

A Restroom Remodel Project at

**Elmira High School**  
**Fern Ridge School District**  
24936 Fir Grove Lane

Elmira, Oregon

BY

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February, 2024  
Bid Set

A Restroom Remodel Project at

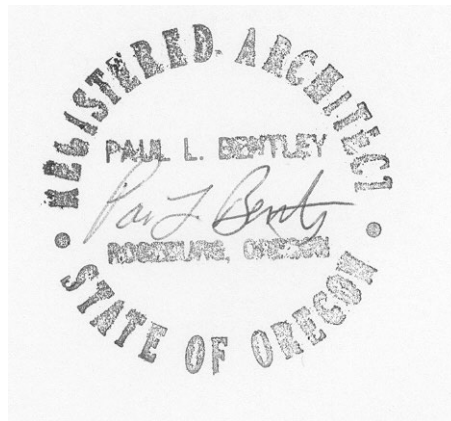
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# Sample OWNER CONTRACT

## DIVISION 0 \* SECTION 00 52 00

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### FERN RIDGE SCHOOL DISTRICT SMALL CONSTRUCTION PROJECTS CONTRACT

This Contract is between FERN RIDGE SCHOOL DISTRICT, ELMIRA, OREGON ("District") and ("Contractor").  
Project:

The parties agree as follows:

**Date of Commencement and Substantial Completion.** The date of commencement of the Work shall be 6-14-23 or the date on which each party has signed this Contract, whichever is later. The Contract Time shall be measured from the date of commencement. Contractor shall achieve Substantial Completion of the entire Work no later than 9-4-23, with final completion no later than 10-31-23.

**Contractor's Agreement to Perform Work.** Contractor agrees to perform the Work described in **Exhibit 2**.

**Statement of Work.** Contractor shall perform the Work described in **Exhibit 2**.

**Payment for Work.** District agrees to pay Contractor in accordance with **Exhibit 2** and this Contract.

**Contract Documents.** The Contract Documents consist of the following documents, which are listed in descending order of precedence: this Contract; exhibits to this Contract, including **Exhibit 1** (District's Solicitation Document and attachments); **Exhibit 2** (Statement of Work, Compensation, Payment and Renewal Terms); **Exhibit 3** (Certification Statement for Corporation or Independent Contractor); **Exhibit 4** (Insurance Requirements); Additional Exhibits:

A conflict in the Contract Documents shall be resolved in the priority listed above with this Contract taking precedence over all other documents. The Contract Documents are the entire Contract between the parties and shall supersede any prior representation, written or oral.

#### STANDARD TERMS AND CONDITIONS

- 1. Time is of the Essence.** Time is of the essence in the performance of this Contract.
- 2. Subcontracts.** District reserves the right to reject in writing any proposed subcontractor, without cause, in which case Contractor shall promptly propose a substitute subcontractor. Any difference in price arising out of such substitution shall be reflected in a Change Order. In addition to any other provisions District may require, Contractor shall require of any permitted subcontractor under this Contract that subcontractor be bound by all the same terms and conditions of this Contract. Such subcontracts are solely between Contractor and subcontractor and shall not have any binding effect on District.
- 3. Assignment.** This Contract is not assignable by Contractor, either whole or in part, unless Contractor has obtained the prior written consent of District.
- 4. Other Contractors.** District may undertake or award other contracts for additional or related work, and Contractor shall fully cooperate with such other contractors and with any District employees concerned with such additional or related work, and shall coordinate its performance under this Contract with such additional or related work. Contractor shall not commit or permit any act that will interfere with the performance of work by any other contractor or by District employees.
- 5. Independent Contractor Status.** Contractor shall certify status in accordance with Exhibit 3.
- 6. No Third-Party Beneficiaries.** District and Contractor are the only parties to this Contract and are the only parties entitled to enforce its terms. Nothing in this Contract gives or provides any benefit or right, whether directly, indirectly, or otherwise, to third persons unless such third persons are individually identified by name in this Contract and expressly described as intended beneficiaries of this Contract.
- 7. Successors in Interest.** The provisions of this Contract shall be binding upon and inure to the benefit of the parties and their successors and approved assigns, if any.
- 8. Nonperformance.** In the event of nonperformance under this Contract, District, after seven (7) days' written notice, shall have the right to obtain from other sources such services as may be required to accomplish the Work not performed, and it is agreed that the difference in cost, if any, for said Work or goods shall be borne by Contractor. For purposes of this Section, nonperformance shall be defined as failure to appear and perform Work as specified and scheduled.
- 9. Early Termination.** This Contract may be terminated as follows:

- a. **Termination by Mutual Agreement:** District and Contractor, by mutual written agreement, may terminate this Contract at any time.
  - b. **Termination for Convenience:** District in its sole discretion may terminate this Contract for any reason on 30 days' written notice to Contractor.
  - c. **Termination for Breach:** Either District or Contractor may terminate this Contract in the event of a breach of the Contract by the other. Prior to such termination, the party seeking termination shall give to the other party written notice of the breach and intent to terminate. If the party committing the breach has not entirely cured the breach within 15 days of the date of the notice, then the party giving the notice may terminate the Contract at any time thereafter by giving a written notice of termination.
  - d. **Termination for Failure to Maintain Qualifications:** Notwithstanding Section 9(c), District may terminate this Contract immediately by written notice to Contractor upon denial, suspension, revocation, or non-renewal of any license, permit, or certificate that Contractor must hold to provide services under this Contract.
  - e. **Payment on Early Termination:** Upon termination pursuant to Section 9, payment shall be made as follows:
    - i. If terminated under 9(a) or 9(b) for the convenience of District, District shall pay Contractor for Work performed prior to the termination date if such Work was performed in accordance with the Contract. District shall not be liable for direct, indirect, or consequential damages. Termination shall not result in a waiver of any other claim that District may have against Contractor.
    - ii. If terminated under 9(c) by Contractor due to a breach by District, then District shall pay Contractor for Work performed prior to the termination date if such Work was performed in accordance with the Contract.
    - iii. If terminated under 9(c) or 9(d) by District due to a breach by Contractor, then District shall pay Contractor for Work performed prior to the termination date, provided such Work was performed in accordance with the Contract, less any setoff to which District is entitled.
- 10. Payment of Invoices.** Unless otherwise provided in Exhibit 2, the payment period shall be one calendar month. Payments are due and payable thirty (30) days from receipt of Contractor's complete invoice or fifteen (15) days after payment is approved by District, whichever is earlier. District may withhold 5% of each payment as retainage pursuant to ORS 279C.570. Retainage will be paid within 30 days of final completion per Architects or Owners representative approval and acceptance by District.
- 11. Changes in the Work.** District reserves the right to adjust the scope of the Work by written Change Order. No Change Order will be effective unless approved in writing by District and signed by Contractor. Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including but not limited to all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum and the construction schedule.
- 12. Inspection and Acceptance of Work.** District shall inspect Contractor's Work and advise Contractor of any deficiencies, or if there are none, that the Work has been accepted. Contractor shall perform all additional Work necessary to correct any deficiencies without undue delay and without additional cost to District.
- 13. Right to Withhold Payments.** District shall have the right to withhold from payments due Contractor such sums as necessary, in District's sole opinion, to protect District against any loss, damage, or claim that may result from Contractor's performance or failure to perform under this Contract or the failure of Contractor to make proper payment to any suppliers or subcontractors. If a liquidated damages provision is contained in the Scope of Work and if Contractor has violated that provision, District shall have the right to withhold from payments due Contractor such sums as are required to satisfy District's claims under that provision.
- 14. Knowledge of Site Conditions.** Contractor shall, as a condition precedent to commencement of the Work (a) become familiar with the Project site and review all analyses, studies, and test data available to Contractor concerning the conditions of the Project site, (b) inspect the location of the Work and satisfy itself as to the condition thereof, including all structural, surface, and observed subsurface conditions, and (c) determine (i) that the Contract Sum is just and reasonable compensation for all the Work, including all foreseen and foreseeable construction risks, hazards, and difficulties in connection therewith, (ii) that the Contract Time is adequate for the performance of the Work, and (iii) that the Work shall not result in any lateral or vertical movement of any adjacent structure. Contractor will notify District in writing in advance of commencement of the Work if it determines that it cannot satisfy these conditions.
- 15. Special Care.** Contractor shall exercise special care in executing subsurface work in proximity of known subsurface utilities, improvements, and easements.
- 16. District's Right to Stop the Work.**
  - a. If Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents or fails to carry out Work in accordance with the Contract Documents, District may issue a written order to Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated.
  - b. If suspension of the Work is warranted by reason of unforeseen conditions that may adversely affect the quality of the Work if such Work were continued, District may suspend the Work by giving written notice to Contractor. In such event, the Contract Time shall be adjusted accordingly, and the Contract Sum shall be adjusted to the extent, if any, that additional costs are incurred by reason of such suspension.
  - c. Notwithstanding any other provision, District's authorized representative may, in his or her complete discretion, stop all of the Work, or any portion of the Work, if the Work creates a safety hazard or if a life/safety threat exists to the facility or its occupants. Any cost to correct deficiencies in Contractor's Work will be borne solely by Contractor.
- 17. Performance of the Work.** Contractor shall supervise, coordinate, and perform the Work in accordance with the Contract Documents in a professional, safe, and workmanlike manner and in accordance with all laws, codes, and professional standards applicable to the industries and trades involved, including without limitation compliance with all applicable federal, state, and local building codes, District's construction and life safety policies and procedures, certification requirements applicable to the Work, and other policies or standards incorporated or referenced in the Contract Documents. Unless otherwise noted or directed, Contractor will perform all Work in accordance with product manufacturers' recommendations or directions for best results. No preparatory step or installation procedure may be omitted unless specifically authorized by the Contract Documents or at the direction of Architect or District's Representative. Conflicts between manufacturers' directions shall be resolved by Architect.
- 18. Remedies.** In the event of breach of this Contract, the parties shall have the following remedies:
  - a. If terminated under 9(c) by District due to a breach by Contractor, District may complete the Work either itself, by agreement with another Contractor, or by a combination thereof. If the cost of completing the Work exceeds the remaining unpaid balance of the total compensation provided under this Contract, then Contractor shall pay to District the amount of the reasonable excess.
  - b. In addition to the remedies in sections 9 and 13 for a breach by Contractor, District also shall be entitled to any other equitable and legal remedies that are available.
  - c. If District breaches this Contract, Contractor's remedy shall be limited to termination of the Contract and receipt of Contract payments for which Contractor has completed the Work.
- 19. Claims.**
  - a. **Time Limits on Claims:** Claims by either party must be made within 10 days after occurrence of the event giving rise to such Claim or within 10 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims must be made in writing to Architect and the other party, and must identify the known bases for each Claim and the nature and amount of the relief sought. Failure to timely file a written claim constitutes a waiver of the claim.
  - b. **Continuing Contract Performance:** Pending final resolution of a Claim except as otherwise agreed in writing, Contractor shall

proceed diligently with performance of the Contract and District shall continue to make payments in accordance with the Contract Documents.

- c. **Claims for Additional Costs:** If Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property. In an emergency affecting the safety of persons or property, Contractor shall act to prevent threatened damage, injury, or loss and shall immediately notify District.
- d. **Claims for Additional Time:** If Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

**20. Compliance With Applicable Law.** Contractor shall comply with all federal, state, and local laws applicable to the Work under this Contract, and all regulations and administrative rules established pursuant to those laws, including without limitation the following:

- a. **ORS 279A.110:** Contractor certifies that Contractor has not discriminated and will not discriminate against a subcontractor in the awarding of a subcontract because the subcontractor is a minority, women, or emerging small business enterprise certified under ORS 200.055.
- a. **ORS 279C.380:** Unless exempted by District in writing pursuant to District's Public Contracting Rules, prior to starting Work under this Contract, Contractor shall execute and deliver to District a good and sufficient performance bond, in a form acceptable to District, in a sum equal to 100% of the Contract Price for the faithful performance of the Contract, and shall execute and deliver to District a good and sufficient payment bond, in a form acceptable to District, in a sum equal to 100% of the Contract Price solely for the protection of claimants under ORS 279C.600.
- b. **ORS 279C.505:** Contractor shall make payment promptly, as due, to all persons supplying to such Contractor labor or material for the prosecution of the Work provided for in such Contract; pay all contributions or amounts due the Industrial Accident Fund from such Contractor or subcontractor incurred in the performance of the Contract; not permit any lien or claim to be filed or prosecuted against the state, county, school, municipality, municipal corporation or subdivision thereof, on account of any labor or material furnished; and pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167. Contractor shall further demonstrate that an employee drug-testing program is in place.
- c. **ORS 279C.510:** If this Contract includes demolition work, Contractor shall salvage or recycle construction and demolition debris, if feasible and cost-effective. If this Contract includes lawn or landscape maintenance, Contractor shall compost or mulch yard waste material at an approved site, if feasible and cost-effective.
- d. **ORS 279C.515:** If Contractor fails, neglects, or refuses to make prompt payment of any claim for labor or services furnished to Contractor or a subcontractor by any person in connection with this Contract as such claim becomes due, District may pay such claim to the person furnishing the labor or services and charge the amount of the payment against funds due or to become due Contractor by reason of this Contract. The payment of a claim in the manner authorized in this Section shall not relieve Contractor or Contractor's surety from any obligation with respect to any unpaid claims.

Unless the payment is subject to a good-faith dispute as defined in ORS 279C.580, if Contractor or any first-tier subcontractor fails to pay any claim for materials or labor furnished under this Contract within 30 days after being paid by District, interest shall be due on such claim as specified in ORS 279C.515(2) at the end of the 10-day period that payment is due under ORS 279C.580(4). A person with any such unpaid claim may file a complaint with the Construction Contractor's Board unless the complaint is subject to a good-faith dispute as defined in ORS 279C.580.

- e. **ORS 279C.520:** Contractor shall not employ any person for more than 10 hours in any one day, or 40 hours in any one week, except in cases of necessity, emergency, or where the public

policy absolutely requires it, and in such cases, except in cases of contracts for personal services as defined in ORS 279A.055, the laborer shall be paid at least time and a half pay:

- i. For all overtime in excess of eight hours a day or 40 hours in any one week when the work week is five consecutive days, Monday through Friday; and
- ii. For all overtime in excess of 10 hours a day or 40 hours in any one week when the work week is four consecutive days, Monday through Friday; and
- iii. For work performed on Saturday and on any legal holiday specified in any applicable collective bargaining agreement or ORS 279C.540.

The requirement to pay at least time and a half for all overtime worked in excess of 40 hours in any one week shall not apply to individuals who are excluded under ORS 653.010 to 653.261 or under 29 U.S.C. Section 201 to 209 from receiving overtime.

Contractor shall and shall require its subcontractors to give notice to their employees who work under this Contract in writing, either at the time of hire or before commencement of Work on the Contract, or by posting a notice in a location frequented by employees, of the number of hours per day and days per week that the employees may be required to work.

- f. **ORS 279C.525:** State law requires that solicitation documents for a public improvement contract make specific reference to federal, state, and local agencies that have enacted ordinances, rules, or regulations dealing with the prevention of environmental pollution or the preservation of natural resources that may affect the performance of this Contract. These agencies include, but are not limited to:
  - i. Federal Agencies: Department of Agriculture, Forest Service, Soil and Water Conservation Service, Coast Guard, Department of Defense, Army Corps of Engineers, Department of Emergency, Federal Energy Regulatory Commission, Environmental Protection Agency, Department of Health and Human Services, Department of Housing and Urban Development, Solar Energy and Energy Conservation Bank, Department of Interior, Bureau of Land Management, Bureau of Indian Affairs, Bureau of Mines, Bureau of Reclamation, Geological Survey, Minerals Management Service, U.S. Fish and Wildlife Service, Department of Labor, Mine Safety and Health Administration, Occupation Safety and Health Administration, Department of Transportation, Federal Highway Administration, Water Resources Council.
  - ii. State Agencies: Department of Administrative Services, Department of Agriculture, Soil and Water Conservation Commission, Columbia River Gorge Commission, Department of Energy, Department of Environmental Quality, Department of Fish and Wildlife, Department of Forestry, Department of Geology and Mineral Industries, Department of Human Resources, Department of Consumer and Business Services, Land Conservation and Development Commission, Department of Parks and Recreation, Division of State Lands, Department of Water Resources.
  - iii. Local Agencies: City councils, county courts, county boards of commissioners, metropolitan service district councils, design commissions, historic preservation commissions, planning commissions, development review commissions, special district boards of directors, and other special districts and special governmental agencies such as Tri-Met, urban renewal agencies, and port districts.
  - iv. Tribal Governments.

- g. **ORS 279C.530:** Contractor shall promptly, as due, make payments to any person, copartnership, association, or corporation furnishing medical, surgical, and hospital care or other needed care and attention, incident to sickness or injury, to the employees of such Contractor, of all sums that Contractor agrees to pay for such services and all moneys and sums that Contractor collected or deducted from the wages of employees pursuant to any law, contract, or agreement for the purpose of providing or paying for such service.

