

PROJECT MANUAL

OPAL Community Land Trust Lavender Hollow Renovations Eastsound, WA

December 5, 2011
Zervas Group Architects
Job #: 200802.04

**Permit Submittal
& Agency Review**



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Permit Set, December 5, 2011

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B I D P R O P O S A L

In compliance with the contract documents, the following bid proposal is submitted:

1) BASE BID

_____ \$ _____
(Please print dollar amount in words in space above) (do not include Washington State Sales Tax)

2) BID ALTERNATES (*Contractor MUST specify whether additive or deductive*)

(1) Replace siding on all sides of all buildings _____ \$ _____

(2) _____ \$ _____

Do not include Washington State Sales Tax in alternate amounts.

The Owner reserves the right to accept or reject any or all bid prices within sixty (60) days of the bid date.

Time for Completion

The undersigned hereby agrees to complete all the work under the Base Bid (and accepted alternates) within **365** calendar days after the date of Notice to Proceed.

Project Name: _____ Project No.: _____

Name of Firm: _____

Liquidated Damages

The undersigned agrees to pay the Owner as liquidated damages the sum of \$ **_____** for each consecutive calendar day that is in default after the Contract Time. Liquidated damages shall be deducted from the contract by change order.

Receipt of Addenda

Receipt of the following addenda is acknowledged:

Addendum No. _____

Addendum No. _____

Addendum No. _____

Addendum No. _____

Addendum No. _____

Addendum No. _____

Name of Firm _____

NOTE: *If bidder is a corporation, write State of Incorporation; if a partnership, give full names and addresses of all parties below.*

Signed by _____, Official Capacity _____

Print Name _____

Address _____

City _____ State _____ Zip Code _____

Date _____ Telephone _____ FAX _____

State of Washington Contractor's License No. _____

Federal Tax ID # _____ e-mail address: _____

Employment Security Department No. _____

SECTION 00 66 00**PREVAILING WAGES**

1. Wage rates shall be the Washington State Department of Labor and Industries wage rates as established for San Juan County.
2. Wage rates that apply to this Contract will be the rates as published by the Washington State Department of Labor and Industries, such rates that are in effect the date of bid release.
3. Before any payment is made by the Owner of any sums due under this Contract, the Owner must receive from the Contractor and any Subcontractor a copy of the "Statement of Intent to Pay Prevailing Wages" approved by the Washington State Department of Labor and Industries. Also following the acceptance of the project, the Owner must receive from the Contractor and each Subcontractor a copy of the "Affidavit of Wages Paid" and in addition, from the prime Contractor, a copy of "Release for the Protection of Property Owners and General Contractor," all approved by the State Department of Labor and Industries. These affidavits will be required before any funds retained, according to the provisions of RCW 60.28.010, are released to the Contractor. Payment by the Contractor or Subcontractor of any fees shall be considered incidental to the construction and all costs shall be included in other pay items of the project.
4. Contractor remains solely responsible for verifying that the rates shown within this section are accurate, current, and inclusive for all parts of this work. Contractor is responsible for notifying the Procurement Manager, in writing, of any problems, errors, or discrepancies in this section no later than seven (7) working days prior to bid opening. Any off-site prefabrication may also require prevailing wages and the Contractor should refer to Department of Labor and Industries Prevailing Wage Rates at:
www.lni.wa.gov/TradesLicensing/PrevWage/WageRates/default.asp
5. It is the responsibility of each bidder to ensure that they and their subcontractors are aware of the wage requirements. The Owner will not consider changes to the contract as a result of bidders or subcontractors errors in calculating wages.
6. The Contractor shall be held responsible for notifying his subcontractors of these wage requirements. Failure by either the Contractor or any subcontractor to comply with the requirements of Chapter 39.12 RCW will result in delay of payment to the Contractor and/or imposition of any other sanctions as may be available under the law and this contract.

END OF SECTION

SUMMARY

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: Lavender Hollow Renovations.
- B. Owner's Name: OPAL Community Land Trust.
- C. Architect's Name: Zervas Group Architects.
- D. The Project consists of construction of a small addition, and interior and exterior renovations to an 8-building, 22-unit apartment complex. Includes minor site work.

1.02 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price..

1.03 DESCRIPTION OF ALTERATIONS WORK

- A. Owner will remove the following items before start of work:
- B. Contractor shall remove and deliver the following to Owner prior to start of work:

1.04 OWNER OCCUPANCY

- A. Owner intends to have tenants continue to occupy most portions of the existing building during the entire construction period.
- B. Cooperate with Owner to minimize conflict and disruption to tenants.
- C. Schedule the Work to accommodate tenant's continued occupancy.

1.05 CONTRACTOR USE OF SITE

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Provide access to and from site as required by law and by Owner:
 - 1. Do not obstruct roadways, sidewalks, or other public ways without permit.
- C. Existing building spaces may not be used for storage.
- D. Time Restrictions:
 - 1. Limit conduct of especially noisy exterior work to the hours of 8 am to 7 pm.
 - 2. Limit conduct of especially noisy interior work to the hours of 9 am to 5 pm.
- E. Utility Outages and Shutdown:
 - 1. Limit shutdown of utility services to a maximum of 2 hours at a time, arranged at least 48 hours in advance with Owner.
 - 2. Prevent accidental disruption of utility services to other facilities.

1.06 WORK SEQUENCE

- A. Construct Work in stages during the construction period:
 - 1. Owner will work with Contractor to prepare move-in/move-out schedules for affected units.
- B. Coordinate construction schedule and operations with Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Intent of this Section: To enable the Owner to compare total costs where alternate materials and methods might be used. Alternates have been established as described on the Drawings and in the Specifications.

1. Related work described elsewhere:

- a. Materials and methods to be used in the Base Bid and in the Alternates have been described on the Drawings and in pertinent Sections of these Specifications.
- b. Method for stating the proposed Contract Sum is described in the Bid Form.

B. HOW TO BID ALTERNATES

1. It is the intent of the alternate bid process that for each alternate bid item, the bidder will supply, as a dollar value, the amount of money which would need to be added to (additive alternate) or deducted from (deductive alternate) the base bid contract sum to achieve the alternate method or material. The bidder should NOT fill in the total contract amount in the alternate bid blank, but only the amount that is required to effect the requested change to the project scope.

C. SUBMITTALS

2. All Alternates described in this Section are required to be reflected on the Bid Form as submitted by bidders. However, do not submit alternates other than as described in this Section, except as provided for "substitutions" under the General Conditions.

PART 2 - SCHEDULE OF ALTERNATES

2.1 ALTERNATES

- A. Alternate No. One: Reduce Scope of Fiber Cement Siding Replacement

1. The base bid requires replacement of all exterior building siding with new Fiber Cement Siding, per Specification Section 07466. The Alternate bid is to replace one side only, on only four of the buildings. (Buildings C, D, E, and F).

PART 3 - EXECUTION

3.1 EXECUTION

- A. Provide all labor, materials, equipment, hardware and finishes as required and directed to complete work.
- B. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

C. Execute accepted alternates under the same conditions as other work of the Contract.

If the Owner elects to proceed on the basis of one or more of the described Alternates, make all modifications to the Work required in furnishing and installing the selected Alternate or Alternates to the approval of the Architect and Owner and at no additional cost to the Owner other than as proposed on the Bid Form.

END OF SECTION

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preconstruction meeting.
- B. Progress meetings.
- C. Construction progress schedule.
- D. Evergreen Project Plan
- E. Submittals for review, information, and project closeout.
- F. Number of copies of submittals.
- G. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Document 00700 - General Conditions: Dates for applications for payment.
- B. Section 01700 - Execution Requirements: Additional coordination requirements.
- C. Section 01780 - Closeout Submittals: Project record documents.
- D. Section 01810 - Commissioning: Additional procedures for submittals relating to commissioning.
 - 1. Where submittals are indicated for review by both Architect and the Commissioning Authority, submit one extra and route to Architect first, for forwarding to the Commissioning Authority.
 - 2. Where submittals are not indicated to be reviewed by Architect, submit directly to the Commissioning Authority; otherwise, the procedures specified in this section apply to commissioning submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRECONSTRUCTION MEETING

- A. Architect will schedule a meeting after Notice of Award.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.
 - 3. Contractor.
- C. Agenda:
 - 1. Execution of Owner-Contractor 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 the parties to Contract, Contractor, Owner and Architect.

6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 7. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.02 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.
- D. Agenda:
1. Review minutes of previous meetings.
 2. Review of Work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Review of off-site fabrication and delivery schedules.
 7. Maintenance of progress schedule.
 8. Corrective measures to regain projected schedules.
 9. Planned progress during succeeding work period.
 10. Maintenance of quality and work standards.
 11. Effect of proposed changes on progress schedule and coordination.
 12. Other business relating to Work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 10 days after date established in Notice to Proceed, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.
- F. Submit updated schedule with each Application for Payment.

3.04 EVERGREEN PROJECT PLAN SUBMITTALS

- A. Certain submittals and documentation are required to be submitted by the contractor in order to comply with the provisions of the Evergreen Project Plan. These may be additional copies of submittals already required, or they may be in addition to the basic submittal requirements.
- B. The contractor shall maintain a copy of the Evergreen Project Plan at the job site at all times, and shall insert documentation of each point as it is implemented.

3.05 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01780 - CLOSEOUT SUBMITTALS.

3.06 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 - 1. Design data.
 - 2. Evergreen Sustainable Design Standards submittals and reports.
 - 3. Certificates.
 - 4. Test reports.
 - 5. Inspection reports.
 - 6. Manufacturer's instructions.
 - 7. Manufacturer's field reports.
 - 8. Qualification Data.
 - 9. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner. No action will be taken.

3.07 SUBMITTALS FOR PROJECT CLOSEOUT

- A. When the following are specified in individual sections, submit them at project closeout:
 - 1. Project record documents.
 - 2. Operation and maintenance data.
 - 3. Warranties.
 - 4. Bonds.
 - 5. Other types as indicated.
- B. Submit for Owner's benefit during and after project completion.

3.08 NUMBER OF COPIES OF SUBMITTALS

- A. Documents for Review:
 - 1. Small Size Sheets, Not Larger Than 8-1/2 x 11 inches: Submit the number of copies that Contractor requires, plus two copies that will be retained by Architect.
 - 2. Larger Sheets, Not Larger Than 36 x 48 inches: Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.
- B. Documents for Information: Submit two copies.
- C. Documents for Project Closeout: Make one reproduction of submittal originally reviewed. Submit one extra of submittals for information.
- D. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 - 1. After review, produce duplicates.
 - 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.09 SUBMITTAL PROCEDURES

- A. Transmit each submittal with AIA Form G810.
- B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- C. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- E. Schedule submittals to expedite the Project, and coordinate submission of related items.
- F. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- G. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- H. Provide space for Contractor and Architect review stamps.
- I. When revised for resubmission, identify all changes made since previous submission.
- J. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- K. Submittals not requested will not be recognized or processed.

END OF SECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. The contractor shall engage the services of a qualified Mold Abatement subcontractor. These documents do not intend, claim or purport to provide a complete program of mold assessment or remediation.
- B. The scope of work under this contract shall include assessment, testing and evaluation of toxic mold conditions in each of the twenty-two (22) apartment units, preparation of and implementation of a mold-remediation program, to the greatest degree possible within the owner's budget.
- C. Allowance: The contractor shall include in his bid preparation an allowance amount of \$10,000 for this work.
- D. Related Sections: 01210: Allowances
- E. Certification; the Contractor shall employ the services of a certified industrial hygienist with at least 2 years experience in sampling for mold, fungus and toxic substances. The hygienist shall inspect the framing for evidence of mold, fungus and toxic substances, collect samples and provide written interpretation of the results. Sample analysis shall follow analytical methods recommended by the American Industrial Hygienists Association (AIHA) or the American Conference of Government Industrial Hygienists (ACGIH). Contractor shall replace or remedy all materials as required by the owner or hygienist and shall provide final Certification from the hygienist that the materials are free from damaging or toxic fungus, damaging or toxic mold or damaging or toxic substances.

1.2 MOLD INSPECTION

- A. Inspection and certification by Contractor:
 - 1. Contractor shall inspect and certify that all materials including typically exposed surfaces, and any hidden areas which are temporarily exposed to view during the work of this contract, including but not limited to gypsum wallboard, insulation, wood framing and sheathing are free of damaging or toxic mold, damaging or toxic fungus and other damaging or toxic foreign substances. The Contractor shall employ the services of a certified industrial hygienist to inspect and certify that the materials are free of damaging or toxic fungus, damaging or toxic mold or damaging or toxic substances.
 - 2. Materials that are overly saturated with water shall be replaced or properly dried. Replacement or drying of materials is at the discretion of the Owner.
 - 3.

PART 2 - SUBMITTALS

- 2.1 TESTING AGENCY: The independent testing agency shall submit a certified written report of each inspection, test or similar service, to the Architect, in duplicate.

2.2 REPORT DATA

- A. Written reports of each inspection, test or similar service shall include, but not be limited to:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address and telephone number of testing agency.

4. Dates and locations of samples and tests or inspections.
5. Names of individuals making the inspection or test.
6. Designation of the Work and test method.
7. Identification of product and Specification Section.
8. Complete inspection or test data.
9. Test results and an interpretation of test results.
10. Ambient conditions at the time of sample-taking and testing.
11. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting.

PART 3 - QUALITY ASSURANCE

- 3.1 QUALIFICATION FOR SERVICE AGENCIES: Inspection and testing service agencies, including independent testing laboratories, shall be prequalified as complying with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.
- 3.2 INDEPENDENT INSPECTION AND TESTING AGENCY: Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state in which the Project is located.

PART 4 - REPAIR AND PROTECTION

- 4.1 GENERAL: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching."
- 4.2 PROTECTION: Protect construction exposed by or for quality control service activities, and protect repaired construction.
- 4.3 REPAIR AND PROTECTION: Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.

1.02 SUBMITTALS

- A. Within 10 days after date established in Notice to Proceed, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.
- F. Submit the number of opaque reproductions that Contractor requires, plus two copies that will be retained by Architect.
- G. Submit under transmittal letter form specified in Section 01300.

1.03 SCHEDULE FORMAT

- A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
- B. Diagram Sheet Size: Maximum 22 x 17 inches or width required.
- C. Scale and Spacing: To allow for notations and revisions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- D. Provide legend for symbols and abbreviations used.

3.03 BAR CHARTS

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

3.04 REVIEW AND EVALUATION OF SCHEDULE

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

3.05 UPDATING SCHEDULE

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.
- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.
- G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect including the effects of changes on schedules of separate contractors.

3.06 DISTRIBUTION OF SCHEDULE

- A. Distribute copies of updated schedules to Contractor's project site file, to Subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

END OF SECTION

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES

- A. Quality assurance submittals.
- B. Mock-ups.
- C. Control of installation.
- D. Tolerances.
- E. Testing and inspection services.
- F. Manufacturers' field services.

1.02 RELATED REQUIREMENTS

- A. Document 00700 - General Conditions: Inspections and approvals required by public authorities.
- B. Section 01300 - Administrative Requirements: Submittal procedures.
- C. Section 01425 - Reference Standards.
- D. Section 01600 - Product Requirements: Requirements for material and product quality.

1.03 SUBMITTALS

- A. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- B. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Conformance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.
- C. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
 - 1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must

be acceptable to Architect.

- D. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- E. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
 - 1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.04 REFERENCES AND STANDARDS - See Section 01425

1.05 TESTING AND INSPECTION AGENCIES

- A. Owner will employ and pay for services of an independent testing agency to perform specified testing and inspection.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

- A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be a comparison standard for the remaining Work.

- D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, remove mock-up and clear area when directed to do so.

3.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:
 - 1. Test samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 3. Perform specified sampling and testing of products in accordance with specified standards.
 - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 5. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
 - 6. Perform additional tests and inspections required by Architect.
 - 7. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
 - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - 2. Agency may not approve or accept any portion of the Work.
 - 3. Agency may not assume any duties of Contractor.
 - 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
 - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 - 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 - 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 - 5. Employ services of an independent qualified testing laboratory and pay for

additional samples, tests, and inspections required by Contractor beyond specified requirements.

6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.
- F. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.
- G. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect. Payment for re testing will be charged to the Contractor by deducting testing charges from the Contract Price.

3.05 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.06 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not conforming to specified requirements.
- B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary telephone service.
- D. Temporary sanitary facilities.
- E. Temporary Controls: Barriers, enclosures, and fencing.
- F. Security requirements.
- G. Vehicular access and parking.
- H. Waste removal facilities and services.
- I. Field offices.

1.02 TEMPORARY UTILITIES

- A. Provide and pay for all electrical power, lighting, water, and heating and cooling required for construction purposes.
- B. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TELECOMMUNICATIONS SERVICES

- A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
- B. Telecommunications services shall include:

1.04 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

1.05 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities 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.

1.06 FENCING

- A. Construction: Contractor's option.

- B. Provide 6 foot high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.07 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.08 VEHICULAR ACCESS AND PARKING

- A. Coordinate access and haul routes with governing authorities and Owner.
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. Provide means of removing mud from vehicle wheels before entering streets.
- D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.09 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.10 FIELD OFFICES

- A. Office: Weathertight, with lighting, electrical outlets, heating, ventilating equipment, and equipped with sturdy furniture.
- B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
- C. Locate offices a minimum distance of 30 feet from existing structures.

1.11 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations and procedures.
- E. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

- A. Section 01400 - Quality Requirements: Product quality monitoring.

1.03 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Do not use products having any of the following characteristics:
 - 1. Made using or containing CFC's or HCFC's.
 - 2. Made of wood from newly cut old growth timber.

2.02 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

- D. Products Specified by Naming One Manufacturer as a Basis of Design: Use the product named or an approved substitute that meets or exceeds the technical and appearance standards of the specified product.

2.03 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

- A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- C. A request for substitution constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 - 2. Will provide the same warranty for the substitution as for the specified product.
 - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. Will reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.
- D. Substitution Submittal Procedure:
 - 1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
 - 2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
 - 3. The Architect will notify Contractor in writing of decision to accept or reject request.

3.02 TRANSPORTATION AND HANDLING

- A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- B. Transport and handle products in accordance with manufacturer's instructions.
- C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- F. Arrange for the return of packing materials, such as wood pallets, where economically

feasible.

