted in individual Sections, training will include classroom instruction with applicable training aids and systems demonstrations. Field instruction per Section 26 00 00, Electrical Basic Requirements, Demonstration.
    c. Copies of certificates of code authority inspections, acceptance, code required acceptance tests, letter of conformance and other special guarantees, certificates of warranties, specified elsewhere or indicated on Drawings.
15. Record Drawings:
    a. Maintain at site at least one set of drawings for recording “As-constructed” conditions. Indicate on drawings changes to original documents by referencing revision document, and include buried elements, location of conduit, and location of concealed electrical items. Include items changed by field orders, supplemental instructions, and constructed conditions.
    b. Record Drawings are to include equipment and fixture/connection schedules that accurately reflect "as constructed or installed" for project.

c. At completion of project, input changes to original project on Revit Model and make one set of black-line drawings created from Revit Model in version/release equal to contract drawings. Submit Revit Model and drawings upon substantial completion.
d. Record drawings solely referencing field orders, supplemental instructions, etc. without any revision markups based on the change responses are not acceptable.
e. See Division 26, Electrical individual Sections for additional items to include in record drawings.

1.5 QUALITY ASSURANCE

A Regulatory Requirements: Work and materials installed to conform with all local, State and Federal codes, and other applicable laws and regulations. Where code requirements are at variance with Contract Documents, meet code requirements as a minimum requirement and include costs necessary to meet these in Contract. Machinery and equipment are to comply with OSHA requirements, as currently revised and interpreted for equipment manufacturer requirements. Install equipment provided per manufacturer recommendations.

B Whenever this Specification calls for material, workmanship, arrangement or construction of higher quality and/or capacity than that required by governing codes, higher quality and/or capacity take precedence.

C Drawings are intended to be diagrammatic and reflect the Basis of Design manufacturer's equipment. They are not intended to show every item in its exact dimensions, or details of equipment or proposed systems layout. Verify actual dimensions of systems (i.e. distribution equipment, duct banks, light fixtures, etc.) and equipment proposed to assure that systems and equipment will fit in available space. Contractor is responsible for design and construction costs incurred for equipment other than Basis of Design, including, but not limited to, architectural, structural, electrical, HVAC, fire sprinkler, and plumbing systems.

D Manufacturer's Instructions: Follow manufacturer's written instructions. If in conflict with Contract Documents, obtain clarification. Notify Engineer/Architect, in writing, before starting work.

E Items shown on Drawings are not necessarily included in Specifications or vice versa. Confirm requirements in all Contract Documents.

F Making, supervising, or directing the making of an electrical installation which does not meet minimum safety standards is not allowed.

G Except as authorized by the Authority Having Jurisdiction, do not remove, transfer, alter or otherwise tamper with an inspection permit, label, tag or other indicia of inspection placed on or at an electrical job site, electrical installation or electrical product.

1.6 WARRANTY

A Provide written warranty covering the work for a period of one year from date of Substantial Completion in accordance with Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

B Sections under this Division can require additional and/or extended warranties that apply beyond basic warranty under Division 01, General Requirements and the General Conditions. Confirm requirements in all Contract Documents.

1.7 COORDINATION DOCUMENTS

A Prior to construction, coordinate installation and location of HVAC equipment, ductwork, grilles, diffusers, piping, plumbing equipment/fixtures, fire sprinklers, plumbing, lights, cable tray and electrical services with architectural and structural requirements, and other trades (including ceiling suspension and tile systems), and provide maintenance access requirements. Coordinate with submitted architectural systems (i.e. roofing, ceiling, finishes) and structural systems as submitted, including footings and foundation. Identify zone of influence from footings and ensure systems are not routed within the zone of influence.

B Advise Architect in event a conflict occurs in location or connection of equipment. Bear costs resulting from failure to properly coordinate installation or failure to advise Architect of conflict.

C Verify in field exact size, location, and clearances regarding existing material, equipment and apparatus, and advise Architect of discrepancies between that indicated on Drawings and that existing in field prior to installation related thereto.

D Submit final Coordination Drawings with changes as Record Drawings at completion of project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A Articles, fixtures, and equipment of a kind to be standard product of one manufacturer.

2.2 STANDARDS OF MATERIALS AND WORKMANSHIP

A Base contract upon furnishing materials as specified. Materials, equipment, and fixtures used for construction are to be new, latest products as listed in manufacturer's printed catalog data and are to be UL or ETL listed and labeled or be approved by State, County, and City authorities prior to procurement and installation.

B Names and manufacturer's names denote character and quality of equipment desired and are not to be construed as limiting competition.

C Hazardous Materials:
1. Comply with local, State of Washington, and Federal regulations relating to hazardous materials.
2. Comply with Division 00, Procurement and Contracting Requirements and Division 01, General Requirements for this project relating to hazardous materials.

3. Do not use any materials containing a hazardous substance. If hazardous materials are encountered, do not disturb; immediately notify Owner and Architect. Hazardous materials will be removed by Owner under separate contract.

2.3 ACCESS PANELS

A See Division 01, General Requirements and Division 08, Openings for products and installation requirements.

B Confirm Access Panel requirements in Division 01, General Requirements, Division 08, Openings and individual Division 26, Electrical Sections. In the absence of specific requirements, comply with the following:
1. Provide flush mounting access panels for service of systems and individual components requiring maintenance or inspection. Where access panels are located in fire-rated assemblies of building, rate access panels accordingly.
   a. Ceiling access panels to be minimum of 24-inch by 24-inch.
   b. Wall access panels to be minimum of 12-inch by 12-inch.
   c. Provide screwdriver operated catch.
   d. Manufacturers and Models:
      1) Drywall: Karp KDW.
      2) Plaster: Karp DSC-214PL.
      3) Masonry: Karp DSC-214M.
      4) 2 hour rated: Karp KPF-350FR.
      5) Manufacturers: Milcor, Elmdor, Acudor, or approved equivalent.

PART 3 - EXECUTION

3.1 ACCESSIBILITY AND INSTALLATION

A Confirm Accessibility and Installation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

B Install equipment requiring access (i.e., junction boxes, light fixtures, power supplies, motors, etc.) so that they may be serviced, reset, replaced or recalibrated by service people with normal service tools and equipment. Do not install equipment in passageways, doorways, scuttles or crawlspaces which would impede or block the intended usage.

C Install equipment and products complete as directed by manufacturer's installation instructions. Obtain installation instructions from manufacturer prior to rough-in of equipment and examine instructions thoroughly. When requirements of installation instructions conflict with Contract Documents, request clarification from Architect prior to proceeding with installation. This includes proper installation methods, sequencing, and coordination with other trades and disciplines.

D Temporary Power:
1. Design of temporary power for construction is the responsibility of the Contractor. Remove temporary power prior to completion of Project.

E Earthwork:
1. Confirm Earthwork requirements in Contract Documents. In the absence of specific requirements, comply with individual Division 26, Electrical Sections and the following:
   a. Perform excavation, dewatering, shoring, bedding, and backfill required for installation of work in this Division in accordance with related earthwork Sections. Contact utilities and locate existing utilities prior to excavation. Repair any work damaged during excavation or backfilling.
   b. Excavation: Do not excavate under footings, foundation bases, or retaining walls.
   c. Provide protection of underground systems. Review the project Geotechnical Report for references to corrosive or deleterious soils which will reduce the performance or service life of underground systems materials.

F Firestopping:
1. Confirm requirements in Division 07, Thermal and Moisture Protection. In the absence of specific requirements, comply with individual Division 26, Electrical Sections and the following:
   a. Coordinate location and protection level of fire and/or smoke rated walls, ceilings, and floors. When these assemblies are penetrated, seal around piping and equipment with approved firestopping material. Install firestopping material complete as directed by manufacturer's installation instructions. Meet requirements of ASTM E814, Standard Test Method for Fire Tests of Through-Penetration Fire Stops.

G Plenums:
1. In plenums, provide plenum rated materials that meet the requirements to be installed in plenums. Immediately notify Architect/Engineer of discrepancy.

H Start up equipment, in accordance with manufacturer's start-up instructions, and in presence of manufacturer's representative. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.

I Provide miscellaneous supports/metals required for installation of equipment and conduit.

3.2 SEISMIC CONTROL

A Confirm Seismic Control requirements in Division 01, General Requirements, Structural documents, and individual Division 26 Electrical Sections.

B General:
1. Earthquake resistant designs for Electrical (Division 26) equipment and distribution, i.e. power distribution equipment, generators, UPS, etc. to conform to regulations of jurisdiction having authority.
2. Restraints which are used to prevent disruption of function of piece of equipment because of application of horizontal force to be such that forces are carried to frame of structure in such a way that frame will not be deflected when apparatus is attached to a mounting base and equipment pad, or to structure in normal way, utilizing attachments provided. Secure equipment and distribution systems to withstand a force in direction equal to value defined by jurisdiction having authority.

3. Provide stamped shop drawings from licensed Structural Engineer of seismic bracing and seismic movement assemblies for conduit and equipment. Submit shop drawings along with equipment submittals.
4. Provide stamped shop drawings from licensed Structural Engineer of seismic flexible joints for conduit crossing building expansion or seismic joints. Submit shop drawings along with seismic bracing details.
5. Provide means to prohibit excessive motion of electrical equipment during earthquake.

3.3 REVIEW AND OBSERVATION

A Confirm Review and Observation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

B Notify Architect, in writing, at following stages of construction so that they may, at their option, visit site for review and construction observation:
1. Underground conduit installation prior to backfilling.
2. Prior to covering walls.
3. Prior to ceiling cover/installation.
4. When main systems, or portions of, are being tested and ready for inspection by AHJ.

C Final Punch:
1. Prior to requesting a final punch visit from the Engineer, request from Engineer the Electrical Precloseout Checklist, complete the checklist confirming completion of systems' installation, and return to Engineer. Request a final punch visit from the Engineer, upon Engineer's acceptance that the electrical systems are ready for final punch.
2. Costs incurred by additional trips required due to incomplete systems will be the responsibility of the Contractor.

3.4 CONTINUITY OF SERVICE

A Confirm requirements in Division 00, Procurement and Contracting Requirements, and Division 01, General Requirements. In the absence of specific requirements in Division 01, General Requirements, comply with individual Division 26, Electrical Sections and the following:
1. During remodeling or addition to existing structure, while existing structure is occupied, present services to remain intact until new construction, facilities or equipment is installed.
2. Prior to changing over to new service, verify that every item is thoroughly prepared. Install new wiring, and wiring to point of connection.
3. Coordinate transfer time to new service with Owner. If required, perform transfer during off-peak hours. Once changeover is started, pursue to its completion to keep interference to a minimum.
    a. If overtime is necessary, there will be no allowance made by Owner for extra expense for such overtime or shift work.

4. No interruption of services to any part of existing facilities will be permitted without express permission in each instance from Owner. Requests for outages must state specific dates, hours and maximum durations, with outages kept to these specific dates, hours and maximum durations. Obtain written permission from Owner for any interruption of power, lighting or signal circuits and systems.
   a. Organize work to minimize duration of power interruption.
   b. Coordinate utility service outages with utility company.

3.5 CUTTING AND PATCHING

A Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In the absence of specific requirements in Division 01, General Requirements, comply with individual Division 26, Electrical Sections and the following:

1. Proposed floor cutting/core drilling/sleeve locations to be approved by Project Structural Engineer. Submit proposed locations to Architect/Project Structural Engineer. Where slabs are of post tension construction, perform x-ray scan of proposed penetration locations and submit scan results including proposed penetration locations to Project Structural Engineer/Architect for approval. Where slabs are of waffle type construction, show column cap extent and cell locations relative to proposed penetration(s).
2. Cutting, patching and repairing for work specified in this Division including plastering, masonry work, concrete work, carpentry work, and painting included under this Section will be performed by skilled craftspeople of each respective trade in conformance with appropriate Division of Work.
3. Additional openings required in building construction to be made by drilling or cutting. Use of jack hammer is specifically prohibited. Patch openings in and through concrete and masonry with grout.
4. Restore new or existing work that is cut and/or damaged to original condition. Patch and repair specifically where existing items have been removed. This includes repairing and painting walls, ceilings, etc. where existing conduit and devices are removed as part of this project. Where alterations disturb lawns, paving, and/or walks, surfaces to be repaired, refinished and left in condition matching existing prior to commencement of work.
5. Additional work required by lack of proper coordination will be provided at no additional cost to the Owner.

3.6 EQUIPMENT SELECTION AND SERVICEABILITY

A Replace or reposition equipment which is too large or located incorrectly to permit servicing, at no additional cost to Owner.

3.7 DELIVERY, STORAGE AND HANDLING

A Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In the absence of specific requirements, comply with individual Division 26, Electrical Sections and the following:

1. Handle materials delivered to project site with care to avoid damage. Store materials on site inside building or protected from weather, dirt and construction dust. Products and/or materials that become damaged due to water, dirt, and/or dust as a result of improper storage and handling to be replaced before installation.
2. Protect equipment to avoid damage. Close conduit openings with caps or plugs. Keep motors and bearings in watertight and dustproof covers during entire course of installation.
3. Protect bus duct and similar items until in service.

3.8 DEMONSTRATION

A Confirm Demonstration requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, and individual Division 26, Electrical Sections.

B Upon completion of work and adjustment of equipment, test systems and demonstrate to Owner's Authorized Representative, Architect, and Engineer that equipment furnished and installed or connected under provisions of these Specifications functions in manner required. Provide field instruction to Owner's Maintenance Staff as specified in Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

C Manufacturer's Field Services: Furnish services of a qualified person at time approved by Owner, to instruct maintenance personnel, correct defects or deficiencies, and demonstrate to satisfaction of Owner that entire system is operating in satisfactory manner and complies with requirements of other trades that may be required to complete work. Complete instruction and demonstration prior to final job site observations.