To the extent any of Contractor's employees are covered by the Oregon employment laws, Contractor, its subcontractors, if any, and all employers working under this Contract are subject employers under the Oregon Workers' Compensation Law and shall comply with ORS 656.017, which requires them to provide



- workers' compensation coverage for all their subject workers. See Contractor Exemption Certification – Exhibit 4 if you believe you may be exempt from this requirement.
- h. **ORS 279C.545:** Workers employed by Contractor shall be foreclosed from the right to collect for any overtime under this Contract unless a claim for payment is filed with Contractor within 90 days from the completion of the Contract, providing Contractor has:
- Caused a circular clearly printed in blackface pica type and containing a copy of this section to be posted in a prominent place alongside the door of the timekeeper's office or in a similar place that is readily available and freely visible to any or all workers employed on the work, and
  - Maintained such circular continuously posted from the inception to the completion of the Contract on which workers are or have been employed.
- i. **ORS 279C.580(3):** Contractor shall include in each subcontract for property or services with a first-tier subcontractor a clause that obligates Contractor to pay the first-tier subcontractor for satisfactory performance under its subcontract within 10 days out of such amounts as are paid to Contractor by District. Contractor shall also include in each subcontract a clause that states that if Contractor fails to pay any claim for materials or labor furnished under this Contract within 30 days after being paid by District, interest shall be due on such claim as specified in ORS 279C.515(2) at the end of the 10-day period that payment is due under ORS 279C.580(3). Contractor shall require each first-tier subcontractor to include a payment clause and interest clause conforming to the requirements of ORS 279C.580 in each of its subcontracts, and to require each of its subcontractors to include a similar clause in each contract with a lower-tiered subcontractor or supplier.
- j. **ORS 279C.800 to 279C.870:**
- This Contract is subject to payment of prevailing wages under ORS 279C.800 to 279C.870. If this Contract is subject to payment of prevailing wages, Contractor and any subcontractors shall pay not less than prevailing wages to each worker in each trade or occupation employed in the performance of the Contract, as determined by the Director of the State of Oregon Bureau of Labor and Industries ("BOLI"). The latest prevailing wage rates for public works contracts in Oregon are contained in the following publications: The **JANUARY 5, 2023** Prevailing Wage Rates for Public Works Projects in Oregon, the **APRIL 5, 2023** PWR Apprenticeship Rates. Such publications can be reviewed electronically at [http://www.boli.state.or.us/BOLI/WHDPWR/pwr\\_state.shtml](http://www.boli.state.or.us/BOLI/WHDPWR/pwr_state.shtml) and are hereby incorporated as part of the Contract Documents.
  - This Contract is not subject to payment of prevailing wages under the federal Davis-Bacon Act (40 U.S.C. 3141 et seq.). Notwithstanding subsection k(i) of this Section, if this Contract is subject to payment of prevailing wages under the Davis-Bacon Act, Contractor and any subcontractors must pay the higher of the federal prevailing wage rate or the state prevailing wage, as determined by the Director of BOLI. The "applicable prevailing wage rates" are those rates as set forth in the **JANUARY 5, 2023** Bureau of Labor and Industries Publications "Prevailing Wage Rates for Public Works Contracts subject to BOTH the State PWR and Federal Davis Bacon Act," and the **APRIL 5, 2023** any published "Amendments/Corrections to the Prevailing Wage Rates for Public Works Contracts Subject to BOTH the State PWR and Federal Davis Bacon Act" as of the date of this Contract. Such publications can be reviewed electronically at [http://www.boli.state.or.us/BOLI/WHDPWR/pwr\\_db2.shtml](http://www.boli.state.or.us/BOLI/WHDPWR/pwr_db2.shtml) and are hereby incorporated as part of the Contract Documents.
  - District shall pay a fee to the Commissioner of the Oregon Bureau of Labor and Industries as provided in ORS 279C.825. The fee shall be paid to the Commissioner under the administrative rule of the Commissioner.
  - Contractor and any subcontractors shall post the prevailing wage rates in a conspicuous and accessible place in or about the Project.
- k. **ORS 279C.836:** If this Contract is subject to payment of prevailing wages under ORS 279C.800 to 279C.870, Contractor shall:
- File a public works bond with the Construction Contractors Board pursuant to ORS 279C.836 before starting Work on the Project, unless exempt under ORS 279C.836(2), (7), or (8).
  - Include in every subcontract a provision requiring the subcontractor to file a public works bond with the Construction Contractors Board pursuant to ORS 279C.836 before starting work on the project, unless exempt under ORS 279C.836(2), (7), or (8).
- l. **ORS 279C.845:** If this Contract is subject to payment of prevailing wages under ORS 279C.800 to 279C.870:
- Contractor or Contractor's surety and every subcontractor or subcontractor's surety shall file with District a certified statement on a form provided by BOLI certifying the hourly rate of wage paid each worker employed by Contractor or subcontractor on the Work and that no such worker has been paid less than the prevailing rate of wage or wage specified under the Contract.
  - Notwithstanding ORS 279C.555 or 279C.570(7), District shall retain 25% of all amounts earned by Contractor until Contractor has filed the certified statements as required by ORS 279C.845. In addition, Contractor shall retain 25% of any amount earned by a first-tier subcontractor until such subcontractor has filed the certified statements with District. District and/or Contractor shall pay any such retained amounts within 14 days after such certified statements are filed.
- m. **ORS 671.560, 701.055:** If Contractor is performing work as a landscape contractor as defined in ORS 671.520(2), Contractor must have a current, valid landscape contractor's license issued under ORS 671.560. If Contractor is performing work as a construction contractor as defined in ORS 701.005(2), Contractor must have a current, valid construction contractor's license issued under ORS 701.701.055. Contractor shall maintain in effect all licenses, permits, and certifications required for the performance of the Work. Contractor shall notify District immediately if any license, permit, or certification required for performance of this Contract shall cease to be in effect for any reason.
- n. **ORS 468A.710:** If this Contract requires asbestos abatement, Contractor or subcontractor must possess an asbestos abatement license as required by ORS 468A.700 et seq.
- 21. When Work Is Performed on District Property (Including Schools) Contractor Shall Comply With the Following:**
- Identification** Contractor performing work on District Property or for District shall carry photo identification and will present such, to anyone on request. Contractors that do not have specific uniforms for employees, shall provide identification tags as described above, and or any other mechanism, the District in its sole discretion determines is required to easily identify Contractors.
  - Sign-in Required.** As required by schools and other District locations, each day of work Contractor's employees shall sign into the Main Office to receive an in-school identification/visitors tag to be displayed on the person at all times they are in the school or other location.
  - No Smoking.** Smoking or other use of tobacco is prohibited on the District property..
  - No Weapons or Firearms.** Except as provided by Oregon Statutes and District policy, weapons and firearms are prohibited on District property.
- 22. When Work Is Performed in or on School Sites, Contractor Shall Comply With the Following:**
- No Unsupervised Contact with Students.** Unsupervised contact with students means contact with students that provide the person opportunity and probability for personal communication or touch when not under direct supervision. Contractor will ensure that Contractor, any subcontractors, and their officers, agents and employees will have no direct unsupervised contact with students while on District property. Contractor will work with the District to ensure compliance with this requirement. If Contractor is unable to ensure through a security plan that none of its officers, agents or employees will have direct, unsupervised, contact with students in a particular circumstance

or circumstances, Contractor shall so notify the District prior to beginning any Work that could result in such contact. Contractor authorizes District to obtain information about Contractor and Contractor's history and to conduct a criminal background check, including fingerprinting, of any officer, agent or employee of Contractor that will have unsupervised contact with students. Contractor also agrees to cause Contractor's employees and/or subcontractors, if any, to authorize District to conduct such background checks. Contractor shall pay all fees assessed by Oregon Department of Education for processing the background check. District may deduct the cost of such fees from a progress or final payment to the Contractor under this contract, unless the Contractor elects to pay such fees directly.

- b. **Confidentiality.** The Parties recognize that the Federal Education Privacy Rights Act (FERPA) imposes strict penalties for improper disclosure or re-disclosure of confidential student information including but not limited to denial of access to personally identifiable information from education records for at least five years (34 CFR 99.33(e)). Therefore, consistent with the requirements of FERPA, personally identifiable information obtained by the Contractor in the performance of this contract: may not be re-disclosed to third parties without written consent of the students' parents/guardians; and must be used only for the purposes identified in this contract.

**23. Quality of Goods and Services.** Unless otherwise specified, all materials shall be new and both workmanship and materials shall be of the highest quality. All workers and subcontractors shall be skilled in their trade.

**24. Errors.** Contractor shall perform such additional work as may be necessary to correct errors in the Work required under this Contract without undue delays and without additional cost.

**25. Access to Records.** Contractor agrees that District and its authorized representatives shall have access to the books, documents, papers, and records of Contractor that are directly pertinent to the specific Contract for the purpose of making audit, examination, excerpts, and transcripts.

**26. Maintenance of Records.** Contractor shall maintain all fiscal records directly relating to this Contract in accordance with generally accepted accounting principles. In addition, Contractor shall maintain any other records pertinent to this Contract in such a manner as to clearly document Contractor's performance. Contractor acknowledges and agrees that District's duly authorized representatives shall have access to such fiscal records and other books, documents, papers, plans, and writings of Contractor that are pertinent to this Contract to perform examinations and audits and make excerpts and transcripts. Contractor shall retain and keep accessible all such fiscal records, books, documents, papers, plans, and writings for a minimum of three (3) years, or such longer period as may be required by applicable law, following final payment and termination of this Contract or until the conclusion of any audit, controversy, or litigation arising out of or related to this Contract, whichever date is later.

**27. Ownership of Work.** All work products created by Contractor as part of Contractor's performance of this Contract, including background data, documentation, and staff work that are preliminary to final reports, shall be the exclusive property of District. If any such work products contain intellectual property of Contractor that is or could be protected by federal copyright, patent, or trademark laws, Contractor hereby grants District a perpetual, royalty-free, fully paid-up, non-exclusive, and irrevocable license to copy, reproduce, deliver, publish, perform, dispose of, use, re-use, in whole or in part, and to authorize others to do so, all such work products. District shall have no rights in any pre-existing work product of Contractor provided to District by Contractor in the performance of this Contract except to copy, use, and re-use any such work product for District use only. If this Contract is terminated by either party or by default, District, in addition to any other rights provided by this Contract, may require Contractor to transfer and deliver such partially completed work products, reports, or other documentation that Contractor has specifically developed or specifically acquired for the performance of this Contract.

**28. Warranty.**

- a. Contractor warrants to District and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract

Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by Architect or District, Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

- b. Contractor guarantees all work against defects in material or workmanship for a period of one (1) year from the date of acceptance or final payment from District, whichever is later.
- c. If, after 10 days' notice, Contractor fails to proceed to cure any breach of this warranty, District may have the defects corrected and Contractor and its surety shall be liable for all expenses incurred. In case of an emergency where, in the opinion of District or Architect, delay would cause serious loss or damage, corrective work may be undertaken without advance notice to Contractor, but Contractor and its surety shall remain liable for all expenses incurred. The remedies stated in this subsection are not exclusive, but are cumulative of any other remedies District may have.
- d. Contractor shall assign all manufacturers' warranties to District and all guarantees and warranties of goods supplied under this Contract shall be deemed to run to the benefit of District. Contractor shall provide District with all manufacturers' warranty documentation and operations and maintenance manuals not later than the date of final acceptance of the Work by District.

**29. Employees of Contractor.** At the direction of District, Contractor will immediately remove any employee of Contractor from all District premises where District determines, in its sole discretion, that removal of such employee would be in the best interests of District.

**30. Security.** Any disclosure or removal of any matter and/or property, not in conjunction with the specifications, on the part of Contractor or Contractor's employees shall be cause for immediate cancellation of the Contract. Any liability, including but not limited to attorney fees, resulting from any action or suit brought against District as a result of Contractor's or Contractor's employees' willful or negligent release of information, documents, or property contained in or on District property shall be borne by Contractor. All information, documents, and property contained within these facilities shall be considered privileged and confidential.

**31. Indemnification.**

- a. To the fullest extent permitted by law, Contractor shall indemnify and hold harmless District, Architect, Architect's consultants, owners representative and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorney fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section.
- b. In claims against any person or entity indemnified under this Section by an employee of Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under subsection a of this Section shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for Contractor or a subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

**32. Insurance.** Unless otherwise provided below, Contractor shall at all times maintain in force at Contractor's expense, the following insurance coverage:

- a. **Workers' Compensation:** As required by ORS 656.017, subject employers shall provide workers' compensation coverage in accordance with ORS Chapter 656 for all subject workers. Contractor and all subcontractors of Contractor with one or more employees shall have this insurance unless exempt under ORS 656.027.
  - b. **Commercial General Liability:** Contractor shall purchase and maintain CGL insurance with occurrence-based coverage on ISO Form CG 0001 (12/04 or later) or an equivalent form approved in advance by District. The CGL insurance shall include all major coverage categories including bodily injury, property damage, and completed operations coverage maintained for at least six years following final payment. Contractor shall maintain CGL insurance coverage of at least \$1,000,000 for each claim, incident, or occurrence, and at least \$2,000,000 combined single limit.
  - c. **Motor Vehicle Liability:** Contractor shall purchase and maintain motor vehicle liability insurance with coverage for owned, hired, and non-owned vehicles on ISO form CA 00 01 or an equivalent form approved in advance by District. The automobile liability insurance shall include pollution liability coverage with vehicle overturn and collision. Contractor shall maintain motor vehicle liability insurance of at least \$1,000,000 for each claim, incident, or occurrence, and at least \$2,000,000 annual aggregate coverage.
  - d. **Builders All-Risk:** Not required – District provides coverage.
  - e. **Additional Requirements:** All insurance coverage shall be provided by an insurance company having an A.M. Best rating of at least A- and/or licensed to do business in Oregon. Contractor alone is responsible for paying all deductibles and retentions. A cross-liability clause or separation of insureds condition shall be included in all general liability policies required by this Contract. Contractor's coverage shall be primary in the event of loss.
  - f. **Certificate of Insurance:** Contractor shall furnish to District a current certificate of insurance for each of the above required coverages prior to conducting Work under this Contract. Additional insured endorsements must be written on form CG 32 63 10 05. SEE EXHIBIT 4. Each certificate must provide that there shall be no cancellation, termination, material change, or reduction of limits of the insurance coverage without 30 days' prior written notice from Contractor or its insurer to District. Each certificate shall also state the relevant deductible or retention level. For general and automobile liability coverage, the certificate shall also provide that District, its agents, officers, and employees are additional insureds with respect to Contractor's services provided under this Contract. If requested by District, Contractor shall also provide complete copies of insurance policies to District.
- 33. Notice of Injury or Damage to Person or Property.** If any person suffers physical injury or property damage arising from the Work regardless of the cause, Contractor shall give notice of such injury or damage, whether or not insured, immediately to District's authorized representative and Contractor's authorized representative. The notice shall provide sufficient detail to enable District and any other party affected to investigate the matter.
- 34. Waiver.** Waiver of any default under this Contract by District shall not be deemed to be a waiver of any subsequent default or a modification of the provisions of this Contract.
- 35. Arbitration.**
- a. Any Claim arising out of or related to the Contract, except those waived as provided for in Section 19, shall, after decision by Architect or 30 days after submission of the Claim to Architect, be subject to arbitration. At any time, party(ies) may endeavor to resolve disputes by mediation.
  - b. Claims shall be decided by arbitration that, unless the parties mutually agree otherwise, shall be in accordance with the rules of the Arbitration Service of Portland, Inc. The demand for arbitration shall be filed in writing with the other party to the Contract and with the Arbitration Service of Portland, Inc., and a copy shall be filed with Architect. Exclusive venue for arbitration shall be in Portland, Oregon.
  - c. A demand for arbitration shall be made within a reasonable time after the Claim has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such Claim would be barred by the applicable statute of limitations.
- 36. Governing Law.** The provisions of this Contract shall be construed in accordance with the laws of the State of Oregon and the Public Contracting Rules of District as they exist at the time of execution of this Contract or any subsequent amendment. Any legal action involving this Contract not subject to arbitration must be brought in Douglas County Circuit Court. If the Claim must be brought in a federal forum, then it shall be brought and conducted in the United States District Court for the State of Oregon.
- 37. Severability.** If any term or provision of this Contract is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Contract did not contain the particular term or provision held invalid.
- 38. Merger Clause.** This Contract and the attached exhibits constitute the entire agreement between the parties. All understandings and agreements between the parties and representations by either party concerning this Contract are contained in this Contract. No waiver, consent, modification, or change in the terms of this Contract shall bind either party unless in writing signed by both parties. Any written waiver, consent, modification, or change shall be effective only in the specific instance and for the specific purpose given.
- 39. Anti-discrimination Clause.** Contractor must comply with all applicable requirements of federal and state civil rights law and rehabilitation statutes and shall not discriminate based on race, religion, color, sex, sexual orientation, marital status, familial status, national origin, age, mental or physical disability, or political affiliation in programs, activities, services, benefits, or employment.
- 40. Attorney Fees.** If a suit or action is filed to enforce any of the terms of this Contract, including a request for arbitration under Section 33 of this Contract, the prevailing party shall be entitled to recover from the other party, in addition to costs and disbursements provided by statute, any sum that a court, including any appellate court, or arbitrator may adjudge reasonable as attorney fees. In the event the prevailing party is represented by "in-house" counsel, the prevailing party shall nevertheless be entitled to recover reasonable attorney fees based on the reasonable time incurred and the attorney fee rates and charges reasonably and generally accepted in the metropolitan Portland, Oregon, area for the type of legal services performed.
- 41. Rule of Construction.** The rule of construction that a contract is construed against the drafter shall not apply to any dispute over the interpretation of application of the Contract.
- 42. Removal of Debris.** Contractor shall remove all trash and debris from the site for disposal. Contractor shall clean the work area and remove all trash, debris, and tools at least daily prior to leaving the job site and as needed to maintain a safe work area.

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**CONTRACTOR DATA AND SIGNATURE**

Business Name: \_\_\_\_\_

Business Address: \_\_\_\_\_

Contractor Phone: \_\_\_\_\_

Federal Tax ID# or Social Security # \_\_\_\_\_

CCB# \_\_\_\_\_

Is Contractor a nonresident alien? ☐ Yes ☐ NoBusiness Designation (check one):  
☐ Sole Proprietorship ☐ Partnership  
☐ Corporation-for profit ☐ Corporation-nonprofit  
☐ Other [describe here: \_\_\_\_\_]

Federal tax ID numbers or Social Security numbers are required pursuant to ORS 305.385 and will be used for the administration of state, federal, and local laws. Payment information will be reported to the Internal Revenue Service under the name and federal tax ID number or, if none, the Social Security number provided above.

**I have read this Contract including the attached Exhibits. I certify that I have the authority to sign and enter into this Contract. I understand the Contract and agree to be bound by its terms.**

\_\_\_\_\_  
Signature\_\_\_\_\_  
Title\_\_\_\_\_  
Name (please print)\_\_\_\_\_  
Date

NOTE: Contractor must also sign Exhibit 4 and (if applicable) Exhibit 5.

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**FERN RIDGE SCHOOL DISTRICT  
SIGNATURE**

(This Contract is not binding on District until signed by the appropriate signing authority)

\_\_\_\_\_  
Signature\_\_\_\_\_  
Title\_\_\_\_\_  
Name (please print)\_\_\_\_\_  
Date

**EXHIBIT 1**  
**INVITATION FOR BID**

DRAFT

**EXHIBIT 2**  
**FERN RIDGE SCHOOL DISTRICT**

**SMALL CONSTRUCTION PROJECTS CONTRACT**

**STATEMENT OF WORK, COMPENSATION,**

**PAYMENT, and RENEWAL TERMS**

1. Contractor shall perform the following Work:

Plans:

Specifications:

Addenda:

Bid Form

Bid Bond submitted by

Site Address:

2. The total Contract Price shall be:

- Base Bid:
- Alternate 1:
- TOTAL Contract Price:

3. District shall pay Contractor as described in Section 10 of the Contract.

**Payments shall be made to the address below:**

**Name:**

**Title:**

**Address: 2**

4. Contractor will invoice District for the Work as follows:

**Invoices shall be submitted to the address below:**

**Name: Cheryl Northam**

**Title: Director of Finance & Operation  
FERN RIDGE SCHOOL DISTRICT**

**Address: FERN RIDGE SCHOOL DISTRICT**



**EXHIBIT 3**  
**FERN RIDGE SCHOOL DISTRICT**  
**SMALL CONSTRUCTION PROJECTS CONTRACT**  
**CERTIFICATION STATEMENT FOR CORPORATION**  
**OR INDEPENDENT CONTRACTOR**  
**NOTE: Contractor Must Complete A or B below**

**A. CONTRACTOR IS A CORPORATION, LIMITED LIABILITY COMPANY, OR A PARTNERSHIP.**

I certify under penalty of perjury that Contractor is a [check one]:

☐ Corporation ☐ Limited Liability Company ☐ Partnership authorized to do business in the State of Oregon.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

**OR**

**B. CONTRACTOR IS A SOLE PROPRIETOR WORKING AS AN INDEPENDENT CONTRACTOR.**

**Contractor certifies under penalty of perjury that the following statements are true:**

1. If Contractor is providing labor or services under this Contract for which registration is required under ORS Chapter 701, Contractor has registered as required by law, **and**
2. If Contractor performed labor or services as an independent contractor last year, Contractor filed federal and state income tax returns last year in the name of the business (or filed a Schedule C in the name of the business as part of a personal income tax return), **and**
3. Contractor represents to the public that the labor or services Contractor provides are provided by an independently established business, **and**
4. All of the statements checked below are true.

**NOTE: Check all that apply. You must check at least four (4) to establish that you are an Independent Contractor.**

- ☐ A. The labor or services I perform is primarily carried out at a location that is separate from my residence or is primarily carried out in a specific portion of my residence that is set aside as the location of the business.
- ☐ B. I purchase commercial advertising or I have business cards for my business, or I am a member of a trade association.
- ☐ C. My business telephone listing is separate from my personal residence telephone listing.
- ☐ D. I perform labor or services only under written contracts.
- ☐ E. Each year I perform labor or services for at least two different persons or entities.
- ☐ F. I assume financial responsibility for defective workmanship or for service not provided by purchasing performance bonds, errors and omission insurance, or liability insurance, or providing warranties relating to the labor or services I provide.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**Exhibit 4:**  
**Insurance Requirements**

**Contractor shall at all times maintain in force at Contractor's expense, each insurance noted below:**

**Workers Compensation** insurance in compliance with ORS 656.017, which requires subject employers to provide workers' compensation coverage in accordance with ORS Chapter 656 for all subject workers. Contractor and all subcontractors of Contractor with one or more employees must have this insurance unless exempt under **ORS 656.027**.