3.03 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- G. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- H. Prevent contact with material that may cause corrosion, discoloration, or staining.
- I. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- J. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

EXECUTION REQUIREMENTS

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Surveying for laying out the work.
- F. Cleaning and protection.
- G. Starting of systems and equipment.
- H. Demonstration and instruction of Owner personnel.
- I. Closeout procedures, except payment procedures.
- J. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

- A. Section 01100 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
- B. Section 01300 - Administrative Requirements: Submittals procedures.
- C. Section 01400 - Quality Requirements: Testing and inspection procedures.

1.03 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
 - 1. On request, submit documentation verifying accuracy of survey work.
 - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
 - 3. Submit surveys and survey logs for the project record.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.

1.04 QUALIFICATIONS

- A. For survey work, employ a land surveyor registered in Washington and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in

the form of an Insurance Certificate.

1.05 PROJECT CONDITIONS

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
- G. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging the work.
- H. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.
- I. Pollution Control: 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. Comply with federal, state, and local regulations.

1.06 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are 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.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01600.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.

- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 LAYING OUT THE WORK

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- F. Utilize recognized engineering survey practices.
- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
 - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations; and _____.
 - 2. Grid or axis for structures.
 - 3. Building foundation, column locations, ground floor elevations, and _____.
- H. Periodically verify layouts by same means.
- I. Maintain a complete and accurate log of control and survey work as it progresses.

3.05 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.06 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.

1. Verify that construction and utility arrangements are as shown.
 2. Report discrepancies to Architect before disturbing existing installation.
 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- C. Remove existing work as indicated and as required to accomplish new work.
1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
 2. Remove items indicated on drawings.
 3. Relocate items indicated on drawings.
 4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - b. See Section 01100 for other limitations on outages and required notifications.
 - c. Provide temporary connections as required to maintain existing systems in service.
 4. Verify that abandoned services serve only abandoned facilities.
 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- E. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 3. Repair adjacent construction and finishes damaged during removal work.

4. Patch as specified for patching new work.
- F. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
 1. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
 2. Where a change of plane of 1/4 inch or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
 3. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required. Seal cut edges of door.
- G. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- H. Refinish existing surfaces as indicated:
 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
 3. Patch as specified for patching new work.
- I. Clean existing systems and equipment.
- J. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- K. Do not begin new construction in alterations areas before demolition is complete.
- L. Comply with all other applicable requirements of this section.

3.07 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
 1. Complete the work.
 2. Fit products together to integrate with other work.
 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 non-conforming work.
- D. Execute cutting and patching including excavation and fill to complete the work, to uncover work in order to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide openings in the work for penetration of mechanical and electrical work, to execute patching to complement adjacent work, and to fit products together to

integrate with other work.

- E. 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.
- F. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- G. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- H. Restore work with new products in accordance with requirements of Contract Documents.
- I. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- J. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07840, to full thickness of the penetrated element.
- K. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. 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 prior to repairing finish.
- L. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
- M. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new work abuts or aligns with existing, perform a smooth and even transition.

3.08 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.09 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.

- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.10 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. 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.
- C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- D. Verify that wiring and support components for equipment are complete and tested.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.11 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. Provide a qualified person who is knowledgeable about the Project to perform demonstration and instruction of owner personnel.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

3.12 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.13 FINAL CLEANING

- A. Use cleaning materials that are nonhazardous.
- 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.
- C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- E. Clean filters of operating equipment.
- F. Clean debris from roofs, gutters, downspouts, and drainage systems.
- G. Clean site; sweep paved areas, rake clean landscaped surfaces.
- H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.14 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
 - 1. Provide copies to Architect and Owner.
- B. Notify Architect when work is considered ready for Substantial Completion.
- C. 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's review.
- D. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.
- E. Notify Architect when work is considered finally complete.
- F. Complete items of work determined by Architect's final inspection.

3.15 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Furnish service and maintenance of components indicated in specification sections during the warranty period.
- D. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- E. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- F. Maintenance service shall not be assigned or transferred to any agent or subcontractor

without prior written consent of the Owner.

END OF SECTION

WASTE MANAGEMENT

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
 - 1. Aluminum and plastic beverage containers.
 - 2. Corrugated cardboard.
 - 3. Wood pallets.
 - 4. Clean dimensional wood: May be used as blocking or furring.
 - 5. Land clearing debris, including brush, branches, logs, and stumps.
 - 6. Bricks: May be used on project if whole, or crushed and used as landscape cover, sub-base material, or fill.
 - 7. Concrete masonry units: May be used on project if whole, or crushed and used as sub-base material or fill.
 - 8. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - 9. Glass.
 - 10. Plastic buckets.
 - 11. Carpet, carpet cushion, carpet tile, and carpet remnants, both new and removed: DuPont (<http://flooring.dupont.com>) and Interface (www.interfaceinc.com) conduct reclamation programs.
 - 12. Paint.
 - 13. Fluorescent lamps (light bulbs).
- E. LEED Certification for this project is dependent on diversion of 75 percent, by weight, of potential landfill trash/waste by recycling and/or salvage.
- F. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.
- G. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.
- H. The following sources may be useful in developing the Waste Management Plan:
 - 1. County or State Recycling Department.
 - 2. Recycling Haulers and Markets: The attached list contains local haulers and markets for recyclable materials. This list is provided for information only and is not necessarily comprehensive; other haulers and markets are acceptable.
 - 3. Recycling Economics Information: The sources below may provide information that may be useful in estimating the costs or savings or recycling options.

- a. Z Recyclers; 6149 Guide Meridian Road, Lynden WA; 360.398.2161
 - b. T&T Recover, Inc.; 4731 Lost Creek Lane, Bellingham WA; 360.671.0722
 - c. Sanitary Service Company, Inc.; 1001 Roeder Ave, Bellingham WA; 360.734.3490
- I. Methods of trash/waste disposal that are not acceptable are:
1. Burning on the project site.
 2. Burying on the project site except as specifically allowed.
 3. Dumping or burying on other property, public or private.
 4. Other illegal dumping or burying.
 5. Incineration, either on- or off-site.
- J. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

- A. Section 01300 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. Section 01500 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.
- C. Section 01600 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.
- D. Section 01700 - Execution Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.
- E. Section 02230 - Site Clearing: Handling and disposal of land clearing debris.

1.03 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Submit Waste Management Plan within 14 calendar days after receipt of Notice to Proceed, or prior to any trash or waste removal, whichever occurs sooner; submit projection of all trash and waste that will require disposal and alternatives to landfilling.
- C. Waste Management Plan: Include the following information:
 - 1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
 - 2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
 - 3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
 - a. List each material proposed to be salvaged, reused, or recycled.
 - b. State the estimated net cost, versus landfill disposal.
 - 4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
 - 5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
 - 6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.
- D. Waste Disposal Reports: Submit at specified intervals, with details of quantities of

trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.

1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
2. Submit Report on a form acceptable to Owner.
3. Landfill Disposal: Include the following information:
 - a. Identification of material.
 - b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.
 - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
4. Recycled and Salvaged Materials: Include the following information for each:
 - a. Identification of material, including those retrieved by installer for use on other projects.
 - b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
 - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
 - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
 - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
5. Material Reused on Project: Include the following information for each:
 - a. Identification of material and how it was used in the project.
 - b. Amount, in tons or cubic yards.
 - c. Include weight tickets as evidence of quantity.
6. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 3 EXECUTION

2.01 WASTE MANAGEMENT PROCEDURES

- A. See Section 01300 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01500 for additional requirements related to trash/waste collection and removal facilities and services.
- C. See Section 01600 for waste prevention requirements related to delivery, storage, and handling.
- D. See Section 01700 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

2.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
 - 1. Pre-bid meeting.
 - 2. Pre-construction meeting.
 - 3. Regular job-site meetings.
 - 4. Job safety meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
 - 1. As a minimum, provide:
 - a. Separate area for storage of materials to be reused on-site, such as wood cut-offs for blocking.
 - b. Separate dumpsters for each category of recyclable.
 - c. Recycling bins at worker lunch area.
 - 2. Provide containers as required.
 - 3. Provide adequate space for pick-up and delivery and convenience to subcontractors.
 - 4. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- H. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION

INDOOR AIR QUALITY

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES:

- A. Construction procedures to promote adequate indoor air quality after construction.

1.02 PROJECT GOALS

- A. Dust and Airborne Particulates: Prevent deposition of dust and other particulates in HVAC ducts and equipment.
 - 1. Cleaning of ductwork is not contemplated under this Contract.
 - 2. Contractor shall bear the cost of cleaning required due to failure to protect ducts and equipment from construction dust.
- B. Airborne Contaminants: Procedures and products have been specified to minimize indoor air pollutants.
 - 1. Furnish products meeting the specifications.
 - 2. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.

1.03 RELATED REQUIREMENTS

- A. Section 01400 - Quality Requirements: Testing and inspection services.

1.04 REFERENCE STANDARDS

- A. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2007.

1.05 DEFINITIONS

- A. Adsorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.
- B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.
- C. Particulates: Dust, dirt, and other airborne solid matter.
- D. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Low VOC Materials: See other sections for specific requirements for materials with low VOC content.
- B. Auxiliary Air Filters: MERV of 8, minimum, when tested in accordance with ASHRAE 52.2.

PART 3 EXECUTION

3.01 CONSTRUCTION PROCEDURES

- A. Prevent the absorption of moisture and humidity by adsorptive materials by:

1. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.
 2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
 3. Provide sufficient ventilation for drying within reasonable time frame.
- B. Begin construction ventilation when building is substantially enclosed.
- C. If extremely dusty or dirty work must be conducted inside the building, shut down HVAC systems for the duration; remove dust and dirt completely before restarting systems.
- D. Do not store construction materials or waste in mechanical or electrical rooms.
- E. Prior to use of return air ductwork without intake filters clean up and remove dust and debris generated by construction activities.
1. Inspect duct intakes, return air grilles, and terminal units for dust.
 2. Clean plenum spaces, including top sides of lay-in ceilings, outsides of ducts, tops of pipes and conduit.
 3. Clean tops of doors and frames.
 4. Clean mechanical and electrical rooms, including tops of pipes, ducts, and conduit, equipment, and supports.
 5. Clean return plenums of air handling units.
 6. Remove intake filters last, after cleaning is complete.
- F. Do not perform dusty or dirty work after starting use of return air ducts without intake filters.
- G. Use other relevant recommendations of SMACNA IAQ Guideline for Occupied Buildings Under Construction for avoiding unnecessary contamination due to construction procedures.

END OF SECTION

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01300 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01700 - Execution Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to 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 the date of acceptance as the beginning of the warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Addenda.
 - 3. Change Orders and other modifications to the Contract.
- 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.
- E. Record Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first 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.

3.02 OPERATION AND MAINTENANCE DATA

- A. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. 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.
 - 4. Complete nomenclature and model number of replaceable parts.

- B. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- D. 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.
- E. Provide servicing and lubrication schedule, and list of lubricants required.
- F. Include manufacturer's printed operation and maintenance instructions.
- G. Include sequence of operation by controls manufacturer.
- H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- I. Provide control diagrams by controls manufacturer as installed.
- J. Additional Requirements: As specified in individual product specification sections.

3.05 OPERATION AND MAINTENANCE MANUALS

- A. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- B. Prepare data in the form of an instructional manual.
- C. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- D. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- E. Provide tabbed dividers for each separate product and system, with typed description of product and major component parts of equipment.
- F. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- G. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, 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. Identify the following:
 - 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 special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
3. Part 3: Project documents and certificates, including the following:
- a. Shop drawings and product data.

3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

END OF SECTION

COMMISSIONING

PART 1 GENERAL

1.01 SUMMARY

- A. Commissioning is intended to achieve the following specific objectives; this section specifies the Contractor's responsibilities for commissioning:
 - 1. Verify that the work is installed in accordance with the Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Prefunctional Checklists executed by Contractor are utilized to achieve this.
 - 2. Verify and document that functional performance is in accordance with the Contract Documents: Functional Tests executed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.
 - 3. Verify that operation and maintenance manuals submitted to Owner are complete: Detailed operation and maintenance (O&M) data submittals by Contractor are utilized to achieve this.
 - 4. Verify that the Owner's operating personnel are adequately trained: Formal training conducted by Contractor is utilized to achieve this.
- B. Commissioning, including Functional Tests, O&M documentation review, and training, is to occur after startup and initial checkout and be completed before Substantial Completion
- C. The Commissioning Authority directs and coordinates all commissioning activities; this section describes some but not all of the Commissioning Authority's responsibilities.
- D. The Commissioning Authority is employed by Owner.

1.02 SCOPE OF COMMISSIONING

- A. The following are to be commissioned:
- B. Plumbing Systems:
- C. HVAC System, including:
- D. Electrical Systems:
- E. Electronic Safety and Security:
- F. Other equipment and systems explicitly identified elsewhere in Contract Documents as requiring commissioning.

1.03 RELATED REQUIREMENTS

- A. Section 01780 - Closeout Submittals: Scope and procedures for operation and maintenance manuals and project record documents.

1.04 REFERENCE STANDARDS

- A. PEI (Samples) - Sample Forms for Prefunctional Checklists and Functional Performance Tests; Portland Energy Conservation, Inc.; located at <http://www.peci.org/library/mcpgs.htm>; current edition.

1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures; except:
 - 1. Make all submittals specified in this section, and elsewhere where indicated for commissioning purposes, directly to the Commissioning Authority, unless they require review by Architect; in that case, submit to Architect first.
 - 2. Submit one copy to the Commissioning Authority, not to be returned.
 - 3. Make commissioning submittals on time schedule specified by Commissioning Authority.
 - 4. Submittals indicated as "Draft" are intended for the use of the Commissioning Authority in preparation of Prefunctional Checklists or Functional Test requirements; submit in editable electronic format, Microsoft Word 2003 preferred.
 - 5. As soon as possible after submittals made to Architect are approved, submit copy of approved submittal to the Commissioning Authority.
- B. Manufacturers' Instructions: Submit copies of all manufacturer-provided instructions that are shipped with the equipment as soon as the equipment is delivered.
- C. Product Data: If submittals to Architect do not include the following, submit copies as soon as possible:
 - 1. Manufacturer's product data, cut sheets, and shop drawings.
 - 2. Manufacturer's installation instructions.
 - 3. Startup, operating, and troubleshooting procedures.
 - 4. Fan and pump curves.
 - 5. Factory test reports.
 - 6. Warranty information, including details of Owner's responsibilities in regard to keeping warranties in force.
- D. Startup Plans and Reports.
- E. Completed Prefunctional Checklists.

PART 2 PRODUCTS

2.01 TEST EQUIPMENT

- A. Provide all standard testing equipment required to perform startup and initial checkout and required Functional Testing; unless otherwise noted such testing equipment will NOT become the property of Owner.
- B. Calibration Tolerances: Provide testing equipment of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. If not otherwise noted, the following minimum requirements apply:
 - 1. Temperature Sensors and Digital Thermometers: Certified calibration within past year to accuracy of 0.5 degree F and resolution of plus/minus 0.1 degree F.
 - 2. Pressure Sensors: Accuracy of plus/minus 2.0 percent of the value range being measured (not full range of meter), calibrated within the last year.
 - 3. Calibration: According to the manufacturer's recommended intervals and when dropped or damaged; affix calibration tags or keep certificates readily available for inspection.
- C. Equipment-Specific Tools: Where special testing equipment, tools and instruments are specific to a piece of equipment, are only available from the vendor, and are required in order to accomplish startup or Functional Testing, provide such equipment, tools, and

instruments as part of the work at no extra cost to Owner; such equipment, tools, and instruments are to become the property of Owner.

- D. Dataloggers: Independent equipment and software for monitoring flows, currents, status, pressures, etc. of equipment.
 - 1. Dataloggers required to for Functional Tests will be provided by the Commissioning Authority and will not become the property of Owner.

PART 3 EXECUTION

3.01 COMMISSIONING PLAN

- A. Commissioning Authority will prepare the Commissioning Plan.
 - 1. Attend meetings called by the Commissioning Authority for purposes of completing the commissioning plan.
 - 2. Require attendance and participation of relevant subcontractors, installers, suppliers, and manufacturer representatives.
- B. Contractor is responsible for compliance with the Commissioning Plan.
- C. Commissioning Plan: The commissioning schedule, procedures, and coordination requirements for all parties in the commissioning process.
- D. Commissioning Schedule:
 - 1. Submit anticipated dates of startup of each item of equipment and system to Commissioning Authority within 60 days after start of work.
 - 2. Re-submit anticipated startup dates whenever revised, but not less than 4 weeks prior to startup.
 - 3. Prefunctional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.
 - 4. Provide sufficient notice to Commissioning Authority for delivery of relevant Checklists and Functional Test procedures, to avoid delay.

3.02 STARTUP PLANS AND REPORTS

- A. Startup Plans: For each item of equipment and system for which the manufacturer provides a startup plan, submit the plan not less than 8 weeks prior to startup.
- B. Startup Reports: For each item of equipment and system for which the manufacturer provides a startup checklist (or startup plan or field checkout sheet), document compliance by submitting the completed startup checklist prior to startup, signed and dated by responsible entity.
- C. Submit directly to the Commissioning Authority.