3.9 CLEANING

A Confirm Cleaning requirements in Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

B Upon completion of installation, thoroughly clean electrical equipment, removing dirt, debris, dust, temporary labels and traces of foreign substances. Throughout work, remove construction debris and surplus materials accumulated during work.

3.10 INSTALLATION

A Confirm Installation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

B Install equipment and fixtures in accordance with manufacturers' installation instructions, plumb and level and firmly anchored to vibration isolators. Maintain manufacturer's recommended clearances.

C Start up equipment, in accordance with manufacturer's start-up instructions, and in presence of manufacturer's representative. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.

D Provide miscellaneous supports/metals required for installation of equipment.

3.11 PAINTING

A Confirm requirements in Division 01, General Requirements and Division 09, Finishes. In the absence of specific requirements, comply with individual Division 26, Electrical Sections and the following:
1. Ferrous Metal: After completion of work, thoroughly clean and paint exposed supports constructed of ferrous metal surfaces (i.e., hangers, hanger rods, equipment stands, etc.) with one coat of black asphalt varnish for exterior or black enamel for interior, suitable for hot surfaces.
2. In Electrical Room, on roof or other exposed areas, equipment not painted with enamel to receive two coats of primer and one coat of rustproof enamel, colors as selected by Architect.
3. See individual equipment Specifications for other painting.
4. Structural Steel: Repair damage to structural steel finishes or finishes of other materials damaged by cutting, welding or patching to match original.
5. Conduit: Clean, primer coat and paint interior/exterior conduit exposed in public areas with two coats paint suitable for metallic surfaces. Color selected by Architect.
6. Covers: Covers such as manholes, vaults and the like will be furnished with finishes which resist corrosion and rust.

3.12 ACCESS PANELS

A Confirm Access Panel requirements in Division 01, General Requirements. In the absence of specific requirements in Division 01, General Requirements, comply with individual Division 26, Electrical Sections and the following:
1. Coordinate locations/sizes of access panels with Architect prior to work.

3.13 DEMOLITION

A Confirm requirements in Division 01, General Requirements and Division 02, Existing Conditions. In the absence of specific requirements, comply with individual Division 26, Electrical Sections and the following:
1. It is the intent of these documents to provide necessary information and adjustments to electrical system required to meet code, and accommodate installation of new work.
2. Coordinate with Owner so that work can be scheduled not to interrupt operations, normal activities, building access or access to different areas. Owner will cooperate to best of their ability to assist in coordinated schedule, but will remain final authority as to time of work permitted.
3. Examination:

a. Determine exact location of existing utilities and equipment before commencing work, compensate Owner for damages caused by failure to locate and preserve utilities. Replace damaged items with new material to match existing.
b. Verify that abandoned wiring and equipment serve only abandoned facilities.
c. Demolition drawings are based on casual field observation and existing record documents.
    1) Verify accuracy of information shown prior to bidding and provide such labor and material as is necessary to accomplish work.
    2) Verify location and number of electrical outlets, luminaires, panels, etc. in field.
d. Report discrepancies to Architect before disturbing existing installation.
    1) Promptly notify Owner if utilities are found which are not shown on Drawings.

4. Execution:
    a. Remove existing luminaires, switches, receptacles, and other electrical equipment and devices and associated wiring from walls, ceilings, floors, and other surfaces scheduled for remodeling, relocation, or demolition unless shown as retained or relocated on Drawings.
    b. Provide temporary wiring and connections to maintain electrical continuity of existing systems during construction. Remove or relocate electrical boxes, conduit, wiring, equipment, and luminaires, as encountered in removed or remodeled areas in existing construction affected by this work.
    c. Remove and restore wiring which serves usable existing outlets clear of construction or demolition.
    d. If existing junction boxes will be made inaccessible, or if abandoned outlets serve as feed through boxes for other existing electrical equipment which is being retained, provide new conduit and wire to bypass inaccessible junction boxes and abandoned outlets.
    e. If existing conduits pass through partitions or ceiling which are being removed or remodeled, provide new conduit and wire to reroute clear of construction or demolition and maintain service to existing load.
    f. Extend circuiting and devices in existing walls to be furred out.
    g. Remove abandoned wiring to source of supply.
    h. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
    i. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
    j. Disconnect and remove abandoned panelboards and distribution equipment.
    k. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
    l. Existing lighting which is to remain, leave luminaires in proper working order.
    m. Repair adjacent construction and finishes damaged during demolition work.
    n. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

3.14 ACCEPTANCE

A Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In the absence of specific requirements, comply with individual Division 26, Electrical Sections and the following:

1. System cannot be considered for acceptance until work is completed and demonstrated to Architect that installation is in strict compliance with Specifications, Drawings and manufacturer's installation instructions, particularly in reference to following:
   a. Cleaning
   b. Operation and Maintenance Manuals
   c. Training of Operating Personnel
   d. Record Drawings
   e. Warranty and Guaranty Certificates
   f. Start-up/Test Document and Commissioning Reports

3.15 FIELD QUALITY CONTROL

A Confirm Field Quality Control requirements in Division 01, General Requirements, Section 26 00 00, Electrical Basic Requirements and individual Division 26, Electrical Sections.

B Tests:
1. Conduct tests of equipment and systems to demonstrate compliance with requirements specified. Reference individual Specification Sections for required tests. Document tests and include in operation and maintenance manuals.
2. During site evaluations by Architect or Engineer, provide appropriate personnel with tools to remove and replace trims, covers, and devices so that proper evaluation of installation can be performed.

3.16 LETTER OF CONFORMANCE

A Provide Letter of Conformance, copies of manufacturers' warranties and extended warranties with a statement that Electrical items were installed in accordance with manufacturers' recommendations, UL listings and FM Global approvals. Include Letter of Conformance, copies of manufacturers' warranties and extended warranties in Operation and Maintenance Manuals.

3.17 SALVAGED EQUIPMENT AND RECYCLED MATERIAL

A Salvage the following equipment not being reused and return to Owner:
1. Luminaires

B Electrical equipment that cannot be salvaged for reuse, sell/give to recycling company. Recycle following excess, removed, or demolished electrical material:
1. Copper or aluminum conductors, buses, and motor/transformer windings.
2. Steel and aluminum from raceways, boxes, enclosures, and housings.
3. Acrylic and glass from luminaire lenses/refractors.

C Provide separate on-site storage space for recycled and salvaged material. Clearly label space.

D Confirm additional salvaged equipment and recycled materials in the Contract Documents.

END OF SECTION

SECTION 260519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A Work Included:
1. Lugs and Pads
2. Wires and Cables
3. Connectors

1.2 RELATED SECTIONS

A Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

A References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A Submittals not required for this Section.

1.5 QUALITY ASSURANCE

A Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.6 WARRANTY

A Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A Lugs and Pads:
1. Anderson
2. Ilsco
3. Panduit
4. Thomas & Betts
5. 3M
6. Or approved equivalent.

B Wires and Cables:
1. General:
   a. General Cable
   b. Okonite
   c. Southwire
   d. Encore Wire
   e. Or approved equivalent.
2. Metal Clad Cable - Type MC:
   a. Alflex
   b. AFC
   c. General Cable
   d. Southwire
   e. Encore Wire
   f. Or approved equivalent.

C Connectors:
1. Anderson Power Products
2. Burndy
3. Ilsco
4. 3M
5. Thomas & Betts
6. Or approved equivalent.

2.2 LUGS AND PADS

A Ampacity: Cross-sectional area of pad for multiple conductor terminations to match ampere rating of panelboard bus or equipment line terminals.

B Copper Pads: Drilled and tapped for multiple conductor terminals.

C Lugs: Compression type for use with stranded branch circuit or control conductors; mechanical type for use with solid branch and feeder circuit conductors.

2.3 WIRES AND CABLES

A Building Wires:
1. Copper: Soft-drawn with conductivity of not less than 98 percent IACS at 20 degrees C (68 degrees F). 600 volt rated throughout. Conductors 12 AWG and 10 AWG, solid or stranded. Conductors 8 AWG and larger, stranded. 12 AWG minimum conductor size. Minimum insulation rating of 90 degrees C. Insulation Type: THHN/THWN-2.

B Phase color to be consistent at feeder terminations; A-B-C, top to bottom, left to right, front to back.

C Color Code Conductors as Follows:

PHASE	208 VOLT WYE	240 VOLT DELTA	480 VOLT
A	Black	Black	Brown
B	Red	Orange (High Leg)	Orange
C	Blue	Blue	Yellow
Neutral	White	White	Gray or White w/colored strip
Ground	Green	Green	Green
Isolated Ground	Green w/yellow trace	N/A	N/A

D MC Cable:
1. Standard: High strength galvanized steel flexible armor. Full length minimum size No. 12 copper ground wire, copper dual rated THHN/THWN-2, full length tape marker phase/circuit identification on cable armor. Short circuit throat insulators, mechanical compression termination.

E AC Cable (Armored Cable): Not allowed.

F NMB Cable: Not allowed.

2.4 CONNECTORS

A Split bolt connectors not allowed.

B Conductor Branch Circuits: Wire nuts with integral spring connectors for conductors 12 AWG through 8 AWG. Push-in type connectors where conductors are not required to be twisted together are not acceptable.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A Install per manufacturer instructions and NEC.

3.2 LUGS AND PADS

A Thoroughly clean surfaces to remove all dirt, oil, grease, or paint.

B Use torque wrench to tighten per manufacturer's directions.

3.3 WIRES AND CABLES

A General:
1. Do not install or handle thermoplastic insulated wire and cable in temperatures below -10 degrees C (14 degrees F). Do not handle thermoset insulated wire and cable in temperatures below -40 degrees C (-40 degrees F). All wire and cable must be acclimated to temperatures above freezing for no less than 24 hours prior to installation.
2. Install conductors in raceways having adequate, code size cross-sectional area for wires indicated.
3. Install conductors with care to avoid damage to insulation.
4. Do not apply greater tension on conductors than recommended by manufacturer during installation.
5. Use of pulling compounds is permitted. Clean residue from exposed conductors and raceway entrances after conductor installation. Do not use pulling compounds for installation of conductors connected to GFCI circuit breakers or GFCI receptacles.
6. Conductor Size and Quantity:
   a. Install no conductors smaller than 12 AWG unless otherwise shown.
   b. Provide required conductors for a fully operable system.
   c. Power Circuits: No. 12 AWG minimum, except as follows:
      1) No. 10 AWG for 20A, 120V circuits longer than 70-feet.
      2) No. 8 AWG for 20A, 120V circuits longer than 100-feet.
   d. When exact run lengths are determined for all branch circuits, and prior to installation of the conductors, ensure that the maximum voltage drop, based on 80 percent of the circuit protective device, does not exceed 3 percent. Increase wire size from #12AWG, if necessary, to ensure that the 3 percent voltage drop is not exceeded.
7. Provide dedicated neutrals (one neutral conductor for each phase conductor) in all 120V circuits.

B Conductors in Cabinets:
1. Conductors and cables within panels and cabinets are to be made up in a clean and workmanlike manner.
2. Cable and tree wires in panels and cabinets for power and control. Use plastic ties in panels and cabinets.
3. Tie and bundle feeder conductors in wireways of panelboards.
4. Hold conductors away from sharp metal edges.

C Homeruns:
1. Do not change intent of branch circuit homeruns without approval. Homeruns for 20A branch circuits may be combined to a maximum of six current carrying conductors including neutral conductors in homeruns. Apply derating factors as required per NEC. Increase conductor size as needed.

2. MC cable homeruns are not allowed.

D Identify wire and cable under the provisions of Section 26 05 53, Identification for Electrical Systems. Identify each conductor with its panel and circuit number as indicated.

E Exposed cable is not allowed.

F All cable must be run parallel or perpendicular to building lines and hidden from view when possible. Where installed in tray each power cable is to be identified with Lamacoid nametag engraved with identification of equipment being fed. Tag to be fastened to cable using tie-wraps. Provide nametag at each floor level.

G Do not install PVC jacketed cables in return air plenums, unless they are specially rated plenum cables.

H Use of MC Cable is limited to the following conditions. Installations that do not comply with the following conditions are to be removed and replaced with no additional expense to the Owner.

1. 15 and 20 amp branch wiring where following conditions apply:
   a. Use MC cable for final flexible connections from junction or outlet boxes to recessed fixtures. Do not use MC cables to loop between fixtures, except where existing inaccessible ceilings prevent installation of conduit runs. Each individual luminaire is to be serviced by an individual cable drop from the associated junction box in the ceiling space. Maximum length 6-feet of MC cable. Luminaire drops secured to, and supported by, the building structure with nylon tie wraps. The use of the ceiling suspension system for support of any type of cabling is not permitted.
   b. MC cable may be routed in the void space above hard lid ceilings, and routed within existing wall cavities and a minimum one 0.75-inch conduit is routed from nearest accessible ceiling space to inaccessible location, terminating in a j-box with blank faceplate, for future circuits.

3.4 CONNECTORS

A Install to assure a solid and safe connection.

B Select hand twist connectors for wire size and install tightly on conductors.

C Install compression connectors using methods and tools recommended by the manufacturer.

D Do not install stranded conductors under screw terminals unless compression lugs are installed.

E Do not connect wiring without UL listed connectors that are listed for the purposes.