**THIS COVERAGE IS REQUIRED.** Attach Certificate of Insurance. If Contractor does not have coverage and claims to be exempt, attach Exhibit 4 in lieu of Certificate.

**Professional Liability / Errors & Omissions (E&O)** insurance with a combined single limit of not less than:

☐ \$500,000, ☐ \$1,000,000, ☐ \$2,000,000 each claim, incident, or occurrence, with an annual aggregate limit of

☐ \$500,000, ☐ \$1,000,000, ☐ \$2,000,000. This is to cover damages caused by error, omission, or negligent acts related to professional services provided under this Contract. The policy must provide extended reporting period coverage for claims made within two years after this Contract is completed.

☐ Required by District ☐ Not required by District

By:

Date:

**Commercial General Liability** insurance, on an occurrence basis, with a combined single limit of not less than:

☐ \$100,000, ☐ \$500,000, ☐ \$1,000,000, ☐ \$5,000,000 each occurrence for Bodily/Personal Injury and Property Damage, with an annual aggregate limit of ☐ \$500,000, ☐ \$1,000,000, ☐ \$2,000,000. This insurance must include contractual liability coverage.

☐ Required by District ☐ Not required by District

**Commercial Automobile Liability** insurance with a combined single limit, or the equivalent of not less than:

☐ \$500,000, ☐ \$1,000,000, ☐ \$2,000,000 each occurrence for Bodily Injury / Personal Injury, and Property Damage, including coverage for owned, hired or non-owned vehicles.

☐ Required by District ☐ Not required by District

By:

Date:

**Builders All-Risk** The District will provide this insurance

**Additional Requirements.** Coverage must be provided by an insurance company admitted to do business in Oregon or rated A- or better by Best's Insurance Rating. Contractor shall pay all deductibles and retentions. A cross-liability clause or separation of insured's condition must be included in all commercial general liability policies required by this Contract. Contractor's coverage will be primary in the event of loss.

**Certificate(s) of Insurance Required.** Contractor shall furnish a current Certificate(s) of Insurance to the District prior to contract execution. The Certificate(s) shall provide that there shall be no cancellation, termination, material change, or reduction of limits of the insurance coverage without 30 days written notice from the Contractor's insurer to the District. The Certificate(s) shall also state the deductible or retention level. **For commercial general liability, the Certificate and by this Contract, shall also provide that the District, its agents, officers, and employees are Additional Insureds with respect to Contractor's services to be provided under this Contract.** Complete copies of insurance policies shall be provided to the District.



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# **Invitation to Bid for Public Improvements DIVISION 0 \* SECTION 00100**

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1.0 Project Name: A Restroom Remodel Project at Elmira High School for the Fern Ridge School District

2.0 Project Address: 24936 Fir Grove Lane, Elmira, Oregon 97437

3.0 Project Description: Demolition of existing restrooms and roof structure and replacement with new CMU walls, finishes, plumbing fixtures, lines, electrical and lighting, restroom accessories, doors and frames and hardware, aluminum storefront entry with new roof coverings of PVC and BUR, painting and miscellaneous work as per the drawings and specifications.

4.0 Not used

5.0 Owner: FERN RIDGE SCHOOL DISTRICT

5.1 Owner's Representative: Dan Pruztman, Facilities/Maintenance Director

6.0 Architect: Paul L Bentley, Architect, AIA PC

7.0 Mandatory Pre-Bid Conference Date and Time: February 15, 2024 at 10 am PST

7.1 Mandatory Pre-Bid Conference Location: 88834 Territorial Hwy, Elmira, OR 97437 with site walk to follow.

7.2 The Consultant and District representative will be present to conduct the tour and answer any questions. Pre-quotation meeting decisions and the attendance list will be distributed in an addendum to contractors eligible to quote. Statements made by the Consultant and District representatives at the conference are not binding upon the District unless confirmed by Written Addendum. Written Addendums will be emailed to all Contractors that attend the mandatory Pre-Bid Conference.

8.1 Point of Contact: All questions concerning the bidding, material or technical requirements should be directed to the Architect listed above. For copies of bid documents, please contact the Architect listed above.

9.0 Bid Closing (Bid Due to District): Date and time: March 7, 2024 at 2 pm PST

10.0 Construction Start Date: June 17, 2024

11.0 Substantial Completion: August 26, 2024

12.0 Final Completion: September 2, 2024

13.0 Sealed bids for the Project named above will be received until bid closing date and time listed above at:

District Office, 88834 Territorial Hwy, Elmira, OR 97437

All bids will be publicly opened at that time. Bids received after Bid Closing will not be considered and returned unopened. Bids will NOT be accepted by facsimile or electronic means.

14.0 Bid Security is Required.

15.0 Each Bidder is required to identify whether the Bidder is a “resident bidder” as defined in ORS 279A.120.

16.0 The FERN RIDGE SCHOOL DISTRICT will not receive or consider an Offer for a Public Improvement Contract unless the Offeror is registered with the Construction Contractors Board as specified in OAR 137-049-0230.

17.0 Required Asbestos & Lead-Based Abatement (licensed under ORS 468A.720) is not required for this quotation. The Owner will procure removal under separate contract.

18.0 No Offer will be received or considered by the Contracting Agency unless the Offer contains a statement by the Offeror as part of its Offer that “Contractor agrees to be bound by and will comply with the provisions of ORS 279C.800 through 279C.870 relating to the prevailing rate of wages.”

19.0 Contractor must certify that they have not discriminated and they will not discriminate against minority, women or emerging small business enterprises in obtaining any subcontracts.

20.0 Criminal background checks will be required as follows:

☒ Student Occupied Site. Employees who will be working on site must have successfully completed a Nationwide Criminal History Verification. The District will process the background checks and provide contractor personnel with photo id badges at the District’s expense.

☐ Not a Student Occupied Site. Contractor conducts background check on their employees and provides their employees with proper picture identification badges.

Publish:

(1) Oregon Buys Website. Oregonbuys.gov  
Bid Title:

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# INSTRUCTIONS TO BIDDERS

## DIVISION 0 \* SECTION 00200

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### 1. SUBMISSION OF BIDS AND BID OPENING:

- A. In accordance with ORS 279C.365, bids will be received by FERN RIDGE SCHOOL DISTRICT, and will be opened and read at the time and place set forth in the Bid Document. Bidders, or their representative, and other interested persons may be present at the opening of bids.
- B. The District will accept only those bids submitted via mail or delivery to 88834 Territorial Hwy, Elmira, OR 97437
- C. The Bidder shall assume full responsibility for timely submission of bids.

### 2. BIDDING DOCUMENTS:

- A. Bidding Documents are those provided by the District, including attachments and any Addenda issued prior to receipt of bids. All requirements and obligations of the Bidding Documents are hereby incorporated by reference into the Contract Documents and are binding on the Successful Bidder upon award of the Contract.
- B. Bidders shall use complete sets of Bidding Documents in preparing Bids. The Owner, Project Manager, and the A/E assume no responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- C. The Owner in making copies of the Bidding Documents available on the above terms does so only for the purpose of obtaining Bids on the Work and does not confer a license or grant for any other use.
- D. When boring data (geological) is provided by Bidding Documents, the Contractor shall assume responsibility for any conclusions it may draw from such data. It may employ its own consultants to analyze available information and to conduct additional tests and examinations of site conditions and shall be responsible for any conclusions drawn from such information, tests and examinations. The Owner does not warrant and specifically disclaims any responsibility for the interpretation of any such data or information.

### 3. DEFINITIONS:

- A. ADDENDA: Written or graphic instructions issued prior to Bid due date which modify or interpret the Bidding Documents including drawings and specifications that add, delete, correct or clarify the scope of work. Addenda will become part of the Contract documents when a construction contract is executed.
- B. BID DOCUMENTS: Include the Advertisement for Bids, Instructions to Bidders, Specifications, Drawings, Addenda issued prior to the receipt of bids, the Bid Proposal, and the proposed Contract Documents.
- C. BASE BID: The Base Bid is the sum stated in the Bid for which the Bidder offers to perform all the Work shown and described in the Bidding Documents as a lump sum bid, to which Work may be added or deducted for sums stated in Alternate Bids, if any.
- D. ALTERNATES: An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents is accepted by the Owner. Any or all Alternates may be accepted or rejected in any order.

#### 4. QUALIFICATIONS OF BIDDERS:

- A. Before the Bid is considered for award, the Owner reserves the right to request the Bidder to complete within seventy-two (72) hours a bidder qualification form and/or a current financial statement prepared by a Certified Public Accountant. Bidder qualifications to be listed upon the Bidder Qualification Form will include as a minimum, a listing of Bidder's previous contracts of a nature similar with technical complexity, operations and size to that being bid upon; a listing of Bidder's staff to include managerial, technical, and laboring positions; summary of Bidder's plan and equipment available for use in the execution of the Contract; and the listing of the projects to which Bidder is currently obligated or anticipates being obligated during this Work.
1. The Owner reserves the right to reject the Bid of any Bidder who fails to furnish promptly and properly all the information called for as previously mentioned when notified to do so.
- B. Pursuant to ORS 279C.375, a Bidder may be deemed unqualified to perform the Contract, if any of the following conditions appear:
1. Bidder does not have sufficient capability to undertake the obligations of the Contract. A determination in this respect will be made when Owner, upon review of the probable cash flow needs of Contractor for this particular Contract (to include payroll, cost of material and supplies, equipment rental costs, and any other direct or incidental costs of the Contract), determines that Contractor does not have sufficient financial resources to enable it to continue to satisfy its financial obligations under the Contract. Owner will consider all other pertinent financial data required by this clause and submitted by the Contractor. A determination that Bidder is unqualified will not be made under this paragraph unless Owner has determined that Bidder cannot meet its financial obligations under the Contract after having considered all sources of income available to the Bidder.
  2. Bidder does not have sufficient staff, equipment, or plant available to perform the Contract. Owner's determination in this matter will be based upon that represented by bidder in the bid form and in subsequent qualification information requested by the Owner upon receipt of bids. Additionally, Bidder does not have sufficient prior experience (or an acceptable substitute thereof, as described below) with projects of a similar nature in technical, managerial, and financial requirements to that in the present Contract being bid.
    - a. Experience does not necessarily mean that the Bidder is an established Contractor in the exact technical area for which the Bid is submitted. In addition to such established Contractors, newly established Contractors will be considered qualified if they have shown on the Bidder Qualification Form that they are staffed with sufficient technical, managerial, and financial personnel with prior experience in the nature of construction for which the Bids are invited, that Bidder may adequately foresee and appreciate problems of such construction.
  3. Bidder has a consistent history of unsatisfactory performance of contracts of this or similar nature, regardless of whether such contracts existed between Owner and the Contractor, or other parties and the Contractor.
    - a. A determination of this nature will not be made unless Owner, after review and verification of Contractor's previous work experience, determines that Contractor's consistent, unsatisfactory performance has resulted from Contractor's failure rather than a failure to perform by the other party. Owner will give Contractor an opportunity to appeal such final determination. Contract disputes, which are pending resolution before any duly authorized judicial or administrative body, will not be considered in reaching this determination.
    - b. A determination of "consistent" failure to perform will not be made unless the Owner is satisfied, after review of Bidder's prior experience that Contractor has repeatedly failed to satisfy its obligations under past contracts. For purposes of this clause, "consistent" will not be construed to mean in every contract, nor will it be construed to include "isolated instances" of failure to perform. Rather it means such evidence of recurring past nonperformance by the Contractor that Owner

cannot safely assume satisfactory performance of the Contract by the Contractor upon execution of the Contract.

- c. In reaching any determination of this nature, Owner may consider statements of other parties to the prior unperformed Contracts. However, in each instance, Owner will advise Contractor of such other statements considered before a determination that the Bidder is not qualified, is made by Owner.
  - 4. Bidder has submitted unrealistic unit prices as determined by other bidders' unit prices for this project.
  - 5. Any information voluntarily submitted by a bidder or prospective bidder pursuant to an investigation may be deemed a trade secret pursuant to ORS 192-501 to 192.505 if requested by the person(s) submitting the information.
  - C. Bidder's representations concerning its qualifications will be construed as a covenant under the Contract. Should it appear that Bidder has made a material misrepresentation, Owner shall have the right to terminate the Contract for Contractor's breach, and Owner may then pursue such remedies as exist elsewhere under this Contract, or as otherwise are provided at law or equity.
  - D. Any determination that a Bidder is unqualified will be made by the Owner. Such determination will be made in writing and identify the reasons why the Bidder is deemed unqualified. A letter will be sent to the Bidder deemed unqualified, stating the reasons for such determination, and the Bidder's right to request a review of this determination by appeal pursuant to ORS 279C.450.
5. **BIDDER'S REPRESENTATIONS:** Each Bidder by submitting its Bid represents that:
- A. I/We have read and understand the Bidding Documents and its Bid is made in accordance therewith; and Bidder agrees to be bound by the terms and requirements set forth in the Bidding and Contract Documents;
  - B. I/We have visited the site, have familiarized ourselves with the local conditions under which the Work is to be performed in accordance with Paragraph 10 herein, and have correlated our observations with the requirements of the proposed Contract Documents;
  - C. Bid is based upon the materials, systems and equipment required by the Bidding Documents without exception; and
  - D. I/We have the capability, in all respects, and the moral and business integrity, reliability, technical ability, financial resources, plant, management, superintendence, equipment and materials which will assure effective and efficient good faith performance in full compliance with the Contract Documents and with any and all schedules and completion dates required by the Owner. The Bidder acknowledges and represents that it has made allowances for normal inclement weather indigenous to the Project Site, in estimating, planning and scheduling of the Work. The Bidder further acknowledges that the Contract Documents are, in its opinion, appropriate and adequate for completing this project and for the construction of sound and suitable work. The Bidder hereby certifies that the Work shall be completed, in place, in full accordance with the Contract Documents, within the time limits specified.
6. **PREPARATION AND SUBMITTAL OF BID FORM:**
- A. Bids shall be submitted via 1B, and shall be complete in every respect. The total Bid amount shall be entered in written words and figures in the space provided. Amounts for alternates and unit prices should be entered in the spaces provided.
  - B. For lump sum Bids, in the event of a discrepancy between the Bid amount in writing and that in figures, the written value shall govern.
  - C. Bids shall not contain any restatement or qualifications of work to be done and alternate bids will not be considered unless called for. No oral, telegraphic or telephonic bids or modifications will be considered.

D. Bids must be submitted by the closing date and time shown on the bidding documents.

**7. BID SECURITY:**

- A. If requested, each Bid must be accompanied by a Bidder's Bond on the Form of Bid Bond provided herein or on a similar form which in every respect materially complies with said Form of Bid Bond, in the amount of ten percent (10%) of its Bid. For purposes of this provision, the amount of the Bid shall be the Base Bid. The Bidder's Bond shall be issued by a Surety company licensed to conduct business in the State of Oregon and be acceptable to the Owner. The Surety signing the Bidder's Bond shall be registered with the Oregon State Insurance Commissioner, and the Surety's name shall appear in the current Authorized Insurance Company list in the State of Oregon published by the office of the Insurance Commissioner. Each Surety's name must also appear on the United States Treasury Department's list of authorized sureties, circular 570, as amended.

Bidders are to attach a copy of the bid security to their response. Bidders are required to provide contact information for the bonding company so the District can verify the bond is authentic. Failure to provide valid contact information may result in rejection of the bid.

- B. Said Bid Security is given as a guarantee that the Bidder will enter into a Contract if awarded the Work and, in the case of refusal or failure to so enter into said Contract, the Bid Security shall be declared forfeited to the Owner, in accordance with ORS 279C.385. Such Bid Security shall be returned to all but the three (3) lowest Bidders after the opening of the Bids and the remaining Bid Security will be returned after the Owner and the successful Bidder have executed the Contract. If no Contract has been awarded or the Bidder has not been notified of the acceptance of its Bid, within sixty (60) days of the Bid opening, the Bidder may withdraw its Bid and request the return of its Bid Security. If, at the Owner's or Project Manager's request, the Bidder agrees to extend and maintain its Bid beyond the specified sixty (60) days, its Bid Security will not be returned until after the Owner and the Successful Bidder have executed the Contract.
- C. The successful Bidder, upon their failure or refusal to execute the Contract within ten (10) days after it has received Notice of Acceptance of its Bid, shall forfeit to the Owner the Bid Security deposited with its Bid, as liquidated damages for such failure or refusal.

**8. INSURANCE BINDER:**

- A. The successful bidder is required to provide a certificate of insurance within five days of bid award, for the coverage specified elsewhere in the bidding documents.

**9. UNIT PRICES:**

- A. The Bidder shall include in the spaces provided on the Bid Form a Bid for each unit price.
- B. The Owner may accept or reject any or all of these unit prices and include them in the Contract. The Owner is not obligated to use these unit prices and may require the Contractor to provide complete breakdown of costs listed therein.

**10. SITE CONDITIONS AND CONDITIONS OF THE WORK:**

- A. Each Bidder must acquaint themselves thoroughly as to the character and nature of the Work to be done and the conditions under which the work will be performed. Each Bidder furthermore must make a careful examination of the site of the Work and inform themselves fully as to the difficulties to be encountered in the performance of the Work, the facilities for delivering, storing and placing materials and equipment, existing and available services and utilities, environmental and access constraints, permit requirements and other conditions relating to construction and labor.
- B. The Successful Bidder, assumes all risk as to the nature and behavior of the soil or subsurface conditions which underlie the Work or is adjacent thereto, or difficulties that may be due to any unfavorable conditions that may be encountered in the Work, whether apparent on surface inspection or disclosed after construction begins.

- C. No plea of ignorance of conditions that exist or may hereafter exist on the site of the Work, or difficulties that may be encountered in the execution of the Work, as a result of failures to make necessary investigations and examinations, will be accepted as an excuse for any failure or omission on the part of the Successful Bidder to fulfill in every detail all the requirements of the Contract Documents and to complete the Work for the consideration set forth therein, or as a basis for any claim whatsoever.
- D. Insofar as possible, the Successful Bidder, in carrying out its work, must employ such methods or means as will not cause interruption of or interference with the Work of the Owner, the Project Manager or any separate Contractor.
- E. The Contract includes excavation on an unclassified basis. The cost of all excavation and backfill required under this Contract is a part of the Base Bid. No distinction will be made insofar as payment is concerned between earth and rock.

**11. BIDDER'S QUESTIONS, ADDENDA AND INTERPRETATIONS:**

- A. Bidder's and Sub-Bidders shall promptly notify the Owner through the A/E of any ambiguity, inconsistency, or error, which they may discover upon examination of the Bidding and Contract Documents or of the site and local conditions. No interpretation of the meaning of the drawings, specifications or other Contract Documents will be made to any Bidder orally.
- B. Every request for such interpretation shall be in writing addressed to the Project Manager, utilizing Section 00210 form, and to be given consideration must be received at least ten (10) days prior to the date fixed for the opening of the Bids, or two days after the mandatory pre-bid, whichever occurs last.
- C. Any and all such interpretations and any supplemental instruction will be in the form of written addenda to the Bidding Documents which, if issued, will be distributed to Bidders not later than three (3) calendar days prior to the date fixed for the opening of the Bids. Neither the Project Manager nor the Owner will be responsible for any other explanations or interpretations of the proposed documents. Failure of any Bidder to receive any such addendum or interpretation shall not relieve the Bidder from any obligation under its Bid as submitted. All addenda so issued shall become a part of the Contract Documents.
- D. If the Bidder (or any person bidding to Bidder and/or subsequently in contract with the Bidder, relating to the subject project) knows, or should have known, that an ambiguity, discrepancy, error, omission or conflicting statement exists in the Bidding or Contract Documents, said Bidder has an obligation to seek a clarification thereof from the A/E prior to the Bid. The Owner will welcome such a clarification request, and, if deemed necessary by the Owner, the Project Manager or A/E, the Purchasing Department will issue a written addendum clarifying the matter in question.