3.03 PREFUNCTIONAL CHECKLISTS

- A. A Prefunctional Checklist is required to be filled out for each item of equipment or other assembly specified to be commissioned.
 - 1. No sampling of identical or near-identical items is allowed.
 - 2. These checklists do not replace manufacturers' recommended startup checklists, regardless of apparent redundancy.
 - 3. Prefunctional Checklist forms will not be complete until after award of the contract; the following types of information will be gathered via the completed Checklist

forms:

- a. Certification by installing contractor that the unit is properly installed, started up, and operating and ready for Functional Testing.
 - b. Confirmation of receipt of each shop drawing and commissioning submittal specified, itemized by unit.
 - c. Manufacturer, model number, and relevant capacity information; list information "as specified," "as submitted," and "as installed."
 - d. Serial number of installed unit.
 - e. List of inspections to be conducted to document proper installation prior to startup and Functional Testing; these will be primarily static inspections and procedures; for equipment and systems may include normal manufacturer's start-up checklist items and minor testing.
 - f. Sensor and actuator calibration information.
4. Samples of Prefunctional Checklist forms that indicate anticipated level of detail can be found at <http://www.peci.org/library/mcpgs.htm>.
- B. Contractor is responsible for filling out Prefunctional Checklists, after completion of installation and before startup; witnessing by the Commissioning Authority is not required unless otherwise specified.
1. Each line item without deficiency is to be witnessed, initialed, and dated by the actual witness; checklists are not complete until all line items are initialed and dated complete without deficiencies.
 2. Checklists with incomplete items may be submitted for approval provided the Contractor attests that incomplete items do not preclude the performance of safe and reliable Functional Testing; re-submission of the Checklist is required upon completion of remaining items.
 3. Individual Checklists may contain line items that are the responsibility of more than one installer; Contractor shall assign responsibility to appropriate installers or subcontractors, with identification recorded on the form.
 4. If any Checklist line item is not relevant, record reasons on the form.
 5. Contractor may independently perform startup inspections and/or tests, at his option.
 6. Regardless of these reporting requirements, Contractor is responsible for correct startup and operation.
 7. Submit completed Checklists to Commissioning Authority within two days of completion.
- C. Commissioning Authority is responsible for furnishing the Prefunctional Checklists to Contractor.
1. Initial Drafts: Contractor is responsible for initial draft of Prefunctional Checklist where so indicated in the Contract Documents.
 2. Provide all additional information requested by Commissioning Authority to aid in preparation of checklists, such as shop drawing submittals, manufacturers' startup checklists, and O&M data.
 3. Commissioning Authority may add any relevant items deemed necessary regardless of whether they are explicitly mentioned in the Contract Documents or not.
 4. When asked to review the proposed Checklists, do so in a timely manner.

- D. Commissioning Authority Witnessing: Required for:
 - 1. Each piece of primary equipment, unless sampling of multiple similar units is allowed by the commissioning plan.
 - 2. A sampling of non-primary equipment, as allowed by the commissioning plan.
- E. Deficiencies: Correct deficiencies and re-inspect or re-test, as applicable, at no extra cost to Owner.
 - 1. If difficulty in correction would delay progress, report deficiency to the Commissioning Authority immediately.

3.04 FUNCTIONAL TESTS

- A. A Functional Test is required for each item of equipment, system, or other assembly specified to be commissioned, unless sampling of multiple identical or near-identical units is allowed by the final test procedures.
- B. Contractor is responsible for execution of required Functional Tests, after completion of Prefunctional Checklist and before closeout.
- C. Commissioning Authority is responsible for witnessing and reporting results of Functional Tests, including preparation and completion of forms for that purpose.
- D. Contractor is responsible for correction of deficiencies and re-testing at no extra cost to Owner; if a deficiency is not corrected and re-tested immediately, the Commissioning Authority will document the deficiency and the Contractor's stated intentions regarding correction.
 - 1. Deficiencies are any condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents or does not perform properly.
 - 2. When the deficiency has been corrected, the Contractor completes the form certifying that the item is ready to be re-tested and returns the form to the Commissioning Authority; the Commissioning Authority will reschedule the test and the Contractor shall re-test.
 - 3. Identical or Near-Identical Items: If 10 percent, or three, whichever is greater, of identical or near-identical items fail to perform due to material or manufacturing defect, all items will be considered defective; provide a proposal for correction within 2 weeks after notification of defect, including provision for testing sample installations prior to replacement of all items.
 - 4. Contractor shall bear the cost of Owner and Commissioning Authority personnel time witnessing re-testing.
 - 5. Contractor shall bear the cost of Owner and Commissioning Authority personnel time witnessing re-testing if the test failed due to failure to execute the relevant Prefunctional Checklist correctly; if the test failed for reasons that would not have been identified in the Prefunctional Checklist process, Contractor shall bear the cost of the second and subsequent re-tests.
- E. Functional Test Procedures:
 - 1. Some test procedures are included in the Contract Documents; where Functional Test procedures are not included in the Contract Documents, test procedures will be determined by the Commissioning Authority with input by and coordination with Contractor.

2. Examples of Functional Testing:
 - a. Test the dynamic function and operation of equipment and systems (rather than just components) using manual (direct observation) or monitoring methods under full operation (e.g., the chiller pump is tested interactively with the chiller functions to see if the pump ramps up and down to maintain the differential pressure setpoint).
 - b. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc.
 - c. Systems are run through all the HVAC control system's sequences of operation and components are verified to be responding as the sequence's state.
 - d. Traditional air or water test and balancing (TAB) is not Functional Testing; spot checking of TAB by demonstration to the Commissioning Authority is Functional Testing.
3. Samples of Functional Test forms that indicate anticipated level of detail can be found at <http://www.peci.org/library/mcpgs.htm>.
- F. Deferred Functional Tests: Some tests may need to be performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design or other site conditions; performance of these tests remains the Contractor's responsibility regardless of timing.
- G. Factory Tests: Commissioning Authority and Contractor are responsible for coordinating testing of equipment at the factory by factory personnel, to ensure compliance with commissioning requirements.

3.05 SENSOR AND ACTUATOR CALIBRATION

- A. Calibrate all field-installed temperature, relative humidity, carbon monoxide, carbon dioxide, and pressure sensors and gages, and all actuators (dampers and valves) on this piece of equipment shall be calibrated. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.
- B. Calibrate using the methods described below; alternate methods may be used, if approved by Owner beforehand. See PART 2 for test instrument requirements. Record methods used on the relevant Prefunctional Checklist or other suitable forms, documenting initial, intermediate and final results.
- C. All Sensors:
 1. Verify that sensor location is appropriate and away from potential causes of erratic operation.
 2. Verify that sensors with shielded cable are grounded only at one end.
 3. For sensor pairs that are used to determine a temperature or pressure difference, for temperature make sure they are reading within 0.2 degree F of each other, and for pressure, within tolerance equal to 2 percent of the reading, of each other.
 4. Tolerances for critical applications may be tighter.
- D. Sensors Without Transmitters - Standard Application:
 1. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
 2. Verify that the sensor reading, via the permanent thermostat, gage or building

- automation system, is within the tolerances in the table below of the instrument-measured value.
3. If not, install offset, calibrate or replace sensor.
- E. Sensors With Transmitters - Standard Application.
1. Disconnect sensor.
 2. Connect a signal generator in place of sensor.
 3. Connect ammeter in series between transmitter and building automation system control panel.
 4. Using manufacturer's resistance-temperature data, simulate minimum desired temperature.
 5. Adjust transmitter potentiometer zero until 4 mA is read by the ammeter.
 6. Repeat for the maximum temperature matching 20 mA to the potentiometer span or maximum and verify at the building automation system.
 7. Record all values and recalibrate controller as necessary to conform with specified control ramps, reset schedules, proportional relationship, reset relationship and P/I reaction.
 8. Reconnect sensor.
 9. Make a reading with a calibrated test instrument within 6 inches of the site sensor.
 10. Verify that the sensor reading, via the permanent thermostat, gage or building automation system, is within the tolerances in the table below of the instrument-measured value.
 11. If not, replace sensor and repeat.
 12. For pressure sensors, perform a similar process with a suitable signal generator.
- F. Sensor Tolerances for Standard Applications: Plus/minus the following maximums:
1. Watthour, Voltage, Amperage: 1 percent of design.
 2. Pressure, Air, Water, Gas: 3 percent of design.
 3. Air Temperatures (Outside Air, Space Air, Duct Air): 0.4 degrees F.
 4. Relative Humidity: 4 percent of design.
 5. Barometric Pressure: 0.1 inch of Hg.
 6. Barometric Pressure: 0.1 inch of Hg (.
 7. Flow Rate, Air: 10 percent of design.
 8. Flow Rate, Water: 4 percent of design.
 9. AHU Wet Bulb and Dew Point: 2.0 degrees F.
- G. Critical Applications: For some applications more rigorous calibration techniques may be required for selected sensors. Describe any such methods used on an attached sheet.
- H. Valve/Damper Stroke Setup and Check:
1. For all valve/damper actuator positions checked, verify the actual position against the control system readout.
 2. Set pump/fan to normal operating mode.
 3. Command valve/damper closed; visually verify that valve/damper is closed and adjust output zero signal as required.
 4. Command valve/damper to open; verify position is full open and adjust output signal as required.
 5. Command valve/damper to a few intermediate positions.
 6. If actual valve/damper position does not reasonably correspond, replace actuator

or add pilot positioner (for pneumatics).

- I. Isolation Valve or System Valve Leak Check: For valves not associated with coils.
 1. With full pressure in the system, command valve closed.
 2. Use an ultra-sonic flow meter to detect flow or leakage.

3.06 TEST PROCEDURES - GENERAL

- A. Provide skilled technicians to execute starting of equipment and to execute the Functional Tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments and problem-solving.
- B. Provide all necessary materials and system modifications required to produce the flows, pressures, temperatures, and conditions necessary to execute the test according to the specified conditions. At completion of the test, return all affected equipment and systems to their pre-test condition.
- C. Sampling: Where Functional Testing of fewer than the total number of multiple identical or near-identical items is explicitly permitted, perform sampling as follows:
 1. Identical Units: Defined as units with same application and sequence of operation; only minor size or capacity difference.
 2. Sampling is not allowed for:
 - a. Major equipment.
 - b. Life-safety-critical equipment.
 - c. Prefunctional Checklist execution.
 3. XX = the percent of the group of identical equipment to be included in each sample; defined for specific type of equipment.
 4. YY = the percent of the sample that if failed will require another sample to be tested; defined for specific type of equipment.
 5. Randomly test at least XX percent of each group of identical equipment, but not less than three units. This constitutes the "first sample."
 6. If YY percent of the units in the first sample fail, test another XX percent of the remaining identical units.
 7. If YY percent of the units in the second sample fail, test all remaining identical units.
 8. If frequent failures occur, resulting in more troubleshooting than testing, the Commissioning Authority may stop the testing and require Contractor to perform and document a checkout of the remaining units prior to continuing testing.
- D. Manual Testing: Use hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").
- E. Simulating Conditions: Artificially create the necessary condition for the purpose of testing the response of a system; for example apply hot air to a space sensor using a hair dryer to see the response in a VAV box.
- F. Simulating Signals: Disconnect the sensor and use a signal generator to send an amperage, resistance or pressure to the transducer and control system to simulate the sensor value.

- G. Over-Writing Values: Change the sensor value known to the control system in the control system to see the response of the system; for example, change the outside air temperature value from 50 degrees F to 75 degrees F to verify economizer operation.
- H. Indirect Indicators: Remote indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100 percent closed, are considered indirect indicators.
- I. Monitoring: Record parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of the relevant control systems; where monitoring of specific points is called for in Functional Test Procedures:
 - 1. All points that are monitored by the relevant control system shall be trended by Contractor; at the Commissioning Authority's request, Contractor shall trend up to 20 percent more points than specified at no extra charge.
 - 2. Other points will be monitored by the Commissioning Authority using dataloggers.
 - 3. At the option of the Commissioning Authority, some control system monitoring may be replaced with datalogger monitoring.
 - 4. Provide hard copies of monitored data in columnar format with time down left column and at least 5 columns of point values on same page.
 - 5. Graphical output is desirable and is required for all output if the system can produce it.
 - 6. Monitoring may be used to augment manual testing.

3.07 OPERATION AND MAINTENANCE MANUALS

- A. See Section 01780 for additional requirements.
- B. Add design intent documentation furnished by Architect to manuals prior to submission to Owner.
- C. Submit manuals related to items that were commissioned to Commissioning Authority for review; make changes recommended by Commissioning Authority.
- D. Commissioning Authority will add commissioning records to manuals after submission to Owner.

END OF SECTION

COMMISSIONING AUTHORITY RESPONSIBILITIES

PART 1 GENERAL

1.01 SUMMARY

- A. Commissioning is intended to achieve the following specific objectives; this section covers the Commissioning Authority's responsibilities for commissioning:
 - 1. Verify that the work is installed in accordance with the Contract Documents and the manufacturer's recommendations and instructions, and that it receives adequate operational checkout prior to startup: Startup reports and Prefunctional Checklists are utilized to achieve this.
 - 2. Verify and document that functional performance is in accordance with the Contract Documents: Functional Tests performed by Contractor and witnessed by the Commissioning Authority are utilized to achieve this.
 - 3. Verify that operation and maintenance manuals submitted to Owner are complete: Detailed O&M data submittals are specified.
 - 4. Verify that the Owner's operating personnel are adequately trained: Formal training conducted by Contractor is specified.
- B. Commissioning, including Functional Tests, O&M documentation review, and training, is to occur after startup and initial checkout and be completed before Substantial Completion.
- C. Coordinate and direct all the commissioning activities in a logical, sequential and efficient manner using consistent protocols and forms, centralized documentation, clear and regular communications and consultations with all necessary parties, frequently updated timelines and schedules and technical expertise.
- D. The Commissioning Authority is to be employed by Owner.
- E. The scope of commissioning activities is defined in Section 01810 - Commissioning.
- F. Contractor's responsibilities are defined in Section 01810 - Commissioning.

1.02 REFERENCE STANDARDS

- A. ASHRAE Guideline 1 - The HVAC Commissioning Process; 1996
- B. PECI (MCP) - Model Commissioning Plan; Portland Energy Conservation, Inc.; located at <http://www.peci.org/library/mcpgs.htm>; current edition.

1.03 SUBMITTALS

- A. Commissioning Plan:
 - 1. Submit preliminary draft for review by Owner and Architect within 30 days after commencement of Commissioning Authority contract.
 - 2. Submit final plan not more than 90 days after commencement of construction, for issuance to all parties.
- B. List of Prefunctional Checklists to be developed:
 - 1. Submit preliminary list at start of construction documents phase or within 30 days after commencement of contract, whichever is later.
 - 2. Submit final list not more than 60 days after start of construction.

- C. Prefunctional Checklists:
 - 1. Submit preliminary draft at start of construction documents phase or within 30 days after commencement of contract, whichever is later.
 - 2. Submit final draft to Contractor not less than 4 weeks prior to startup of particular items to be commissioned.
- D. List of Functional Test procedures to be developed:
 - 1. Submit preliminary list at start of construction documents phase or within 30 days after commencement of contract, whichever is later.
 - 2. Submit final list not more than 60 days after start of construction.
- E. Functional Test Procedures:
 - 1. Submit preliminary draft at start of construction documents phase or within 30 days after commencement of contract, whichever is later.
 - 2. Submit final draft to Contractor not less than 4 weeks prior to startup of particular items to be commissioned.
- F. Training Plan.
- G. Commissioning Record: Submit to Contractor for inclusion with O&M manuals.
- H. Final Commissioning Report: Submit to Owner.
- I. Recommissioning Manual: Submit within 60 days after receipt of Owner's instructions to proceed with preparation.

1.04 QUALITY ASSURANCE

- A. Qualifications:

PART 3 EXECUTION

2.01 COMMISSIONING PLAN

- A. Prepare and maintain the Commissioning Plan, covering commissioning schedule, Prefunctional Checklist and Functional Test procedures, coordination requirements, and forms to be used, for all parties in the commissioning process.
 - 1. Call and chair meetings of the Commissioning Team when appropriate.
 - 2. Give Contractor sufficient notice for scheduling commissioning activities.
 - 3. Develop a comprehensive start-up and initial systems checkout plan with cooperation of Contractor and subcontractors.
 - 4. The PEI Model Commissioning Plan may be used as a guide for the Commissioning Plan.
 - 5. ASHRAE Guideline 1 may be used as a guide for the Commissioning Plan.
 - 6. Avoid replication of information included in the construction contract documents to the greatest extent possible.
- B. Review the construction contract documents for Contractor submittals of draft checklists, draft test procedures, manufacturer startup procedures, and other information intended for the use of the Commissioning Authority in preparing the Commissioning Plan.
- C. Commissioning Schedule:
 - 1. Coordinate with Contractor anticipated dates of startup of each item of equipment

- and system.
- 2. Contractor's scheduling responsibilities are specified in the construction contract documents.
- 3. Revise and re-issue schedule monthly.
- 4. Prefunctional Checklists and Functional Tests are to be performed in sequence from components, to subsystems, to systems.
- 5. Deliver relevant Prefunctional Checklists and Functional Test Procedures to Contractor in time to avoid delay.

2.02 CONSTRUCTION CONTRACT DOCUMENTS

- A. General Commissioning Specifications: Architect has prepared general commissioning specifications for inclusion in the construction contract documents; review and submit comments to Owner.
 - 1. These specifications include:
 - a. Procedures applicable to all types of items to be commissioned.
 - 2. Prepare specifications for any of the following that would be recommended, for incorporation into the construction contract documents by Architect:
 - a. Additional Contractor submittals needed for purposes of commissioning, such as startup procedures, draft test procedures, draft training plans, etc.
 - b. Additional Owner personnel training.
 - c. Additional operation or maintenance data that should be submitted.
- B. Prefunctional Checklists: Develop detailed Checklists for each item to be commissioned.
 - 1. List of Checklists to be Developed: Prepare and maintain a detailed list of titles, not full text.
 - 2. The Checklist forms are intended to be part of the Contractor's Contract Documents.
- C. Functional Testing: Develop detailed procedures for each item to be commissioned; submit for review by Owner and Architect.
 - 1. List of Test Procedures to be Developed: Prepare and maintain a detailed list of titles, not full text.
 - 2. The forms the Commissioning Authority will use to report Functional Test results are not intended to be part of Contractor's Contract Documents, but the Functional Test Procedures that must be executed by the Contractor must be made part of the Contract Documents, by modification if necessary.
- D. Develop any other reporting forms Contractor will be required to use; if they are likely to require a substantially different amount of work than the Contractor can reasonably anticipate, they must be included in the construction contract documents.
- E. If any part of the documents described above have not been developed by the bid date, coordinate with Architect the issuance of modifications to the construction contract documents

2.03 PREFUNCTIONAL CHECKLISTS

- A. Prefunctional Checklists - Content: Prepare forms for Contractor's use, in sufficient detail to document that the work has been installed in accordance with the Contract Documents and the manufacturer's recommendations and instructions, and that it

receives adequate operational checkout prior to startup.