END OF SECTION

SECTION 260526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A Work Included:
1. Connectors and Accessories
2. Grounding Conductor

1.2 RELATED SECTIONS

A Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

A References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A Submittals not required for this Section.

1.5 QUALITY ASSURANCE

A Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

B In addition, meet the following:
1. Comply with the requirements of ANSI/NFPA 70.

1.6 WARRANTY

A Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A Connectors and Accessories:
1. Burndy Hyground Compression System
2. Erico/Cadweld
3. Amp Ampact Grounding System
4. Pipe Grounding Clamp:
   a. Burndy GAR Series
   b. O Z Gedney
   c. Thomas & Betts
   d. Or approved equivalent.

B Grounding Conductor
1. General Cable
2. Okonite
3. Southwire
4. Or approved equivalent

2.2 CONNECTORS AND ACCESSORIES

A Grounding Connectors: Hydraulic compression tool applied connectors or exothermic welding process connectors or powder actuated compression tool applied connectors.

B Pipe Grounding Clamp: Mechanical ground connector with cable parallel or perpendicular to pipe.

2.3 GROUNDING CONDUCTOR

A Grounding Electrode Conductor: Soft-draw bare stranded copper for wire sizes larger than #10 AWG Bare. Solid copper for wire sizes #10 AWG and smaller.

B Equipment Grounding Conductor: Green insulated, insulation type to match that of associated feeder or branch circuit wiring, size as indicated on Drawings.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A Verify site conditions prior to beginning work.

B Bond sections of service equipment enclosure to service ground bus.

C Separately Derived Systems: Ground each separately derived system per NEC Article 250.

D Corrosion inhibitors: Apply a corrosion inhibitor to contact surfaces when making grounding and bonding connections. Use corrosion inhibitor appropriate for protecting a connection between metals used.

E Grounding system resistance to ground not to exceed 5 ohms. Make necessary modifications or additions to grounding electrode system for compliance. Submit final tests to assure that this requirement is met.

F Resistance of grounding electrode system: measure using a four-terminal fall-of-potential method as defined in IEEE 81. Take ground resistance measurements before electrical distribution system is energized and in normally dry conditions, not less than 48 hours after last rainfall. Take resistance measurements of separate grounding electrode systems before systems are bonded together below grade. Combined resistance of separate systems may be used to meet required resistance, but specified number of electrodes must still be provided.

G Inspect and test in accordance with NETA Standard ATS, except Section 4.

H Perform inspections and tests listed in NETA Standard AB, Section 7.13.

3.2 CONNECTORS AND ACCESSORIES INSTALLATION

A Install per manufacturer's instructions.

3.3 GROUNDING CONDUCTOR INSTALLATION

A Raceways:
1. Ground metallic raceway systems. Bond to ground terminal with code size jumper except where code size or larger equipment grounding conductor is included with circuit, use grounding bushing with lay-in lug.
2. Connect metal raceways, which terminate within an enclosure but without mechanical connection to enclosure, by grounding bushings and ground conductor to grounding bus.
3. Where equipment supply conductors are in flexible metallic conduit, install stranded copper equipment grounding conductor from outlet box to equipment frame.
4. Install equipment grounding conductor, code size minimum unless noted on drawings, in metallic and nonmetallic raceway systems.

B Feeders and Branch Circuits:
1. Provide continuous green insulated copper equipment grounding conductors for feeders and branch circuits.
2. Where installed in a continuous solid metallic raceway system and larger sizes are not detailed, provide insulated equipment grounding conductors for feeders and branch circuits sized in accordance with the latest adopted edition of NEC Article 250, Table 250-122.

C Ladder Rack and Network Cabinets:

1. Provide continuous green insulated copper equipment ground, minimum #6 AWG, from OFCI ladder rack and network cabinets to telecom grounding busbar. Grounding conductor routed horizontally in ladder rack and vertically in conduit. Provide bushings at cut ends to protect cable insulation.

D Bond boxes, cabinets, enclosures and panelboard equipment grounding conductors to enclosure with specified conductors and lugs. Install lugs only on thoroughly cleaned contact surfaces.

E Motors, Equipment, and Appliances: Install code size equipment grounding conductor to (motor) equipment frame or manufacturer's designated ground terminal.

F Receptacles: Connect ground terminal of receptacle and associated outlet box to equipment grounding conductor. Self grounding nature of receptacle devices does not eliminate equipment grounding conductor bolted to outlet box.

END OF SECTION

SECTION 260529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A Work Included:
1. Anchors, Threaded Rod, and Fasteners
2. Support Channel, Hangers, and Supports

1.2 RELATED SECTIONS

A Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

A References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A Submittals not required for this Section.

1.5 QUALITY ASSURANCE

A Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

B In addition, meet the following:
1. Manufacturers regularly engaged in the manufacture of bolted metal framing support systems, whose products have been in satisfactory use in similar service for not less than 10 years.
2. Engineering Responsibility: Design and preparation of Shop Drawings and calculations for code required pipe support, trapeze, equipment hangers/supports, and seismic restraint by a qualified Structural Professional Engineer.
    a. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of hangers and supports that are similar to those indicated for this Project in material, design, and extent.

1.6 WARRANTY

A Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.7 PERFORMANCE REQUIREMENTS

A General: Provide conduit and equipment hangers and supports in accordance with the following:
1. When supports, anchorages, and seismic restraints for equipment and supports, anchorages and seismic restraints for conduit, cable tray and equipment are not shown on the Drawings, the Contractor is responsible for their design.
2. Connections to structural framing shall not introduce twisting, torsion, or lateral bending in the framing members. Provide supplementary steel as required.

B Engineered Support Systems: The following support systems to be designed, detailed, and bear the seal of a professional engineer registered in the State of Washington.
1. Support frames such as conduit racks or stanchions for conduit and equipment which provide support from below.
2. Equipment and piping support frame anchorage to supporting slab or structure.

C Provide channel support systems, for conduits to support multiple conduits capable of supporting combined weight of support systems and system contents.

D Provide heavy-duty steel trapezes for piping to support multiple conduit capable of supporting combined weight of supported systems and system contents.

E Provide seismic restraint hangers and supports for conduit and equipment.

F Obtain approval from AHJ for seismic restraint hanger and support system to be installed for piping and equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A Anchors, Threaded Rod, and Fasteners:
1. Anchor It
2. Epcon System
3. Hilti-Hit System
4. Power Fast System
5. Or approved equivalent.

B Support Channel, Hangers, and Supports:
1. B-Line
2. Kindorf

3. Superstrut
4. Unistrut
5. Or approved equivalent.

2.2 ANCHORS, THREADED ROD, AND FASTENERS

A Anchors, Threaded Rod and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.

B Concrete Inserts: Cast in concrete for support fasteners for loads up to 800-pounds.

C Anchors and Fasteners:
1. Do not use powder-actuated anchors.
2. Concrete Structural Elements: Use precast inserts.
3. Steel Structural Elements: Use beam clamps.
4. Concrete Surfaces: Use self-drilling anchors.
5. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts.
6. Solid Masonry Walls: Use expansion anchors.
7. Sheet Metal: Use sheet metal screws.
8. Wood Elements: Use wood screws.

D Fasteners: Provide fasteners of types as required for assembly and installation of fabricated items; surface-applied fasteners are specified elsewhere.

E Bolts: Low carbon steel externally and internally threaded fasteners conforming with requirements of ASTM A307; include necessary nuts and plain hardened washers. For structural steel elements supporting mechanical material or equipment from building structural members or connection thereto, use fasteners conforming to ASTM A325.

F Miscellaneous Materials: Provide incidental accessory materials, tools, methods, and equipment required for fabrication.

2.3 SUPPORT CHANNEL, HANGERS, AND SUPPORTS

A Hangers and Supports - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.
1. Channel Material: Carbon steel.
2. Coating: Hot dip galvanized.

B Pipe Straps: Two-hole galvanized or malleable iron.

C Luminaire Chain: Carbon steel with zinc plated finish. Rated to minimum 90-pound safe working load.

D Miscellaneous Metal: Provide miscellaneous metal items specified hereunder, including materials, fabrication, fastenings and accessories required for finished installation, where indicated on Drawings or otherwise not shown on drawings that are necessary for completion of the project. The Contractor is responsible for their design.

1. Fabricate miscellaneous units to size shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

E Structural Shapes: Where miscellaneous metal items are needed to be fabricated from structural steel shapes and plates, provide members constructed of steel conforming with requirements of ASTM A36 or approved equivalent.

F Steel Pipe: Provide seamless steel pipe conforming to requirements of ASTM A53, Type S, Grade A, or Grade B. Weight and size required as specified.

G Miscellaneous Materials: Provide incidental accessory materials, tools, methods, and equipment required for fabrication.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A Fabrication - Miscellaneous Metals
1. General: Verify dimensions prior to fabrication. Form metal items to accurate sizes and configurations as indicated on Drawings and otherwise required for proper installation; make with lines straight and angles sharp, clean and true; drill, countersink, tap, and otherwise prepare items for connections with work of other trades, as required. Fabricate to detail of structural shapes, plates and bars; weld joints where practicable; provide bolts and other connection devices required. Include anchorages; clip angles, sleeves, anchor plates, and similar devices. Hot dipped galvanize after fabrication items installed in exterior locations. Set accurately in position as required and anchor securely to building construction. Construct items with joints formed for strength and rigidity, accurately machining for proper fit; where exposed to weather, form to exclude water.
2. Finishes:
   a. Ferrous Metal: After fabrication, but before erection, clean surfaces by mechanical or chemical methods to remove rust, scale, oil, corrosion, or other substances detrimental to bonding of subsequently applied protective coatings. For metal items exposed to weather or moisture, galvanize in manner to obtain G90 zinc coating in accordance with ASTM A123. Provide other non-galvanized ferrous metal with one coat of approved rust-resisting paint primer, in manner to obtain not less than 1.0 mil dry film thickness. Touch-up damaged areas in primer with same material, before installation. Apply zinc coatings and paint primers uniformly and smoothly; leave ready for finish painting as specified elsewhere.
   b. Metal in contact with Concrete, Masonry and Other Dissimilar Materials: Where metal items are to be erected in contact with dissimilar materials, provide contact surfaces with coating of an approved zinc-chromate primer in manner to obtain not less than 1.0 mil dry film thickness, in addition to other coatings specified in these specifications.
   c. For Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

3.2 ANCHORS, THREADED ROD, AND FASTENERS INSTALLATION

A Safety factor of 4 required for every fastening device or support for equipment installed. Supports to withstand four times the weight of equipment it supports.

B Do not use other trade's fastening devices as supporting means for luminaires, equipment or materials.

C Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.

D Do not use supports or fastening devices to support other than one particular item.

E Securely suspend junction boxes, pull boxes or other conduit terminating housings located above suspended ceiling from floor above or roof structure to prevent sagging and swaying.

F Provide seismic bracing per IBC requirements.

G Install surface-mounted cabinets and panelboards with minimum of four anchors.

H Use spring lock washers under fastener nuts for strut.

I Cutting and Drilling
1. Do not drill or cut structural members without prior permission from Architect.

3.3 SUPPORT CHANNEL, HANGERS, AND SUPPORTS INSTALLATION

A Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1.

B Safety factor of 4 required for every fastening device or support for equipment installed. Supports to withstand four times the weight of equipment it supports.

C Verify mounting height of luminaires prior to installation when heights are not detailed.

D Install vertical support members for equipment and luminaires, straight and parallel to building walls.

E Install horizontal support members straight and parallel to ceilings or finished floor unless otherwise noted.

F Provide independent supports to structural member for luminaires, materials, or equipment installed in or on ceiling, walls or in void spaces or over suspended ceilings.

G Do not use other trade's fastening devices as supporting means for luminaires, equipment or materials.

H Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.

I Do not use supports or fastening devices to support other than one particular item.

J Support conduits within 18-inches of outlets, boxes, panels, cabinets and deflections unless more stringently required by NEC.

K Maximum distance between supports not to exceed 8 foot spacing unless otherwise required by NEC.

L Support flexible conduits and metal clad cable within 12-inches of outlets, boxes, panels, cabinets and deflections unless otherwise required by NEC.

M Maximum distance between supports for flexible conduits and metal clad cable not to exceed 48-inches spacing unless otherwise required by NEC.

N Maximum distance between supports for rigid PVC conduits unless otherwise required by NEC is as follows:
1. 1/2-inch or 3/4-inch and 1-inch conduit, 3-feet apart.
2. 1-1/4-inch or 1-1/2-inch and 2-inch conduit, 4-feet apart.
3. 2-1/2-inch and 3-inch conduit, 5-feet apart.
4. 4-inch and 5-inch conduit, 6-feet apart.
5. 6-inch conduit, 7-feet apart.

O Maximum distance between supports for auxiliary gutters and wireways unless otherwise required by NEC is as follows:
1. Sheet metal auxiliary gutters and wireways: 4-feet apart horizontally and 10-feet vertically.
2. Non-metallic auxiliary gutters and wireways: 30-inches apart horizontally and 3-feet vertically.

P Install strut hangers as instructed by strut manufacturer. Suspend strut hangers as instructed by strut manufacturer for the load, with a maximum spacing of 8-feet on center and within 2-feet of outlet box, cabinet, junction box or other channel raceway termination unless otherwise required by NEC.

Q Coordinate routing of conduit racks with materials and equipment installed by other trades. Where conduit racks are exposed to view, coordinate location and installation with Architect for optimal appearance.

R Securely suspend junction boxes, pull boxes or other conduit terminating housings located above suspended ceiling from floor above or roof structure to prevent sagging and swaying.