**12. PERFORMANCE AND PAYMENT BOND:**

For public improvement contracts of more than \$100,000, the Successful Bidder shall promptly execute and deliver a Performance and Payment Bond in an amount equal to one hundred percent (100%) of the Contract sum, as security for the faithful performance of this Contract and as security for the payment of all persons performing labor and furnishing materials under this Contract. The Performance and Payment Bond shall be acceptable to the Owner, in accordance with State law and shall be delivered to the Owner not later than the date of execution of the Contract. The Surety signing the Bond shall be registered with the Oregon State Insurance Commissioner, and the Surety's name shall appear in the current Authorized Insurance Company list in the State of Oregon published by the office of the Insurance Commissioner. The Surety's name must also appear on the United States Treasury Department's list of authorized sureties, circular 570, as amended. No Work shall commence at the project site until approved Bonds are received by the Owner. Both bonds shall be in compliance with ORS Sections 279C.380, 279C.625 and 701.430.

**13. TIME FOR COMPLETION:**

The time for completion of this Contract shall be as listed on the Specific Dates list and as fixed in the Owner-Contractor Agreement.

**14. LOCATION OF THE WORK:**

The site of the proposed work is on Owner owned property, public streets, easements and/or other right-of-ways, as shown on the drawings.

**15. LIABILITY INSURANCE AND WORKER'S COMPENSATION:**

The Successful Bidder will be required to carry public liability and worker's compensation and other insurance in the amounts and under the terms stipulated under Section 00620. No Work shall commence at the project site until approved Certificates are received by the Owner.

**16. BIDDERS REFERRED TO LAWS:**

- A. The attention of the Bidders is called to the provisions of all Local, State and Federal laws, regulations, ordinances and resolutions applicable to the work, as well as laws, regulations, ordinances, resolutions and permits relating to obstructing streets, maintaining signals, storing and handling of explosives, preserving safety or affecting the Bidder, or its employees or its work hereunder in its relation to the Owner or any other person. The Bidder shall obey all such laws, regulations, ordinances, permits or resolutions applicable to the Work or controlling or limiting Contractors while engaged in the prosecution of the Work under this Contract.
- B. The provisions of this Contract shall be interpreted in accordance with the laws of the State of Oregon and in accordance with the laws, ordinances, regulations, permits and resolutions of Yamhill County.

**17. TAXES:**

Contractor shall include in its Bid and pay for all applicable taxes. Refer to General Conditions regarding further discussion. Certification of Compliance with Oregon tax laws is required to be submitted prior to commencement of work.

**18. RIGHT TO REJECT BIDS:**

The Owner expressly reserves the right to reject any or all Bids, to waive any informalities or irregularities in the Bids received, and to accept that Bid which in its judgment, best serves the interest of the Owner.

**19. MODIFICATION OR WITHDRAWAL OF BID:**

- A. A Bidder may withdraw its Bid from consideration if the price bid was substantially lower than the other Bids due solely to a mistake therein, provided: (1) the Bid was submitted in good faith; and (2) the mistake was a clerical mistake as opposed to a judgment mistake, and; (3) the mistake was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of a Bid, which unintentional error or omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the Bid sought to be withdrawn. The Bidder shall give notice in writing of its claim of right to withdraw its Bid within two (2) business days after the conclusion of the Bid opening procedure.
- B. Prior to the time and date designated for the receipt of Bids, any Bid submitted may be retracted by the Bidder.
- C. Withdrawn Bids may be resubmitted up to the time designated for the receipt of the Bids provided that they are then fully in conformance with these Instructions to Bidders.
- D. Bid security, if any is required, shall be in an amount sufficient for the Bid as modified or resubmitted.

**20. DETAILED BID BREAKDOWN:**

- A. Upon notification from the Owner or the Project Manager to the Bidder that submitted the apparent lowest responsive Bid, the Bidder shall, within forty-eight (48) hours, provide a detailed breakdown of its Bid in a form acceptable to the Owner or Project Manager. Breakdown will be using a typical AIA Schedule of



Values and will be broken down by each school for accounting purposes.

- B. The breakdown may be used by the Owner to verify accounting requirements, and to determine whether the Bidder has grossly misjudged the requirements of any area.
- C. The Bidder's failure to provide the requested detailed breakdown in the specified time may result in rejection of the Bid at the sole discretion of the Owner.

## 21. **AWARD OF CONTRACT:**

The Contract will be awarded to the lowest responsive and responsible Bidder whose Bid is considered to be in the best interest of the Owner. After the Owner determines that a contract is to be awarded, it will award the contract to the lowest responsible bidder. The "lowest responsible bidder" will be the lowest bidder who has substantially complied with all bidding requirements and procedures and who has not been disqualified by the Owner under ORS 279C.375. In determining the lowest responsible bidder, the Owner shall add a percentage increase of the bid of nonresident bidder as required by ORS 279A.120.

- A. The Lowest Bidder is determined by the aggregate amount of the Base Bid, plus any Alternates selected by the Owner or Project Manager.
- B. A Responsive Bidder shall mean a Bidder who has submitted a Bid, which conforms, in all material respects, to the Bidding Documents.
- C. A Responsible Bidder shall mean a Bidder who has the capability, in all respects, to perform fully the Contract requirements and the moral and business integrity and reliability, which will assure good faith performance. In determining responsibility, the following criteria will be considered:
  - 1. The ability, capacity and skill of the Bidder to perform the Contract or provide the services required;
  - 2. Whether the Bidder can perform the Contract or provide the service promptly, or within the time specified, without delay or interference;
  - 3. The character, integrity, reputation, judgment, experience and efficiency of the Bidder;
  - 4. The quality of performance of previous contracts or services. For example, the following information will be considered:
    - a. The administrative and consultant cost overruns incurred by Owners on previous contracts with Bidder,
    - b. The Bidder's compliance record with Contract General Conditions on other projects,
    - c. The submittal by the Bidder of excessive and/or unsubstantiated extra costs proposals and claims on other projects,
    - d. The Bidders record for completion of the work within the Contract time or within Contract milestones and Bidders compliance with scheduling and coordination requirements on other projects,
    - e. The Bidder's demonstrated cooperation with the Owner, the Project Manager, or the A/E and other Contractors on previous contracts,
    - f. Whether the work performed and materials furnished on previous contracts were in accordance with the Contract Documents;
  - 5. The previous and existing compliance by the Bidder with laws, regulations, resolutions and ordinances relating to contracts or services;
  - 6. The sufficiency of the financial resources and ability of the Bidder to perform the Contract or provide

the services;

7. The quality, availability and adaptability of the goods or services to the particular use required;
  8. The ability of the Bidder to provide future maintenance and service for the warranty period of the Contract;
  9. Whether the Bidder is or has been in arrears to the Owner on debt or contract or is or has been a defaulter on surety to the Owner;
  10. Such other information as may be secured by the Owner or the Project Manager having a bearing on the decision to award the Contract, to include, but not limited to:
    - a. The ability, experience and commitment of the Bidder to properly and reasonably plan, schedule, coordinate and execute the Work,
    - b. Whether the Bidder has ever been debarred from bidding or found ineligible for bidding on any other projects.
- D. The purpose of the above is to enable the Owner or the Project Manager in its opinion, to select the Bid that is in the best interest of the Owner. The ability of the low Bidder to provide the required bonds will not of itself demonstrate responsibility of the Bidder.
- E. The Owner reserves the right to require from the Bidder: (1) submission of references, within seventy-two (72) hours, to include a listing of previous and current projects and (2) financial statements indicating current financial status, prepared in accordance with generally accepted accounting principles, by a CPA licensed to do business in the State of Oregon.
- F. The Owner reserves the right to defer award of this Contract for a period of sixty (60) days after the due date of the Bids. During this period of time, the Bidder shall guarantee the prices quoted in its Bid.

22. **BID PROTEST:**

Any actual bidder who is adversely affected or aggrieved by the Owner's notice of award of the contract to another bidder on the same solicitation shall have seven (7) calendar days after notice of award to submit to the Owner a written protest of the notice of award. The written protest shall specify the grounds upon which the protest is based. In order to be an adversely affected or aggrieved with the right to submit a written protest, a bidder must itself claim to be eligible for award of the contract as the lowest responsible bidder and must be next in line for award, i.e., the protestor must claim that all lower bidders are ineligible for award because they are non-responsive or non-responsible. The Owner will not entertain a protest submitted after the time period established in this provision.

The Owner's designee shall have the authority to settle or resolve the written protest. If the protest is not settled or resolved by mutual agreement, the Owner's designee shall promptly issue a written decision on the protest.

23. **SUBCONTRACTORS:**

- A. All Subcontractors proposed for the Work must be acceptable to the Owner.
- B. Contractor shall comply with ORS 279C.580, a copy of which is hereto attached under Section 00667.
- C. The Owner reserves the right to request the proposed Subcontractors to complete Bidder Qualification Forms and/or current financial statements prepared by a Certified Public Accountant. These forms will be similar to those required of a Bidder under Instruction to Bidders.
- D. In accordance with ORS 279A.110
  1. A bidder or proposer who competes for or is awarded a public contract may not discriminate against

a subcontractor in the awarding of a subcontract because the subcontractor is a minority, women or emerging small business enterprise certified under ORS 200.055.

2. The public contracting agency may debar or disqualify under ORS 279C.440 any person as a bidder on a public contract if the agency finds that the person has violated subsection (1) of this section in a contract between the person and the agency.
3. If the person desires to appeal the disqualification, the appeal procedure shall be subject to ORS 279C.445 to 450.

**24. PREVAILING WAGE RATES:**

- A. If applicable, labor required for the construction of this project is subject to the prevailing wage rates as provided in the General Requirements.
- B. Contractors working on public works projects must obtain and file with the Construction Contractors Board (CCB) a public works bond with a corporate surety authorized to do business in Oregon for the amount of \$30,000 before starting work on a contract or subcontract for a public works project, unless exempt. (Mandated by SB477 2005)

**25. PRE-BID CONFERENCE:**

- A. When scheduled, a Pre-Bid Conference will be conducted by the Project Manager in conjunction with the A/E at the time indicated in the Advertisement for Bids to afford Bidders the opportunity to question the Owner, the Project Manager, and the A/E.
- B. The meeting will be held at the location identified in the Bidding Documents. Sign-in will begin 15 minutes prior to start of meeting. Bidders must be signing in by no later than 10 minutes after meeting start time. Any bidders not signing in by that time may be deemed late and not eligible to submit a bid. The District reserves the right to consider unusual or extenuating circumstances

**26. INSPECTION AND LABORATORY TESTING:**

- A. Inspection and Laboratory Testing shall be provided as called for in the General Requirements and Technical Specifications by a Testing Consultant to be retained by the Owner.

**27. PROGRESS PAYMENTS:**

- A. Monthly progress payments will generally be made to the Contractor by the Owner within thirty (30) days after approval of the Certificate of Payment by the Owner. Invoice to be using the AIA G702 and G703 forms or an approved facsimile thereof.
- B. The Owner will retain funds from progress payments as described in General Conditions and in accordance with ORS 279C.550 through 279C.570.

**28. SUBSTITUTIONS:**

The attention of potential bidders and other interested parties is called to the conditions set forth in Division 1, Section 01600, "Materials and Equipment", regarding approval and product options for substitutions. All requests for substitutions must be submitted on the form provided in the bidding documents.

**29. DRUG TESTING PROGRAM FOR PUBLIC IMPROVEMENT CONTRACTS:**

ORS 279C.505 (2) requires that all public improvement contracts contain a provision requiring contractors to demonstrate that an employee drug-testing program is in place. Bidder is therefore required to certify that it has an employee drug-testing program in place that applies to all employees, and will maintain a drug-testing program at all times during the performance of the Contract awarded. Failure to maintain a program shall constitute a material breach of contract. The use of drugs, alcohol, or any tobacco products is prohibited on all District property.

END SECTION 00200

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# PRE-BID REQUEST FOR INFORMATION

## DIVISION 0 \* SECTION 00210

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**BID TITLE:** A Restroom Remodel Project at Elmira High School for the Fern Ridge School District.

**SUBJECT:**

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<b>INFORMATION REQUESTED BY BIDDER</b>
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REFERENCE: SPEC SECTION: \_\_\_\_\_ DRAWING NO. \_\_\_\_\_

**BIDDER:** \_\_\_\_\_

**RESPONSE REQUESTED BY:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

<b>DISTRICT'S RESPONSE</b>
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**RESPONSE FURNISHED BY:** \_\_\_\_\_  
FOR Fern Ridge School District

**SUBMIT FORM TO ARCHITECT LISTED ABOVE.**

END OF SECTION 00210

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# BID FORM

## DIVISION 0 \* SECTION 00300

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**Bid TO:** Fern Ridge School District  
Attn: Quanah Bennet  
88834 Territorial Hwy, Elmira, OR 97437

**Bids DUE:** March 7, 2024 at 2 pm PST (unless changed by Addenda)

**PROJECT:** A Restroom Remodel Project at Elmira High School for the Fern Ridge School District

**Start of Project:** Julne 17, 2024 (unless changed by Addenda)

**Substantial Completion:** August 26, 2024 (unless changed by Addenda)

**Final Completion:** September 2, 2024(unless changed by Addenda)

1. The undersigned,

**NAME of FIRM:** \_\_\_\_\_

after having carefully examined the bidding documents and **addenda numbered** \_\_\_\_\_ **through** \_\_\_\_\_ inclusive, as well as the work site and conditions affecting the work, hereby proposes and agrees to furnish all labor, materials, and all other work, required by and in strict conformance with the above documents, necessary to complete the project for the stipulated sum of:

**Base Bid:**

TOTAL (Figures) \$ \_\_\_\_\_ Dollars

TOTAL (Words) \_\_\_\_\_ Dollars

2. The undersigned agrees to maintain the proposal price for a period of 30 calendar days after bid opening.
3. The undersigned agrees, if awarded a contract, to complete all work as shown in the Contract Documents by the substantial completion date listed above.
4. The undersigned agrees that, prior to commencement of the Work, and within 7 calendar days of Notice of Intent to Award, to:
- A. Enter into and execute a contract for the work in the form of Fern Ridge School District, "Construction Contract".
  - B. Deliver to the Owner duly executed AIA Document G705, "Certificate of Insurance," or ACORD form 25S.

C. Deliver to the Owner duly executed AIA Document A312, "Performance Bond and Payment Bond."

5. The undersigned certifies that this Bid has been prepared independently and is not made in the interests of any undisclosed party. It is submitted without collusion or intent to limit independent, competitive bidding. The Bidder has in no way induced or solicited other Bidders to submit false bids, or to refrain from bidding.
6. The Undersigned agrees to be bound by and will comply with the provisions of ORS 279C.838 and 279C.840 pertaining to the payment of the prevailing rates of wage.
7. The undersigned agrees to comply with Oregon tax laws in accordance with ORS 305.385.
8. Indicate below whether Bidder is Resident or Non Resident bidder.

Oregon Reciprocal Preference Law (ORS 279.029): In compliance with ORS 279.029, each Bidder must state in its proposal whether it is a resident or non-resident bidder. Bids that fail to provide this information will be considered nonresponsive and will be rejected.

DEFINITION - RESIDENT BIDDER: A bidder that has paid unemployment taxes or income taxes in this state during the 12 calendar months immediately preceding submission of the bid, has a business address in this state and has stated in the bid whether the bidder is a "resident bidder."

DEFINITION – NON-RESIDENT BIDDER: A bidder who is not a resident bidder as defined above.

Indicate by an "X" in the appropriate space whether you are an Oregon resident bidder or non-resident bidder:  
Oregon Resident Bidder \_\_\_\_\_ Non-Resident Bidder \_\_\_\_\_

9. The undersigned certifies that you visited the site and thoroughly investigated all existing conditions. It is understood that the Bidder, before signing his/her proposal, has made a careful examination of the plans, specifications, and character of work required; that he/she has made a careful examination of the location and condition of the work, verified all measurements at the job site, and sources of supply of materials.
10. Security Deposit
  - a. Bids shall be accompanied by a security deposit as follows: Bid Bond of a sum no less than 10 percent on AIA A310 Bid Bond Form
  - b. Endorse the Bid Bond in the name of Elmira School District as obligee, signed and sealed by the principal (Contractor) and surety
  - c. The security deposit will be returned after delivery to the Elmira School District of the required Performance and Payment Bond by the accepted bidder
  - d. Include the cost of the bid security in the Bid Amount
  - e. If no contract is awarded, all security deposits will be returned.
11. The Undersigned certifies that it has not discriminated against minority, women, or emerging small businesses in obtaining any subcontracts for this project as required by ORS 279A.110(4).
12. If applicable the first tier subcontractor disclosure form is due 2 hours after bid are due.
13. Submittals are due promptly after Letter of Intent. A Pre-Construction Meeting will be held prior to commencement, Weekly Construction meetings are required.
14. As a condition to submitting a bid, a Contractor must be registered with the Oregon Construction Contractors Board in accordance with ORS 701.035 to 701.055 and/or the State Landscape Contractors Board licensed number, and disclose the appropriate numbers. Failure to register and disclose the numbers, as applicable, will make the bid unresponsive and it will be rejected. The Undersigned hereby certifies that all subcontractors

who will perform construction work as described in ORS 701.005 are or will be registered with the Construction Contractors Board in accordance with ORS 701.035 to 701.055 or State Landscape Contractors Board, as applicable, at the time the subcontractor(s) made a bid to work under the contract.

15. Oregon Business Registration: To transact business in the State of Oregon, a Bidder must be registered with the State of Oregon Corporations Division. Please indicate your business' current registration type with an "X" in the appropriate space:

Corporate Registration \_\_\_\_\_

Assumed Business Name Registration \_\_\_\_\_

16. Any Bid of a contractor or subcontract listed on BOLI's list of Ineligible Contractors will be rejected.

## SIGNATURES

Oregon Construction Contractor's Board No. \_\_\_\_\_

State Landscape Contractors Board No. \_\_\_\_\_ (if applicable for the project)

NAME OF FIRM \_\_\_\_\_

ADDRESS \_\_\_\_\_

FEDERAL TAX ID \_\_\_\_\_

TELEPHONE NO. \_\_\_\_\_

Cell NO. \_\_\_\_\_

SIGNATURE

1) \_\_\_\_\_  
Sole Individual – Signature

2) \_\_\_\_\_  
Sole Individual – Printed Name

or 2) \_\_\_\_\_  
Partner

or 3) \_\_\_\_\_  
Authorized Officer of Corporation – Signature

\_\_\_\_\_  
Authorized Officer of Corporation – Printed Name

\_\_\_\_\_  
Attested: Secretary of Corporation

(SEAL)



# FIRST-TIER SUBCONTRACTOR FORM

## DIVISION 0 \* SECTION 00410

### FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM

Bids which are submitted by Bid Closing, but for which a required disclosure submittal has not been made by the specified Disclosure Deadline, are not responsive and shall not be considered for Contract award.