1. Prepare separate Checklists for each type of equipment, system, or other assembly, customized to the item.
2. Identify each Checklist by using the contract documents identification number or name, if any; if none, create unique identifiers for each Checklist; do not rely on Contractor to number checklists.
3. Multiple identical or near-identical items may appear on a single Checklist provided there is space to record all required data for each separately; label each set of data uniquely.
4. Include space to record manufacturer name, model number, serial number, capacity and other relevant characteristics, and accessories and other features as applicable; include space to record "as specified", "as submitted", and "as installed" data.
5. Include space to record whether or not the required submittals have been received; list each separate type of submittal.
6. Include line items for each physical inspection to be performed.
7. Include line items for each operational inspection to be performed, such as checking switch operation, fan rotation, valve and damper stroke, and measuring actual electrical loads.
8. Include separate section for sensors and actuators, with space for documenting actual physical location and calibration measurements; provide a separate generic calibration checklist identified wherever referenced.
9. Include spaces to record that related Checklists for related work upon which this work depends have been completed.

B. Prefunctional Checklists - Format:

1. Provide a cover sheet showing name of equipment item or system, documentation identification number (see Documentation Identification Scheme), names of accessory components involved, and identification of related checklists.
2. Include on cover sheet space for Contractor's use in attesting to completeness; provide spaces for the signatures of the general contractor and each subcontractor or other entity responsible, customized to the project and the type of item.
3. Include on the cover sheet, above the signature block, the following statement: "The work referenced in this Checklist and other work integral to or dependent on this work is complete and ready for functional testing. The checklist items are complete and have been checked off only by parties having direct knowledge of the event." Include two checkboxes:
 - a. "This Checklist is submitted for approval with no exceptions."
 - b. "This Checklist is submitted for approval, subject to the attached list of outstanding items, none of which preclude the performance of safe and reliable functional tests. A statement of completion will be submitted upon completion of the outstanding items."
4. Use a consistent, tabular format for all Checklists, with one line per checklist activity.
5. For each line item, provide space for initials and date, and identification of the subcontractor or other entity responsible.

2.04 FUNCTIONAL TEST PROCEDURES

- A. Develop test procedures in sufficient detail to show that functional performance is in accordance with the Contract Documents and shows proper operation through all modes of operation where there is a different system response, including seasonal, unoccupied, warm-up, cool-down, part- and full-load.
 - 1. Obtain assistance and review by installing subcontractors.
 - 2. Itemize each test sequence in step-by-step order, with acceptance criteria for each step and for the test as a whole.
 - 3. Include test setup instructions, description of tools and apparatus, special cautions, and.
 - 4. Avoid procedures that would void or otherwise limit warranties; review with Contractor prior to execution.
 - 5. For HVAC systems, procedures may include energy management control system trending, stand-alone datalogger monitoring or manual functional testing.
 - 6. Obtain explicit approval of Contractor in regard to feasibility and safety prior to execution.
- B. Functional Test Report Forms: Prepare forms in advance of testing, using a consistent format; include all test procedure information given to Contractor and:
 - 1. Report Identifier (see Documentation Identification Scheme).
 - 2. Test prerequisites.
 - 3. Formulas to be used in calculations.
 - 4. Yes/No check boxes for each step of test.
 - 5. Space to record results, document deficiencies, and make recommendations.
 - 6. Signature and date block for Commissioning Authority.
- C. Functional Test Prerequisites: Include space to verify all of the following items on each Functional Test Report Form, unless truly inapplicable:
 - 1. All related equipment has been started up and start-up reports and Prefunctional Checklists submitted and approved ready for Functional Testing.
 - a. For hydronic systems, check that:
 - 1) Piping system flushing is complete and required report approved.
 - 2) Water treatment system is complete and operational.
 - 3) Test and balance (TAB) is complete and approved.
 - 2. All control system functions for this and all interlocking systems are programmed and operable in accordance with the Contract Documents, including final set points and schedules with debugging, loop tuning and sensor calibrations completed, with space for signature of controls installer.
 - 3. Incomplete items identified by Architect during closeout inspections have been corrected or completed.
 - 4. Safeties and operating ranges have been reviewed.
 - 5. A copy of the specified sequence of operation is attached.
 - 6. A copy of applicable schedules and setpoints is attached.
 - 7. A copy of the specified Functional Test Procedures is attached.
 - 8. The Functional Test Procedures have been reviewed and approved by the applicable installer.
 - 9. Vibration control report approved (if required).
 - 10. False loading equipment, system and procedures ready.
 - 11. Sufficient clearance around equipment for servicing.
 - 12. Original values of pre-test setpoints that need to be changed to accommodate

- testing have been recorded, with a check box provided to verify return to original values (include control parameters, limits, delays, lockouts, schedules, etc.).
13. Any other items on the Prefunctional Checklist or Start-up Reports that need to be re-verified.

2.05 CONSTRUCTION PHASE

- A. Coordinate the commissioning work with Contractor and Construction Manager, ensure that commissioning activities are being incorporated into the master schedule.
- B. Perform site visits, as necessary, to observe component and system installations. Attend planning and job-site meetings to obtain information on construction progress. Review Contractor's meeting minutes for issues relating to the commissioning process. Assist in resolving discrepancies.
- C. Commissioning Kick-Off Meeting: Plan and conduct a meeting early in the construction phase to review commissioning activities and responsibilities with all parties involved. Require attendance by all members of the Commissioning Team.
- D. Conduct periodic meetings as necessary to coordinate, resolve planning issues, and aid in resolution of deficiencies, minimizing the time spent by Contractor and Owner personnel; hold meetings at least monthly.
- E. Submit periodic progress reports to Owner and Contractor.
- F. Review Contractor shop drawing submittals applicable to systems being commissioned for compliance with commissioning needs; verify that Owner's responsibilities are clearly defined in warranties.
- G. Review and approve submittals directly related to commissioning.
- H. Deliver Prefunctional Checklists and Functional Test procedures to Contractor.
- I. Verify satisfactory completion of Prefunctional Checklists by Contractor by reviewing checklists and by site observation and spot checking; provide formal approval when satisfactory.
- J. Verify startup of all systems by reviewing start-up reports and by site observation; provide formal approval when satisfactory.
- K. Coordinate, witness and approve Functional Tests performed by Contractor. Coordinate retesting until satisfactory performance is achieved.
- L. HVAC Commissioning:
 - 1. Gather and review the control sequences and interlocks and work with Contractor and design engineers until sufficient clarity has been obtained, in writing, to be able to prepare detailed Functional Test procedures.
 - 2. Witness all or part of HVAC piping test and flushing procedures, sufficient to be confident that proper procedures were followed; document testing and include documentation in O&M manuals.
 - 3. Witness all or part of duct testing and cleaning procedures, sufficient to be confident that proper procedures were followed; document testing and include documentation in O&M manuals.
 - 4. Review TAB Plan prepared by Contractor.

5. Before TAB is executed, witness sufficient Functional Testing of the control system to approve it to be used for TAB.
 6. Verify air and water systems balancing by spot testing, by reviewing completed reports, and by site observation; provide formal approval when satisfactory.
 7. Analyze trend logs and monitoring data to verify performance.
- M. Witness and document testing of systems and components over which the Commissioning Authority does not have direct control, such as smoke control systems, tests contracted directly by Owner, and tests by manufacturer's personnel; include documentation in O&M manuals.
- N. When Functional Testing for specific systems or equipment is specified to be performed by the Commissioning Authority rather than the Contractor, perform such testing without assistance of Contractor.
- O. Perform Functional Testing for systems and equipment so specified, without assistance of Contractor.
- P. Maintain a master deficiency and resolution log and a separate testing record. Provide written progress and test reports with recommended actions.
- Q. O&M Data: Review submitted operation and maintenance data for completeness; provide formal approval if satisfactory.
- R. Notify Contractor and Owner of deficiencies in procedures or results; suggest solutions.

2.06 TRAINING

- A. Training Plan: Prepare a comprehensive Training Plan, incorporating draft training plans submitted by Contractor.
1. Include a ____ hour session by the HVAC design engineer covering the overall HVAC system and equipment design concepts, with one-line schematic drawings.
 2. Include a ____ hour session by the Commissioning Authority on the use of the blank Prefunctional Checklists and Functional Test report forms for re-commissioning purposes.
 3. Establish criteria for determining satisfactory completion of training.
- B. Verify that training was satisfactorily completed; provide formal approval if satisfactory.

2.07 CLOSEOUT

- A. Commissioning Record: Use the same format and organization as specified for the O&M manuals.
1. Include the Final Commissioning Plan and Final Report.
 2. For each product or system and equipment item, include the following organized as indicated, with separator tabs:
 - a. Design intent documentation, furnished by Architect or others.
 - b. Detailed operational sequences.
 - c. Startup plan and approved startup reports.
 - d. Filled out Prefunctional Checklists.
 - e. Filled out Functional Test reports; trend logs and monitoring reports and analysis; other verification documentation.
 - f. Training plan and training records.

- g. Recommissioning recommendations, including time schedule and procedures; include blank copies of all Prefunctional Checklists and Functional Test report forms.
- B. Final Commissioning Report: Include:
 - 1. Executive summary.
 - 2. List of participants and roles.
 - 3. Brief facility description.
 - 4. Overview of commissioning scope and general description of testing and verification methods.
 - 5. For each item commissioned, an evaluation of adequacy of:
 - a. The product itself; i.e. compliance with the contract documents.
 - b. Installation.
 - c. Functional performance; include a brief description of the verification method used and observations and conclusions from the testing.
 - d. O&M documentation, including design intent.
 - e. Operator training.
 - 6. List of all outstanding non-compliance items, referenced to the specific functional test, inspection, trend log, etc., where the deficiency is documented.
 - 7. List of unresolved issues, seasonal or deferred testing, and other concerns that could affect facility operation.
 - 8. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. (about four to six pages).
 - 9. Attach appendices containing all commissioning documentation, including logs, minutes, reports, deficiency lists, communications, findings, etc., except that specified to be part of the Commissioning Record.
- C. Recommissioning Manual: Revise the Commissioning Plan documents, checklists, and Functional Test forms as necessary based on accepted recommendations of the final Commissioning Report. Provide step-by-step instructions for recommissioning, blank forms, and cross-references to O&M data needed during recommissioning.

2.08 POST-OCCUPANCY PHASE

- A. Coordinate deferred and seasonal Functional Tests; verify correction of deficiencies.
- B. On-Site Review: 10 months after Substantial Completion conduct on-site review with Owner's staff.
 - 1. Review the current facility operation and condition of outstanding issues related to the original and seasonal commissioning.
 - 2. Interview staff to identify problems or concerns they have operating the facility as originally intended.
 - 3. Make suggestions for improvements and for recording these changes in the O&M manuals.
 - 4. Identify areas of concern that are still under warranty or are the responsibility of the original construction contractor.
 - 5. Assist facility staff in developing reports, documents and requests for services to remedy outstanding problems.

END OF SECTION

PORTLAND CEMENT CONCRETE PAVING

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, DELIVERY AND APPLICATION OF:

- A. Concrete sidewalks, integral curbs, and gutters.

1.02 RELATED REQUIREMENTS

- A. Section 02310 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.
- B. Section 02316 - Fill and Backfill: Compacted subbase for paving.
- C. Section 03200 - Concrete Reinforcement.
- D. Section 03300 - Cast-in-Place Concrete.
- E. Section 07900 - Joint Sealers: Sealant for joints.

1.03 REFERENCE STANDARDS

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).
- B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2010.
- C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.
- D. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete; 2009a.
- E. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2007.
- F. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2008).
- G. ASTM D 1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2004a (Reapproved 2008).

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301.
- B. Obtain cementitious materials from same source throughout.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.01 FORM MATERIALS

- A. Form Materials: Conform to ACI 301.
- B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D 1751) or sponge rubber or cork (ASTM D 1752).
 - 1. Thickness: 1/2 inch.

2.02 REINFORCEMENT

- A. Reinforcing Steel and Welded Wire Reinforcement: Types specified in Section 03200. Follow City of Bellingham standards for reinforcement in right-of-way sidewalks, curbs, gutters.

2.03 CONCRETE MATERIALS

- A. Concrete Materials: As specified in Section 03300.
- B. Fiber Reinforcement: Synthetic fibers shown to have long-term resistance to deterioration when in contact with alkalis and moisture; 1/2 inch length. Use fiber reinforcement in all non-right-of-way sidewalks, curbs, gutters.
 - 1. Acceptable Products:
 - a. Fibermesh
 - b. Substitutions: See Section 01600 - Product Requirements.

2.04 ACCESSORIES

- A. Curing Compound: ASTM C 309, Type 1, Class A.
- B. Joint Sealer: Type "concrete paving joint sealer" as specified in Section 07900.

2.05 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Fiber Reinforcement: Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.

2.06 MIXING

- A. Transit Mixers: Comply with ASTM C 94/C 94M.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

3.02 SUBBASE

- A. Prepare subbase in accordance with State of Washington Highways standards.

3.03 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.

3.04 FORMING

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT (at right-of-way locations)

3.06 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.
- C. Place concrete continuously over the full width of the panel and between predetermined construction joints.

3.07 JOINTS

- A. Align curb, gutter, and sidewalk joints.
- B. Place 3/8 inch wide expansion joints at 20 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
 - 1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch of finished surface.
 - 2. Secure to resist movement by wet concrete.
- C. Provide scored joints:
 - 1. At 3 feet intervals.
 - 2. Between sidewalks and curbs.

3.08 FINISHING

- A. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- B. Curbs and Gutters: Light broom, texture parallel to pavement direction.
- C. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.09 JOINT SEALING

- A. See Section 07900 for joint sealer requirements.

3.10 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.

3.11 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01400.
 - 1. Provide free access to concrete operations at project site and cooperate with appointed firm.

3.12 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian traffic over pavement for 7 days minimum after finishing.

END OF SECTION

PAVEMENT MARKINGS

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES:

- A. Parking lot markings, including parking bays, handicapped symbols, and curb markings.
- B. "No Parking" curb painting.

1.02 RELATED REQUIREMENTS

- A. Section 02741 - Bituminous Concrete Paving.
- B. Section 02751 - Portland Cement Concrete Paving.

1.03 REFERENCE STANDARDS

- A. FS TT-B-1325 - Beads (Glass Spheres); Retro-Reflective; Rev. D, 2007.
- B. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; current edition, www.paintinfo.com.
- C. FHWA MUTCD - Manual on Uniform Traffic Control Devices for Streets and Highways; U.S. Department of Transportation, Federal Highway Administration; <http://mutcd.fhwa.dot.gov>; current edition.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.
- B. Deliver glass beads in containers suitable for handling and strong enough to prevent loss during shipment accompanied by batch certificate.
- C. Store products in manufacturer's unopened packaging until ready for installation.
- D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 FIELD CONDITIONS

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.07 EXTRA MATERIALS

- A. See Section 01600 - Product Requirements, for additional provisions.
- B. Supply 2 containers of each color for Owner's use.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Line and Zone Marking Paint: MPI No. 97 Latex Traffic Marking Paint; color(s) as indicated.
 - 1. Parking Lots: Yellow.
 - 2. Handicapped Symbols: Blue.
- B. Reflective Glass Beads: FS TT-B-1325, Type I (low index of refraction), Gradation A (coarse, drop-on); with silicone or other suitable waterproofing coating to ensure free flow.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Allow new pavement surfaces to cure for a period of not less than 14 days before application of marking materials.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Clean surfaces thoroughly prior to installation.
 - 1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.
- D. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.
- E. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.
- F. Temporary Pavement Markings: When required or directed by Architect, apply temporary markings of the color(s), width(s) and length(s) as indicated or directed.
 - 1. After temporary marking has served its purpose, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method so that surface to which the marking was applied will not be damaged.
 - 2. At Contractor's option, temporary marking tape may be used in lieu of temporary painted marking; remove unsatisfactory tape and replace with painted markings at no additional cost to Owner.

3.03 INSTALLATION

- A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.
- B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.

- C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.
- D. Comply with FHWA MUTCD manual (<http://mutcd.fhwa.dot.gov>) for details not shown.
- E. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.
- F. Apply uniformly painted markings of color(s), lengths, and widths as indicated on the drawings true, sharp edges and ends.
 - 1. Apply paint in one coat only.
 - 2. Wet Film Thickness: 0.015 inch, minimum.
 - 3. Length Tolerance: Plus or minus 3 (.
 - 4. Width Tolerance: Plus or minus 1/8 inch.
- G. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings.
 - 1. Mark the International Handicapped Symbol at indicated parking spaces.
 - 2. Hand application by pneumatic spray is acceptable.
- H. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.

3.04 DRYING, PROTECTION, AND REPLACEMENT

- A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.
- B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.
- C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.
- D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.
- E. Remove markings in manner to avoid damage to the surface to which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or other approved method.
- F. Replace removed markings at no additional cost to Owner.

END OF SECTION

SEEDING

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES:

- A. Seeding, mulching and fertilizer.
- B. Maintenance.

1.02 RELATED REQUIREMENTS

- A. Section 02310 - Grading: Topsoil material.

1.03 DEFINITIONS

- A. Weeds: Including, but not limited to, Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.04 REGULATORY REQUIREMENTS

- A. Comply with regulatory agencies for fertilizer and herbicide composition.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Deliver seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.
- B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.
- C. Maintain seeded areas immediately after placement for two cuttings.

PART 2 PRODUCTS

2.01 SEED MIXTURE

- A. Seed Mixture: (drought tolerant)
 - 1. Colonial Bentgrass: 10 percent.
 - 2. Red Fescue Grass (Illahee, Ranier or Pennlawn): 45 percent.
 - 3. Perennial Rye: 30 percent.
 - 4. White Clover: 14 to 15 percent.

2.02 SOIL MATERIALS

- A. Topsoil: Type ____ as specified in Section 02310.

2.03 ACCESSORIES

- A. Mulching Material: Fir, Hemlock or Alder species wood cellulose fiber, chip form, free of growth or germination inhibiting ingredients.
- B. Fertilizer: _____; recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, to the following proportions:

1. Nitrogen: 90 pounds per acre.
 2. Phosphoric Acid: 70 pounds per acre.
 3. Soluble Potash: 70 pounds per acre.
- C. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.
- D. Erosion Fabric: Jute matting, open weave.
- E. Stakes: Softwood lumber, chisel pointed.
- F. String: Inorganic fiber.
- G. Edging: Plastic.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared soil base is ready to receive the work of this Section.