S Provide seismic bracing per IBC requirements.

T Where service disconnects are mounted on building exterior, physically attach service disconnect to the building or structure served.

U Install surface-mounted cabinets and panelboards with minimum of four anchors.

V Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

W Wet and Damp Locations:
1. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1-inch off wall.

END OF SECTION

SECTION 260533.01

COMMUNICATIONS RACEWAY SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A Work Included:
1. EMT Conduit
2. Outlet Boxes
3. Pull Tape
4. Duct Plugs
5. Pull Box Enclosures
6. Fittings
7. Accessories

1.2 RELATED SECTIONS

A Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

A References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A Submittals as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.5 QUALITY ASSURANCE

A Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.6 WARRANTY

A Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.7 SYSTEM DESCRIPTION

A Provide an empty TIA-569-B compliant raceway system for building telephone/data cabling as indicated on Drawings and as specified.

B Provide a complete raceway system from data outlet to Main Equipment Room / Telecommunications Room (MER/TR) designated to serve that outlet. Raceway system to include, but not limited to, wall/floor penetrations, boxes, sleeves, conduits and surface raceway. Provide independent support from building structure for raceway components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A EMT Conduit:
1. Allied Tube and Conduit
2. Beck Manufacturing
3. Wheatland Tube Company
4. Appleton
5. Or approved equivalent.

B Outlet Boxes:
1. Randl; Model P/N T-55017.
2. Cooper Industries
3. Allied Moulded Products, Inc.
4. Or approved equivalent.

C Pull Tape:
1. Greenlee
2. George Ingraham; Model 9216-JK.
3. Or approved equivalent.

D Duct Plugs:
1. Aboveground Conduit Openings:
   a. Carlton; Model P258NT.
   b. Or approved equivalent.
2. Underground or Underslab Conduit Openings:
   a. Vikimatic; Model 40D402U.
   b. Or approved equivalent.

E Pull Box Enclosures:
1. Wiegmann
2. Hoffman
3. Oldcastle (concrete)
4. Or approved equivalent.

F Fittings:

1. OZ/Gedney
2. Thomas & Betts
3. Or approved equivalent.

G Accessories:
1. D-Rings:
   a. Allentel; Models GB13A, B and C.
   b. Or approved equivalent.
2. J Hooks:
   a. Erico Caddy
   b. Or approved equivalent.
3. Telecommunications Ground Bus Bar:
   a. Panduit
   b. Erico
   c. Chatsworth
   d. Or approved equivalent.

2.2 EMT CONDUIT

A 1-inch to 4-inch electrogalvanized steel tubing.

2.3 OUTLET BOXES

A Minimum 4-inch square by 2-1/8-inch deep, with single gang plaster ring with correct rating for use.

2.4 PULL TAPE

A Measuring and pulling tape constructed of synthetic fiber with plastic jacket, printed with accurate sequential footage marks.

2.5 DUCT PLUGS

A Aboveground Conduit Openings: Tapered PVC plugs with tab for pulltape.

B Underground or Underslab Conduit Openings: Removable screwtight compression type duct plugs with wing-nut and corrosion resistant hardware. Use appropriate part according to duct size.

2.6 PULL BOX ENCLOSURES

A NEMA Type 1 galvanized steel enclosure with flat screw-applied cover, with or without knockouts, gray enamel finish.

2.7 FITTINGS

A Wet Areas: Steel compression type couplings and nipples.

B Dry Areas: Set screw type couplings and nipples.

2.8 ACCESSORIES

A D-Rings:
1. Die-cast aluminum.
2. Designed for holding cables on equipment mounting boards.

B J-Hooks: Tee grid or drop wire style.

C Telecommunications Ground Bus Bar:
1. 10-inches by 1/4-inch by 2-inches with standoffs, insulators and two hole lug pattern.
2. UL listed.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A Install electrical work in telecommunications equipment rooms as shown on Drawings. Coordinate with incoming utilities, Owner, and with other trades working in area.

B Provide independent support from building structure for raceway components and cable supports.

C Install plastic-jacketed pull tape printed with accurate sequential footage in empty conduits.

D Provide copper grounding bus bars and listed copper conductors at each terminal board, bonded to the main electrical distribution panel and to building ground grid, per ANSI-J-STD-607-A.

E Provide insulated bushings on conduits and sleeves.

F Conduit bodies (condulets) are not to be used in data raceway system.

G Furnish and install plywood terminal boards, sized as shown on Drawings.

H Raceway and Pull Boxes:
1. Install no more than two 90 degree bends or maximum of 180 degrees of curvature between pullboxes.
2. Install pull boxes along conduit at maximum 100-foot spacing.
3. Provide minimum 12-inch by 12-inch by 4-inch pull boxes with screw type lids, minimum four screws to secure lid.

4. Use long radius elbows for raceway bends; do not use pull boxes in place of raceway bend.
5. Size recessed conduits to surface raceway serving multiple data outlets as follows. Sizing is based on TIA-569-A for 28 percent conduit fill, assuming Category 6A cables (nominal outer diameter 0.24-inch) to each data outlet. Provide recessed backbox between surface raceway and recessed conduit sized for conduit.

3.2 EMT CONDUIT

A Reference General Installation Requirements above.

B Install per manufacturer's instructions and recommendations.

3.3 OUTLET BOXES

A Reference General Installation Requirements above.

B Install per manufacturer's instructions and recommendations.

C Install conduit no smaller than 1-inch trade size from any signal outlet box, no smaller than 3/4-inch trade size from any wall phone outlet box.

D Wall Boxes: Install double-gang box with single-gang trim ring and minimum 1-inch conduit to accessible space. Use double-gang trim ring where required for 4-to 6-jack installation in one wall box.

E Mount center of outlet boxes as required by ADA, or noted on Drawings, following distance above floor:
1. Wall phones: 46-inches.
2. Telecom Outlets: 18-inches.
3. Other Outlets: As detailed on Drawings.

3.4 PULL TAPE

A Reference General Installation Requirements above.

B Install per manufacturer's instructions and recommendations.

3.5 DUCT PLUGS

A Reference General Installation Requirements above.

B Install per manufacturer's instructions and recommendations.

3.6 PULL BOX ENCLOSURES

A Reference General Installation Requirements above.

B Install per manufacturer's instructions and recommendations.

3.7 FITTINGS

A Reference General Installation Requirements above.

B Install per manufacturer's instructions and recommendations.

3.8 ACCESSORIES

A D-Rings:
1. Reference General Installation Requirements above.
2. Install per manufacturer's instructions and recommendations.

B J Hooks:
1. Reference General Installation Requirements above.
2. Install per manufacturer's instructions and recommendations.
3. Attach J-hook supports securely to metal studs or structural metal deck above (slip rods are not permitted).
4. Space J-hook supports 4-feet on center if attached to walls.
5. Space J-hook supports 5-feet on center if hung from structural deck above.
6. Provide a minimum clearance around J-hook cable path with a minimum radius of 18-inches.
7. Route main J-hook paths so that no outlet is more than 30-feet horizontally from a J-hook support. Wherever possible, route J-hooks parallel or perpendicular to interior partition lines. The drawings do not indicate the exact number of J-hooks required. Provide the correct quantity required by the NEC. Adjust location and routing to accommodate work and to prevent interferences.

END OF SECTION

SECTION 260533

RACEWAYS

PART 1 - GENERAL

1.1 SUMMARY

A Work Included:
1. Electrical Metallic Tubing (EMT)
2. Electrical Polyvinyl Chloride (PVC) Conduit
3. Conduit Fittings

B Provide a complete system of conduit and fittings, with associated couplings, connectors, and fittings, as shown on Drawings and described in these Specifications.

1.2 RELATED SECTIONS

A Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

B In addition, reference the following:
1. Section 26 05 29, Hangers and Supports for Electrical Systems and Equipment
2. Section 26 05 34, Boxes

1.3 REFERENCES AND STANDARDS

A References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A Submittals as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.5 QUALITY ASSURANCE

A Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.6 WARRANTY

A Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.7 DEFINITIONS

A Raceway system is defined as consisting of conduit, tubing, duct, and fittings including but not limited to connectors, couplings, offsets, elbows, bushings, expansion/deflection fittings, and other components and accessories. Complete electrical raceway installation before starting the installation of conductors and cables.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A Electrical Metallic Tubing (EMT):
1. Allied Tube & Conduit
2. Beck Manufacturing WL
3. Picoma
4. Wheatland Tube Company
5. Or approved equivalent.

B Electrical Polyvinyl Chloride (PVC) Conduit:
1. AFC Cable Systems Inc.
2. Electri-Flex Company
3. International Metal Hose
4. JM Eagle
5. Or approved equivalent.

C Conduit Fittings:
1. Bushings:
   a. Insulated Type for Threaded Raceway Without Factory Installed Plastic Throat Conductor Protection:
      1) Thomas & Betts 1222 Series
      2) O-Z Gedney B Series
      3) Or approved Equivalent.
2. Raceway Connectors and Couplings:
   a. Thomas & Betts Series
   b. O-Z Gedney Series
   c. Or approved Equivalent.
3. Expansion/Deflection Fittings:
   a. EMT: O-Z Gedney Type TX
   b. RMC: O-Z Gedney Type AX, DX and AXDX, Crouse & Hinds XD
   c. PVC: O-Z Gedney Type DX with PVC adapters, Carlon E945 Series, Kraloy OPEJ Series

d. Or approved equivalent.

2.2 ELECTRICAL METALLIC TUBING (EMT)

A Description: UL 797, ANSI C80.3; steel galvanized tubing.

B Fittings: NEMA FB 1; steel, compression type.

2.3 ELECTRICAL POLYVINYL CHLORIDE (PVC) CONDUIT

A Description: UL 651, NEMA TC 2; Schedule 40 PVC.

B Fittings: NEMA TC 3.

2.4 CONDUIT FITTINGS

A Bushings:
1. Insulated type for threaded raceway connectors without factory-installed plastic throat conductor protection.
2. Insulated grounding type for threaded raceway connectors.

B Raceway Connectors and Couplings:
1. Steel connectors, couplings, and conduit bodies, hot-dip galvanized.
2. Connector locknuts to be steel, with threads meeting ASTM tolerances. Locknuts to be hot-dip galvanized.
3. Connector throats (EMT, flexible conduit, metal clad cable and cordset connectors) to have factory installed plastic inserts permanently installed. For normal cable or conductor exiting angles from raceway, the cable jacket or conductor insulation to bear only on plastic throat insert.
4. Steel gland, Tomic or Breagle connectors and couplings are recognized for this Contract as having acceptable raceway to fitting electrical conductance.
5. Set screw connectors and couplings, without integral compression glands, are recognized for this Contract as not having acceptable raceway to fitting electrical conductance. A ground conductor sized per this Specification must be included and bonded within raceway assembly utilizing this type connector or coupling.

C Provide expansion/deflection fittings for EMT.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A Finished Surfaces: Schedule raceway installation to avoid conflict with installed wall and ceiling surfaces. If unavoidable, coordinate work and repairs with Architect.

B Conduit Size:

1. Minimum Size: 3/4-inch for power and control, unless otherwise noted. 3/4-inch for communication/data, unless otherwise noted. 3/4-inch for signal systems, unless otherwise noted.

C Underground Installations:
1. More than 5-feet from Foundation Wall: Use PVC.
2. Within 5-feet from Foundation Wall: Use PVC coated RMC.
3. In or Under Slab on Grade: Use PVC.
4. Minimum Size: 1-inch.

D In Slab Above Grade:
1. Use PVC.
2. Maximum Size Conduit in Slab: Contact Structural Engineer for maximum outside diameter of conduit.

E Provide two pull strings/tapes in empty conduits. Types:
1. High-strength, stretch resistant, woven polyester. Factory lubricated to reduce burn-through.
2. Feeders: 5/8-inch, 1,800-pound rated, Greenlee 4436, Mule Tape, Herculine, or approved equivalent.
3. Branch Circuits and Low Voltage: 1/2-inch, 1,250-pound rated, Greenlee 4435, Mule Tape, Herculine, or approved equivalent.
4. If fish tape is used for pulling line or low voltage wiring, fiberglass type to be used. Metal fish tapes not allowed.
5. Secure pull string/tape with minimum 6-feet extended at each end.
6. Install pull string/tape after conduit is joined and glue is dry.
7. Provide caps on ends of empty conduit to be used in future.
8. Label both ends of empty conduits with location of opposite end.

F Elbows: Use fiberglass or PVC coated RMC for underground installations.
1. Elbows in utility conduits must be factory made. Field bends or heat bends are not allowed.

G Elbow for Low Energy Signal Systems: Use long radius factory ells where linking sections of raceway for installation of signal cable.

H When installing utility conduit, 6-inch or smaller, sweeps must be separated by a straight section of at least 5-feet in length and an initial horizontal straight section of at least 3-feet beginning from the vault.

I Verify that field measurements are as shown on Drawings.

J Plan locations of conduit runs in advance of the installation and coordinate with ductwork, plumbing, ceiling and wall construction in the same areas.

K Locate penetrations and holes in advance where they are proposed in the structural sections such as footings, beams, and walls. Penetrations are acceptable only when the following occurs:
1. Where shown on the Structural Drawings.
2. As approved by the Structural Engineer prior to construction, and after submittal of drawing showing location, size, and position of each penetration.

L Verify routing and termination locations of conduit prior to rough-in.

M Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

N Install raceways securely, in neat and workmanlike manner, as specified in NECA 1, Standard Practices for Good Workmanship in Electrical Construction.