#### AGENCY SUPPLIED INFORMATION:

Project Name	A Restroom Remodel Project at Elmira High School for the Fern Ridge School District				
	Closing Date:	March 7, 2024	Time:	2:00 PM	
Disclosure Deadline:	Date:	March 7, 2024	Time	4:00 PM	
Deliver Form to:	Fern Ridge School District				
Designated Recipient	Quanah Bennett				
Agency's Address	Fern Ridge School District				
	88834 Territorial Hwy, Elmira, OR 97437				

#### INSTRUCTIONS:

The contracting agency will insert "N/A" above if the contract value is not anticipated to exceed \$100,000. Otherwise this form must be submitted either with the bid or within two (2) working hours after the advertised bid closing date and time; but no later than the DISCLOSURE DEADLINE stated above. This form must be submitted at the location indicated in the Invitation to Bid.

Unless otherwise stated in the solicitation, this document shall not be submitted by facsimile. It is the responsibility of bidders to submit this disclosure form by attaching to the bid, or if submitting later to the online disclosure event published immediately after bid closing. The online event will have the same number as the bid, and the word disclosure in the title.

List below the name of each subcontractor that will be furnishing labor or will be furnishing labor materials and that is required to be disclosed, the category of work that the subcontractor will be performing and the dollar value of the subcontractor. Enter "NONE" if there are no subcontractors that need to be disclosed. ATTACH ADDITIONAL SHEETS IF NECESSARY.

#### BIDDER DISCLOSURE

	SUBCONTRACTOR NAME	CATEGORY OF WORK	DOLLAR VALUE
1.			
2.			
3.			
4.			
5.			
6.			
7.			

The above listed first-tier subcontractor(s) are providing labor, or labor and material, with a Dollar Value equal to or greater than:

a) 5% of the total Contract Price, or \$15,000, whichever is greater.

**or**

b) \$350,000 regardless of the percentage of the total Contract Price.

Form Submitted By (Bidder Name): \_\_\_\_\_

Contact Name: \_\_\_\_\_ Phone #: \_\_\_\_\_

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# FORM OF BID BOND

## DIVISION 0 \* SECTION 00420

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### BID BOND

We, \_\_\_\_\_, as "Principal,"  
(Name of Principal)

and \_\_\_\_\_, an \_\_\_\_\_ Corporation,  
(Name of Surety)

authorized to transact Surety business in Oregon, as "Surety," hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns to pay unto the Fern Ridge School District ("Obligee") the sum of (\$ \_\_\_\_\_)

\_\_\_\_\_ dollars.

WHEREAS, the condition of the obligation of this bond is that Principal has submitted its proposal or bid to an agency of the Obligee in response to Obligee's procurement document (No. \_\_\_\_\_) for the project identified as: \_\_\_\_\_ which proposal or bid is made a part of this bond by reference, and Principal is required to furnish bid security in an amount equal to **ten (10%)** percent of the total amount of the bid pursuant to the procurement document and ORS 279C.365(5) for competitive bidding or 279C.400(5) for competitive proposals.

NOW, THEREFORE, if the proposal or bid submitted by Principal is accepted, and if a contract pursuant to the proposal or bid is awarded to Principal, and if Principal enters into and executes such contract within the time specified in the procurement document and executes and delivers to Obligee its good and sufficient performance and payment bonds required by Obligee, as well as any required proof of insurance, within the time fixed by Obligee, then this obligation shall be void; otherwise, it shall remain in full force and effect.

IN WITNESS WHEREOF, we have caused this instrument to be executed and sealed by our duly authorized legal representatives this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

**PRINCIPAL:** \_\_\_\_\_

**SURETY:** \_\_\_\_\_

By \_\_\_\_\_  
Signature

BY ATTORNEY-IN-FACT:

\_\_\_\_\_  
Official Capacity

\_\_\_\_\_  
Name

Attest: \_\_\_\_\_  
Corporation Secretary

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

\_\_\_\_\_  
City State Zip

\_\_\_\_\_  
Phone Fax

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# FORM OF PERFORMANCE BOND

## DIVISION 0 \* SECTION 00430

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### PERFORMANCE BOND

Bond No. \_\_\_\_\_  
Solicitation \_\_\_\_\_  
Project Name \_\_\_\_\_

_____ (Surety #1)	Bond Amount No. 1:	\$ _____
_____ (Surety #2)*	Bond Amount No. 2: *	\$ _____
	Total Penal Sum of Bond:	\$ _____

*\* If using multiple sureties*

We, \_\_\_\_\_ as Principal, and the above identified Surety(ies), authorized to transact surety business in Oregon, as Surety, hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto the Fern Ridge School District the sum of (Total Penal Sum of Bond)

(Provided, that we the Sureties bind ourselves in such sum “jointly and severally” as well as “severally” only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety), and

WHEREAS, the Principal has entered into a contract with the Fern Ridge School District, the plans, specifications, terms and conditions of which are contained in the above-referenced Solicitation;

WHEREAS, the terms and conditions of the contract, together with applicable plans, standard specifications, special provisions, schedule of performance, and schedule of contract prices, are made a part of this Performance Bond by reference, whether or not attached to the contract (all hereafter called “Contract”); and

WHEREAS, the Principal has agreed to perform the Contract in accordance with the terms, conditions, requirements, plans and specifications, and all authorized modifications of the Contract which increase the amount of the work, the amount of the Contract, or constitute an authorized extension of the time for performance, notice of any such modifications hereby being waived by the Surety:

NOW, THEREFORE, THE CONDITION OF THIS BOND IS SUCH that if the Principal herein shall faithfully and truly observe and comply with the terms, conditions and provisions of the Contract, in all respects, and shall well and truly and fully do and perform all matters and things undertaken by Contractor to be performed under the Contract, upon the terms set forth therein, and within the time prescribed therein, or as extended as provided in the Contract, with or without notice to the Sureties, and shall indemnify and save harmless the Fern Ridge School District, its officers, employees and agents, against any direct or indirect damages or claim of every kind

and description that shall be suffered or claimed to be suffered in connection with or arising out of the performance of the Contract by the Principal or its subcontractors, and shall in all respects perform said contract according to law, then this obligation is to be void; otherwise, it shall remain in full force and effect.

Nonpayment of the bond premium will not invalidate this bond nor shall the State of Oregon, or the above-referenced agency(ies), be obligated for the payment of any premiums.

This bond is given and received under authority of ORS Chapter 279C, the provisions of which hereby are incorporated into this bond and made a part hereof.

IN WITNESS WHEREOF, WE HAVE CAUSED THIS INSTRUMENT TO BE EXECUTED AND SEALED BY OUR DULY AUTHORIZED LEGAL REPRESENTATIVES.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

PRINCIPAL: \_\_\_\_\_

By \_\_\_\_\_  
Signature

\_\_\_\_\_  
Official Capacity  
Attest: \_\_\_\_\_  
Corporation Secretary

SURETY: \_\_\_\_\_  
*[Add signatures for each surety if using multiple bonds]*

BY ATTORNEY-IN-FACT:  
*[Power-of-Attorney must accompany each surety bond]*

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

\_\_\_\_\_  
City State Zip

\_\_\_\_\_  
Phone Fax

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# FORM OF PAYMENT BOND

## DIVISION 0 \* SECTION 00440

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### PAYMENT BOND

Bond No. \_\_\_\_\_  
Solicitation \_\_\_\_\_  
Project Name \_\_\_\_\_

_____ (Surety #1)	Bond Amount No. 1:	\$ _____
_____ (Surety #2)*	Bond Amount No. 2:*	\$ _____
	Total Penal Sum of Bond:	\$ _____

\* If using multiple sureties

We, \_\_\_\_\_, as Principal, and the above identified Surety(ies), authorized to transact surety business in Oregon, as Surety, hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto the Fern Ridge School District the sum of \_\_\_\_\_ (Total Penal Sum of Bond) \_\_\_\_\_ (Provided, that we the Sureties bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety), and

WHEREAS, the Principal has entered into a contract with the Fern Ridge School District, the plans, specifications, terms and conditions of which are contained in above-referenced Solicitation;

WHEREAS, the terms and conditions of the contract, together with applicable plans, standard specifications, special provisions, schedule of performance, and schedule of contract prices, are made a part of this Payment Bond by reference, whether or not attached to the contract (all hereafter called "Contract"); and

WHEREAS, the Principal has agreed to perform the Contract in accordance with the terms, conditions, requirements, plans and specifications, and schedule of contract prices which are set forth in the Contract and any attachments, and all authorized modifications of the Contract which increase the amount of the work, or the cost of the Contract, or constitute authorized extensions of time for performance of the Contract, notice of any such modifications hereby being waived by the Surety:

NOW, THEREFORE, THE CONDITION OF THIS BOND IS SUCH that if the Principal shall faithfully and truly observe and comply with the terms, conditions and provisions of the Contract, in all respects, and shall well and truly and fully do and perform all matters and things by it undertaken to be performed under said Contract and any duly authorized modifications that are made, upon the terms set forth therein, and within the time prescribed therein, or as extended therein as provided in the Contract, with or without notice to the Sureties, and shall indemnify and save harmless the Fern Ridge School District, its officers, employees and agents, against any claim for direct or indirect damages of every kind and description that shall be suffered or claimed to be suffered in connection with or arising out of the performance of the Contract by the Contractor or its subcontractors, and shall promptly pay all persons supplying labor, materials or both to the Principal or its subcontractors for prosecution of the work provided in the Contract; and shall promptly pay all contributions due the State Industrial Accident Fund and the State Unemployment Compensation Fund from the Principal or its subcontractors in connection with the performance of the Contract; and shall pay over to the Oregon Department of

Revenue all sums required to be deducted and retained from the wages of employees of the Principal and its subcontractors pursuant to ORS 316.167, and shall permit no lien nor claim to be filed or prosecuted against the State on account of any labor or materials furnished; and shall do all things required of the Principal by the laws of this State, then this obligation shall be void; otherwise, it shall remain in full force and effect.

Nonpayment of the bond premium will not invalidate this bond nor shall the Fern Ridge School District, be obligated for the payment of any premiums.

This bond is given and received under authority of ORS Chapter 279C, the provisions of which hereby are incorporated into this bond and made a part hereof.

IN WITNESS WHEREOF, WE HAVE CAUSED THIS INSTRUMENT TO BE EXECUTED AND SEALED BY OUR DULY AUTHORIZED LEGAL REPRESENTATIVES:

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

PRINCIPAL: \_\_\_\_\_

By \_\_\_\_\_

Signature

Official Capacity

Attest: \_\_\_\_\_

Corporation Secretary

SURETY: \_\_\_\_\_

*[Add signatures for each if using multiple bonds]*

BY ATTORNEY-IN-FACT:

*[Power-of-Attorney must accompany each bond]*

\_\_\_\_\_  
Name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Address

\_\_\_\_\_  
City State Zip

\_\_\_\_\_  
Phone Fax

**DIVISION 0 SECTION 00550**  
**FERN RIDGE SCHOOL DISTRICT**  
**GENERAL TERMS AND CONDITIONS FOR**  
**PUBLIC IMPROVEMENT CONTRACTS**

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FERN RIDGE SCHOOL DISTRICT  
GENERAL CONDITIONS FOR PUBLIC IMPROVEMENT CONTRACTS  
("General Conditions")

SECTION A  
GENERAL PROVISIONS

**A.1 DEFINITION OF TERMS**

In the Contract Documents the following terms shall be as defined below:

**ARCHITECT/ENGINEER**, means the Person appointed by the Owner to make drawings and specifications and, to provide contract administration of the Work contemplated by the Contract to the extent provided herein or by supplemental instruction of Owner (under which Owner may delegate responsibilities of the Owner's Authorized Representative to the Architect/Engineer), in accordance with ORS Chapter 671 (Architects) or ORS Chapter 672 (Engineers) and administrative rules adopted thereunder.

**CHANGE ORDER**, means a written order issued by the Owner's Authorized Representative to the Contractor requiring a change in the Work within the general scope of the Contract Documents, issued under the changes provisions of Section D.1 including Owner's written change directives as well as changes reflected in a writing executed by the parties to this Contract and, if applicable, establishing a Contract Price or Contract Time adjustment for the changed Work.

**CLAIM**, means a demand by Contractor pursuant to Section D.3 for review of the denial of Contractor's initial request for an adjustment of Contract terms, payment of money, extension of Contract Time or other relief, submitted in accordance with the requirements and within the time limits established for review of Claims in these General Conditions.

**CONTRACT**, means the written agreement between the Owner and the Contractor comprised of the Contract Documents which describe the Work to be done and the obligations between the parties.

**CONTRACT DOCUMENTS**, means the Solicitation Document and addenda thereto, the Fern Ridge School District Public Improvement Agreement Form, General Conditions, Supplemental General Conditions, if any, the accepted Offer, Plans, Specifications, amendments and Change Orders.

**CONTRACT PERIOD**, as set forth in the Contract Documents, means the total period of time beginning with the issuance of the Notice to Proceed and concluding upon Final Completion.

**CONTRACT PRICE**, means the total of the awarded Offer amount, as increased or decreased by the price of approved alternates and Change Orders.

**CONTRACT TIME**, means any incremental period of time allowed under the Contract to complete any portion of the Work as reflected in the project schedule.

**CONTRACTOR**, means the Person awarded the Contract for the Work contemplated.

**DAYS**, are calendar days, including weekdays, weekends and holidays, unless otherwise specified.

**DIRECT COSTS**, means, unless otherwise provided in the Contract Documents, the cost of materials, including sales tax, cost of delivery; cost of labor, including social security, old age and unemployment insurance, and fringe benefits required by agreement or custom; worker's compensation insurance; project specific insurance (including, without limitation, Builder's Risk Insurance and Builder's Risk Installation Floater); bond premiums, rental cost of equipment, and machinery required for execution of the work; and the additional costs of field personnel directly attributable to the Work.

**FINAL COMPLETION**, means the final completion of all requirements under the Contract, including Contract Closeout as described in Section K but excluding Warranty Work as described in Section I.2, and the final payment and release of all retainage, if any, released.

**FORCE MAJEURE**, means an act, event or occurrence caused by fire, riot, war, acts of God, nature, sovereign, or public enemy, strikes, freight embargoes or any other act, event or occurrence that is beyond the control of the party to this Contract who is asserting Force Majeure.

**NOTICE TO PROCEED**, means the official written notice from the Owner stating that the Contractor is to proceed with the Work defined in the Contract Documents. Notwithstanding the Notice to Proceed, Contractor shall not be authorized to proceed with the Work until all initial Contract requirements, including the Contract, performance bond and payment bond, and certificates of insurance, have been fully executed and submitted to Owner in a suitable form.

**OFFER**, means a bid in connection with an invitation to bid and a proposal in connection with a request for proposals.

**OFFEROR**, means a bidder in connection with an invitation to bid and a proposer in connection with a request for proposals.

**OVERHEAD**, means those items which may be included in the Contractor's markup (general and administrative expense and profit) and that shall not be charged as Direct Cost of the Work, including without limitation such Overhead expenses as wages or salary of personnel above the level of foreman (i.e., superintendents and project managers), expenses of Contractor's offices at the job site (e.g. job trailer) including expenses of personnel staffing the job site office, and Commercial General Liability Insurance and Automobile Liability Insurance.

**OWNER**, means the Fern Ridge School District acting by and through the governmental entity identified in the Solicitation Document.

**OWNER'S AUTHORIZED REPRESENTATIVE**, means those individuals identified in writing by the Owner to act on behalf of the Owner for this project. Owner may elect, by written notice to Contractor, to delegate certain duties of the Owner's Authorized Representative to more than one party, including without limitation, to an Architect/Engineer. However, nothing in these General Conditions is intended to abrogate the separate design professional responsibilities of Architects under ORS Chapter 671 or of Engineers under ORS Chapter 672.

**PERSON**, means an entity doing business as a sole proprietorship, a partnership, a joint venture, a corporation, a limited liability company or partnership, or any other entity possessing the legal capacity to contract.

**PLANS**, means the drawings which show the location, type, dimensions, and details of the Work to be done under the Contract.

**PUNCHLIST**, means the list of Work yet to be completed or deficiencies which need to be corrected in order to achieve Final Completion of the Contract.

**RECORD DOCUMENT**, means the as-built Plans, Specifications, testing and inspection records, product data, samples, manufacturer and distributor/supplier warranties evidencing transfer to Owner, operational and maintenance manuals, shop drawings, Change Orders, correspondence, certificate(s) of occupancy, and other documents listed in Subsection B.9.1 of these General Conditions, recording all Services performed.

**SOLICITATION DOCUMENT**, means an invitation to bid or request for proposal or request for quotes.

**SPECIFICATION**, means any description of the physical or functional characteristics of the Work, or of the nature of a supply, service or construction item. Specifications may include a description of any requirement for inspecting, testing or preparing a supply, service or construction item for delivery and the quantities or qualities of materials to be furnished under the Contract. Specifications generally will state the results or products to be obtained and may, on occasion, describe the method and manner of doing the work to be performed. Specifications may be incorporated by reference and/or may be attached to the Contract.

**SUBCONTRACTOR**, means a Person having a direct contract with the Contractor, or another Subcontractor, to perform one or more items of the Work.

**SUBSTANTIAL COMPLETION**, means the date when the Owner accepts in writing the construction, alteration or repair of the improvement to real property or any designated portion thereof as having reached that state of completion when it may be used or occupied for its intended purpose. Substantial Completion of facilities with operating systems occurs only after thirty (30) continuous Days of successful, trouble-free operation of the operating systems as provided in Section K.4.2.

**SUBSTITUTIONS**, means items that in function, performance, reliability, quality, and general configuration are the same or better than the product(s) specified. Approval of any substitute item shall be solely determined by the Owner's Authorized Representative. The decision of the Owner's Authorized Representative is final.

**SUPPLEMENTAL GENERAL CONDITIONS**, means those conditions that remove from, add to, or modify these General Conditions. Supplemental General Conditions may be

included in the Solicitation Document or may be a separate attachment to the Contract.

**WORK**, means the furnishing of all materials, equipment, labor, transportation, services and incidentals necessary to successfully complete any individual item or the entire Contract and the carrying out of duties and obligations imposed by the Contract Documents.

## **A.2 SCOPE OF WORK**

The Work contemplated under this Contract includes all labor, materials, transportation, equipment and services for, and incidental to, the completion of all construction work in connection with the project described in the Contract Documents. The Contractor shall perform all Work necessary so that the project can be legally occupied and fully used for the intended use as set forth in the Contract Documents.

## **A.3 INTERPRETATION OF CONTRACT DOCUMENTS**

A.3.1 Unless otherwise specifically defined in the Contract Documents, words which have well-known technical meanings or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. Contract Documents are intended to be complementary. Whatever is called for in one, is interpreted to be called for in all. However, in the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following descending order of precedence:

1. Contract amendments and Change Orders, with those of later date having precedence over those of an earlier date;
2. The Supplemental General Conditions;
3. The Fern Ridge School District Public Improvement Agreement Form;
4. The General Conditions
5. The Plans and Specifications
6. The Solicitation Document and any addenda thereto;
7. The accepted Offer.

A.3.2 In the case of an inconsistency between Plans and Specifications or within either document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Owner or Owner's Authorized Representative's interpretation in writing.

A.3.3 If the Contractor finds discrepancies in, or omissions from the Contract Documents, or if the Contractor is in doubt as to their meaning, the Contractor shall at once notify the Owner or Owner's Authorized Representative. Matters concerning performance under, and interpretation of, the Contract Documents will be decided by the Owner's Authorized Representative, who may delegate that duty in some instances to the Architect/Engineer. Responses to Contractor's requests for interpretation of Contract Documents will be made in writing by Owner's Authorized Representative (or the Architect/Engineer) within any time limits agreed upon or otherwise with reasonable promptness.

Interpretations and decisions of the Owner's Authorized Representative (or Architect/Engineer) will be consistent with the intent of and reasonably inferable from the Contract Documents. Contractor shall not proceed without direction in writing from the Owner's Authorized Representative (or Architect/Engineer).