3.02 PREPARATION

- A. Install edging at periphery of seeded areas in straight lines to consistent depth.

3.03 FERTILIZING

- A. Apply fertilizer in accordance with manufacturer's instructions.
- B. Apply after smooth raking of topsoil and prior to roller compaction.
- C. Do not apply fertilizer at same time or with same machine as will be used to apply seed.
- D. Mix thoroughly into upper 2 inches of topsoil.
- E. Lightly water to aid the dissipation of fertilizer.

3.04 SEEDING

- A. Apply seed at a rate of 150 pounds of seed per acre evenly in two intersecting directions. Rake in lightly.
- B. Do not seed areas in excess of that which can be mulched on same day.
- C. Do not sow immediately following rain, when ground is too dry, or during windy periods.
- D. Immediately following seeding and compacting, apply mulch to a thickness of 1/8 inches. Maintain clear of shrubs and trees.
- E. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.
- F. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches.

3.05 HYDROSEEDING (Contractor Option)

- A. Apply seeded slurry with a hydraulic seeder at a rate of 150 pounds of seed per acre evenly in two intersecting directions.

- B. Do not hydroseed area in excess of that which can be mulched on same day.
- C. Immediately following seeding, apply mulch to a thickness of 1/8 inches. Maintain clear of shrubs and trees.
- D. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.
- E. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches.

3.06 PROTECTION

- A. Identify seeded areas with stakes and string around area periphery. Set string height to 36 inches. Space stakes at 60 inches.
- B. Cover seeded slopes where grade is 3 inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.

3.07 MAINTENANCE

- A. Provide maintenance at no extra cost to Owner; Owner will pay for water.
- B. See Section 01700 - Execution Requirements, for additional requirements relating to maintenance service.
- C. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.
- D. Neatly trim edges and hand clip where necessary.
- E. Immediately remove clippings after mowing and trimming.
- F. Water to prevent grass and soil from drying out.
- G. Roll surface to remove minor depressions or irregularities.
- H. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- I. Immediately reseed areas that show bare spots.
- J. Protect seeded areas with warning signs during maintenance period.

END OF SECTION

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, DELIVERY AND INSTALLATION OF

- A. Concrete formwork.
- B. Concrete foundation walls and slabs
- C. Concrete reinforcement.
- D. Concrete curing.

1.02 RELATED REQUIREMENTS

- A. Section 02751 - Portland Cement Concrete Paving: Sidewalks, curbs and gutters.
- B. Section 07900 - Joint Sealers: Sealants for saw cut joints and isolation joints in slabs.

1.03 REFERENCE STANDARDS

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2002).
- B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 2010.
- C. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (Errata 2007).
- D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.
- E. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 2010.
- F. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 2010.
- G. ACI 308R - Guide to Curing Concrete; American Concrete Institute International; 2001 (Reapproved 2008).
- H. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2008.
- I. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute International; 2004.
- J. ASTM A 185/A 185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- K. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2009b.
- L. ASTM C 33 - Standard Specification for Concrete Aggregates; 2008.
- M. ASTM C 150 - Standard Specification for Portland Cement; 2007.
- N. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete; 2006.

- O. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2007.
- P. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete; 2008a.
- Q. ASTM C 1059/C 1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 1999 (Reapproved 2008).
- R. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2008).

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
- C. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

- A. Formwork Design and Construction: Comply with guidelines of ACI 347 to provide formwork that will produce concrete complying with tolerances of ACI 117.
- B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
 - 1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
 - 2. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
 - 3. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.02 REINFORCEMENT

- A. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420).
 - 1. Type: Deformed billet-steel bars.
 - 2. Finish: Unfinished, unless otherwise indicated.
- B. Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain type.
 - 1. Mesh Size and Wire Gage: As indicated on drawings.
- C. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gage.
2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.03 CONCRETE MATERIALS

- A. Cement: ASTM C 150, Type I - Normal Portland type, unless otherwise indicated.
 1. Acquire all cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C 33.
 1. Acquire all aggregates for entire project from same source.
- C. Water: Clean and not detrimental to concrete.

2.04 CHEMICAL ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C 260.
- C. Water Reducing Admixture: ASTM C 494/C 494M Type A.

2.05 ACCESSORY MATERIALS

- A. Liquid Curing Compound: ASTM C 309, Type 1-D, clear or translucent with fugitive dye.

2.06 BONDING AND JOINTING PRODUCTS

- A. Latex Bonding Agent: Non-redispersible acrylic latex, complying with ASTM C 1059 Type II.
- B. Epoxy Bonding System: Complying with ASTM C 881/C 881M and of Type required for specific application.
- C. Reglets: Formed steel sheet, galvanized, with temporary filler to prevent concrete intrusion during placement.
 1. Size: As indicated on drawings.
- D. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, complying with ASTM D 1751, 1/4 inch thick and 4 inches deep; tongue and groove profile.

2.07 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

2.08 MIXING

- A. Transit Mixers: Comply with ASTM C 94/C 94M.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Verify that forms are clean and free of rust before applying release agent.
- C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
 - 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
 - 2. Use latex bonding agent only for non-load-bearing applications.

3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

3.04 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

3.05 CONCRETE FINISHING

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
- C. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
 - 1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile and ceramic tile with full bed setting system.
 - 2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 301.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, thin set quarry tile, and thin set ceramic tile.
 - 3. Other Surfaces to Be Left Exposed: "Steel trowel" as described in ACI 302.1R,

minimizing burnish marks and other appearance defects.

- a. Chemical Hardener: After slab has cured, apply water-diluted hardener in three coats per manufacturer's instructions, allowing 24 hours between coats.
- D. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

3.06 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.07 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01400.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

3.08 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

END OF SECTION

ROUGH CARPENTRY

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, DELIVERY AND INSTALLATION OF:

- A. Structural floor, wall, and roof framing for office addition.
- B. Sheathing.
- C. Miscellaneous wood nailers, furring, and grounds.

1.02 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2009.
- B. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association; 2001.
- C. ASTM A 153/A 153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- D. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2005.
- E. WWPA G-5 - Western Lumber Grading Rules; Western Wood Products Association; 2011.

1.03 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on application instructions.

1.04 QUALITY ASSURANCE

- A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
 - 1. Acceptable Lumber Inspection Agencies: Any agency with rules approved by American Lumber Standards Committee.
- B. Exposed-to-View Rough Carpentry: Submit manufacturer's certificate that products meet or exceed specified requirements, in lieu of grade stamping, if allowed by governing authority.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.

2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: Western Wood Products Association (WWPA).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Stud Framing (2 by 2 through 2 by 6):
 1. Species: Any allowed under referenced grading rules.
 2. Grade: No. 2.
- E. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16):
 1. Machine stress-rated (MSR) as follows:
 - a. Fb-single (minimum extreme fiber stress in bending): 1350 psi.
 - b. E (minimum modulus of elasticity): 1,300,000 psi.
 2. Species: Any allowed under grading rules.
- F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 1. Lumber: S4S, No. 2 or Standard Grade.
 2. Boards: Standard or No. 3.
- G. Miscellaneous Blocking, Furring, and Nailers:
 1. Lumber: S4S, No. 2 or Standard Grade.
 2. Boards: Standard or No. 3.

2.03 TIMBERS FOR CONCEALED APPLICATIONS

- A. Grading Agency: Western Wood Products Association (WWPA).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry (23 percent maximum).
- D. Beams and Posts 5 inches and over in thickness:
 1. Species: Any allowed under referenced grading rules.
 2. Grade: Select Structural.

2.04 CONSTRUCTION PANELS

- A. Subflooring: APA PRP-108: Rated Sheathing.
 1. Exposure Class: Exterior.
 2. Span Rating: 32/16 inches.
 3. Thickness: 3/4 inch, nominal.
- B. Underlayment: Particleboard, ANSI A208.1, Grade PBU.
- C. Roof Sheathing: APA PRP-108, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
 1. Span Rating: 24/0.

- D. Wall Sheathing: APA PRP-108, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
 - 1. Span Rating: 24/0.

2.05 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
- B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
- C. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.
- D. Subfloor Glue: Waterproof, water base, air cure type, cartridge dispensed.
- E. Water-Resistive Barrier: No. 15 asphalt felt.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

3.02 FRAMING INSTALLATION

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- D. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- E. Install structural members full length without splices unless otherwise specifically detailed.
- F. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.
- G. Install horizontal spanning members with crown edge up and not less than 1-1/2 inches of bearing at each end.
- H. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

- I. Provide bridging at joists in excess of 8 feet span as detailed. Fit solid blocking at ends of members.
- J. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.03 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD

- A. Place sill gasket directly on cementitious foundation. Puncture gasket cleanly and fit tightly to protruding foundation anchor bolts.
- B. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
- C. Coordinate curb installation with installation of decking and support of deck openings.

3.04 INSTALLATION OF CONSTRUCTION PANELS

- A. Subflooring: Glue and nail to framing; staples are not permitted.
- B. Underlayment: Secure to subflooring with nails and glue.
 - 1. Place building paper between floor underlayment and subflooring.
- C. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
 - 1. Use sheathing clips between roof framing members.
 - 2. Provide solid edge blocking between sheets.
 - 3. Nail panels to framing; staples are not permitted.
- D. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails, screws, or staples.
 - 1. Use plywood or other acceptable structural panels at building corners, for not less than 96 inches, measured horizontally.
 - 2. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.

3.05 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.
- C. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.06 CLEANING

- A. Waste Disposal: Comply with the requirements of Section 01732.
 - 1. Comply with applicable regulations.
 - 2. Do not burn scrap on project site.
 - 3. Do not burn scraps that have been pressure treated.
 - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

- C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

FINISH CARPENTRY

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, DELIVERY AND INSTALLATION OF:

- A. Finish carpentry items.
- B. Wood casings and moldings.
- C. Hardware and attachment accessories.
- D. Assorted toilet room and kitchen accessories as indicated on drawings.

1.02 RELATED REQUIREMENTS

- A. Section 06100 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 09900 - Paints and Coatings: Painting and finishing of finish carpentry items.
- C. Section 12355 - Residential Casework: Shop fabricated cabinet work.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements for submittal procedures.
- B. Product Data:
 - 1. Provide instructions for attachment hardware and finish hardware.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, accessories, to a minimum scale of 1-1/2 inch to 1 ft.
- D. Samples: Submit two samples of wood trim 12 inch long.

1.05 QUALITY ASSURANCE

- A. Perform work in accordance with AWI Architectural Woodwork Quality Standards Illustrated, Custom grade.
- B. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
- C. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver finish carpentry only when environmental conditions meet requirements specified for installation areas. If finish carpentry must be stored on other than installation areas, store only where environmental conditions meet requirements specified for installation areas.
- B. Protect materials against

- C. Protect work from moisture damage.

1.07 PROJECT CONDITIONS

- A. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- B. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY ITEMS

- A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI//AWMAC/WI Architectural Woodwork Standards for Premium Grade.

2.02 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.

2.03 LUMBER MATERIALS

- A. Softwood Lumber: Western Hemlock species, maximum moisture content of 6 percent; clear.

2.04 SHEET MATERIALS

- A. Softwood Plywood: Veneer core; APA Medium Density Overlay. Group 1. 3/4 inch unless otherwise noted.

2.05 ADHESIVE

- A. Adhesive: Type recommended by AWI to suit application.

2.06 FASTENINGS

- A. Fasteners: Of size and type to suit application; _____ finish in concealed locations and _____ finish in exposed locations.
- B. Concealed Joint Fasteners: Threaded steel.

2.07 ACCESSORIES

- A. Lumber for Shimming, Blocking, and: Softwood lumber of any species.
- B. Primer: Alkyd primer sealer.
- C. Wood Filler: Solvent base, tinted to match surface finish color.
- D. Hardware: See Section _____ - _____.

2.08 FABRICATION

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

2.09 SHOP FINISHING

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- D. Finish work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards, Section 5 - Finishing for Grade specified and as follows:
 - 1. Transparent: Nitrocellulose lacquer (formerly TR-1).
 - 2. Opaque: Nitrocellulose lacquer (formerly OP-1).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.02 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.03 SITE APPLIED WOOD TREATMENT

- A. Apply preservative treatment in accordance with manufacturer's instructions.
- B. Brush apply one coats of preservative treatment on wood in contact with cementitious materials. Treat site-sawn cuts.
- C. Allow preservative to dry prior to erecting members.

3.04 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
- B. Site Finishing: See Section 09900.
- C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.05 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

BOARD AND BATT INSULATION

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, DELIVERY AND APPLICATION OF:

- A. Board insulation at perimeter foundation wall.
- B. Batt insulation and vapor retarder in exterior wall, ceiling, and roof construction for office addition.
- C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof where exposed during renovations.

1.02 RELATED REQUIREMENTS

- A. Section 06100 - Rough Carpentry: Supporting construction for batt insulation.

1.03 REFERENCE STANDARDS

- A. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2006.
- B. ASTM E 136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2009b.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.05 FIELD CONDITIONS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.06 SEQUENCING

- A. Sequence work to ensure firestop materials are in place before beginning work of this section.

1.07 COORDINATION

- A. Coordinate the work with Section 07260 for installation of vapor retarder.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Insulation at Perimeter of Foundation: Extruded polystyrene board.

- B. Insulation in Wood Framed Walls: Batt insulation with integral vapor retarder.

2.02 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene Board Insulation: ASTM C 578, Type X; Extruded polystyrene board with natural skin surfaces; with the following characteristics:
1. Flame Spread Index: 75 or less, when tested in accordance with ASTM E 84.
 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E 84.
 3. Board Size: 48 x 96 inch.
 4. Board Thickness: 2 inches.
 5. Board Edges: Square.
 6. Substitutions: See Section 01600 - Product Requirements.

2.03 BATT INSULATION MATERIALS

- A. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, at Contractor's option.
- B. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C 665; friction fit.
1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E 84.
 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E 84.
 3. Combustibility: Non-combustible, when tested in accordance with ASTM E 136, except for facing, if any.
 4. Formaldehyde Content: Zero.
 5. Thermal Resistance: R of 21.
 6. Facing: Aluminum foil, one side.
 7. Manufacturers:
 - a. Basis of Design: Johns Manville Corporation: www.jm.com.
 8. Substitutions: See Section 01600 - Product Requirements.
- C. Mineral Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C 665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E 84.
1. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E 84.

2.04 ACCESSORIES

- A. Sheet Vapor Retarder: Reinforced polyethylene vapor retarder; 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 25 lb/100 sq. ft. with maximum performance rating of 0.0507 perm.
1. Basis of Design: Reef Industries; Griffolyn T-65.
 2. Vapor Retarder Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or

substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER

- A. Install boards horizontally on foundation perimeter.
 - 1. Place boards to maximize adhesive contact.
 - 2. Install in running bond pattern.
 - 3. Butt edges and ends tightly to adjacent boards and to protrusions.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- F. Staple or nail facing flanges in place at maximum 6 inches on center.
- G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- H. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches on center. Lap and seal sheet retarder joints over member face.
- I. Tape seal tears or cuts in vapor retarder.
- J. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

3.04 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

PREFORMED METAL ROOF PANELS

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, DELIVERY AND INSTALLATION OF:

- A. Architectural roofing system of preformed steel panels.
- B. Fastening system.
- C. Factory finishing.
- D. Accessories and miscellaneous components.

1.02 RELATED REQUIREMENTS

- A. Section 07900 - Joint Sealers: Field-installed sealants.

1.03 REFERENCE STANDARDS

- A. ASTM A 792/A 792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2009a.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Storage and handling requirements and recommendations.
 - 2. Installation methods.
 - 3. Specimen warranty.
- C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
 - 1. Show work to be field-fabricated or field-assembled.
- D. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in the manufacture of roofing systems similar to those required for this project, with not less than 5 years of documented experience.
- B. Installer Qualifications: Company trained and authorized by roofing system manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Provide strippable plastic protection on prefinished roofing panels for removal after installation.
- B. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

1.07 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 5 year period from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design is Select Seam, manufactured by AEPSpan.
- B. Substitutions: See Section 01600 - Product Requirements.

2.02 ARCHITECTURAL ROOF PANELS

- A. Performance Requirements: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.
- B. Metal Roofing: Factory-formed panels with factory-applied finish.
 - 1. Steel Panels:
 - a. Aluminum-zinc alloy-coated steel conforming to ASTM A 792/A 792M; minimum AZ50 coating.
 - b. Steel Thickness: Minimum 0.023 inch.
 - 2. Profile: Standing seam, with minimum 1.0 inch seam height; concealed fastener system for field seaming with special tool.
 - 3. Texture: Smooth.
 - 4. Length: Full length of roof slope, without lapped horizontal joints.
 - 5. Width: Maximum panel coverage of 24 inches.

2.03 ATTACHMENT SYSTEM

- A. Concealed System: Provide manufacturer's standard stainless steel or nylon-coated aluminum concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

2.04 PANEL FINISH

- A. Fluoropolymer Coating System: Manufacturer's standard multi-coat thermocured coating system, including minimum 70 percent fluoropolymer color topcoat with minimum total dry film thickness of 0.9 mil; color and gloss to match sample.

2.05 ACCESSORIES AND MISCELLANEOUS ITEMS

- A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, and equipment curbs of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.
- B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish, closed-cell synthetic rubber, neoprene, or PVC, or combination steel and closed-cell foam.

- C. Sealants: As specified in Section 07900.
 - 1. Exposed sealant must cure to rubber-like consistency.
 - 2. Concealed sealant must be non-hardening type.

2.06 FABRICATION

- A. Panels: Fabricate panels and accessory items at factory, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.
- B. Remove protective film from surface of roof panels immediately prior to installation. Strip film carefully, to avoid damage to prefinished surfaces.
- C. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by roof panel manufacturer.
- D. Where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.03 INSTALLATION

- A. Overall: Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
 - 1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
 - 2. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.
- B. Accessories: Install all components required for a complete roofing assembly, including flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.
- C. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.