O Duct proof all underground conduits to remove dirt and debris and ensure conduit is not obstructed, out-of-round, or collapsed. Utilize a wood test mandrel (or equivalent plastic/hard-rubber) configured for the conduit inside diameter.

P Install steel conduit as specified in NECA 101, Standard for Installing Steel Conduits.

Q Install nonmetallic conduit in accordance with manufacturer's instructions.

R Inserts, anchors and sleeves.
1. Coordinate location of inserts and anchor bolts for electrical systems prior to concrete pour.
2. Coordinate location of sleeves with consideration for other building systems prior to concrete pour.

S Conduit Supports:
1. Arrange supports to prevent misalignment during wiring installation.
2. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
3. Group related conduits; support using conduit rack. Construct rack using steel channel. Provide space on each for 25 percent additional conduits.
4. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
5. Do not attach conduit to ceiling support wires.

T Flexible metal conduit length not-to-exceed 6-feet, 3-feet in concealed walls. Provide sufficient slack to reduce the effect of vibration.

U Install conduit seals at boundaries where ambient temperatures differ by 10 degrees F or more as shown on the drawings. Install seals on warm side of partition.

V Seal raceways stubbing up into electrical equipment. Plug raceways with conductors with duct-seal. Cap spare raceways and plug PVC raceway products with plastic plugs as made by Underground Products, or equal, shaped to fit snugly into the stubup.

W Seal raceways penetrating an exterior building wall to prevent moisture and vermin from entering into the electrical equipment.

X Use suitable caps on spare and empty conduits to protect installed conduit against entrance of dirt and moisture.

Y Keep 277/480 volt wiring independent of 120/208 volt wiring. Keep power wiring independent of communication system wiring.

Z Keep emergency system wiring independent of other wiring systems per NEC 700.

AA Arrange conduit to maintain headroom and present neat appearance.

BB Do not install conduits on surface of building exterior, along vapor barrier, across roof, on top of parapet walls, or across floors, unless otherwise noted on drawings.

CC Exposed conduits are permitted only in following areas:
1. Mechanical rooms, electrical rooms or spaces where walls, ceilings and floors will not be covered with finished material.
2. Existing walls that are concrete or block construction.
3. Where specifically noted on Drawings.
4. Route exposed conduit parallel and perpendicular to walls, tight to finished surfaces and neatly offset into boxes.

DD Do not install conduits or other electrical equipment in obvious passages, doorways, scuttles or crawl spaces which would impede or block area passage's intended usage.

EE Install continuous conduit and raceways for electrical power wiring and signal systems wiring.

FF Route conduit installed above accessible ceilings parallel and perpendicular to walls.

GG Maintain adequate clearance between conduit and piping.

HH Keep conduits a minimum of 12-inches away from steam or hot water radiant heating lines (at or above 104 degrees F) or 3-inches away from waste or water lines.

II Cut conduit square using saw or pipecutter; deburr cut ends.

JJ Bring conduit to shoulder of fittings; fasten securely.

KK Use conduit hubs to fasten conduit to cast boxes in damp and wet locations.

LL Install no more than the equivalent of three 90 degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams.

MM Use factory elbows or hydraulic one shot bender to fabricate elbows for bends in metal conduit larger than 2-inch size.

NN Avoid moisture traps.

OO Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control, and expansion joints.

PP Conduit Terminations for Signal Systems: Provide a plastic bushing on the end of conduit used for signal system wiring.

QQ Feeders: Do not combine or change feeder runs.

RR Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 07, Thermal and Moisture Protection.

SS Route conduit through roof openings for piping and ductwork wherever possible. Where separate roofing penetration is required, coordinate location and installation method with roofing installation and installer.

3.2 ELECTRICAL METALLIC TUBING (EMT) INSTALLATION

A Dry Locations:
1. Concealed: EMT.
2. Exposed: EMT.

B Dry, Protected: EMT.

3.3 ELECTRICAL POLYVINYL CHLORIDE (PVC) CONDUIT INSTALLATION

A Install in accordance with manufacturer's instructions.

B Provide equipment grounding conductor in PVC conduit runs containing power conductors.

C Underground Installation:
1. Areas subject to vehicular traffic: Schedule 80 PVC.
2. Other underground applications: Schedule 40 PVC, except where prohibited by the NEC or local codes.

D Convert PVC conduit to Rigid Metal Conduit (RMC) prior to emerging from underground, concrete encasement, or concrete slab.

E Provide expansion fittings to compensate for expansion and contraction per NEC 352.44.

F PVC elbows are not acceptable. Use fiberglass or PVC coated RMC.

G Trim cut ends inside and outside to remove rough edges.

H Provide bushings when entering a box, fitting or other enclosure.

3.4 CONDUIT FITTINGS INSTALLATION

A Conduit Joints: Assemble conduits continuous and secure to boxes, panels, luminaires and equipment with fittings to maintain continuity. Provide watertight joints where embedded in concrete, below grade or in damp locations. Seal metal conduit with metal thread primer. Rigid conduit connections to be threaded, clean and tight (metal to metal). Threadless connections are not permitted for RMC.

B Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

C Use set screw type fittings only in dry locations. When set screw fittings are utilized provide insulated continuous equipment ground conductor in conduit, from overcurrent protection device to outlet.

D Use compression fittings in dry locations, damp and rain-exposed locations. Maximum size permitted in damp locations and locations exposed to rain is 2-inches in diameter.

E Use threaded type fittings in wet locations, hazardous locations, and damp or rain-exposed locations where conduit size is greater than 2-inches.

F Use PVC coated, threaded type fittings in corrosive environments.

G Use insulated type bushings with ground provision at switchboards, panelboards, safety disconnect switches, junction boxes that have feeders 60 amperes and greater.

H Condulets and Conduit Bodies:
1. Do not use condulets and conduit bodies in conduits for signal wiring, in feeders 100 amp and larger, or for conductor splicing.

I Sleeves and Chases - Floor, Ceiling and Wall Penetrations: Provide necessary conduit sleeves, openings and chases where conduits or cables are required to pass through floors, ceilings, or walls.

J Expansion Joints:
1. Provide conduits crossing expansion joints where cast in concrete with expansion-deflection fittings, installed per manufacturer's recommendations.
2. Secure conduits 3-inches and larger to building structure on opposite sides of a building expansion joint with an expansion-deflection fitting across joint installed per manufacturer's recommendations.
3. Provide conduits less than 3-inches where not cast in concrete with junction boxes securely fastened on both sides of expansion joint, connected together with 15-inches of slack (minimum of 15-inches longer than straight line length) flexible conduit and copper green ground bonding jumper. In lieu of this flexible conduit, an expansion-deflection fitting, as indicated for conduits 3-inch and larger may be installed.
4. Verify expansion/deflection requirements with Structural Engineer prior to installation.

K Seismic Joints:
1. No conduits cast in concrete allowed to cross seismic joint.
2. Provide conduits with junction boxes securely fastened on both sides of seismic joint, connected together with 15-inches of slack (minimum of 15-inches longer than straight line length) flexible conduit and copper green ground bonding jumper. Prior to installation, verify with Architect that 15-inches is adequate for designed movement, and if not, increase this length as required.

3. Provide conduits less than 3-inches where not cast in concrete with junction boxes securely fastened on both sides of expansion joint, connected together with 15-inches of slack (minimum of 15-inches longer than straight line length) flexible conduit and copper green ground bonding jumper. In lieu of this flexible conduit, an expansion-deflection fitting, as indicated for conduits 3-inches and larger may be installed.

L Provide rigid conduit coupling flush with surface of slab or wall for conduit stubbed in concrete slab or wall to serve electrical equipment or an outlet under table or to supply shop tool, etc. Provide plug where conduit is to be used in future.

END OF SECTION

SECTION 260534

BOXES

PART 1 - GENERAL

1.1 SUMMARY

A Work Included:
1. Outlet Boxes
2. Floor Boxes and Poke-Thrus
3. Pull and Junction Boxes
4. Box Extension Adapter

B Provide electrical boxes and fittings for a complete installation. Include but not limited to outlet boxes, junction boxes, pull boxes, bushings, locknuts and other necessary components.

1.2 RELATED SECTIONS

A Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

B In addition, reference the following:
1. Section 26 05 33, Raceways
2. Section 26 05 53, Identification for Electrical Systems

1.3 REFERENCES AND STANDARDS

A References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A Submittals as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.5 QUALITY ASSURANCE

A Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.6 WARRANTY

A Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A Outlet Boxes:
1. Hubbell
2. Thomas & Betts
3. Eaton/Crouse-Hinds
4. Or approved equivalent.

B Floor Boxes and Poke-Thrus:
1. Legrand (Wiremold)
2. FSR
3. Hubbell
4. Thomas & Betts
5. MonoSystems
6. Eaton/Crouse-Hinds
7. Or approved equivalent.

C Pull and Junction Boxes:
1. Eaton/Crouse-Hinds
2. Hoffman
3. Or approved equivalent.

D Box Extension Adapter:
1. Hubbell
2. Thomas & Betts
3. Eaton/Crouse-Hinds
4. Or approved equivalent.

2.2 OUTLET BOXES

A Luminaire Outlet: 4-inch octagonal box, 1-1/2-inches deep with 3/8-inch luminaire stud if required. Provide raised covers on bracket outlets and on ceiling outlets.

B Device Outlet: Installation of one or two devices at common location, minimum 4-inches square, minimum 1-1/2-inches deep for non-USB type devices. Installation of one or two devices at common locations, minimum 4-inches square, minimum 2-inches deep for USB type devices. Single- or two-gang flush device raised covers.

C Telecom Outlet: Provide 4-inches square, minimum 2-1/8-inch deep box with two-gang plaster ring.

D Multiple Devices: Three or more devices at common location. Install one-piece gang boxes with one-piece device cover. Install one device per gang.

E Masonry Boxes: Outlets in concrete.

F Construction: For interior locations, provide galvanized steel outlet wiring boxes, of the type, shape and size, including depth of box, to suit each respective location and installation; constructed with stamped knockouts in back and sides, and with threaded holes with screws for securing box covers or wiring devices. All surface mounted outlet boxes are to be drawn. Welded boxes are not acceptable.

G Accessories: Provide outlet box accessories for each installation, including mounting brackets, wallboard hangers, extension rings, luminaire studs, cable clamps and metal straps for supporting outlet boxes, compatible with outlet boxes being used and meeting requirements of individual wiring situations.

H Noise Control: Provide acoustic putty pad to back side of each outlet box installed in acoustic rated walls.

2.3 FLOOR BOXES AND POKE-THRUS

A Basis of Design: Floor boxes and poke-thrus are based on Hubbell as the manufacturer. Manufacturers are approved for use on this project on condition of meeting or exceeding basis of design for conditions of use, box capacity, total allowed connecting conduit capacity, and available finishes. Products ordered or installed not meeting basis of design are subject to removal and replacement at no cost to Owner.

B Floor Boxes:
1. Multi-Gang Box, Slab on Grade: Refer to Drawings.

C Poke-Thrus: Refer to Drawings for specifications.

2.4 PULL AND JUNCTION BOXES

A Construction: Provide ANSI 61 gray polyester powder painted sheet steel junction and pull boxes, with screw-on covers; of type shape and size, to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.

B Location:
1. Provide junction boxes above accessible ceilings for drops into walls for receptacle outlets from overhead.
2. Provide junction boxes and pull boxes to facilitate installation of conductors and limiting accumulated angular sum of bends between boxes, cabinets and appliances to 270 degrees.

C In-Ground Cast Metal Box: NEMA 250, Type 6, outside flanged, recessed cover box for flush mounting.
1. Construction: Galvanized cast iron.
2. Cover: Smooth cover with neoprene gasket and stainless steel cover screws.
3. Cover Legend: ELECTRIC.

D Fiberglass Handholes: Die molded glass fiber hand holes:
1. Cable Entrance: Pre-cut 6- by 6-inch cable entrance at center bottom of each side.
2. Cover: Fiberglass weatherproof cover with nonskid finish.
3. Cover Legend: ELECTRIC.

2.5 BOX EXTENSION ADAPTER

A Construction: Diecast aluminum.

B Location: Install over flush wall outlet boxes to permit flexible raceway extension from flush outlet to fixed or movable equipment.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A Coordinate locations of floor boxes and wall mounted wiring device boxes with architectural and structural floor plans prior to rough-in.

B Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1, Standard Practice of Good Workmanship in Electrical Construction.

C Secure boxes rigidly to substrate upon which they are being mounted, or solidly embed boxes in concrete or masonry.

D Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NEC. Locate boxes and conduit bodies so as to ensure accessibility of electrical wiring.

E Set wall mounted boxes at elevations to accommodate mounting heights shown on Architectural Elevations.

F Electrical boxes are shown on drawings in approximate locations unless dimensioned.
1. Adjust box locations up to 10-feet if required to accommodate intended purpose.

G Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 07, Thermal and Moisture Protection.

H Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

I Install flush mounting box without damaging wall insulation or reducing its effectiveness.

J Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12-inches of box.

K Box Color Coding and Marking: Reference Section 26 05 53, Identification for Electrical Systems.

L Adjust boxes to be parallel with building lines. Boxes not plumb to building lines are not acceptable.

M Install knockout closures in unused box openings.

N Clean interior of boxes to remove dust, debris, and other material.

O Clean exposed surfaces and restore finish.