- A.3.4 References to standard specifications, manuals, codes of any technical society, organization or association, to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, laws or regulations in effect in the jurisdiction where the project is occurring on the first published date of the Solicitation Document, except as may be otherwise specifically stated.

#### **A.4 EXAMINATION OF PLANS, SPECIFICATIONS, AND SITE**

- A.4.1 It is understood that the Contractor, before submitting an Offer, has made a careful examination of the Contract Documents; has become fully informed as to the quality and quantity of materials and the character of the Work required; and has made a careful examination of the location and conditions of the Work and the sources of supply for materials. The Owner will in no case be responsible for any loss or for any unanticipated costs that may be suffered by the Contractor as a result of the Contractor's failure to acquire full information in advance in regard to all conditions pertaining to the Work. No oral agreement or conversation with any officer, agent, or personnel of the Owner, or with the Architect/Engineer either before or after the execution of this Contract, shall affect or modify any of the terms or obligations herein contained.
- A.4.2 Should the Plans or Specifications fail to particularly describe the materials, kind of goods, or details of construction of any aspect of the Work, Contractor shall have the duty to make inquiry of the Owner and Architect/Engineer as to what is required prior to performance of the Work. Absent Specifications to the contrary, the materials or processes that would normally be used to produce first quality finished Work shall be considered a part of the Contract requirements.
- A.4.3 Any design errors or omissions noted by the Contractor shall be reported promptly to the Owner's Authorized Representative, including without limitation, any nonconformity with applicable laws, statutes, ordinances, building codes, rules and regulations.
- A.4.4 If the Contractor believes that additional cost or Contract Time is involved because of clarifications or instructions issued by the Owner's Authorized Representative (or Architect/Engineer) in response to the Contractor's notices or requests for information, the Contractor must submit a written request to the Owner's Authorized Representative, setting forth the nature and specific extent of the request, including all time and cost impacts against the Contract as soon as possible, but no later than thirty (30) Days after receipt by Contractor of the clarifications or instructions issued. If the Owner's Authorized Representative denies Contractor's request for additional compensation, additional Contract Time, or other relief that Contractor believes results from the clarifications or instructions, the Contractor may

proceed to file a Claim under Section D.3, Claims Review Process. If the Contractor fails to perform the obligations of Sections A.4.1 to A.4.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations.

#### **A.5 INDEPENDENT CONTRACTOR STATUS**

The service or services to be performed under this Contract are those of an independent contractor as defined in ORS 670.600. Contractor represents and warrants that it is not an officer, employee or agent of the Owner.

#### **A.6 RETIREMENT SYSTEM STATUS AND TAXES**

Contractor represents and warrants that it is not a contributing member of the Public Employees' Retirement System and will be responsible for any federal or state taxes applicable to payment received under this Contract. Contractor will not be eligible for any benefits from these Contract payments of federal Social Security, employment insurance, workers' compensation or the Public Employees' Retirement System, except as a self-employed individual. Unless the Contractor is subject to backup withholding, Owner will not withhold from such payments any amount(s) to cover Contractor's federal or state tax obligations.

#### **A.7 GOVERNMENT EMPLOYMENT STATUS**

- A.7.1 If this payment is to be charged against federal funds, Contractor represents and warrants that it is not currently employed by the Federal Government. This does not preclude the Contractor from holding another contract with the Federal Government.
- A.7.2 Contractor represents and warrants that Contractor is not an employee of the Fern Ridge School District for purposes of performing Work under this Contract.

### **SECTION B ADMINISTRATION OF THE CONTRACT**

#### **B.1 OWNERS ADMINISTRATION OF CONTRACT**

- B.1.1 The Owner's Authorized Representative will provide administration of the Contract as described in the Contract Documents (1) during construction (2) until final payment is due and (3) during the one-year period for correction of Work. The Owner's Authorized Representative will act on behalf of the Owner to the extent provided in the Contract Documents, unless modified in writing in accordance with other provisions of the Contract. In performing these tasks, the Owner's Authorized Representative may rely on the Architect/Engineer or other consultants to perform some or all of these tasks.
- B.1.2 The Owner's Authorized Representative will visit the site at intervals appropriate to the stage of the Contractor's operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. The Owner's Authorized Representative

will not make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Owner's Authorized Representative will neither have control over or charge of, nor be responsible for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work.

- B.1.3 Except as otherwise provided in the Contract Documents or when direct communications have been specifically authorized, the Owner and Contractor shall endeavor to communicate with each other through the Owner's Authorized Representative or designee about matters arising out of or relating to the Contract. Communications by and with the Architect/Engineer's consultants shall be through the Architect/Engineer. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner's Authorized Representative.
- B.1.4 Based upon the Architect/Engineer's evaluations of the Contractor's Application for Payment, or unless otherwise stipulated by the Owner's Authorized Representative, the Architect/Engineer will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

## **B.2 CONTRACTOR'S MEANS AND METHODS: MITIGATION OF IMPACTS**

- B.2.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures.
- B.2.2 The Contractor is responsible to protect and maintain the Work during the course of construction and to mitigate any adverse impacts to the project, including those caused by authorized changes, which may affect cost, schedule, or quality.
- B.2.3 The Contractor is responsible for the actions of all its personnel, laborers, suppliers, and Subcontractors on the project. The Contractor shall enforce strict discipline and good order among Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of persons who are unfit or unskilled for the tasks assigned to them.

## **B.3 MATERIALS AND WORKMANSHIP**

- B.3.1 The intent of the Contract Documents is to provide for the construction and completion in every detail of the Work described. All Work shall be performed in a professional manner and unless the means or methods of performing a task are specified elsewhere in the Contract Documents, Contractor shall employ methods that are generally accepted

and used by the industry, in accordance with industry standards.

- B.3.2 The Contractor is responsible to perform the Work as required by the Contract Documents. Defective Work shall be corrected at the Contractor's expense.
- B.3.3 Work done and materials furnished shall be subject to inspection and/or observation and testing by the Owner's Authorized Representative to determine if they conform to the Contract Documents. Inspection of the Work by the Owner's Authorized Representative does not relieve the Contractor of responsibility for the Work in accordance with the Contract Documents.
- B.3.4 Contractor shall furnish adequate facilities, as required, for the Owner's Authorized Representative to have safe access to the Work including without limitation walkways, railings, ladders, tunnels, and platforms. Producers, suppliers, and fabricators shall also provide proper facilities and access to their facilities.
- B.3.5 The Contractor shall furnish Samples of materials for testing by the Owner's Authorized Representative and include the cost of the Samples in the Contract Price.

## **B.4 PERMITS**

- B.4.1 Owner shall obtain and pay for all necessary permits, for temporary obstructions, enclosures, opening of streets for pipes, walls, utilities, environmental Work, etc., as required for the project. Contractor shall obtain and pay for any licenses needed for the construction of the Work. Contractor shall be responsible for all violations of the law, in connection with the construction or caused by obstructing streets, sidewalks or otherwise. Contractor shall give all requisite notices to public authorities. The Contractor shall pay all royalties and license fees. The Contractor shall defend all suits or claims for infringement of any patent or other proprietary rights and save harmless and blameless from loss, on account thereof, the State of Oregon, and its departments, divisions, members and employees.

## **B.5 COMPLIANCE WITH GOVERNMENT LAWS AND REGULATIONS**

- B.5.1 Contractor shall comply with all federal, state and local laws, codes, regulations and ordinances applicable to the Work and the Contract. Failure to comply with such requirements shall constitute a breach of Contract and shall be grounds for Contract termination. Without limiting the generality of the foregoing, Contractor expressly agrees to comply with the following as applicable: i) Title VI and VII of Civil Rights Act of 1964, as amended; (ii) Section 503 and 504 of the Rehabilitation Act of 1973, as amended; (iii) the Health Insurance Portability and Accountability Act of 1996; (iv) the Americans with Disabilities Act of 1990, as amended; (v) ORS Chapter 659A; as amended; (vi) all regulations and administrative rules established pursuant to the foregoing laws; and (vii) all other applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations. Owner's performance under the Contract is conditioned upon Contractor's compliance with the provisions of ORS 279C.505, 279C.510, 279C.515, 279C.520, and 279C.530, which are incorporated by

reference herein.

B.5.2 Contractor shall comply with all applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations; and

- (a) Contractor shall not discriminate against Disadvantaged, Minority, Women or Emerging Small Business enterprises, as those terms are defined in ORS 200.005, or a business enterprise that is owned or controlled by or that employs a disabled veteran, as that term is defined in ORS 408.225, in the awarding of subcontracts.
- (b) Contractor shall maintain, in current and valid form, all licenses and certificates required by law, regulation, or this Contract when performing the Work.

B.5.3 Unless contrary to federal law, Contractor shall certify that it shall not accept a bid from Subcontractors to perform Work as described in ORS 701.005 under this Contract unless such Subcontractors are registered with the Construction Contractors Board in accordance with ORS 701.035 to 701.055 at the time they submit their bids to the Contractor.

B.5.4 Unless contrary to federal law, Contractor shall certify that each landscape contractor, as defined in ORS 671.520(2), performing Work under this Contract holds a valid landscape contractor's license issued pursuant to ORS 671.560.

B.5.5 The following notice is applicable to Contractors who perform excavation Work. ATTENTION: Oregon law requires you to follow rules adopted by the Oregon Utility Notification Center. Those rules are set forth in OAR 952-001-0010 through OAR 952-001-0090. You may obtain copies of the rules by calling the center at (503)232-1987.

B.5.6 Failure to comply with any or all of the requirements of B.5.1 through B.5.5 shall be a breach of Contract and constitute grounds for Contract termination. Damages or costs resulting from such noncompliance shall be the responsibility of Contractor.

## **B.6 SUPERINTENDENCE**

Contractor shall keep on the site, during the progress of the Work, a competent superintendent and any necessary assistants who shall be satisfactory to the Owner and who shall represent the Contractor on the site. Directions given to the superintendent by the Owner's Authorized Representative shall be confirmed in writing to the Contractor.

## **B.7 INSPECTION**

B.7.1 Owner's Authorized Representative shall have access to the Work at all times.

B.7.2 Inspection of the Work will be made by the Owner's Authorized Representative at its discretion. The Owner's Authorized Representative will have authority to reject Work that does not conform to the Contract Documents. Any Work found to be not in conformance with the Contract Documents, in the discretion of the Owner's Authorized Representative, shall be removed and replaced at the Contractor's expense.

B.7.3 Contractor shall make or obtain at the appropriate time all tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work. The Contractor shall give the Owner's Authorized Representative timely notice of when and where tests and inspections are to be made so that the Owner's Authorized Representative may be present for such procedures. Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Owner's Authorized Representative.

B.7.4 As required by the Contract Documents, Work done or material used without inspection or testing by the Owner's Authorized Representative may be ordered removed at the Contractor's expense.

B.7.5 If directed to do so any time before the Work is accepted, the Contractor shall uncover portions of the completed Work for inspection. After inspection, the Contractor shall restore such portions of Work to the standard required by the Contract. If the Work uncovered is unacceptable or was done without sufficient notice to the Owner's Authorized Representative, the uncovering and restoration shall be done at the Contractor's expense. If the Work uncovered is acceptable and was done with sufficient notice to the Owner's Authorized Representative, the uncovering and restoration will be paid for as a Change Order.

B.7.6 If any testing or inspection reveals failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Owner's Authorized Representative's and Architect/Engineer's services and expenses, shall be at the Contractor's expense.

B.7.7 When the United States government participates in the cost of the Work, or the Owner has an agreement with other public or private organizations, or if any portion of the Work is being performed for a third party or in close proximity to third party facilities, representatives of these organizations have the right to inspect the Work affecting their interests or property. Their right to inspect shall not make them a party to the Contract and shall not interfere with the rights of the parties of the Contract. Instructions or orders of such parties shall be transmitted to the Contractor, through the Owner's Authorized Representative.

## **B.8 SEVERABILITY**

If any provision of this Contract is declared by a court to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected and the rights and obligations of the parties shall be construed and

enforced as if the Contract did not contain the particular provision held to be invalid.

#### **B.9 ACCESS TO RECORDS**

B.9.1 Contractor shall keep, at all times on the Work site, one record copy of the complete Contract Documents, including the Plans, Specifications, Change Orders and addenda, in good order and marked currently to record field changes and selections made during construction, and one record copy of Shop Drawings, Product Data, Samples and similar submittals, and shall at all times give the Owner's Authorized Representative access thereto.

B.9.2 Contractor shall retain and the Owner and its duly authorized representatives shall have access to, for a period not less than ten (10) years, all Record Documents, financial and accounting records, and other books, documents, papers and records of Contractor which are pertinent to the Contract including records pertaining to Overhead and indirect costs, for the purpose of making audit, examination, excerpts and transcripts. If for any reason, any part of the Contract is involved in litigation, Contractor shall retain all such records until all litigation is resolved. The Owner and/or its agents shall continue to be provided full access to the records during litigation.

#### **B.10 WAIVER**

Failure of the Owner to enforce any provision of this Contract shall not constitute a waiver or relinquishment by the Owner of the right to such performance in the future nor of the right to enforce any other provision of this Contract.

#### **B.11 SUBCONTRACTS AND ASSIGNMENT**

B.11.1 Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound by the terms and conditions of these General Conditions, and to assume toward the Contractor all of the obligations and responsibilities which the Contractor assumes toward the Owner thereunder, unless (1) the same are clearly inapplicable to the subcontract at issue because of legal requirements or industry practices, or (2) specific exceptions are requested by Contractor and approved in writing by Owner. Where appropriate, Contractor shall require each Subcontractor to enter into similar agreements with sub-subcontractors at any level.

B.11.2 At Owner's request, Contractor shall submit to Owner prior to their execution either Contractor's form of subcontract, or the subcontract to be executed with any particular Subcontractor. If Owner disapproves such form, Contractor shall not execute the form until the matters disapproved are resolved to Owner's satisfaction. Owner's review, comment upon or approval of any such form shall not relieve Contractor of its obligations under this Agreement or be deemed a waiver of such obligations of Contractor.

B.11.3 Contractor shall not assign, sell, or transfer its rights, or delegate its responsibilities under this Contract, in whole or in part, without the prior written approval of the Owner. No such written approval shall relieve Contractor of any obligations of this Contract, and any transferee shall be considered the agent of the Contractor and bound to perform in accordance with

the Contract Documents. Contractor shall remain liable as between the original parties to the Contract as if no assignment had occurred.

#### **B.12 SUCCESSORS IN INTEREST**

The provisions of this Contract shall be binding upon and shall accrue to the benefit of the parties to the Contract and their respective permitted successors and assigns.

#### **B.13 OWNER'S RIGHT TO DO WORK**

Owner reserves the right to perform other or additional work at or near the project site with other forces than those of the Contractor. If such work takes place within or next to the project site, Contractor will coordinate work with the other contractors or forces, cooperate with all other contractors or forces, carry out the Work in a way that will minimize interference and delay for all forces involved, place and dispose of materials being used so as not to interfere with the operations of another, and join the Work with the work of the others in an acceptable manner and perform it in proper sequence to that of the others. The Owner's Authorized Representative will resolve any disagreements that may arise between or among Contractor and the other contractors over the method or order of doing all work (including the Work). In case of unavoidable interference, the Owner's Authorized Representative will establish work priority (including the Work) which generally will be in the sequence that the contracts were awarded.

#### **B.14 OTHER CONTRACTS**

In all cases and at any time, the Owner has the right to execute other contracts related to or unrelated to the Work of this Contract. The Contractor of this Contract will fully cooperate with any and all other contractors without additional cost to the Owner in the manner described in section B.13.

#### **B.15 GOVERNING LAW**

This Contract shall be governed by and construed in accordance with the laws of the State of Oregon without regard to principles of conflict of laws.

#### **B.16 LITIGATION**

Any Claim between Owner and Contractor that arises from or relates to this Contract and that is not resolved through the Claims Review Process in Section D.3 shall be brought and conducted solely and exclusively within the Circuit Court of FERN RIDGE for the Fern Ridge School District; provided, however, if a Claim must be brought in a federal forum, then it shall be brought and conducted solely and exclusively within the United States District Court for the District of Oregon. In no event shall this section be construed as a waiver by the Fern Ridge School District on any form of defense or immunity, whether sovereign immunity, governmental immunity, immunity based on the Eleventh Amendment to the Constitution of the United States or otherwise, from any claim or from the jurisdiction of any court. CONTRACTOR BY EXECUTION OF THIS CONTRACT HEREBY CONSENTS TO THE IN PERSONAM JURISDICTION OF THE COURTS REFERENCED IN THIS SECTION B.16.

#### **B.17 ALLOWANCES**

B.17.1 The Contractor shall include in the Contract Price all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such



amounts and by such persons or entities as the Owner may direct.

B.17.2 Unless otherwise provided in the Contract Documents:

- (a) When finally reconciled, allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- (b) Contractor's costs for unloading and handling at the site, labor, installation costs, Overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Price but not in the allowances;
- (c) Whenever costs are more than or less than allowances, the Contract Price shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section B.17.2(a) and (2) changes in Contractor's costs under Section B.17.2(b).
- (d) Unless Owner requests otherwise, Contractor shall provide to Owner a proposed fixed price for any allowance work prior to its performance.

#### **B.18 SUBMITTALS, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES**

B.18.1 The Contractor shall prepare and keep current, for the Architect's/Engineer's approval (or for the approval of Owner's Authorized Representative if approval authority has not been delegated to the Architect/Engineer), a schedule and list of submittals which is coordinated with the Contractor's construction schedule and allows the Architect/Engineer reasonable time to review submittals. Owner reserves the right to finally approve the schedule and list of submittals. Submittals include, without limitation, Shop Drawings, Product Data, and Samples which are described below:

- (a) Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor (including any sub-subcontractor), manufacturer, supplier or distributor to illustrate some portion of the Work.
- (b) Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.
- (c) Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

B.18.2 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required by the Contract Documents the way by which the Contractor proposes to conform to the information given and the design concept expressed

in the Contract Documents. Review of submittals by the Architect/Engineer is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, or for approval of safety precautions or, unless otherwise specifically stated by the Architect/Engineer, of any construction means, methods, techniques, sequences or procedures, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect/Engineer's review of the Contractor's submittals shall not relieve the Contractor of its obligations under the Contract Documents. The Architect/Engineer's approval of a specific item shall not indicate approval of an assembly of which the item is a component. Informational submittals upon which the Architect/Engineer is not expected to take responsive action may be so identified in the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the Architect/Engineer without action.

B.18.3 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect/Engineer Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect/Engineer without action.

B.18.4 By approving and submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

B.18.5 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect/Engineer.

B.18.6 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect/Engineer's review or approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect/Engineer in writing of such deviation at the time of submittal and:

- (i) the Architect/Engineer has given written approval to the specific deviation as a minor change in the Work, or (ii) a Change Order has been executed by Owner authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect/Engineer's review or approval thereof.

B.18.7 In the event that Owner elects not to have the obligations and duties described under this Section

B.18 performed by the Architect/Engineer, or in the event no Architect/Engineer is employed by Owner on the project, all obligations and duties assigned to the Architect/Engineer hereunder shall be performed by the Owner's Authorized Representative.

#### **B.19 SUBSTITUTIONS**

The Contractor may make Substitutions only with the consent of the Owner, after evaluation by the Owner's Authorized Representative and only in accordance with a Change Order. Substitutions shall be subject to the requirements of the bid documents. By making requests for Substitutions, the Contractor represents that the Contractor has personally investigated the proposed substitute product; represents that the Contractor will provide the same warranty for the Substitution that the Contractor would for the product originally specified unless approved otherwise; certifies that the cost data presented is complete and includes all related costs under this Contract including redesign costs, and waives all claims for additional costs related to the Substitution which subsequently become apparent; and will coordinate the installation of the accepted Substitution, making such changes as may be required for the Work to be completed in all respects.