3.04 CLEANING AND PROTECTION

- A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.
- B. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.
- C. Touch-up, repair, or replace damaged roof panels or accessories before date of Substantial Completion.

END OF SECTION

FIBER CEMENT SIDING

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, DELIVERY AND INSTALLATION OF:

- A. Wood-fiber cement siding.
- B. Weather-resistive barrier under siding.
- C. Removal and disposal of existing siding where indicated.

1.02 ALTERNATE BID WORK

- A. Base Bid work scope includes removal and replacement of all existing siding.
- B. Alternate Bid No. One includes removal and replacement of siding on ONLY the South-facing walls of buildings C, D, E & F.

1.03 RELATED REQUIREMENTS

- A. Section 01230 - Alternates
- B. Section 06100 - Rough Carpentry: Siding substrate.

1.04 REFERENCE STANDARDS

- A. ASTM C 1186 - Standard Specification for Flat Fiber Cement Sheets; 2008.

1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Manufacturer's requirements for related materials to be installed by others.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods, including nail patterns.
- C. Test Report: Applicable model code authority evaluation report (e.g. ICC-ES).
- D. Maintenance Instructions: Periodic inspection recommendations and maintenance procedures.
- E. Warranty: Submit copy of manufacturer's warranty, made out in Owner's name, showing that it has been registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section with minimum 3 years of experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store products under waterproof cover and elevated above grade, on a flat surface.

PART 2 PRODUCTS

2.01 SIDING

- A. Lap Siding: Individual horizontal boards made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C 1186 Type A Grade II; with machined edges, for nail attachment.
 - 1. Style: Dutch lap style.
 - 2. Texture: Simulated cedar grain.
 - 3. Length: 12 ft, nominal.
 - 4. Width (Height): 5-1/4 inches.
 - 5. Thickness: 5/16 inch, nominal.
 - 6. Finish: Factory applied primer.
 - 7. Warranty: 50 year limited; transferable.
 - 8. Lap Siding Manufacturers:
 - a. Basis of design: James Hardie Building Products, Inc: www.jameshardie.com.
 - b. Substitutions: See Section 01600 - Product Requirements.
- B. Soffit Panels: Panels made of cement and cellulose fiber formed under high pressure with integral surface texture, complying with ASTM C 1186 Type A Grade II; with machined edges, for nail attachment.
 - 1. Texture: Smooth.
 - 2. Length: 96 inches, nominal.
 - 3. Width: 48 inches.
 - 4. Thickness: 5/16 inch, nominal.
 - 5. Finish: Unfinished.
 - 6. Manufacturer: Same as siding.

2.02 ACCESSORIES

- A. Weather-Resistive Barrier: ASTM D 226 Type I asphalt felt (No.15).
- B. Trim: Same material and texture as siding.
- C. Fasteners: Galvanized or corrosion resistant; length as required to penetrate minimum 1-1/4 inch.
- D. Joint Sealer: As specified in Section 07900.

PART 3 EXECUTION

3.01 PREPARATION

- A. Examine substrate and clean and repair as required to eliminate conditions that would be detrimental to proper installation.
- B. Do not begin until unacceptable conditions have been corrected.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Install weather-resistive barrier over entire substrate; lap and seal as required to shed water.
- B. Install sheet metal flashing:
 - 1. Above door and window trim and casings.
 - 2. Above horizontal trim in field of siding.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions and recommendations.
 - 1. Read warranty and comply with all terms necessary to maintain warranty coverage.
 - 2. Install in accordance with conditions stated in model code evaluation report applicable to location of project.
 - 3. Use trim details indicated on drawings.
 - 4. Touch up all field cut edges before installing.
 - 5. Pre-drill nail holes if necessary to prevent breakage.
- B. Over Wood and Wood-Composite Sheathing: Fasten siding through sheathing into studs.
- C. Allow space between both ends of siding panels that butt against trim for thermal movement; seal joint between panel and trim with exterior grade sealant.
- D. Joints in Horizontal Siding: Avoid joints in lap siding except at corners; where joints are inevitable stagger joints between successive courses.
- E. Do not install siding less than 6 inches from surface of ground nor closer than 1 inch to roofs, patios, porches, and other surfaces where water may collect.
- F. After installation, seal all joints except lap joints of lap siding. Seal around all penetrations. Paint all exposed cut edges.
- G. Finish Painting: Specified in Section 09900.

3.04 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, DELIVERY AND INSTALLATION OF:

- A. New Pre-finished aluminum gutters and downspouts, replaced where existing.
- B. Removal and disposal of existing gutters and downspouts.

1.02 RELATED REQUIREMENTS

- A. Section 07620 - Sheet Metal Flashing and Trim.

1.03 REFERENCE STANDARDS

- A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2005.
- B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.
- C. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2007.
- D. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors' National Association; 2003.

1.04 DESIGN REQUIREMENTS

- A. Conform to SMACNA Architectural Sheet Metal Manual for sizing components for rainfall intensity determined by a storm occurrence of 1 in 5 years.

1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Samples: Submit two samples, 12 inch long illustrating component design, finish, color, and configuration.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
- B. Prevent contact with materials that could cause discoloration, staining, or damage.

1.07 PROJECT CONDITIONS

- A. Coordinate the work with downspout discharge pipe inlet.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Pre-Finished Aluminum Sheet: ASTM B 209 (ASTM B 209M); 0.032 inch thick.
 - 1. Finish: Plain, shop pre-coated with modified silicone coating.
 - 2. Color: As selected from manufacturer's standard colors.

2.02 FABRICATION

- A. Form gutters and downspouts of profiles and sizes indicated.
- B. Fabricate with required connection pieces.
- C. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- D. Hem exposed edges of metal.
- E. Fabricate gutter and downspout accessories; seal watertight.

2.03 FACTORY FINISHING

- A. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system; color as selected from manufacturer's standard colors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.

3.02 PREPARATION

- A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION

- A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.
- B. Sheet Metal: Join lengths with seams sealed watertight. Flash and seal gutters to downspouts and accessories.
- C. Slope gutters 1/16 inch per foot.
- D. Connect downspouts to downspout existing boots at minimum 6 inches above grade. Grout connection watertight.

END OF SECTION

STEEL DOORS AND FRAMES

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, DELIVERY AND INSTALLATION OF:

- A. Steel frames for wood doors.

1.02 RELATED REQUIREMENTS

- A. Section 08710 - Door Hardware.
- B. Section 08800 - Glazing: Glass for doors and borrowed lites.
- C. Section 09900 - Paints and Coatings: Field painting.

1.03 REFERENCE STANDARDS

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2003.
- B. ANSI A250.8 - SDI-100 Recommended Specifications for Standard Steel Doors and Frames; 2003.
- C. ANSI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 1998 (R2004).
- D. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.
- E. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute; 2000 (ANSI/DHI A115 Series).
- F. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; The National Association of Architectural Metal Manufacturers; 2007.
- G. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2010.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store in accordance with NAAMM HMMA 840.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent

corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Steel Doors and Frames:
 - 1. Assa Abloy Ceco, Curries, or Fleming: www.assaabloydss.com.
 - 2. Ceco Door Products; Product ____: www.cecodoor.com.
 - 3. Windsor Republic Doors; Product ____: www.republicdoor.com.
 - 4. Steelcraft; Product ____: www.steelcraft.com.
 - 5. Substitutions: See Section 01600 - Product Requirements.

2.02 DOORS AND FRAMES

- A. Requirements for All Doors and Frames:
 - 1. Accessibility: Comply with ANSI/ICC A117.1.
 - 2. Door Top Closures: Flush with top of faces and edges.
 - 3. Door Edge Profile: Beveled on both edges.
 - 4. Door Texture: Smooth faces.
 - 5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
 - 6. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
 - 7. Galvanizing for Units in Wet Areas: All components hot-dipped zinc-iron alloy-coated (galvannealed), manufacturer's standard coating thickness.
 - 8. Finish: Factory primed, for field finishing.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 STEEL FRAMES

- A. General:
 - 1. Comply with the requirements of grade specified for corresponding door, except:
 - a. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 18 gage
 - 2. Finish: Factory primed, for field finishing.

2.04 ACCESSORY MATERIALS

- A. Glazing: As specified in Section 08800, factory installed.
- B. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- C. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.05 FINISH MATERIALS

- A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.

3.02 INSTALLATION

- A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.
- B. In addition, install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Coordinate installation of hardware.
- E. Coordinate installation of glazing.

3.03 TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.04 ADJUSTING

- A. Adjust for smooth and balanced door movement.

END OF SECTION

FLUSH WOOD DOORS

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, DELIVERY AND INSTALLATION OF:

- A. Flush wood doors; flush configuration; non-rated.

1.02 RELATED REQUIREMENTS

- A. Section 06200 - Finish Carpentry.
- B. Section 08110 - Steel Doors and Frames.
- C. Section 08710 - Door Hardware.
- D. Section 09900 - Paints and Coatings: Site finishing of doors.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2009.
- B. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- C. WDMA I.S.1-A - Architectural Wood Flush Doors; Window and Door Manufacturers Association; 2004.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Specimen warranty.
- D. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing.
- E. Samples: Submit two samples of door construction, 12x12 inch in size cut from top corner of door.
- F. Samples: Submit two samples of door veneer, 12x12 inch in size illustrating wood grain, stain color, and sheen.
- G. Manufacturer's Installation Instructions: Indicate special installation instructions.
- H. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

- A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 PROJECT CONDITIONS

- A. Coordinate the work with door opening construction, door frame and door hardware installation.

1.08 WARRANTY

- A. See Section 01780 - Closeout Submittals for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Provide warranty for the following term:
 - 1. Interior Doors: Life of installation.
- D. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
- B. Wood Veneer Faced Doors:
 - 1. Lynden door; Product SD Series Wood veneer particle-board core.
 - 2. Substitutions: See Section 01600 - Product Requirements.

2.02 DOORS AND PANELS

- A. All Doors: See drawings for locations and additional requirements.
 - 1. Quality Level: Premium Grade, in accordance with AWI/AWMAC/WI Architectural Woodwork Standards.
 - 2. Quality Level: Custom Grade, Standard Duty performance, in accordance with WDMA I.S.1-A.
 - 3. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at all locations.
 - 2. Wood veneer facing with factory transparent finish.

2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated above.

2.04 DOOR FACINGS

- A. Wood Veneer Facing for Transparent Finish: red oak, veneer grade as specified by quality standard, plain sliced, slip veneer match, running assembly match.
 - 1. Vertical Edges: Compatible hardwood.
 - 2. Pairs: Pair match each pair; set match pairs within 10 feet of each other when doors are closed.
- B. Veneer Facing for Opaque Finish: Medium density overlaid plywood.

2.05 ACCESSORIES

2.06 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
- C. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
 - 1. Provide solid blocking for other throughbolted hardware.
- D. Fit door edge trim to edge of stiles after applying veneer facing.
- E. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- F. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances as follows.
 - 1. 1/8 inch at head and jambs.
 - 2. 3/8 inch from top of floor covering or threshold at bottom.
 - 3. Exception: Doors to be field finished.
- G. Provide edge clearances in accordance with the quality standard specified.

2.07 FACTORY FINISHING - WOOD VENEER DOORS

- A. Factory finish doors in accordance with specified quality standard:
 - 1. Transparent Finish: Transparent conversion varnish, Premium quality, satin sheen.
 - 2. Opaque Finish: Opaque catalyzed polyurethane, Premium quality, satin sheen.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.

- D. Coordinate installation of doors with installation of frames and hardware.

3.03 TOLERANCES

- A. Conform to specified quality standard for fit and clearance tolerances.
 - 1. Maximum 1/8 inch clearance at head and jambs.
 - 2. Maximum 3/8 inch clearance from top of floor covering or threshold
- B. Conform to specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

3.05 SCHEDULE - See Drawings

END OF SECTION

FIBERGLASS DOORS AND FRAMES

PART 2 PRODUCTS

1.01 DOOR AND FRAME ASSEMBLIES

- A. Door and Frame Assemblies: Factory-fabricated, prepared and machined for hardware.
 - 1. Mechanical Durability: Tested to ANSI A250.4 Level A (1,000,000 cycles), minimum; tested with hardware and fasteners intended for use on project.
 - 2. Screw-Holding Capacity: Tested to 900 psi, minimum.
 - 3. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less; when tested in accordance with ASTM E 84.
 - 4. Flammability: Self-extinguishing when tested in accordance with ASTM D 635.
 - 5. Clearance Between Door and Frame: 1/8 inch, maximum.
 - 6. Clearance Between Bottom of Door and Finished Floor: 3/4 inch, maximum; not less than 1/4 inch clearance to threshold.

1.02 COMPONENTS

- A. Doors: Through-color gel coating on fiberglass reinforced polyester resin construction with reinforced core.
 - 1. Thickness: 1-3/4 inches, overall.
 - 2. Subframe and Reinforcements: Fiberglass pultrusions or polymer foam; no metal or wood.
 - 3. Waterproof Integrity: All edges, cut-outs, and hardware preparations factory fabricated of fiberglass reinforced plastic; provide cut-outs with joints sealed independently of glazing or louver inserts or trim.
 - 4. Hardware Preparations: Factory reinforce, machine, and prepare for all hardware including field installed items; provide solid blocking for each hardware item; make field cutting, drilling or tapping unnecessary; obtain manufacturer's templates for hardware preparations.
 - 5. Gel Coating: Ultraviolet stabilized polyester, marine grade NPG-isophthalic, with slightly textured semi-gloss final finish.
 - 6. Gel Coating Thickness: Minimum 15 mils wet, plus/minus 3 mils.
- B. Frames: Profiles and dimensions as indicated on drawings; same type and construction used in mechanical durability test for doors.
 - 1. Corner Joints: Mitered with concealed corner blocks or angles of same material as frame; fiberglass and aluminum joined with screws; steel and stainless steel spot welded; sealed watertight with silicone sealant.
 - 2. At hardware cut-outs provide continuous backing or mortar guards of same material as frame, sealed watertight.
 - 3. Frame Anchors: Stainless steel, Type 304; provide 3 anchors in each jamb for heights up to 84 inches with one additional anchor for each additional 24 inches in height.
- C. Hinge and Hardware Fasteners: Stainless steel, Type 304; wood screws.

END OF SECTION

TUBULAR PLASTIC (VINYL) WINDOWS

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, DELIVERY AND INSTALLATION OF:

- A. Factory fabricated tubular extruded plastic windows with operating sash.
- B. Factory glazed.
- C. Operating hardware.
- D. Insect screens.
- E. Perimeter sealant.

1.02 RELATED REQUIREMENTS

- A. Section 07900 - Joint Sealers: Perimeter sealant and back-up materials.

1.03 REFERENCE STANDARDS

- A. AAMA/WDMA/CSA 101/I.S.2/A440 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors; American Architectural Manufacturers Association; 2008.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, anchorage and fasteners, glass, internal drainage details.
- C. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work, installation requirements.
- D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.
- B. Jig, brace, and box the window frame assemblies for transport to minimize flexing of members or joints.

1.06 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F.
- B. Maintain this minimum temperature during and after installation of sealants.

1.07 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same. Include coverage for

degradation of color finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Tubular Plastic Windows:
 - 1. Basis of Design: Milgard.
 - 2. Substitutions: See Section 01600 - Product Requirements.

2.02 COMPONENTS

- A. Windows: Extruded, hollow, tubular, ultra-violet resistant polyvinyl chloride (PVC) with integral color; factory fabricated; with vision glass, related flashings, anchorage and attachment devices.
 - 1. Performance Requirements: AAMA/WDMA/CSA 101/I.S.2/A440 R15.
 - 2. Configuration: Fixed, non-operable, outward opening, side hinged, and outward opening, top hinged sash.
 - 3. Color: Color as selected.
- B. Insect Screens: FS L-S-125, woven plastic mesh; 14/18 mesh size.
 - 1. Color: Black.

2.03 GLASS AND GLAZING MATERIALS

- A. Glass and Glazing Materials: As specified in Section 08800 of Types described below:
 - 1. Glass in Exterior Lights: insulating, double pane.

2.04 SEALANT MATERIALS

- A. Perimeter Sealant and Backing Materials: Exterior Silicone Type as specified in Section 07900.

2.05 FABRICATION

- A. Factory glaze window units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.

3.02 INSTALLATION

- A. Install window units in accordance with manufacturers instructions.
- B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- D. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

- E. Install perimeter sealant and backing materials in accordance with Section 07900.

3.03 TOLERANCES

- A. Maximum Variation from Level or Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.

3.04 ADJUSTING

- A. Adjust hardware for smooth operation and secure weathertight closure.

3.05 CLEANING

- A. Remove protective material from pre-finished surfaces.
- B. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION

DOOR HARDWARE

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, DELIVERY AND INSTALLATION OF:

- A. Hardware for wood and hollow steel doors.
- B. Hardware for fire-rated doors.
- C. Lock cylinders for doors for which hardware is specified in other sections.
- D. Thresholds.
- E. Weatherstripping, seals and door gaskets.

1.02 RELATED REQUIREMENTS

- A. Section 08110 - Steel Doors and Frames.
- B. Section 08410 - Metal-Framed Storefronts: Hardware for same except cylinders; installation of cylinders.

1.03 REFERENCE STANDARDS

- A. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; Door and Hardware Institute; 2004.
- B. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; Door and Hardware Institute; 1993; also in WDHS-1/WDHS-5 Series, 1996.
- C. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2010.
- D. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.

1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Samples: Prior to preparation of hardware schedule:
 - 1. Submit 1 sample of hinge, latchset, and lockset illustrating style, color, and finish.
 - 2. Samples will be returned to supplier.
- C. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- D. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.
- E. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with 5 years of experience.
- B. Hardware Supplier Personnel: Employ a qualified person to assist in the work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.08 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty for door closers and panic hardware.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 DOOR HARDWARE - GENERAL

- A. Provide all hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
- B. Provide all items of a single type of the same model by the same manufacturer.
- C. Provide products that comply with the following:
 - 1. Applicable provisions of federal, state, and local codes.
 - 2. Fire-Rated Doors: NFPA 80.
 - 3. All Hardware on Fire-Rated Doors: Listed and classified by UL as suitable for the purpose specified and indicated.
 - 4. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.