3.2 OUTLET BOXES INSTALLATION

A Mount outlet boxes, unless otherwise required by ADA, or noted on Drawings, following distances above finished floor:
1. Control Switches:
   a. 48-inches to the top of outlet box.
   b. 4-inches above top of backsplash at countertops/workstations, not to exceed 44-inches above finished floor to the top of outlet box, per ADA requirements.
2. Receptacles:
   a. 15-inches to the bottom of outlet box.
   b. 4-inches above top of backsplash at countertops/workstations, not to exceed 44-inches above finished floor to the top of outlet box, per ADA requirements.
3. Telecom Outlets:
   a. Match height of adjacent receptacle.
   b. 15-inches to the bottom of outlet box.
   c. 4-inches above top of backsplash at countertops/workstations, not to exceed 44-inches above finished floor to the top of outlet box, per ADA standards.
4. Other Outlets: As indicated in other sections of Specifications or as detailed on Drawings.

B Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6-inches from ceiling access panel or from removable recessed luminaire.

C Flush Outlets in Insulated Spaces: Maintain integrity of insulation and vapor barrier.

D Coordinate electrical device locations and elevations (switches and receptacles) with architectural drawings to prevent mounting devices in mirrors, back splashes, and behind cabinets.

E Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.

F Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices. Adjacent boxes not aligned vertically to be adjusted at no additional cost to Owner.

G Use flush mounting outlet box in finished areas.

H Do not install flush mounting box back-to-back in walls; provide minimum 6-inches separation. Provide minimum 24-inches in acoustic rated walls.

I In acoustical walls, apply acoustic putty pad on outlet box prior to installation of acoustical blanket.

J Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

K Use stamped steel bridges to fasten flush mounting outlet box between studs.

L Use adjustable steel channel fasteners for hung ceiling outlet box.

M Use gang box where more than one device is mounted together. Do not use sectional box.

N Use gang box with plaster ring for single device outlets.

O Adjust flush-mounting outlets to make front flush with finished wall material.

3.3 FLOOR BOXES AND POKE-THRUS INSTALLATION

A Use cast floor boxes for installations in slab on grade.

B Use steel boxes matching fire-rating of floor slab for slab above grade.

C Set floor boxes level.

D Adjust floor boxes flush with finish flooring material.

E Provide poke-thrus with fire rating equal to floor rating.

F Provide sufficient concrete cover around floor box to maintain fire rating of floor slab for slab above grade, and meet manufacturer installation directions for floor box on grade.

3.4 PULL AND JUNCTION BOXES INSTALLATION

A Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

B Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6-inches from ceiling access panel or from removable recessed luminaire.

C Do not fasten boxes to ceiling support wires.

D Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

3.5 BOX EXTENSION ADAPTER INSTALLATION

A Match material to box.

B Install gaskets at exterior and wet locations.

END OF SECTION

SECTION 260553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A Work Included:
1. Equipment Nameplates
2. Device Labels
3. Wire Markers

1.2 RELATED SECTIONS

A Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

A References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A Submittals not required for this Section.

1.5 QUALITY ASSURANCE

A Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

B In addition, meet the following:
1. Manufacturer's Qualifications: Firms regularly engaged in manufacture of identification devices of types and sizes required.
2. Manufacturer's standard products of categories and types required for each application as referenced in other Division 26, Electrical Sections. Where more than a single type is specified for application, provide single selection for each product category.
3. Codes and Standards: Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices unless otherwise indicated.

1.6 WARRANTY

A Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A Equipment Nameplates:
1. B & I Nameplates
2. Intellicum
3. JBR Associates
4. Or approved equivalent.

B Device Labels:
1. Kroy
2. Brady
3. Or approved equivalent.

C Wire Markers:
1. Brady
2. Panduit
3. Sumitomo
4. Or approved equivalent.

2.2 EQUIPMENT NAMEPLATES

A Engraved phenolic plastic, laminate, minimum 1/16-inch thick in the size indicated, with beveled edge border matching letter color. Federal specification LP-387A. All upper case letters in engraver standard letter style of the size and wording indicated. Provide with 2-mil adhesive backing. Embossed tape style labels are not acceptable.

B Color:
1. Normal (Utility): White letters on black background.
2. Life Safety/Critical (Emergency Systems): Black letters on orange background.
3. Equipment Branch (Legally Required Standby Systems): Black letters on yellow background.

C Letter Size:
1. Use 1/2-inch letters minimum for identifying major equipment and loads, including switchgear, switchboards, distribution panels, generators, automatic transfer switches, UPS, etc.
2. Use 1/4-inch or 1/2-inch letters minimum for identifying panels, breakers, transformers, VFDs, disconnects, etc.

3. Use 3/16-inch minimum for identifying source, voltage, current, phase, wire configurations, and short circuit current rating (SCCR).

D Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

E The Architect, Engineer, Commissioning Agent and Owner reserve the right to make modifications to the nameplates as necessary.

F Locations:
1. Switchgear, switchboards, sub-distribution switchboards, distribution panels, branch panels, automatic transfer switches, UPS.
2. Main breakers and distribution breakers in switchgear, switchboards, and distribution panels.
3. Equipment including, but not limited to, motor controllers, disconnects, and VFDs.
4. Low-voltage equipment enclosures including, but not limited to, fire alarm panels, access control panels, and lighting control panels.
5. Distribution transformers.

2.3 DEVICE LABELS

A Extra strength, laminated adhesive tape with 3/16-inch black letters on clear background. Embossed tape/punch tape style labels are not acceptable.

B Receptacles: Indicate source panel and source circuits (e.g. xxx-xx).

C Wall Switches/Control Device Stations:
1. Where controls are provided for remote lighting or power outlets, or where controls in same location serve different purposes or areas, such as corridor and outside, provide device label indicating function of each control device.
2. Label the function of control devices where two or more are mounted in same location and control function may be unclear.
3. Wall switches with engraved buttons do not require labeling.

D Junction Boxes: Label to show system identification, source circuit, or raceway origin. In finished areas, utilize device label. In unfinished areas or above ceilings, use of permanent ink marker is acceptable.

E Panel and circuit designation written in permanent marker on the back of the plate and inside all back-boxes and junction boxes.

2.4 WIRE MARKERS

A Description: Vinyl-cloth self-adhesive type wire markers.

B Locations: Each conductor at panelboard gutters, pull boxes, outlet boxes, junction boxes, and each load connection.

C Power and Lighting Circuits: Branch circuit or feeder number as indicated on drawings and source panel.

D Control Circuits: control wire number indicated on schematic and interconnection diagrams on drawings or shop drawings.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A Coordinate designations used on Drawings with equipment nameplates and device labels.

B Install nameplates and labels parallel to equipment lines.

C Identify empty conduit and boxes with intended use.

D Provide typewritten branch panel schedules with protective clear transparent covers accounting for every breaker installed. Use actual room designations assigned by name or number near completion of the work, and not the designations shown on Drawings.

3.2 EQUIPMENT NAMEPLATES

A Degrease and clean surfaces to receive nameplates.

B Secure equipment nameplates to equipment front using manufacturer adhesive backing.

C Secure equipment nameplates to inside surface of door on panelboard that is recessed in finished locations.

D Verify emergency system distribution equipment nameplate colors with Architect/Owner.

E Switchgear, switchboards, sub-distribution switchboards, distribution panels and branch panels to include name, source, voltage, current, phase, wire configuration, and short circuit current rating (SCCR).

F Transformers to include source, KVA, and secondary voltage, phase, and wire configuration.

G Disconnect switches and VFDs to include name, source, and circuit number.

H Provide nameplates for flush mounted branch panelboards identifying name on front door. On inside of door provide nameplate as noted above. Verify with Architect/Owner if nameplate on outside of door is required.

I Provide a second label at branch panelboards listing the means of identification of branch circuit conductors. This identification legend to consist of the color code used for each voltage system (208Y/120V and 480Y/277V). Include identification of both voltage systems on each label, regardless of the voltage of the panelboard to which the label is affixed. Comply with requirements of NEC 210.5.

1. See Specification Section 26 05 19, Low-Voltage Electrical Power Conductors and Cables, for required conductor color code for this project.

3.3 DEVICE LABELS

A Reference General Installation Requirements above.

B Install per manufacturer's instructions and recommendations.

C Degrease and clean surfaces to receive labels. Fingers to be regularly cleaned of grease and debris to prevent fingerprints on labels. Labels installed dirty or with fingerprints to be replaced at no cost to Owner.

3.4 WIRE MARKERS

A Reference General Installation Requirements above.

B Install per manufacturer's instructions and recommendations.

C Provide wire markers on each conductor for power, control, signalling and communications circuits.

END OF SECTION

SECTION 260923

OCCUPANCY AND VACANCY SENSORS

PART 1 - GENERAL

1.1 SUMMARY

A Work Included:
1. Occupancy/Vacancy Sensors (Ceiling Mounted)

1.2 RELATED SECTIONS

A Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

A References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A Submittals as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

B In addition, provide:
1. Provide wiring diagrams indicating low voltage and line voltage wiring requirements.
2. Provide, on reproducible architectural floor plan, a layout of sensors indicating their sensing distribution.

1.5 QUALITY ASSURANCE

A Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

B In addition, meet the following:
1. Use manufacturer's published testing and adjusting procedures to adjust sensors time delay, daylight sensitivity, and passive infrared sensitivity to satisfaction of the Owner, in compliance with Washington State Energy Code, C408.4.
2. Prepare and complete report of test procedures and results. Submit these test procedures and results to Owner and Architect.

1.6 WARRANTY

A Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A Occupancy/Vacancy Sensors (Ceiling Mounted):
1. Passive Infrared Occupancy/Vacancy Sensors:
   a. Acuity Controls
   b. WattStopper
   c. Leviton
   d. Hubbell
   e. Cooper/Greengate
   f. Lutron
   g. Steinel
   h. Or approved equivalent.
2. Ultrasonic Occupancy/Vacancy Sensors:
   a. WattStopper
   b. Leviton
   c. Hubbell
   d. Cooper/Greengate
   e. Acuity Controls
   f. Lutron
   g. Steinel
   h. Or approved equivalent.
3. Dual Technology Occupancy/Vacancy Sensors:
   a. WattStopper
   b. Leviton
   c. Hubbell
   d. Cooper/Greengate
   e. Acuity Controls
   f. Lutron
   g. Steinel
   h. Or approved equivalent.

B Basis of Design: Occupancy/Vacancy sensor layout on Drawings are designed based on Steinel product line. Approved manufacturers listed are allowed on condition of meeting the specified conditions including complete sensor coverage of the area controlled and switching of luminaires in the area controlled. Provide additional sensors and power switch packs as needed to provide the same level of functionality as shown on Drawings or required in Specifications. Remove and replace electrical equipment installed not meeting these conditions at no cost to Owner.

2.2 GENERAL

A Occupancy sensor designation indicates sensors automatically turn lights ON when the sensor detects the presence of a person and will automatically turn lights OFF when no presence is detected for a specified amount of time (automatic-on and automatic-off).

B Vacancy sensor designation requires someone to manually turn the lights ON. The sensor will then automatically turn the lights OFF when no presence is detected for a specified amount of time (manual-on and automatic-off).

C Provide occupancy sensors to sense presence of human activity within desired space and enable or disable on/off manual lighting control function provided by local switches.

D Upon detection of human activity by detector, sensor initiates time delay to maintain lights on for present period of time. Field adjustable time delay setting from 30 seconds to 15 minutes.

E Factory set sensors for maximum sensitivity.

F LED lamp built into sensor indicates when occupant is detected.

G Provide zero cross relay control with sensors and sensor/switched; relay contacts close and open with AC voltage signal is at zero.

H Where line voltage sensors and sensor/switches are used, provide to match voltage of controlled circuit.

I Line Voltage Sensors, Control Units, and Relays: UL listed.

2.3 OCCUPANCY/VACANCY SENSORS (CEILING MOUNTED)

A Passive Infrared Sensors:
1. Sensor Function: Detects human presence in floor area being controlled by detecting changes in Infrared energy. Sensor detects small movements, i.e., when people are writing while seated at a desk.
2. Provide temperature compensated dual element pyro-electric sensor and with multi element Fresnel lens.
3. Provide daylight filter to ensure that sensor is insensitive to short-wavelength infrared waves, i.e., those emitted by sun.
4. Sensor utilizes advanced digital signal processing technology to reduce false offs without reducing sensitivity.
5. Sensor utilizes DIP switches for adjustment to time delay and override. Field adjustable settings for sensitivity.
6. Low Voltage Sensor: 24VDC power. Sensor operates remote power switch packs. Multiple sensors can be wired in parallel to allow coverage of large areas.
7. Provide adjustments and mounting hardware under removable cover to prevent tampering.
8. Finish: White.
9. Ceiling-Mounted Sensor:

a. Programmable to operate as an occupancy sensor (automatic-on and automatic-off) or a vacancy sensor (manual-on and automatic-off).
b. 360 degree sensor range; Coverage: 1,200-square feet, unless otherwise noted on Drawings.
c. Provide internal form C dry contacts for HVAC control.