#### **B.20 USE OF PLANS AND SPECIFICATIONS**

Plans, Specifications and related Contract Documents furnished to Contractor by Owner or Owner's Architect/Engineer shall be used solely for the performance of the Work under this Contract. Contractor and its Subcontractors and suppliers are authorized to use and reproduce applicable portions of such documents appropriate to the execution of the Work, but shall not claim any ownership or other interest in them beyond the scope of this Contract, and no such interest shall attach. Unless otherwise indicated, all common law, statutory and other reserved rights, in addition to copyrights, are retained by Owner.

#### **B.21 FUNDS AVAILABLE AND AUTHORIZED**

Owner reasonably believes at the time of entering into this Contract that sufficient funds are available and authorized for expenditure to finance the cost of this Contract within the Owner's appropriation or limitation. Contractor understands and agrees that, to the extent that sufficient funds are not available and authorized for expenditure to finance the cost of this Contract, Owner's payment of amounts under this Contract attributable to Services performed after the last day of the current biennium is contingent on Owner receiving from the Oregon Legislative Assembly appropriations, limitations or other expenditure authority sufficient to allow Owner, in the exercise of its reasonable administrative discretion, to continue to make payments under this Contract.

#### **B.22 NO THIRD PARTY BENEFICIARIES**

Owner and Contractor are the only parties to this Contract and are the only parties entitled to enforce its terms. Nothing in this Contract gives, is intended to give, or shall be construed to give or provide any benefit or right, whether directly, indirectly, or otherwise, to third persons unless such third persons are individually identified by name herein and expressly described as intended beneficiaries of the terms of this Contract.

### **SECTION C WAGES AND LABOR**

#### **C.1 MINIMUM WAGE RATES ON PUBLIC WORKS**

Contractor shall comply fully with the provisions of ORS 279C.800 through 279C.870. Documents establishing those conditions, as determined by the Commissioner of the Bureau of Labor and Industries (BOLI), are included as attachments to or are incorporated by reference in the Contract Documents. Contractor shall pay workers at not less than the specified minimum hourly rate of wage, and shall include that requirement in all subcontracts.

#### **C.2 PAYROLL CERTIFICATION; ADDITIONAL RETAINAGE; FEE REQUIREMENTS**

C.2.1 In accordance with ORS 279C.845, the Contractor and every Subcontractor shall submit written certified statements to the Owner's Authorized Representative, on the form prescribed by the Commissioner of the Bureau of Labor and Industries, certifying the hourly rate of wage paid each worker which the Contractor or the Subcontractor has employed on the project and further certifying that no worker employed on the project has been paid less than the prevailing rate of wage or less than the minimum hourly rate of wage specified in the Contract, which certificate and statement shall be verified by the oath of the Contractor or the Subcontractor that the Contractor or Subcontractor has read the certified statement, that the Contractor or Subcontractor knows the contents of the certified statement and that to the Contractor's or Subcontractor's best knowledge and belief the certified statement is true. The certified statements shall set out accurately and completely the payroll records for the prior week including the name and address of each worker, the worker's correct classification, rate of pay, daily and weekly number of hours worked, deductions made and actual wages paid. Certified statements for each week during which the Contractor or Subcontractor has employed a worker on the project shall be submitted once a month, by the fifth business day of the following month.

The Contractor and Subcontractors shall preserve the certified statements for a period of ten (10) years from the date of completion of the Contract.

C.2.2 Pursuant to ORS 279C.845(7), the Owner shall retain 25 percent of any amount earned by the Contractor on this public works project until the Contractor has filed the certified statements required by section C.2.1. The Owner shall pay to the Contractor the amount retained under this subsection within 14 days after the Contractor files the required certified statements, regardless of whether a Subcontractor has failed to file certified statements.

C.2.3 Pursuant to ORS 279C.845(8), the Contractor shall retain 25 percent of any amount earned by a first-tier Subcontractor on this public works project until the first-tier Subcontractor has filed with the Owner the certified statements required by C.2.1. Before paying any amount retained under this subsection, the Contractor shall verify that the first-tier Subcontractor has filed the certified statement. Within 14 days after the first-tier Subcontractor files the required certified statement the Contractor shall pay the first-tier Subcontractor any amount retained under this subsection.

- C.2.4 In accordance with statutory requirements, and administrative rules promulgated by the Commissioner of the Bureau of Labor and Industries, the fee required by ORS 279C.825(1) will be paid by Owner to the Commissioner.

### **C.3 PROMPT PAYMENT AND CONTRACT CONDITIONS**

- C.3.1 Pursuant to ORS 279C.505 and as a condition to Owner's performance hereunder, the Contractor shall:

C.3.1.1 Make payment promptly, as due, to all persons supplying to Contractor labor or materials for the prosecution of the Work provided for in this Contract.

C.3.1.2 Pay all contributions or amounts due the State Industrial Accident Fund from such Contractor or Subcontractor incurred in the performance of the Contract.

C.3.1.3 Not permit any lien or claim to be filed or prosecuted against the Owner on account of any labor or material furnished. Contractor will not assign any claims that Contractor has against Owner, or assign any sums due by Owner, to Subcontractors, suppliers, or manufacturers, and will not make any agreement or act in any way to give Subcontractors a claim or standing to make a claim against the Owner.

C.3.1.4 Pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.

C.3.1.5 Demonstrate that an employee drug testing program is in place as follows:

- (a) Contractor represents and warrants that Contractor has in place at the time of the execution of this Contract, and shall maintain during the term of this Contract, a Qualifying Employee Drug Testing Program for its employees that includes, at a minimum, the following:

- (1) A written employee drug testing policy,
- (2) Required drug testing for all new Subject Employees or, alternatively, required testing of all Subject Employees every 12 months on a random selection basis, and
- (3) Required testing of a Subject Employee when the Contractor has reasonable cause to believe the Subject Employee is under the influence of drugs.

A drug testing program that meets the above requirements will be deemed a "Qualifying Employee Drug Testing Program." For the purposes of this section, an employee is a "Subject Employee" only if that employee will be working on the project job site.

- (b) Contractor shall require each Subcontractor providing labor for the project to:

- (1) Demonstrate to the Contractor that it has a Qualifying Employee Drug Testing Program for the Subcontractor's Subject Employees,

and represent and warrant to the Contractor that the Qualifying Employee Drug Testing Program is in place at the time of subcontract execution and will continue in full force and effect for the duration of the subcontract, or

- (2) Require that the Subcontractor's Subject Employees participate in the Contractor's Qualifying Employee Drug Testing Program for the duration of the subcontract.

C.3.2 Pursuant to ORS 279C.515, and as a condition to Owner's performance hereunder, Contractor agrees:

C.3.2.1 If Contractor fails, neglects or refuses to pay promptly a person's claim for labor or services that the person provides to the Contractor or a Subcontractor in connection with the project as such claim becomes due, the proper officer that represents the Owner may pay the amount of the claim and charge the amount of the payment against funds due or to become due Contractor under this Contract. Paying a claim in this manner shall not relieve the Contractor or the Contractor's surety from obligation with respect to an unpaid claim.

C.3.2.2 If the Contractor or a first-tier Subcontractor fails, neglects or refuses to pay a person that provides labor or materials in connection with the public contract for a public improvement within thirty (30) Days after receiving payment from Owner or a contractor, the contractor or first-tier Subcontractor owes the person the amount due plus interest charges that begin at the end of the 10-Day period within which payment is due under ORS 279C.580(3) and that end upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.580. The rate of interest on the amount due is nine percent per annum. The amount of interest may not be waived.

C.3.2.3 If the Contractor or a Subcontractor fails, neglects or refuses to pay a person that provides labor or materials in connection with the Contract, the person may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580. Every contract related to this Contract must contain a similar clause.

C.3.3 Pursuant to ORS 279C.580, Contractor shall include in each subcontract for property or services the Contractor enters into with a first-tier Subcontractor, including a material supplier, for the purpose of performing a construction contract:

- (a) A payment clause that obligates the Contractor to pay the first-tier Subcontractor for satisfactory performance under the subcontract within ten (10) Days out of amounts the Owner pays to the Contractor under the Contract;
- (b) A clause that requires the Contractor to provide the first-tier Subcontractor with a standard form that the first-tier Subcontractor may use as an application for payment or as another method by which the Subcontractor may claim a payment due from the Contractor;

- (c) A clause that requires the Contractor, except as otherwise provided in this paragraph, to use the same form and regular administrative procedures for processing payments during the entire term of the subcontract. The Contractor may change the form or the regular administrative procedures the Contractor uses for processing payments if the Contractor:

- (1) Notifies the Subcontractor in writing at least 45 days before the date on which the Contractor makes the change; and
- (2) Includes with the written notice a copy of the new or changed form or a description of the new or changed procedure.

- (d) An interest penalty clause that obligates the Contractor, if the Contractor does not pay the first-tier Subcontractor within thirty (30) Days after receiving payment from Owner, to pay the first-tier Subcontractor an interest penalty on amounts due in each payment the Contractor does not make in accordance with the payment clause included in the subcontract under paragraph (a) of this subsection. Contractor or first-tier Subcontractor is not obligated to pay an interest penalty if the only reason that the Contractor or first-tier Subcontractor did not make payment when payment was due is that the Contractor or first-tier Subcontractor did not receive payment from Owner or Contractor when payment was due. The interest penalty applies to the period that begins on the day after the required payment date and that ends on the date on which the amount due is paid; and is computed at the rate specified in ORS 279C.515(2).

- (e) A clause which requires each of Contractor's Subcontractors to include, in each of their contracts with lower-tier Subcontractors or suppliers, provisions to the effect that the first-tier Subcontractor shall pay its lower-tier Subcontractors and suppliers in accordance with the provisions of paragraphs (a) through (d) above and requiring each of their Subcontractors and suppliers to include such clauses in their subcontracts and supply contracts.

C.3.4 All employers, including Contractor, that employ subject workers who work under this contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its Subcontractors complies with these requirements.

#### **C.4 PAYMENT FOR MEDICAL CARE**

Pursuant to ORS 279C.530, and as a condition to Owner's performance hereunder, Contractor shall promptly, as due, make payment to any person, partnership, association or corporation furnishing medical, surgical, and hospital care or other needed care and attention, incident to sickness or injury, to the employees of such Contractor, all sums of which the Contractor agrees to pay for such services and all moneys and sums which the Contractor has collected or deducted from the wages of personnel pursuant to any law, contract or agreement for the purpose of providing or paying for such services.

#### **C.5 HOURS OF LABOR**

As a condition to Owner's performance hereunder, Contractor shall comply with ORS 279C.520, as amended from time to time and incorporated herein by this reference:

Pursuant to ORS 279C.520 and as a condition to Owner's performance hereunder, no person shall be employed to perform Work under this Contract for more than ten (10) hours in any one day or forty (40) hours in any one week, except in cases of necessity, emergency or where public policy absolutely requires it. In such instances, Contractor shall pay the employee at least time and a half pay:

- (a) For all overtime in excess of eight (8) hours a day or forty (40) hours in any one week when the work week is five consecutive Days, Monday through Friday; or
- (b) For all overtime in excess of ten (10) hours a day or forty (40) hours in any one week when the work week is four consecutive Days, Monday through Friday; and
- (c) For all Work performed on Saturday and on any legal holiday specified in ORS 279C.540.

This section C.5 will not apply to Contractor's Work under this Contract if Contractor is currently a party to a collective bargaining agreement with any labor organization.

This Section C.5 shall not excuse Contractor from completion of the Work within the time required under this Contract.

### **SECTION D** **CHANGES IN THE WORK**

#### **D.1 CHANGES IN WORK**

D.1.1 The terms of this Contract shall not be waived, altered, modified, supplemented or amended in any manner whatsoever without prior written approval of the Owner's Authorized Representative, and then only in a manner consistent with the Change Order provisions of this Section D.1 and after any necessary approvals required by public contracting laws have been obtained. Otherwise, a formal contract amendment is required, which shall not be effective until its execution by the parties to this Contract and all approvals required by public contracting laws have been obtained.

D.1.2 It is mutually agreed that changes in Plans, quantities, or details of construction are inherent in the nature of construction and may be necessary or desirable during the course of construction. Within the general scope of this Contract, the Owner's Authorized Representative may at any time, without notice to the sureties and without impairing the Contract, require changes consistent with this Section D.1. All Change Order Work shall be executed under the conditions of the Contract Documents. Such changes may include, but are not limited to:

- (a) Modification of specifications and design.
- (b) Increases or decreases in quantities.
- (c) Increases or decreases to the amount of Work.

- (d) Addition or elimination of any Work item.
- (e) Change in the duration of the project.
- (f) Acceleration or delay in performance of Work.
- (g) Deductive changes.

Deductive changes are those that reduce the scope of the Work, and shall be made by mutual agreement whenever feasible, as determined by Owner. In cases of suspension or partial termination under Section J, Owner reserves the right to unilaterally impose a deductive change and to self-perform such Work, for which the provisions of B.13 (Owner's Right to Do Work) shall then apply.

Adjustments in compensation shall be made under the provisions of D.1.3, in which costs for deductive changes shall be based upon a Direct Costs adjustment together with the related percentage markup specified for profit, Overhead and other indirect costs, unless otherwise agreed to by Owner.

D.1.3 The Owner and Contractor agree that Change Order Work shall be administered and compensated according to the following:

- (a) *Unit pricing* may be utilized at the Owner's option when unit prices or solicitation alternates were provided that established the cost for additional Work, and a binding obligation exists under the Contract on the parties covering the terms and conditions of the additional Work.
- (b) If the Owner elects not to utilize unit pricing, or in the event that unit pricing is not available or appropriate, *fixed pricing* may be used for Change Order Work. In fixed pricing the basis of payments or total price shall be agreed upon in writing between the parties to the Contract, and shall be established before the Work is done whenever feasible. The mark-ups set forth in D.1.3(c) shall be utilized by the parties as a guide in establishing fixed pricing, and will not be exceeded by Owner without adequate justification. Cost and price data relating to Change Orders shall be supplied by Contractor to Owner upon request, but Owner shall be under no obligation to make such requests.
- (c) In the event that unit pricing and fixed pricing are not utilized, then Change Order Work shall be performed on a *cost reimbursement* basis for Direct Costs. Such Work shall be compensated on the basis of the actual, reasonable and allowable cost of labor, equipment, and material furnished on the Work performed. In addition, the following markups shall be added to the Contractor's or Subcontractor's Direct Costs as full compensation for profit, Overhead and other indirect costs for Work directly performed with the Contractor's or Subcontractor's own forces:

On Labor.....	15%
On Equipment.....	10%
On Materials.....	10%

When Change Order Work under D.1.3(c) is invoiced by an authorized Subcontractor at any level, each ascending

tier Subcontractor or Contractor will be allowed a 5% supplemental mark-up on each piece of subcontract Work covered by such Change Order.

Payments made to the Contractor shall be complete compensation for Overhead, profit, and all costs that were incurred by the Contractor or by other forces furnished by the Contractor, including Subcontractors, for Change Order Work. Owner may establish a maximum cost for Change Order Work under this Section D.1.3(c), which shall not be exceeded for reimbursement without additional written authorization from Owner. Contractor shall not be required to complete such Change Order Work without additional authorization.

D.1.4 Any necessary adjustment of Contract Time that may be required as a result of a Change Order must be agreed upon by the parties before the start of the Change Order Work unless Owner's Authorized Representative authorizes Contractor to start the Work before agreement on Contract Time adjustment. Contractor shall submit any request for additional compensation (and additional Contract Time if Contractor was authorized to start Work before an adjustment of Contract Time was approved) as soon as possible but no later than thirty (30) Days after receipt of the Change Order. If Contractor's request for additional compensation or adjustment of Contract Time is not made within the thirty (30) day time limit, Contractor's requests pertaining to that Change Order are barred. The thirty (30) day time limit for making requests shall not be extended for any reason, including without limitation Contractor's claimed inability to determine the amount of additional compensation or adjustment of Contract Time, unless an extension is granted in writing by Owner. If the Owner's Authorized Representative denies Contractor's request for additional compensation or adjustment of Contract Time, Contractor may proceed to file a Claim under Section D.3, Claims Review Process. No other reimbursement, compensation, or payment will be made, except as provided in Section D.1.5 for impact claims.

D.1.5 If any Change Order Work under Section D.1.3 causes an increase or decrease in the Contractor's cost of, or the Contract Time required for the performance of, any other part of the Work under this Contract, the Contractor must submit a written request to the Owner's Authorized Representative, setting forth the nature and specific extent of the request, including all time and cost impacts against the Contract as soon as possible, but no later than thirty (30) Days after receipt of the Change Order by Contractor.

The thirty (30) day time limit applies to claims of Subcontractors, suppliers, or manufacturers that may be affected by the Change Order and that request additional compensation or an extension of Contract Time to perform; Contractor has responsibility for contacting its Subcontractors, suppliers, or manufacturers within the thirty (30) day time limit, and including their requests with Contractor's requests. If the request involves Work to be completed by Subcontractors, or materials to be furnished by suppliers or manufacturers, such requests shall be submitted to the Contractor in writing with full analysis and justification for the compensation and additional Contract Time

requested. The Contractor will analyze and evaluate the merits of the requests submitted by Subcontractors, suppliers, and manufacturers to Contractor prior to including those requests and Contractor's analysis and evaluation of those requests with Contractor's requests for additional compensation or Contract Time that Contractor submits to the Owner's Authorized Representative. Failure of Subcontractors, suppliers, manufacturers or others to submit their requests to Contractor for inclusion with Contractor's requests submitted to Owner's Authorized Representative within the time period and by the means described in this section shall constitute a waiver of these Subcontractor claims. The Owner's Authorized Representative and the Owner will not consider direct requests or claims from Subcontractors, suppliers, manufacturers or others not a party to this Contract. The consideration of such requests and claims under this section does not give any person, not a party to the Contract the right to bring a claim against the Fern Ridge School District, whether in this claims process, in litigation, or in any dispute resolution process.

If the Owner's Authorized Representative denies the Contractor's request for additional compensation or an extension of Contract Time, the Contractor may proceed to file a Claim under Section D.3, Claims Review Process.

D.1.6 No request or Claim by the Contractor for additional costs or an extension of Contract Time shall be allowed if made after receipt of final payment application under this Contract. Contractor agrees to submit its final payment application within ninety (90) days after Substantial Completion, unless written extension is granted by Owner. Contractor shall not delay final payment application for any reason, including without limitation nonpayment of Subcontractors, suppliers, manufacturers or others not a party to this Contract, or lack of resolution of a dispute with Owner or any other person of matters arising out of or relating to the Contract. If Contractor fails to submit its final payment application within ninety (90) days after Substantial Completion, and Contractor has not obtained written extension by Owner, all requests or Claims for additional costs or an extension of Contract Time shall be waived.

D.1.7 It is understood that changes in the Work are inherent in construction of this type. The number of changes, the scope of those changes, and the effect they have on the progress of the original Work cannot be defined at this time. The Contractor is notified that numerous changes may be required and that there will be no compensation made to the Contractor directly related to the number of changes. Each change will be evaluated for extension of Contract Time and increase or decrease in compensation based on its own merit.

## **D.2 DELAYS**

D.2.1 Delays in construction include "Avoidable Delays", which are defined in Section D.2.1.1, and "Unavoidable Delays", which are defined in Section D.2.1.2. The effect of Avoidable Delays is described in Section D.2.2 and the effect of Unavoidable Delays is described in Section D.2.3.