2.03 HINGES

- A. Hinges: (Basis of Design, Used in Schedule)
- B. Hinges: Provide hinges on every swinging door.
 - 1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
 - 2. Provide ball-bearing hinges at all doors having closers.
 - 3. Provide hinges in the quantities indicated.
 - 4. Provide non-removable pins on exterior outswinging doors.
 - 5. Where electrified hardware is mounted in door leaf, provide power transfer hinges.

2.04 LOCKS AND LATCHES

- A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
 - 1. Hardware Sets indicate locking functions required for each door.
 - 2. If no hardware set is indicated for a swinging door provide an office lockset.
 - 3. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.

- 4. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
- B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.
 - 1. Provide cams and/or tailpieces as required for locking devices required.
- C. Keying: Grand master keyed.
- D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.
- D. Mounting heights for hardware from finished floor to center line of hardware item:
 - 1. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."
 - 2. For wood doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."

3.03 FIELD QUALITY CONTROL

- A. Provide an Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.

3.04 ADJUSTING

- A. Adjust work under provisions of Section 01700.
- B. Adjust hardware for smooth operation.

3.05 PROTECTION

- A. Protect finished Work under provisions of Section 01700.
- B. Do not permit adjacent work to damage hardware or finish.

SCHEDULE .

END OF SECTION

PART 1 - GENERAL

- 1.1 WORK INCLUDES: Furnishing and installing all gypsum board shown including finishing.
- 1.2 RELATED SECTIONS:
 - A. Thermal insulation and vapor retarder: Section 07200.
 - B. Painting: Section 09900.
- 1.3 SUBMITTALS: Submit product data and installation instructions for each type of product indicated.
- 1.4 SINGLE SOURCE RESPONSIBILITY: Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.
- 1.5 QUALITY ASSURANCE
 - A. Installer Qualifications: Provide installation by a company specializing in work similar to that required on this project and with not less than 5 years of documented experience.
 - B. Building Code Compliance:
 - 1. Install gypsum board systems including fire resistance construction in accordance with requirements of the International Building Code.
- 1.6 DELIVERY AND STORAGE
 - A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
 - B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.
 - C. Handle gypsum boards to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.
- 1.8 JOB CONDITIONS
 - A. Environmental conditions, general: Establish and maintain environmental conditions for application and finishing gypsum board to comply with ASTM C 840 and with gypsum board manufacturer's recommendations.
 - B. Minimum room temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 deg F. For adhesive attachment and finishing of gypsum board maintain not less than 50 deg. F for 48 hours prior to application and continuously thereafter until drying is complete.
 - C. Ventilate building spaces to remove water not required for drying joint treatment materials. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.

PART 2 - MATERIALS

- 2.1 MANUFACTURERS: Basis of Design: U.S. Gypsum Co.
- 2.2 GYPSUM WALLBOARD: Sheetrock gypsum panels SW, or Fire code core type X where shown. Edges tapered. Thickness: 5/8" unless noted otherwise. Conform to ASTM C-36. Provide water resistant panels at all toilet rooms and kitchen.

2.3 GYPSUM BOARD SHAFTWALL COMPONENTS

- A. Framing: Studs, runners, and accessories formed of coated steel sheet complying with ASTM A 446 or ASTM A 792; with properties conforming to requirements of ASTM C 645. Refer to Section 09100 – Light Gauge Metal Framing.
- B. Liner Panels: Gypsum core-board as required for specific fire-resistant-rated assemblies (shaft wall) indicated; nominally 1 inch thick and 24 inches in width.

2.4 TILE BACKER BOARD: Refer to Section 09300 Tile for tile backer board.

2.5 SCREWS: Conform to ASTM C-1002.

2.6 ACCESSORIES: USG Dur-A-Bead corners, 200-A ("LC") and 200-B ("L") Grounds and Zinc Control Joint 093. Comply with ASTM C-1047. Locate control joints where shown.

2.7 REVEAL MOLDING: Extruded aluminum. Fry Reglet Co. "Reveal Molding" DRM-625-375 (3/8" width). Provide factory made 4-corner intersection pieces.

2.8 TAPE AND COMPOUND: Comply with ASTM C-475.

- A. Taping and pre-filling: chemical hardening setting type.
- B. Topping compound: vinyl based powder-drying type.

PART 3 - EXECUTION

3.1 PREPARATION: Examine substrates to which drywall construction attaches or abuts, preset hollow metal frames, cast-in-anchors, and structural framing, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Gypsum board application and finishing standard: Install and finish gypsum board to comply with ASTM C 840.
- B. Install sound attenuation blankets where indicated, prior to gypsum board unless readily installed after board has been installed.
- C. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.
- D. Install ceiling boards across framing in the manner which minimizes the number of end-butt joints, and which avoids end joints in the central area of each ceiling. Stagger end joints at least 24 inches.
- E. Install wall/partition boards in manner, which minimizes the number of end-butt joints or avoids them entirely where possible. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs.
- F. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16 inch open space between boards. Do not force into place.
- G. Locate either edge or end joints over supports, except in horizontal applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.

- H. Attach gypsum board to steel studs so that leading edge or end of each board is attached to open (unsupported) edge of stud flange first.
- I. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.
- J. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (above ceilings, as shown, etc.). Fit gypsum board around ducts, pipes, and conduits.
- K. Space fasteners in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.
- L. Single-layer application: Install gypsum wallboard as follows:
 - 1. On ceilings apply gypsum board prior to wall/partition board application to the greatest extent possible.
 - 2. On partitions/walls apply gypsum board vertically (parallel to framing), unless otherwise indicated, and provide sheet lengths which will minimize end joints.
 - 3. On partitions/walls 8'-1" or less in height apply gypsum board horizontally (perpendicular to framing); use maximum length sheets possible to minimize end joints.
- M. Single-layer fastening methods: Apply gypsum boards to supports as follows:
 - 1. Fasten with self-drilling screws to steel framing at 12" o.c. maximum. Conform to IBC fastener spacing.
- N. Installation of drywall trim accessories:
 - 1. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.
 - 2. Install corner beads at external corners.
 - 1. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed. Provide type with face flange to receive joint compound.
 - a. Install "LC" bead where drywall construction is tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
 - b. Install "L" bead where edge trim can only be installed after gypsum board is installed.
 - 4. Install control joints and reveal moldings where shown. Provide precise butt joints and intersections.

3.3 INSTALLATION OF TILE BACKER BOARD

- A. Refer to Section 09300 – Tile Work. Install per manufacturer's recommendations.

3.4 INSTALLATION OF SHAFTWALL

- A. General: Comply with manufacturer's printed installation instructions, standard details, and recommendations, except where these are exceeded by requirements of the contract documents.
- B. Metal Perimeter Framing: Accurately position tracks at floor and ceiling, with short leg to finish room side. Attach tracks to structure with appropriate power-driven fasteners, spaced at not more than 24 inches on center. Install metal studs, struts, or vertical tracks as recommended by manufacturer at intersection of shaftwall and structural framing, at corners and T-shaped intersections, and at openings.
- C. Shaft-wall Liner: Cut liner panels accurately to a dimension $\frac{3}{4}$ inch to 1 inch less than wall height. Install sequentially between special metal studs designed to hold liner panels by friction at shaft side of wall.

1. On walls over 16 feet in height, screw-attach studs to track top and bottom.
 2. When maximum panel length available is less than shaft-wall height, position horizontal joint within top third and bottom third of wall, alternating location at adjacent panels.
- D. Door Openings: Comply with manufacturer's details for installation of minimum 20 gage metal struts or studs at head and jambs. Spot grout one-piece metal frames after liner panels have been installed.
1. Support elevator doorframes, accessories, and operating mechanisms independently of gypsum board shaft-wall system.
- E. Boxes and Recessed Accessories: Maintain fire separation at openings by adding protection behind recessed components in accordance with manufacturer's details for tested assemblies.
- F. Structural Support: Provide supplemental blocking, framing, furring, and reinforcement as recommended by manufacturer and as required to properly support elements attached to non-load bearing shaft-wall system.
- G. Perimeter Seal: Seal perimeter of shaft-wall and penetrations through shaft-wall with firestopping (Section 07840) in accordance with requirements of fire-rated assembly (UL) requirements.

3.5 FINISHING OF DRYWALL

- A. General: Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration. Comply with ASTM C 840 and GA-216.
- B. Pre-fill open joints and rounded or beveled edges, if any, using setting-type joint Compound.
- C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.
- D. Finish interior gypsum wallboard by applying the following joint compounds in 3 coats (not including pre-fill of openings in base), and sand between coats and after last coat:
1. Embedding and first coat: Ready-mix setting type taping compound.
 2. Fill (second) coat: Ready-mix setting type compound.
 3. Finish (third) coat: Level 4 finish, as defined by Northwest Wall and Ceiling Bureau: Ready-mix drying type topping compound. Level 3 finish for surfaces receiving FRP panels.
 4. Finish at light orange peel texture: Level 5 finish (skim coat).
- E. Partial finishing: Omit third coat and sanding on concealed drywall construction which is indicated for drywall finishing or which requires finishing only to achieve fire-resistance rating, sound rating or to act as air or smoke barrier.

3.6 CLEAN-UP AND PROTECTION

- A. Remove any texture droppings or overspray from doorframes, windows and other adjoining construction.
- B. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall construction being without damage or deterioration at time of Substantial Completion.

RESILIENT FLOORING

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, DELIVERY AND INSTALLATION OF:

- A. Resilient sheet flooring.
- B. Resilient tile flooring.
- C. Resilient base.
- D. Installation accessories.

1.02 RELATED REQUIREMENTS

- A. Section 03300 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.

1.03 REFERENCE STANDARDS

- A. ASTM E 648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2009a.
- B. ASTM F 710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2008.
- C. ASTM F 1066 - Standard Specification for Vinyl Composition Floor Tile; 2004.
- D. ASTM F 1303 - Standard Specification for Sheet Vinyl Floor Covering with Backing; 2004 (Reapproved 2009).
- E. ASTM F 1861 - Standard Specification for Resilient Wall Base; 2008.
- F. ASTM F 1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing; 2004.
- G. BAAQMD 8-51 - Bay Area Air Quality Management District Regulation 8, Rule 51, Adhesive and Sealant Products; www.baaqmd.gov; 2002.
- H. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; National Fire Protection Association; 2011.
- I. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition; www.aqmd.gov.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

- D. Verification Samples: Submit two samples, ____ x ____ inch in size illustrating color and pattern for each resilient flooring product specified.
- E. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.05 FIELD CONDITIONS

- A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.06 EXTRA MATERIALS

- A. See Section 01600 - Product Requirements, for additional provisions.
- B. Provide ____ sq ft of flooring, ____ lineal feet of base, and 5 percent of installed stair materials of each type and color specified.

PART 2 PRODUCTS

2.01 SHEET FLOORING

- A. Vinyl Sheet Flooring Type ____: Homogeneous without backing, with color and pattern throughout full thickness, and:
 - 1. Minimum Requirements: Comply with ASTM F 1303, Type II, without backing, or ASTM F 1913.
- B. Vinyl Welding Rod: Solid vinyl bead produced by manufacturer of vinyl flooring for heat welding seams, in color matching field color.

2.02 TILE FLOORING

- A. Vinyl Composition Tile: Homogeneous, with color extending throughout thickness, and:
 - 1. Minimum Requirements: Comply with ASTM F 1066, of Class corresponding to type specified.
 - 2. Size: 12 x 12 inch.
 - 3. Pattern: refer to drawings.
 - 4. Manufacturers:
 - a. Basis of Design: Mannington Mills, Inc; Product Design Essentials: www.mannington.com.
 - b. Substitutions: See Section 01600 - Product Requirements.

2.03 RESILIENT BASE

- A. Resilient Base: ASTM F 1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove, and as follows:
 - 1. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648 or NFPA 253.
 - 2. Height: 4 inch.
 - 3. Thickness: 0.125 inch thick.
 - 4. Finish: Satin.
 - 5. Length: Roll.

6. Color: Color as selected from manufacturer's standards.
7. Accessories: Premolded external corners, internal corners, and end stops.

2.04 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seaming Materials: Waterproof; types recommended by flooring manufacturer.
 1. Provide only products having lower volatile organic compound (VOC) content than required by the more stringent of the South Coast Air Quality Management District Rule No.1168 and the Bay Area Air Quality Management District Regulation 8, Rule 51.
- C. Moldings, Transition and Edge Strips: Metal.
- D. Sealer and Wax: Types recommended by flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive resilient flooring.
- C. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- D. Verify that sub-floor surfaces are dust-free and free of substances which would impair bonding of adhesive materials to sub-floor surfaces.
- E. Verify that concrete sub-floor surfaces are dry enough and ready for resilient flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F 710; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- F. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Prepare sub-floor surfaces as recommended by flooring and adhesive manufacturers.
- B. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is cured.
- D. Clean substrate.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of sub-floor conditions.

- B. Install in accordance with manufacturer's instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 SHEET FLOORING

- A. Install in accordance with manufacturer's instructions.
- B. Spread only enough adhesive to permit installation of materials before initial set.
- C. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns carefully at seams.
- E. Double cut sheet at seams.
- F. Lay flooring with tightly butted seams, without any seam sealer.

3.05 TILE FLOORING

- A. Install in accordance with manufacturer's instructions.
- B. Mix tile from container to ensure shade variations are consistent when tile is placed, unless manufacturer's instructions say otherwise.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Set flooring in place, press with heavy roller to attain full adhesion.
- E. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.
- F. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated. After installation of flooring, secure metal strips with stainless steel screws.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.06 RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between

joints.

- B. Install base on solid backing. Bond tightly to wall and floor surfaces.
- C. Scribe and fit to door frames and other interruptions.

3.07 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's instructions.
- C. Clean, seal, and wax resilient flooring products in accordance with manufacturer's instructions.

3.08 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION

CARPET

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, DELIVERY AND INSTALLATION OF:

- A. Carpet, stretched-in, with cushion underlay.
- B. Removal of existing carpet.
- C. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 01732 - Waste Management: Reclamation/Recycling of new carpet scrap.

1.03 PRICE AND PAYMENT PROCEDURES

- A. See Section 01210 - Allowances, for cash allowances affecting this section.

1.04 REFERENCE STANDARDS

- A. CRI (CIS) - Carpet Installation Standard; Carpet and Rug Institute; 2009.
- B. CRI (GLA) - Green Label Testing Program - Approved Adhesive Products; Carpet and Rug Institute; Current Edition.

1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Samples: Submit two samples 18 x 18 inch in size illustrating color and pattern for each carpet and cushion material specified.
- D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.06 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in installing carpet with minimum three years experience.

1.07 FIELD CONDITIONS

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.
- B. Maintain minimum 70 degrees F ambient temperature 24 hours prior to, during and 24 hours after installation.
- C. Ventilate installation area during installation and for 72 hours after installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS - to be determined.

2.02 CARPET

2.03 ACCESSORIES

- A. Sub-Floor Filler: Type recommended by carpet manufacturer.
- B. Tackless Strip: Carpet gripper, of type recommended by carpet manufacturer to suit application, with attachment devices.
- C. Moldings and Edge Strips: Embossed aluminum, _____ color.
- D. Adhesives - General: Compatible with materials being adhered; maximum VOC content of 50 g/L; CRI Green Label certified; in lieu of labeled product, independent test report showing compliance is acceptable.
- E. Seam Adhesive: Recommended by manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive carpet.
- B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesives to sub floor surfaces.
- C. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

- A. Remove existing carpet and carpet cushion.
- B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- D. Clean substrate.

3.03 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install carpet and cushion in accordance with manufacturer's instructions and CRI Carpet Installation Standard.
- C. Verify carpet match before cutting to ensure minimal variation between dye lots.
- D. Lay out carpet and locate seams in accordance with shop drawings:
 - 1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
 - 2. Do not locate seams perpendicular through door openings.
 - 3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
 - 4. Locate change of color or pattern between rooms under door centerline.
 - 5. Provide monolithic color, pattern, and texture match within any one area.

- E. Install carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance.

3.04 STRETCHED-IN CARPET

END OF SECTION

PAINTS AND COATINGS

PART 1 GENERAL

1.01 WORK UNDER THIS SECTION INCLUDES FURNISHING, INSTALLATION AND APPLICATION OF:

- A. Surface preparation.
- B. Field application of paints, stains, varnishes, and other coatings.
- C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
- D. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Floors, unless specifically so indicated.
 - 6. Glass.
 - 7. Concealed pipes, ducts, and conduits.
- E. See Schedule - Surfaces to be Finished, at end of Section.

1.02 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2008.
- C. GreenSeal GS-11 - Paints; 1993.

1.03 DEFINITIONS

- A. Conform to ASTM D 16 for interpretation of terms used in this section.

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on all finishing products, including VOC content.
- C. Samples: Submit two paper chip samples, ____x____ inch in size illustrating range of colors and textures available for each surface finishing product scheduled.
- D. Samples: Submit two painted samples, illustrating selected colors and textures for each color and system selected with specified coats cascaded. Submit on aluminum sheet, ____x____ inch in size.
- E. Certification: By manufacturer that all paints and coatings do not contain any of the prohibited chemicals specified; GreenSeal GS-11 certification is not required but if provided shall constitute acceptable certification.

- F. Manufacturer's Instructions: Indicate special surface preparation procedures.
- G. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.05 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience.

1.06 REGULATORY REQUIREMENTS

- A. Conform to applicable code for flame and smoke rating requirements for products and finishes.

1.07 MOCK-UP

- A. See Section 01400 - Quality Requirements, for general requirements for mock-up.
- B. Provide panel, ____ feet long by ____ feet wide, illustrating special coating color, texture, and finish.
- C. Locate where directed.
- D. Mock-up may remain as part of the work.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.09 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.10 EXTRA MATERIALS

- A. See Section 01600 - Product Requirements, for additional provisions.
- B. Supply 1 gallon of each color; store where directed.