B Ultrasonic Occupancy/Vacancy Sensors:
1. Sensor Function: Detects human presence in controlled floor area by detecting Doppler shifts in 40kHz ultrasound created by sensor.
2. Sensors are precision crystal controlled and do not interfere with each other when two or more are placed in same area. Sensor includes advanced digital signal processing to reduce false on signals without decreasing sensitivity, as well as immunity to RFI/EMI sources.
3. Sensor utilizes DIP switches for adjustment to time delay and override. Field adjustable settings for sensitivity.
4. Low Voltage Sensor: 24VDC power. Sensor operates remote power switch packs. Multiple sensors can be wired in parallel to allow coverage of large areas.
5. Provide adjustments and mounting hardware under removable cover to prevent tampering.
6. Finish: White.
7. Ceiling-Mounted Sensor:
   a. Programmable to operate as an occupancy sensor (automatic-on and automatic-off) or a vacancy sensor (manual-on and automatic-off).
   b. Maximum protrusion of 1.1-inches and blend in aesthetically with ceiling.
   c. 360 degree sensor range; Coverage: 2,000-square feet, unless otherwise noted on Drawings.
   d. Provide internal form C dry contacts for HVAC control.
8. Ceiling Mounted Sensor - Hallway Sensor Coverage:
   a. Programmable to operate as an occupancy sensor (automatic-on and automatic-off) or a vacancy sensor (manual-on and automatic-off).
   b. Maximum protrusion of 1.5-inches and blend in aesthetically with ceiling.
   c. Coverage: 90 linear feet.
   d. Provide internal form C dry contacts for HVAC control.

C Dual Technology Sensors:
1. Sensor Function: Combined capability of passive infrared with ultrasonic or microphonic technology as described above. Upon a person entering a space, motion must be sensed by both technologies before lighting will be turned on. After this has occurred, detection by either technology will hold lighting on. Sensors retrigger time delay where only one motion is necessary to turn on lights within 5 seconds after turning off.
2. Sensor utilizes DIP switches for adjustment to time delay and override. Field adjustable settings for sensitivity.
3. Low Voltage Sensor: 24VDC power. Sensor operates remote power switch packs. Multiple sensors can be wired in parallel to allow coverage of large areas.
4. Ceiling-Mounted Sensor:
   a. Programmable to operate as an occupancy sensor (automatic-on and automatic-off) or a vacancy sensor (manual-on and automatic-off).
   b. 360 degree sensor range; Coverage: 1,000-square feet for half-step motion, unless otherwise noted on Drawings.
   c. Provide internal form C dry contacts for HVAC control.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A Install occupancy/vacancy sensors as directed by manufacturer's instructions. Complete connections to control circuits, occupancy sensors, power supply pack and low voltage wiring.

B Provide power packs for sensor to control number of circuits and/or switch legs within its area of coverage.

C Field adjust each sensor to maximize its coverage of room space.

D Relocate sensors with ultrasonic technology to avoid being closer to HVAC diffusers and power packs than recommended by manufacturer.

E Field set time delay for each device as noted below:
1. Offices, Workrooms: 30 minutes.
2. Restrooms: 15 minutes.
3. Storage Rooms, Janitor's Closets, Unisex Restrooms: 5 minutes.
4. All Other Spaces: 15 minutes.
5. Time Switches: 2-hours.

F Coordinate HVAC control requirements with controls contractor prior to installation.

G Lighting System Testing and Commissioning:
1. Test lighting controls to ensure that control devices, components, equipment, and systems are calibrated, adjusted, and operate in accordance with Drawings and Specifications. Provide functional testing of sequences of operation to ensure operation in accordance with Drawings and Specifications. Provide complete report of test procedures and results to engineer and insert approved copy into project closeout documents.
2. Testing includes:
   a. Daylight Automatic Controls.
   b. Occupant Sensing Automatic Controls.
   c. Automatic Time and Override Controls for Interior Lighting.
   d. Automatic Time and Photo Controls for Exterior Lighting.

END OF SECTION

SECTION 262726

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A Work Included: Provision of materials, installation and testing of:
1. Wall Switches
2. Receptacles
3. Finish Plates

1.2 RELATED SECTIONS

A Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

A References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A Submittals as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

B In addition, provide:
1. Wall Switches
2. Receptacles
3. Wall Plates

1.5 QUALITY ASSURANCE

A Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.6 WARRANTY

A Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A Wall Switches:
1. Toggle Type:
   a. Cooper AH1201
   b. Hubbell HBL1221
   c. Leviton 1221
   d. Legrand P&S PS20AC1
   e. Or approved equivalent.

B Receptacles:
1. Commercial Grade:
   a. 20 Amp:
      1) Cooper 5362
      2) Hubbell 5362
      3) Bryant CBRS20
      4) Leviton 5362S
      5) Legrand P&S 5362
      6) Or approved equivalent.
2. Ground Fault Circuit Interrupter (GFCI) Receptacle - 20 Amp:
   a. Cooper WRSGF20W
   b. Hubbell GFR5362SGW
   c. Legrand P&S 2097TRWR
   d. Or approved equivalent.

C Finish Plates:
1. Bryant
2. Cooper
3. Hubbell
4. Leviton
5. Legrand P&S
6. Or approved equivalent.

D Provide lighting switches and receptacles of common manufacturer and appearance.

2.2 WALL SWITCHES

A Characteristics: Toggle type, quiet acting, 20 amp, 120/277 volt, UL listed for motor loads up to 80 percent of rated amperage, extra heavy duty.

B Finish: White.

2.3 RECEPTACLES

A Duplex Receptacles Characteristics: Straight parallel blade, 125 volt, 2 pole, 3 wire grounding.
1. Commercial Grade: Riveted. Back and side wired. Brass ground contact on steel strap. Nylon face and nylon base. 20 amp.

B Ground Fault Circuit Interrupter (GFCI) Receptacle: Feed through type, back-and-side wired, tamper-resistant, weather resistant self-testing, 20 amp, 125 VAC.

C Special Purpose Receptacles: Reference Drawings for NEMA Standard Specification.

D Finish:
1. Same exposed finish as switches.

2.4 FINISH PLATES

A Finish Plates: Commercial grade thermoplastic with same finish as devices.

B Provide telephone/signal device plates; activated outlets to have coverplates to match modular jack.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A See Architectural elevations for location and mounting height of wiring devices. Review Architectural elevations prior to rough-in and contact Architect immediately if conflicts are found between Architectural and Electrical Drawings. Do not rough-in devices until conflicts are resolved.

B Install wiring devices and finish plates plumb with building lines, equipment cabinets and adjacent devices. Devices not plumb will be fixed at no additional cost to Owner.

C Orientation:
1. Install wiring devices with long dimension oriented vertically at centerline height shown on drawings or as specified.
2. Vertical Alignment: When more than one device is shown on Drawings in close proximity to each other, but at different elevations, align devices on a common vertical center line for best appearance. Verify with Architect.
3. Horizontal Alignment: When more than one device is shown on drawings in close proximity to each other with same elevation, align devices on a common horizontal center line for best appearance. Verify with Architect.

D Provide labeling per Section 26 05 53, Identification for Electrical Systems.

E Test wiring devices to ensure electrical continuity of grounding connections, and after energizing circuitry, to demonstrate compliance with requirements. Test receptacles for line to neutral, line to ground and neutral to ground faults. Correct any defective wiring.

3.2 WALL SWITCHES INSTALLATION

A At time of substantial completion, replace those items which have been damaged.

3.3 RECEPTACLES INSTALLATION

A Upon installation, adhere to proper and cautious use of convenience receptacles. At time of substantial completion, replace those items which have been damaged, including those burned and scored by faulty receptacles or cord caps.

B In the following outlet locations, regardless of whether shown as GFCI on Drawings, either provide a GFCI duplex receptacle, or use a GFCI breaker where code would require a GFCI outlet to have a remote test switch:
1. Bathrooms.
2. Where receptacles are installed within 6-feet, 0-inches from edge of sinks.
3. Kitchens above counters.
4. On rooftops.
5. Outdoors.
6. Where serving vending machines.
7. Where serving electric drinking fountains.

C GFCI Receptacles: One GFCI receptacle may not be used to provide GFCI protection to downstream duplex receptacles on the same branch circuit.

3.4 FINISH PLATES INSTALLATION

A Do not install items until finish painting is complete. Replace scratched and paint splattered finish plates and wiring devices.

END OF SECTION

SECTION 262800

OVERCURRENT PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A Work Included:
1. Molded Case Circuit Breakers

1.2 RELATED SECTIONS

A Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

A References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A Submittals as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

B In addition, provide:
1. Product data and instantaneous let-through current curves and average melting time current curves for fuses supplied to project.
2. Product data and time/current trip curves for circuit breakers supplied to project.

1.5 QUALITY ASSURANCE

A Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements apply to this Section.

1.6 WARRANTY

A Warranty of materials and workmanship as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A Molded Case Circuit Breakers:
1. Eaton Electrical
2. ABB/General Electric
3. Siemens
4. Schneider Electric/Square D
5. Or approved equivalent.

2.2 MOLDED CASE CIRCUIT BREAKERS

A 1-, 2- or 3-pole bolt-on, single handle common trip, 600VAC or 250VAC as indicated on Drawings.

B Overcenter toggle-type mechanism, quick-make, quick-break action. Trip indication is by handle position.

C Calibrate for operation in 40 degrees C ambient temperature.

D 15 to 150 Amp Breakers: Permanent trip unit containing individual thermal and magnetic trip elements in each pole.

E 151 to 400 Amp Breakers: Adjustable magnetic trip elements. Provide push-to-trip button on cover of breaker for mechanical tripping.

F Greater than 401 Amp: Electronic trip type with adjustments for long-time, instantaneous, and short-time functions.

G Circuit breakers 1200 Amp and Greater: Provide breaker with energy-reducing maintenance switching with local status indicator per NEC Article 240.87(B).

H Provide ground fault protection for breakers 1000 amps and greater where applied at 480 volts line-to-line and where indicated on Drawings. Provide ground fault annunciation in lieu of protection, where required, for breakers on emergency (NEC 700) and legally required (NEC 701) systems.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A Coordination:
1. Obtain and review the submitted product data for equipment furnished by the Owner, and furnished under other Divisions of this contract, particularly under Divisions 22 and 23.

2. Confirm the equipment nameplate maximum overcurrent protection (MOCP) and make accommodations and adjustments to overcurrent protective devices as necessary to coordinate with the nameplate rating.

B Install all items in accordance with manufacturer's written instructions.

3.2 MOLDED CASE CIRCUIT BREAKERS INSTALLATION

A Provide testing of ground fault interrupting breakers.

B Provide circuit breakers, as specified and on Drawings, for installation in panelboards, individual enclosures or combination motor starters.

C Provide ground fault interrupter circuit breakers for equipment in damp or wet locations.

D Provide device on handle to lock breaker in "ON" position for breakers feeding time switches, night lights and similar circuits required to be continuously energized.

E Shunt Trip Circuit Breakers: Provide wiring to remote trip switch/contacts as indicated on Drawings.

F Provide multi-pole branch circuit breakers for multiwire branch circuits for simultaneous disconnection of circuits.

END OF SECTION

SECTION 265100

LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A Work Included:
1. Luminaires
2. LED Drivers
3. Lamps

B Provide wiring for complete and operating lighting system.

1.2 RELATED SECTIONS

A Contents of Division 26, Electrical and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

A References and Standards as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

B In addition, meet the following:
1. NECA 500 - Commercial Lighting.
2. UL 8750 - Light Emitting Diode (LED) equipment for use in lighting products.

1.4 SUBMITTALS

A Submittals as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

B In addition, provide:
1. Submit product data for:
   a. LED Luminaires: Electrical ratings, dimensions, mounting, material, clearances, terminations, wiring, connection diagram, LM-79 photometric data, LM-80 lumen depreciation data.
   b. LED Drivers
   c. Lamps

2. Submittal Cutsheets: Highlight, circle or otherwise graphically indicate which option(s) are being selected for the products submitted. Cutsheets that are not edited to indicate which products and options are submitted for this project or that list only catalog numbers to identify submitted options are not acceptable.
3. Specified manufacturers are approved to submit bid. However, inclusion does not relieve manufacturer from supplying product as described.
4. Provide the following operating and maintenance instructions as required by Section 26 00 00, Electrical Basic Requirements:
   a. Luminaires
   b. LED Drivers
   c. Lamps

1.5 QUALITY ASSURANCE

A Quality assurance as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

B In addition, meet the following:
1. Provide luminaires acceptable to code authority for application and location installed.
2. Comply with applicable ANSI standards.
3. Comply with applicable NEMA standards.
4. Provide luminaires and lampholders that comply with UL standards and have been listed and labeled for location and use indicated by a testing agency acceptable by the AHJ (e.g., UL, ETL, and the like).
5. Comply with NEC as applicable to installation and construction of luminaires.
6. Comply with fallout and retention requirements of IBC for diffusers, baffles, and louvers.
7. Provide LED luminaires from the same manufacturer and manufacturing LED source batch for similar applications (e.g., all LED downlights from a single manufacturer and batch, all linear LED products from single manufacturer and batch).

1.6 WARRANTY

A Warranty as required by Section 26 00 00, Electrical Basic Requirements and Division 01, General Requirements.

B In addition, provide:
1. LED Luminaire Manufacturer's Warranty: Not less than 5 years for luminaire based on date of substantial completion. Includes normal cost of labor to replace luminaire. Replacement luminaire will match physical dimensions, physical appearance, chromaticity, lumen output and photometric characteristics of original installed equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A Luminaires:

1. Reference description and manufacturers in Luminaire Schedule on Drawings.
2. Or approved equivalent.

B LED Drivers:
1. Indoor Drivers:
   a. eldoLED Series
   b. Advance/Philips
   c. Osram Sylvania
   d. Or approved equivalent.

C Lamps:
1. LED (Light Emitting Diode) Lamps:
   a. Nichia
   b. Cree
   c. Osram Sylvania
   d. GE Lumination
   e. Or approved equivalent.
2. Unless specific manufacturer not shown on this list is indicated in the Luminaire Schedule.
3. Special types as indicated in Luminaire Schedule.
4. Or approved equivalent.

2.2 LUMINAIRES

A Luminaires: Reference description and manufacturers in Luminaire Schedule on Drawings.

B Where recessed luminaires are installed in cavities intended to be insulated, provide IC rated luminaires or other code approved installation.

C UL label luminaires installed under canopies, roof or open porches, and similar damp or wet locations, as suitable for damp or wet location.

D Suspended luminaires: Provide minimum 24-inch adjustability in aircraft cable length where used.

E Recessed Luminaires: Frame compatible with ceiling material installed at particular luminaire location. Provide proper factory trim and frame for luminaire to fit location and ceiling material. Verify with Architectural Reflected Ceiling Plan prior to submittals.

F Finishes:
1. Manufacturer's standard finish (unless otherwise indicated) over corrosion resistant primer.
2. Interior Light Reflecting Finishes: White or specular finish with not less than 85 percent reflectance.
3. Exterior Finishes: As detailed in Luminaire Schedule or on Drawings. Refer cases of uncertain applicability to Architect for resolution prior to release for fabrication.

G Light Transmitting Components:
1. Plastic diffusers, molded or extruded of 100 percent virgin acrylic.

2. Prismatic acrylic, extruded, flat diffusers, 0.125-inch overall thickness, unless otherwise noted.

H LED Luminaires:
1. UL listing of luminaire includes drivers, transformers, enclosures, rated wire, communications devices and accessories needed for a complete and functional system.
2. LM-79: Testing and measurement of absolute photometry, chromaticity (CCT) and luminaire power. Report provided by DOE certified independent testing laboratory. CCT as specified in Luminaire Schedule.
3. Standards: ANSI C78.377, LM-79 and LM-82 compliant for performance characteristics, photometry, colorimetry, efficacy and thermal characteristics.
4. LM-80 + TM-21: Testing and measurement, and statistical prediction of LED lamp life. Report provided by DOE certified independent testing laboratory.
5. LEDs in one module/luminaire: Supplied from same batch/bin and fall within 3-step MacAdam Ellipse, or as described in Luminaire Schedule, whichever is the more stringent requirement.
6. Provide luminaires with integral LED thermal management system (heat sinking).
7. Luminaires to be equipped with an LED driver that accepts 120V through 277V, 50Hz to 60Hz (universal). Component-to-component wiring within the luminaire will carry no more than 80 percent of rated current and be listed by UL for use at 600VAC at 302 degrees F/150 degrees C or higher. Plug disconnects to be listed by UL for use at 600VAC, 15A or higher.
8. Provide luminaires with individual LED arrays/modules and drivers that are accessible and replaceable from exposed side of the luminaire.

2.3 LED DRIVERS

A General:
1. Performance: Meet dimming range called out in Luminaire Schedule, free from perceived flicker or visible stroboscopic flicker, smooth and continuous change in level (no visible steps in transitions), natural square law response to control input, and stable when input voltage conditions fluctuate over what is typically experienced in a commercial environment. Demonstration of this compliance to dimming performance will be necessary for substitutions or prior approval.
2. Ten-year expected life while operating at maximum case temperature and 90 percent non-condensing relative humidity.
3. Minimum efficiency of 85 percent, power factor greater than or equal to 0.90, compliance with reduction of hazardous substances (RoHS). Rated for operating temperature range of area in which driver is installed.
4. Limit inrush current to minimize breaker tripping.
   a. Base specification: NEMA 410 standard for inrush current for electronic drivers.
   b. Preferred Specification: Meet or exceed 30 milliamp-squared-seconds at 277VAC for up to 50 watts of load and 75 amps at 240 microseconds at 277VAC for 100 watts of load.
5. Withstand up to a 1,000 volt surge without impairment of performance as defined by ANSI C62.41 Category A.
6. No visible change in light output with a variation of plus/minus 10 percent line voltage input.

7. Total Harmonic Distortion less than 10 percent and meet ANSI C82.11 maximum allowable THD requirements at full output. THD at no point in the dimming curve allows imbalance current to exceed full output THD.
8. Support automatic adaptation, allowing for future luminaire upgrades and enhancements and deliver improved performance:
    a. Adjustment of forward LED voltage, supporting 3V through 55V.
    b. Adjustment of LED current from 150mA to 1.4A at the 100 percent control input point in increments of 1mA.
    c. Adjustment for operating hours to maintain constant lumens (within 5 percent) over the 50,000 hour design life of the system, and deliver up to 20 percent energy savings early in the life cycle.
9. Operate for a (+/- 10 percent) supply voltage of 120V through 277VAC at 60Hz.
10. UL Recognized under the component program and modular for simple field replacement. Drivers that are not UL Recognized or not suited for field replacement will not be considered.
11. Ability to provide no light output when the analog control signal drops below 0.3 V, or the DALI/DMX digital signal calls for light to be extinguished and consume 0.5 watts or less in this standby. Control dead band between 0.3V and 0.65V included to allow for voltage variation of incoming signal without causing noticeable variation in luminaire to luminaire output.

B Light Quality:
1. Over the entire range of available drive currents, driver to provide step-free, continuous dimming to black from 100 percent to 0.1 percent and 0 percent relative light output, or 100 percent to 1 percent light output and step to 0 percent where indicated. Driver to respond similarly when raising from 0 percent to 100 percent.
    a. Driver must be capable of 20 bit dimming resolution for white light LED drivers or 15 bit resolution for RGBW LED drivers.
2. Driver must be capable of configuring a linear or logarithmic dimming curve, allowing fine grained resolution at low light levels.
3. Drivers to track evenly across multiple luminaires at all light levels, and must have an input signal to output light level that allows smooth adjustment over the entire dimming range.
4. Driver and luminaire electronics to deliver illumination that is free from objectionable flicker as measured by flicker index (ANSI/IES RP-16-10). At all points within the dimming range from 100 percent to 0.1 percent luminaire will have:
    a. LED dimming driver to provide continuous step-free, flicker free dimming similar to incandescent source.
    b. Base specification: Based on IEEE PAR1789, minimum output frequency should be greater than 1250 Hz.
    c. Preferred specification: Flicker index to be equal to incandescent, less than 1 percent at all frequencies below 1000 Hz.

C Control Input:
1. Provide control protocol to match lighting control system specified for use with luminaire.
2. 4-Wire (0-10V DC Voltage Controlled) Dimming Drivers:
    a. Meet IEC 60929 Annex E for General White Lighting LED drivers.

b. Connect to devices compatible with 0 to 10V Analog Control Protocol, Class 2, capable of sinking 0.6 ma per driver at a low end of 0.3V. Limit the number of drivers on each 0-10V control output based on voltage drop and control capacity.
c. Meet ESTA E1.3 for RGBW LED drivers.

2.4 LAMPS

A Provide lamps for luminaires.

B Provide lamp catalogued for specified luminaire type.

C Incandescent Lamps: Not allowed unless noted in Luminaire Schedule.

D LED (Light Emitting Diode):
1. LED manufacturer will include, but not be limited to, light source, luminaire, power supply and control interface with added components as needed for complete and functioning system.
    a. Comply with ANSI chromaticity standard for classifications of color temperature. See Luminaire Schedule for specified LED lamp color and color temperature. UL or ETL listed and labeled.
    b. Luminaire testing per IESNA LM-79 and LM-80 procedures.
    c. Lamp life for white LEDs: 50,000 plus hours with lamp failure occurring when LED produces 70 percent of initial rated lumens.
    d. Lamp life for color LEDs: 30,000 plus hours with lamp failure occurring when LED produces 50 percent of its initial rated lumens.
    e. LED Drivers: Reverse polarity protection, open circuit protection, require no minimum load. Minimum 80 percent efficiency. Class A noise rating.
    f. Dimming: LED system capable of full and continuous dimming.
    g. Correlated Color Temperature (CCT): See Luminaire Schedule for selection of color temperature for each luminaire. Ranges given below reflect maximum allowable tolerances for color temperature range for each nominal CCT.
        1) Nominal CCT:
            (a) 2700 K (2725 ± 145)
            (b) 3000 K (3045 ± 175)
            (c) 3500 K (3465 ± 245)
            (d) 4000 K (3985 ± 275)
    h. Color Rendering Index (CRI) to be greater than or equal to 80.
2. Special types as indicated in Luminaire Schedule.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A Install per manufacturer's written installation instructions and requirements.

B Install luminaires securely, in neat and workmanlike manner.

C Install luminaires of types indicated where shown and at indicated heights in accordance with manufacturer's written instructions and with recognized industry practices to ensure that luminaires comply with requirements and serve intended purposes.

D Wiring:
1. Recessed luminaires to be installed using flexible metallic conduit or MC Cable as allowed by Section 26 05 19 with luminaire conductors spliced to branch circuit conductors in nearby accessible junction box over ceiling. Junction box fastened to building structural member within 6-feet of luminaire.
2. Luminaires for lift out and removal from ceiling pattern without disconnecting conductors or defacing ceiling materials.
3. Flexible connections where permitted to exposed luminaires; neat and straight, without excess slack, attached to support device.
4. Install junction box, flexible conduit and high temperature insulated conductors for through wiring of recessed luminaires.

E Relamp luminaires which have failed lamps at substantial completion.

F Replace LED drivers deemed as excessively noisy by Architect, Engineer, or Owner.

G Install suspended luminaires and exit signs using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.

H Support luminaires larger than 2- by 4-foot size independent of ceiling framing.

I Locate recessed ceiling luminaires as indicated on architectural reflected ceiling plan.

J Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.

K Exposed Grid Ceilings:
1. Support surface mounted luminaires in grid ceiling directly from building structure.
2. Provide auxiliary members spanning ceiling grid members to support surface mounted luminaires.
3. Fasten surface mounted luminaires to ceiling grid members using bolts, screws, rivets, or suitable clips.

L Install recessed luminaires to permit removal from below.

M Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.

N Install clips to secure recessed grid-supported luminaires in place.

O Install wall mounted luminaires, emergency lighting units, and exit signs at height as indicated on Architectural Drawings.

P Install accessories furnished with each luminaire.

Q Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

R Bond products and metal accessories to branch circuit equipment grounding conductor.

S Install specified lamps in each emergency lighting unit, exit sign, and luminaire.

T Where manufactured wiring assemblies are used, ensure that wiring assembly manufacturer sends components to appropriate luminaire manufacturer for respective installation of proper components.

U Coordination:
1. Coordination of Conditions: Coordinate ceiling construction, recessing depth and other construction details prior to ordering luminaires for shipment. Refer cases of uncertain applicability to Architect for resolution prior to release of luminaires for shipment. Where luminaires supplied do not match ceiling construction, replace luminaires at no cost to Owner.
2. Electrical drawings are schematic, identifying quantity and type of luminaires used and their approximate location, but are not to be used for dimensional purposes. Reference architectural drawings for exact locations, including mounting heights.
3. Provide lighting indicated on Drawings with luminaire of the type designated and appropriate for location.
4. Provide LED luminaires with driver compatible to lighting control system as shown in drawings and as specified.
5. Where remote drivers are required, ensure adequate accessibility to driver. Upsize conductors between luminaire and driver to accommodate voltage drop.

V Field Quality Control:
1. Perform field inspection in accordance with Division 01, General Requirements.
2. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

W Cleaning:
1. Clean electrical parts to remove conductive and deleterious materials.
2. Remove dirt and debris from enclosures.
3. Clean paint splatters, dirt, dust, fingerprints, and debris from luminaires.
4. Clean photometric control surfaces as recommended by manufacturer.
5. Clean finishes and touch up damaged finishes per by manufacturer's instructions.

X Demonstrate luminaire operation for minimum of two hours.

3.2 LUMINAIRES INSTALLATION

A Install per manufacturer's written installation instructions and requirements.

B Align, mount and level luminaires uniformly. Use ball hangers for suspended stem mounted luminaires.

C Avoid interference with and provide clearance from equipment. Where indicated locations for luminaires conflict with locations for equipment, change locations for luminaire by minimum distance necessary as directed by Architect.

D Suspended Luminaires: Mounting heights indicate clearances between bottom of luminaire and finished floors.

E Emergency Egress Luminaires: Provide unswitched circuit for battery charging and autotransfer circuiting for exit signs and luminaires with integral batteries. Where test switch cannot be integral to luminaire, mount remote test switch flush-to-ceiling and adjacent to egress luminaire.

F Interior Luminaire Supports:
1. Support Luminaires: Anchor supports to structural slab or to structural members within a partition, or above a suspended ceiling.
2. Maintain luminaire positions after cleaning and relamping.
3. Support luminaires without causing ceiling or partition to deflect.
4. Provide mounting supports for recessed and pendant mounted luminaires as required by IBC.

G Adjusting:
1. Aim and adjust luminaires as indicated.
2. Focus and adjust floodlights, spotlights and other adjustable luminaires, with Architect, at such time of day or night as required.
3. Align luminaires that are not straight and parallel/perpendicular to structure.
4. Position exit sign directional arrows as indicated.

3.3 LED DRIVERS INSTALLATION

A Install lamps per manufacturer's installation instructions and requirements.

B Where driver is remote mounted, size wiring based on type of driver, driver distance from luminaire, and voltage/power level, and manufacturer's installation instructions.

C Protect 0-10V input from line voltage mis-connection, and so it will be immune and the output unresponsive to induced AC voltage on the control leads.

END OF SECTION

STAMPS


CODY ROSS BARCHOLZ
STATE OF WASHINGTON
REGISTERED
PROFESSIONAL ENGINEER


12494
REGISTERED
ARCHITECT
Mona Zellers
STATE OF WASHINGTON