- C. Label each container with color in addition to the manufacturer's label.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
 - 1. Basis of Design: Sherwin-Williams.
 - 2. Parker Paint Mfg Co Inc., a Comex Group company: www.parkerpaint.com.
- C. Substitutions: See Section 01600 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
 - 1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Supply each coating material in quantity required to complete entire project's work from a single production run.
 - 3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Volatile Organic Compound (VOC) Content:
 - 1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.
- E. Seal surfaces that might cause bleed through or staining of topcoat.

- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

3.02 APPLICATION

- A. Apply products in accordance with manufacturer's instructions.
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.03 SCHEDULE - SURFACES TO BE FINISHED

- A. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically noted.
 - 2. Fire rating labels, equipment serial number and capacity labels.
- B. Paint the surfaces described below under Schedule - Paint Systems.
- C. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.
 - 1. Paint all insulated and exposed pipes occurring in finished areas to match background surfaces, unless otherwise indicated.
 - 2. Paint shop-primed items occurring in finished areas.
 - 3. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
 - 4. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.

3.04 SCHEDULE - PAINT SYSTEMS

- A. Wood Doors: WI-TR-VS.
- B. Exterior Pavement Markings:

END OF SECTION

PART 1 - GENERAL

- 1.1 WORK INCLUDES: Furnishing, delivery and installation of all toilet accessories as shown on drawings, and as listed below.
- 1.2 RELATED SECTIONS
 - A. Refer to Section 06100 "Rough Carpentry" for installation of backing.
- 1.3 SUBMITTALS: Submit manufacturer's technical data and installation instructions for approval before ordering.
- 1.4 FABRICATION
 - A. General: Only an unobtrusive stamped logo of manufacturer, as approved by owner, is permitted on exposed face of toilet or bath accessory units. On either interior surface not exposed to view or back surface, provide additional identification by means of either a printed, waterproof label or a stamped nameplate, indicating manufacturer's name and product model number.
 - B. Surface mounted toilet accessories, general: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Provide concealed anchorage wherever possible.

PART 2 - PRODUCTS

- 2.1 Provide toilet and bath accessories as follows:
 - A. Typical Unit bathrooms:
 - a. Paper Holder: Maintenance Warehouse, Model 820450. Provide one at each water closet.
 - b. Mirrors: ¼" plate glass with silver mirrored backing. Provide 5 year warranty on backing. Sizes and locations as shown on drawings.
 - b. Medicine Cabinet: Nutone recessed 268R with polished chrome frame.
 - c. Towel bar: Maintenance Warehouse Model 820 000, lengths as shown on drawings.
 - d. Robe Hook, NuTone hallmack, Hm-682, chrome, install on back of each door.
 - B. Accessible units:
 - a. Paper Holder: Maintenance Warehouse, Model 820450. Provide one at each water closet.
 - b. Medicine Cabinet: Nutone recessed 262RN (30" high).
 - c. Towel bar: Model 820 000, 24" long
 - d. Robe Hook, NuTone hallmack, Hm-682, chrome, install on back of each door.
 - e. Grab Bars: NuTone, Bobrick or equal, one 42" and one 36" at each toilet.

PART 3 - EXECUTION

- 3.1 INSTALLATION
 - A. Provide solid backing locations to Contractor for all items as required.
 - B. Use concealed fastenings wherever possible.
 - C. Provide anchors, bolts, blocking and other necessary anchorage, and attach accessories securely to walls and partitions in locations as shown or directed.

PART 3 – EXECUTION (Cont.)

3.1 INSTALLATION (Continued)

- D. Install concealed mounting devices and fasteners fabricated of the same material as the accessories, or of galvanized steel, as recommended by the manufacturer.
- E. Install exposed mounting devices and fasteners finished to match the accessories.
- F. Provide theft-resistant fasteners for all accessory mountings.
- G. Secure toilet room accessories in accordance with the manufacturer's instructions for each item and each type of substrate construction.

END OF SECTION

RESIDENTIAL EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Kitchen appliances.
- B. Laundry appliances.

1.02 RELATED REQUIREMENTS

- A. Section 15145 - Plumbing Piping: Plumbing connections for appliances.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Copies of Warranties: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 WARRANTY

- A. See Section 01780 - Closeout Submittals, for additional warranty requirements.
- B. Provide five (5) year manufacturer warranty on refrigeration system of refrigerators.

PART 2 PRODUCTS

3.01 KITCHEN APPLIANCES

3.02 PRODUCT SCHEDULE

- A. Refrigerators: GE Energy Star 18.0 Cu. Ft. Top-Freezer
 - 1. Refrigerator Model # GTH18IBXBB (1 point - EPP)
- B. Clothes Washers: ADA compliant stack W/D and Energy Star
 - 1. labeled side-by-side front loading horizontal axis washer to be installed in laundry. (3 points - EPP)
- C.
- D.

PART 3 EXECUTION

4.01 EXAMINATION

- A. Verify utility rough-ins are present and correctly located.

4.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

4.03 CLEANING

- A. Remove packing materials from equipment.

B. Wash and clean equipment.

END OF SECTION

PART 1 - GENERAL

- 1.1 This section includes wood cabinets and shelves, and plastic laminate faced countertops.
- 1.2 Submittals: Submit the following:
 - A. Product data and brochure including color photographs of proposed cabinets.
 - B. Shop drawings for casework showing location and size, accessories, materials, finishes, and filler panels. Include fully dimensioned plans, elevations, and anchorage details to countertop and walls.
 - C. Samples for initial selection purposes of manufacturer's color charts in the form of unit sections showing the full range of colors, textures, and patterns available for each type of material indicated or exposed to view.
 - D. Alternate Products: Any product submitted as an alternate, must meet or exceed the specified product in every category of this Section.
- 1.3 Quality assurance:
 - A. Comply with ANSI\KCMA A161.1 and HUD "Minimum Property Standards", Housing 4910.1, paragraph 611-1.1.
 - B. Comply with American Woodwork Institute (AWI) Custom Grade 400 A.
 - C. Plastic laminate countertops: Comply with ANSI A161.2.
- 1.4 Environmental conditions: Comply with casework manufacturer's written requirements for temperature and humidity conditions during storage and installation. Do not install casework until these conditions have been attained and stabilized.
- 1.5 Field measurements: Verify casework dimensions by field measurements. Verify kitchen casework can be installed in compliance with the original design and referenced standards. Verify countertop size and shape prior to fabrication by field measurements taken after base units are installed.

PART 2 - PRODUCTS

- 2.1 Manufacturer: Huntwood, Deluxe Series, Aristokraft Sta Box (Oakland), or approved equal.
- 2.2 Cabinet materials, general:
 - A. Size, dimensions and thicknesses given are minimum dimensions.
 - B. Hardwood plywood: ANSI\HPMA HP hardwood and decorative plywood, Good Grade (1) or better.
 - C. Solid wood: Clear, dry, sound, and free of defects selected from First Grade lumber as defined by NHLA.
 - D. Hardboard: ANSI A135.4, Class 1, tempered.
 - E. Cabinet Pulls: Owner reserves the right to require U-shaped matt brass pulls, depending on cabinet door design. Submit style and color for Owners approval.
- 2.3 Wood face casework species and style:
 - A. Solid wood and face veneer species: Red Oak with wheat stain.
 - B. Face style: Reveal overlay on face frame, veneered flat panel, with pulls.
- 2.4 Wood face casework fabrication:
 - A. Face frame: 3/4 inch minimum solid wood frame, joints to be screwed and glued.
 - B. Doors: Solid wood stiles and rails, minimum 3/4 inch thick by 2 inches wide, with 1/4

inch thick flat veneered hardwood plywood center panels.

1. Huntwood Estate Door Style, #11 edge profile, or approved equal, oak with honey pecan finish.
 - C. Drawer fronts: Solid wood, minimum 3/4 inch.
 - D. Exposed cabinet ends (sides): 1/2 inch thick hardwood plywood with thermoset decorative panels on interior surfaces. Connect to stile with pressure-glued tongue and plow joint and concealed mechanical fasteners.
 - E. Concealed cabinet ends (sides): 1/2 inch thick plywood with thermoset decorative panels on interior surfaces. Connect to stile with pressure glued tongue and plow joint concealed mechanical fasteners.
 - F. Cabinet tops and bottoms: 1/2 inch thick hardwood plywood, fully supported by and secured in rabbets in end panels, front frame, and back rail. Thermoset decorative panels on inside surfaces.
 - G. Wall-hung unit back panels: 3/16 inch thick plywood with thermoset decorative panels on inside surfaces, dadoed and mechanically fastened to rear edge of ends and to top and bottom rails.
 - H. Base unit back panels: 3/16 inch thick plywood with thermoset decorative panels on interior surfaces, dadoed and mechanically fastened to rear edge of end panels and to top and bottom rails.
 - I. Toe boards: 1/2" inch thick plywood attached between end panels and extended from bottom panel to floor.
 - J. Corner blocks: Solid wood, glued and fastened in each top corner to maintain casework squareness and rigidity.
 - K. Corner posts: 3/4 by 7/8 inch solid wood, attached to vertical corners; fabricated with notches to provide adjustability and retention of interior storage devices.
 - L. Drawers: Fabricated with exposed fronts fastened to subfront with mounting screws from interior of body. Fabricated with subfront and back rabbeted into sides and secured with glue and mechanical fasteners as follows:
 1. Subfronts, sides, and backs: 1/2 inch thick plywood with edge banding and thermoset decorative panels both sides.
 2. Bottoms: Not less than 1/4 inch thick plywood, captured four sides.
 3. Drawer suspension: Provide for a minimum capacity of 50 lb, with twin-track, side-mounted, drawer-glide suspension with nylon rollers. Provide self-closing feature and positive stop.
 4. Provide stop block at back of each drawer, adjusted so as to prevent drawer front from hitting face of frame.
 - M. Shelves: 3/4 inch thick plywood with thermoset decorative panels on top, bottom, and exposed (front) edge, for spans up to 36 inches, and 1" thick for spans up to 48 inches.
- 2.5 Casework hardware: Manufacturer's standard units complying with ANSI A156.9, of type, material, size, and finish as selected from manufacturer's standard choices.
- 2.6 Countertops and Backsplash: 3/4" Industrial Grade Medium Density Particleboard complying with ASTM D 1037. High Density Decorative Laminate overlay; comply with requirements of AWI Quality Standards 400C, Custom Grade. Laminate: (all units) Wilsonart, Formica, Nevamar, as selected by Architect. Allow for two colors, 25 units each color. Provide metal trim edge at plastic laminate applied to walls behind stoves.

PART 3 - EXECUTION

3.1 Installation:

- A. Install casework with no variations in flushness of adjoining surfaces using concealed shims. Where casework abuts other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match casework face.

- B. Install casework without distortion so that doors and drawers fit openings properly and are aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessories as indicated.
- C. Install casework and countertop level and plumb to a tolerance of 1/8 inch in 8 feet.
- D. Fasten unit of casework to adjacent unit and into structural support members of wall construction with #10 sheet metal or wood screws with washer head or washer. Fasten peninsula cabinets to wood blocking attached to floor.
- E. Fasten plastic laminate countertops by screwing through corner blocks in base units into underside of countertop. Spline and glue joints in countertops and provide concealed mechanical clamping of joint.

3.2 Adjusting and Cleaning:

- A. Adjust hardware to center doors and drawers in openings and lubricate to provide unencumbered operation.
- B. Clean casework on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE

- A. This section includes all plumbing fixtures, plumbing fixture brass, stops and traps, and water heaters.
- B. The project is required to meet specific sustainability requirements for water usage. Where fixtures are replaced, new fixtures are required to meet the following targets. Where new fixtures are not installed, Showerhead and aerators are to be installed on all existing fixtures to meet the following conservation targets:

Toilets: 1.6 GPF or less
Showerhead: 1.75 GPM or less.
Kitchen Faucets: 1.5 GPM or less
Bath faucets – 1.0 GPM or less.

PART 2 - PRODUCT

2.1 ACCEPTABLE MANUFACTURERS

- A. American Standard, Sterling, Speakman, Moen, Kohler, Crane, Eljer, Elkay, Delta, or approved equal.

2.2 GENERAL PRODUCTS

- A. Obtain exact location and mounting heights of fixtures from details on the Architectural plans.
- B. Provide stop valve for each water connection for each fixture including sinks, except where integral stops are provided with product.
- C. Furnish all necessary, trim or rough, for the completion of the job, and of the same quality as elsewhere specified.
- D. Provide white fixtures.
- E. Trim chrome plated.
- F. Provide escutcheon plates for pipes through walls and floors.
- G. Provide stainless steel self-rim for all countertop sinks except self-rimming.
- H. Install wall carrier fittings where required for wall mounted fixtures. Provide carrier or hanger clips furnished as standard for the particular fixture.
- I. Install trim and connect to equipment furnished by others.
- J. Provide 17 gauge tubing chrome-plated P-traps.

- K. Install trap primers on all floor drains. Primer and piping to be concealed in ceiling or crawl space.
- L. At the time of final clean-up, remove the labels and thoroughly clean each plumbing fixture and each piece of equipment provided by this contract, so as to leave in condition for use.

2.3 PLUMBING FIXTURES

New Shower heads: Speakman S-2253-E175 Low Flow Shower Head 1.75 GPM

New Kitchen Faucets (if required): Delta "Leland" Single Handle Wter Efficient Pull-Down Kitchen Faucet: Model 978-SSWE-DST

Tub/Shower Faucet & Mixing Vaves (if required): Model Delta, #1305WSHDS, chrome, single control with adjustable temperature limit stop (anti-scald feature) and 1/4 turn stops.

Bath Lav Faucet (if required): Model Delta, 15710-DST, chrome, center-set, single lever.

Toilet: Model Western Pottery, #822, or Sterling #404515-0, 1.5 gallon per flush, vitreous china, white.

END OF SECTION 15400

PART 1 - GENERAL

- 1.1 SCOPE OF WORK: Provide all labor, equipment and materials to complete all Electrical Work as generally included under the following headings or identified in the drawings. Refer to scope of work matrix contained in drawings to determine scope of each item.
- A. Replace hot water tanks in all apartment units and laundry room.
 - B. Replace and/or install new electric convection heating units.
 - C. Replace existing interior light fixtures with new Energy Star Compliant Light fixtures.
 - D. Replace existing exterior "porch" lights and pole mounted walkway lights.
 - E. Install new kitchen range hood/exhaust fans.
 - F. Install new "whole house" bath fans.
 - G. Replace all smoke detectors in apartment units. Install new ADA-compliant horn-strobe alarms in two ADA units, new office addition and existing laundry.
 - H. Install outlets, telecom/data and overhead lighting fixture in new office addition.
- 1.2 ELECTRICAL SYSTEM DESIGN (BIDDER DESIGN): Electrical subcontractor shall provide engineering design for complete electrical system. Electrical subcontractor shall be responsible for the proper operation and function of the electrical system and for obtaining all permits. Provide 5 sets of Shop Drawings to Architect for review prior to installation.
- 1.3 SUBMITTALS: Contractor shall prepare three copies of a complete submittal package including all fixtures and accessories proposed for use in the project.
- 1.4 CORRELATION: Correlate Work so there is no interference between light outlets, fixtures, piping or sheet metal work. Coordinate with Mechanical subcontractor.
- 1.5 CODES, PERMITS & INSPECTIONS
- A. Install Work in accordance with State of Washington Code, Rules for Electrical Construction and local ordinances. Inspections required during construction arranged for by Contractor.
 - B. On completion of Work, furnish satisfactory evidence to show all Work installed in accordance with codes.
- 1.6 CUTTING AND PATCHING: Notify General Contractor of cutting and patching required to be performed for Electrical Work. All cutting done carefully to prevent damage to work of other trades, and all patching done carefully by mechanics skilled in trade affected, subject to approval by Architect.
- 1.7 RUBBISH: Promptly remove waste material and rubbish caused by electrical workmen. At completion of Work, clean all fixtures and other equipment.
- 1.8 EXISTING CONDITIONS: Before submitting bid examine existing conditions to determine effect on execution of Electrical Work and include costs in bid due to existing conditions.

PART TWO – ELECTRICAL SYSTEM CRITERIA

- 2.1 DESIGN CRITERIA: The following criteria shall be used as a guide for the design of the Electrical System. The standards shall be the minimum acceptable, however, code requirements shall govern.
- A. Electrical system to consist of interior and exterior lighting, and other items as defined in section 1.1, or shown on the drawings.
 - 1. Receptacles 120V duplex. Specification grade, smooth face, ivory color.
 - 2. Switches: Specification grade, quiet type, smooth face, ivory color.
 - 3. Telephone outlets: Specification grade, smooth face, ivory color.
 - B. Lighting:
 - 1. Emergency and exit lighting as required by code.
 - 2. Interior lighting: See Electrical Fixture Schedule.
 - 3. Exterior lighting: See Electrical Fixture Schedule.
 - C. Smoke Detection and fire alarm:
 - 1. Smoke detectors as required by Code.
 - 2. Provide ADA-compliant horn-strobe alarms in ADA units. (2)
 - 3. Connection to Electrical System.
 - D. Whole-house ventilation fans
 - 1. Provide and install fans in bathroom which comply with Washington State Energy Code and VIAQ.
 - a. System shall be capable of continuous low-level operation, with switch and timer to boost operation manually as well as automatically on a predefined daily schedule.

END OF SECTION

PART 1 - GENERAL

- 1.1 Work Included: Provide electric resistance heating units as specified herein and as shown on the drawings.
- 1.2 Related work: See Division 16, General requirements.
- 1.3 Submittals and Shop Drawings: Furnish manufacturer's product information for each unit to be installed. Provide layout drawings showing proposed heater location in each room and unit. Provide engineering calculations, signed and sealed by qualified professional engineer or Certified Energy Code Plans Reviewer if required to show conformance with Washington State Energy Code.
- 1.4 Coordination: Coordinate with other trades as required to avoid conflict of location with other devices and for prompt delivery of all materials needed for installation.

PART 2 - PRODUCTS

- 2.1 General: The allegro product has been selected by the Owner for reasons of standardization with other products.
- 2.2 Basis of Design: Convectair NMT Inc. or approved equal.
- 2.3 Thermostats: As included with product, or required for complete installation.
- 2.4 Model: Allegro, Size: as indicated on drawings.

PART 3 – INSTALLATION

- 3.1 Install per all applicable codes and per manufacturer's instructions and recommendations.

END OF SECTION