D.2.1.1 Avoidable Delays include any delays other than Unavoidable Delays, and include delays that

otherwise would be considered Unavoidable Delays but that:

- (a) Could have been avoided by the exercise of care, prudence, foresight, and diligence on the part of the Contractor or its Subcontractors.
- (b) Affect only a portion of the Work and do not necessarily prevent or delay the prosecution of other parts of the Work nor the completion of the whole Work within the Contract Time.
- (c) Do not impact activities on the accepted critical path schedule.
- (d) Are associated with the reasonable interference of other contractors employed by the Owner that do not necessarily prevent the completion of the whole Work within the Contract Time.

D.2.1.2 Unavoidable Delays include delays other than Avoidable Delays that are:

- (a) Caused by any actions of the Owner, Owner's Authorized Representative, or any other employee or agent of the Owner, or by separate contractor employed by the Owner.
- (b) Caused by any site conditions which differ materially from what was represented in the Contract Documents or from conditions that would normally be expected to exist and be inherent to the construction activities defined in the Contract Documents. The Contractor shall notify the Owner's Authorized Representative immediately of differing site conditions before the area has been disturbed. The Owner's Authorized Representative will investigate the area and make a determination as to whether or not the conditions differ materially from either the conditions stated in the Contract Documents or those which could reasonably be expected in execution of this particular Contract. If Contractor and the Owner's Authorized Representative agree that a differing site condition exists, any additional compensation or additional Contract Time will be determined based on the process set forth in Section D.1.5 for Change Order Work. If the Owner's Authorized Representative disagrees that a differing site condition exists and denies Contractor's request for additional compensation or Contract Time, Contractor may proceed to file a Claim under Section D.3, Claims Review Process.
- (c) Caused by Force Majeure acts, events or occurrences that could not have been avoided by the exercise of care, prudence, foresight, and diligence on the part of the Contractor or its Subcontractors.
- (d) Caused by adverse weather conditions. Any adverse weather conditions must be substantiated by documentary evidence that weather conditions were abnormal for the specific time period claimed, could not have been anticipated by the Contractor, and adversely impacted the project in a manner that could not be avoided by rescheduling the Work or by implementing measures to protect against the weather so that the Work could proceed. A rain, windstorm, high water, or other natural

phenomenon for the specific locality of the Work, which might reasonably have been anticipated from the previous 10-year historical records of the general locality of the Work, shall not be construed as abnormal. The parties agree that rainfall greater than the following levels cannot be reasonably anticipated:

- (i) Daily rainfall equal to, or greater than, 0.50 inch during a month when the monthly rainfall exceeds the normal monthly average by twenty-five percent (25 %) or more.
- (ii) daily rainfall equal to, or greater than, 0.75 inch at any time.

The Office of the Environmental Data Service of the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce nearest the project site shall be considered the official agency of record for weather information.

D.2.2 Except as otherwise provided in ORS 279C.315, Contractor shall not be entitled to additional compensation or additional Contract Time for Avoidable Delays.

D.2.3 In the event of Unavoidable Delays, based on principles of equitable adjustment, Contractor may be entitled to the following:

- (a) Contractor may be entitled to additional compensation or additional Contract Time, or both, for Unavoidable Delays described in Section D.2.1.2 (a) and (b).
- (b) Contractor may be entitled to additional Contract Time for Unavoidable Delays described in Section D.2.1.2(c) and (d).

In the event of any requests for additional compensation or additional Contract Time, or both, as applicable, arising under this Section D.2.3 for Unavoidable Delays, other than requests for additional compensation or additional Contract Time for differing site conditions for which a review process is established under Section D.2.1.2 (b), Contractor shall submit a written notification of the delay to the Owner's Authorized Representative within two (2) Days of the occurrence of the cause of the delay. This written notification shall state the cause of the potential delay, the project components impacted by the delay, and the anticipated additional Contract Time or the additional compensation, or both, as applicable, resulting from the delay. Within seven (7) Days after the cause of the delay has been mitigated, or in no case more than thirty (30) Days after the initial written notification, the Contractor shall submit to the Owner's Authorized Representative, a complete and detailed request for additional compensation or additional Contract Time, or both, as applicable, resulting from the delay. If the Owner's Authorized Representative denies Contractor's request for additional compensation or adjustment of Contract Time, the Contractor may proceed to file a Claim under Section D.3, Claims Review Process.

If Contractor does not timely submit the notices required under this Section D.2., then unless otherwise prohibited by law, Contractor's Claim shall be barred.

### **D.3 CLAIMS REVIEW PROCESS**

D.3.1 All Contractor Claims shall be referred to the Owner's Authorized Representative for review. Contractor's Claims, including Claims for additional compensation or additional Contract Time, shall be submitted in writing by Contractor to the Owner's Authorized Representative within five (5) Days after a denial of Contractor's initial request for an adjustment of Contract terms, payment of money, extension of Contract Time or other relief, provided that such initial request has been submitted in accordance with the requirements and within the time limits established in these General Conditions. Within thirty (30) Days after the initial Claim, Contractor shall submit to the Owner's Authorized Representative, a complete and detailed description of the Claim (the "Detailed Notice") that includes all information required by Section D.3.2. Unless the Claim is made in accordance with these time requirements, it shall be waived.

D.3.2 The Detailed Notice of the Claim shall be submitted in writing by Contractor and shall include a detailed, factual statement of the basis of the Claim, pertinent dates, Contract provisions which support or allow the Claim, reference to or copies of any documents which support the Claim, the dollar value of the Claim, and the Contract Time extension requested for the Claim. If the Claim involves Work to be completed by Subcontractors, the Contractor will analyze and evaluate the merits of the Subcontractor claim prior to forwarding it and that analysis and evaluation to the Owner's Authorized Representative. The Owner's Authorized Representative and the Owner will not consider direct claims from Subcontractors, suppliers, manufacturers, or others not a party to this Contract. Contractor agrees that it will make no agreement, covenant, or assignment, nor will it commit any other act that will permit or assist any Subcontractor, supplier, manufacturer, or other to directly or indirectly make a claim against Owner.

D.3.3 The Owner's Authorized Representative will review all Claims and take one or more of the following preliminary actions within ten (10) Days of receipt of the Detailed Notice of a Claim: (1) request additional supporting information from the Contractor; (2) inform the Contractor and Owner in writing of the time required for adequate review and response; (3) reject the Claim in whole or in part and identify the reasons for rejection; (4) based on principles of equitable adjustment, recommend approval of all or part of the Claim; or (5) propose an alternate resolution.

D.3.4 The Owner's Authorized Representative's decision shall be final and binding on the Contractor unless appealed by written notice to the Owner within fifteen (15) Days of receipt of the decision. The Contractor must present written documentation supporting the Claim within fifteen (15) Days of the notice of appeal. After receiving the appeal documentation, the Owner shall review the materials and render a decision within thirty (30) Days after receiving the appeal documents.

D.3.5 The decision of the Owner shall be final and binding unless the Contractor delivers to the Owner its requests for mediation, which shall be a non-binding process, within fifteen (15) Days of the date of the Owner's decision. The mediation process will be

considered to have commenced as of the date the Contractor delivers the request. Both parties acknowledge and agree that participation in mediation is a prerequisite to commencement of litigation of any disputes relating to the Contract. Both parties further agree to exercise their best efforts in good faith to resolve all disputes within sixty (60) Days of the commencement of the mediation through the mediation process set forth herein.

In the event that a lawsuit must be filed within this sixty (60) day period in order to preserve a cause of action, the parties agree that notwithstanding the filing, they shall proceed diligently with the mediation to its conclusion prior to actively prosecuting the lawsuit, and shall seek from the Court in which the lawsuit is pending such stays or extensions, including the filing of an answer, as may be necessary to facilitate the mediation process. Further, in the event settlements are reached on any issues through mediation, the parties agree to promptly submit the appropriate motions and orders documenting the settlement to the Court for its signature and filing.

- D.3.6 The mediator shall be an individual mutually acceptable to both parties, but in the absence of agreement each party shall select a temporary mediator and the temporary mediators shall jointly select the permanent mediator. Each party shall pay its own costs for the time and effort involved in mediation. The cost of the mediator shall be split equally between the two parties. Both parties agree to exercise their best effort in good faith to resolve all disputes in mediation. Participation in mediation is a mandatory requirement of both the Owner and the Contractor. The schedule, time and place for mediation will be mutually acceptable, or, failing mutual agreement, shall be as established by the mediator. The parties agree to comply with Owner's administrative rules governing the confidentiality of mediation, if any, and shall execute all necessary documents to give effect to such confidentiality rules. In any event, the parties shall not subpoena the mediator or otherwise require the mediator to produce records, notes or work product, or to testify in any future proceedings as to information disclosed or representations made in the course of mediation, except to the extent disclosure is required by law.
- D.3.7 Owner may at any time and at its discretion issue a construction change directive adding to, modifying or reducing the scope of Work. Contractor and Owner shall negotiate the need for any additional compensation or additional Contract Time related to the change, subject to the procedures for submitting requests or Claims for additional compensation or additional Contract Time established in this Section D. Unless otherwise directed by Owner's Authorized Representative, Contractor shall proceed with the Work while any request or Claim is pending, including but not limited to, a request or Claim for additional compensation or additional Contract Time resulting from Work under a Change Order or construction change directive. Regardless of the review period or the final decision of the Owner's Authorized Representative, the Contractor shall continue to diligently pursue the Work as identified in the Contract Documents. In no case is the Contractor justified or allowed to cease Work without a written stop work order from the Owner or Owner's Authorized Representative.

## **SECTION E PAYMENTS**

### **E.1 SCHEDULE OF VALUES**

The Contractor shall submit, at least ten (10) Days prior to submission of its first application for progress payment, a schedule of values ("Schedule of Values") for the contracted Work. This schedule will provide a breakdown of values for the contracted Work and will be the basis for progress payments. The breakdown will demonstrate reasonable, identifiable, and measurable components of the Work. Unless objected to by the Owner's Authorized Representative, this schedule shall be used as the basis for reviewing Contractor's applications for payment. If objected to by Owner's Authorized Representative, Contractor shall revise the schedule of values and resubmit the same for approval of Owner's Authorized Representative.

### **E.2 APPLICATIONS FOR PAYMENT**

- E.2.1 Owner shall make progress payments on the Contract monthly as Work progresses. Payments shall be based upon estimates of Work completed and the Schedule of Values. All payments shall be approved by the Owner's Authorized Representative. A progress payment shall not be considered acceptance or approval of any Work or waiver of any defects therein. Owner shall pay to Contractor interest on the progress payment, not including retainage, due the Contractor. The interest shall commence thirty (30) Days after the receipt of invoice ("application for payment") from the Contractor or fifteen (15) Days after the payment is approved by the Owner's Authorized Representative, whichever is the earlier date. The rate of interest shall equal three times the discount rate on 90-day commercial paper in effect at the Federal Reserve Bank in the Federal Reserve district that includes Oregon on the date that is thirty (30) Days after receipt of the application for payment from the Contractor or fifteen (15) Days after the payment is approved by the Owner, whichever is the earlier date, but the rate of interest shall not exceed thirty (30) percent. Notwithstanding the foregoing, in instances when an application for payment is filled out incorrectly, or when there is any defect or impropriety in any submitted application or when there is a good faith dispute, Owner shall so notify the Contractor within fifteen (15) Days stating the reason or reasons the application for payment is defective or improper or the reasons for the dispute. A defective or improper application for payment, if corrected by the Contractor within seven (7) Days of being notified by the Owner, shall not cause a payment to be made later than specified in this section unless interest is also paid. Accrual of interest will be postponed when payment on the principal is delayed because of disagreement between the Owner and the Contractor.

Owner reserves the right, instead of requiring the Contractor to correct or resubmit a defective or improper application for payment, to reject the defective or improper portion of the application for payment and pay the remainder of the application for payment that is correct and proper.

Owner, upon written notice to the Contractor, may elect to make payments to the Contractor only by means of Electronic Funds Transfers (EFT) through Automated Clearing House (ACH) payments. If



Owner makes this election, the Contractor will be required to arrange to receive EFT/ACH payments.

E.2.2 Contractor shall submit to the Owner's Authorized Representative, an application for each payment and, if required, receipts or other vouchers showing payments for materials and labor, including payments to Subcontractors. Contractor shall include, in its application for payment, a schedule of the percentages of the various parts of the Work completed, based on the Schedule of Values which shall aggregate to the payment application total, and shall include, on the face of each copy thereof, a certificate in substantially the following form:

"I, the undersigned, hereby certify that the above bill is true and correct, and the payment therefore, has not been received.

Signed: \_\_\_\_\_

E.2.3 Generally, applications for payment will be accepted only for materials that have been installed. Under special conditions, applications for payment for stored materials will be accepted at Owner's sole discretion. Such a payment, if made, will be subject to the following conditions:

- (a) The request for stored material shall be submitted at least thirty (30) Days in advance of the application for payment on which it appears. Applications for payment shall be entertained for major equipment, components or expenditures only.
- (b) The Contractor shall submit applications for payment showing the quantity and cost of the material stored.
- (c) The material shall be stored in a bonded warehouse and Owner's Authorized Representative shall be granted the right to access the material for the purpose of removal or inspection at any time during the Contract Period.
- (d) The Contractor shall name the Owner as co-insured on the insurance policy covering the full value of the property while in the care and custody of the Contractor until it is installed. A certificate noting this coverage shall be issued to the Owner.
- (e) Payments shall be made for materials only. The submitted amount of the application for payment shall be reduced by the cost of transportation and for the cost of an inspector to check the delivery at out of town storage sites. The cost of said inspection shall be borne solely by the Contractor.
- (f) Within sixty (60) Days of the application for payment, the Contractor shall submit evidence of payment covering the material stored.
- (g) Payment for stored materials shall in no way indicate acceptance of the materials or waive any rights under this Contract for the rejection of the Work or materials not in conformance with the Contract Documents.

- (h) All required documentation must be submitted with the respective application for payment.

E.2.4 The Owner reserves the right to withhold all or part of a payment, or may nullify in whole or part any payment previously made, to such extent as may be necessary in the Owner's opinion to protect the Owner from loss because of:

- (a) Work that is defective and not remedied, or that has been demonstrated or identified as failing to conform with the Contract Documents,
- (b) third party claims filed or evidence reasonably indicating that such claims will likely be filed unless security acceptable to the Owner is provided by the Contractor;
- (c) failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment (in which case Owner may issue checks made payable jointly to Owner and such unpaid persons under this provision, or directly to Subcontractors and suppliers at any level under Section C.3.2.1);
- (d) reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Price;
- (e) damage to the Owner or another contractor;
- (f) reasonable evidence that the Work will not be completed within the Contract Time required by the Contract, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- (g) failure to carry out the Work in accordance with the Contract Documents; or
- (h) assessment of liquidated damages.

E.2.5 Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- (a) Take that portion of the Contract Price properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the total Contract Price allocated to that portion of the Work in the Schedule of Values, less retainage as provided in Section E.5. Pending final determination of cost to the Owner of changes in the Work, no amounts for changes in the Work can be included in application for payment until the Contract Price has been adjusted by Change Order;
- (b) Add that portion of the Contract Price properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner pursuant to Section E.2.3, suitably stored off the site at a location agreed upon in writing), less retainage as provided in Section E.5;
- (c) Subtract the aggregate of previous payments made by the Owner; and

- (d) Subtract any amounts for which the Owner's Authorized Representative has withheld or nullified payment as provided in the Contract Documents.

E.2.6 Contractor's applications for payment may not include requests for payment for portions of the Work for which the Contractor does not intend to pay to a Subcontractor or material supplier.

E.2.7 The Contractor warrants to Owner that title to all Work covered by an application for payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an application for payment all Work for which payments are received from the Owner shall be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

E.2.8 If Contractor disputes any determination by Owner's Authorized Representative with regard to any application for payment, Contractor nevertheless shall continue to prosecute expeditiously the Work. No payment made hereunder shall be or be construed to be final acceptance or approval of that portion of the Work to which such partial payment relates or shall relieve Contractor of any of its obligations hereunder.

### **E.3 PAYROLL CERTIFICATION REQUIREMENT**

Payroll certification is required before payments are made on the Contract. Refer to Section C.2 for this information.

### **E.4 DUAL PAYMENT SOURCES**

Contractor shall not be compensated for Work performed under this Contract from any state agency other than the agency that is a party to this Contract.

### **E.5 RETAINAGE**

E.5.1 Retainage shall be withheld and released in accordance with ORS 279C.550 to 279C.580:

E.5.1.1 Owner may reserve as retainage from any progress payment an amount not to exceed five (5) percent of the payment. As Work progresses, Owner may reduce the amount of the retainage and may eliminate retainage on any remaining monthly Contract payments after 50 percent of the Work under the Contract is completed if, in the Owner's opinion, such Work is progressing satisfactorily. Elimination or reduction of retainage shall be allowed only upon written application by the Contractor, which application shall include written approval of Contractor's surety; except that when the Work is 97-1/2 percent completed the Owner may, at its discretion and without application by the Contractor, reduce the retained amount to 100 percent of the value of the Work remaining to be done. Upon receipt of written application by the Contractor, Owner shall respond in writing within a reasonable time.

E.5.1.2 In accordance with the provisions of ORS 279C.560 and any applicable administrative rules, unless the Owner finds in writing that accepting a bond, security or other instrument

described in options (a) or (c) below poses an extraordinary risk that is not typically associated with the bond, security or instrument, the Owner will approve the Contractor's written request:

- (a) to be paid amounts which would otherwise have been retained from progress payments where Contractor has deposited acceptable bonds, securities or other instruments of equal value with Owner or in a custodial account or other mutually-agreed account satisfactory to Owner, with an approved bank or trust company to be held in lieu of the cash retainage for the benefit of Owner. Interest or earnings on the bonds, securities or other instruments shall accrue to the Contractor. The Contractor shall execute and provide such documentation and instructions respecting the bonds, securities and other instruments as the Owner may require to protect its interests. To be permissible the bonds, securities and other instruments must be of a character approved by the Owner, including but not limited to:

- (i) Bills, certificates, notes or bonds of the United States.
- (ii) Other obligations of the United States or agencies of the United States.
- (iii) Obligations of a corporation wholly owned by the federal government.
- (iv) Indebtedness of the Federal National Mortgage Association.
- (v) General obligation bonds of the State of Oregon or a political subdivision of the State of Oregon.
- (vi) Irrevocable letters of credit issued by an insured institution, as defined in ORS 706.008.

- (b) that retainage be deposited in an interest bearing account, established through the State Treasurer for state agencies, in a bank, savings bank, trust company or savings association for the benefit of Owner, with interest from such account accruing to the Contractor; or

- (c) that the Contractor be allowed, with the approval of the Owner, to deposit a surety bond for the benefit of Owner, in a form acceptable to Owner, in lieu of all or a portion of funds retained, or to be retained. Such bond and any proceeds therefrom shall be made subject to all claims and liens in the manner and priority as set forth for retainage under ORS 279C.550 to ORS 279C.625.

Where the Owner has accepted the Contractor's election of any of the options above, Owner may recover from Contractor any additional costs incurred through such election by reducing Contractor's final payment. Where the Owner has agreed to Contractor's request to deposit a surety bond under option (c), Contractor shall accept like bonds from Subcontractors and suppliers on the project from which Contractor has required retainage.

E.5.1.3 The retainage held by Owner shall be included in and paid to the Contractor as part of the final payment of the Contract Price. The Owner shall pay to Contractor interest at the rate of one and one-half percent per month on the final payment

due Contractor, interest to commence thirty (30) Days after the Work under the Contract has been completed and accepted and to run until the date Contractor shall notify Owner in writing when the Contractor considers the Work complete and Owner shall, within fifteen (15) Days after receiving the written notice, either accept the Work or notify the Contractor of Work yet to be performed on the Contract. If Owner does not within the time allowed notify the Contractor of Work yet to be performed to fulfill contractual obligations, the interest provided by this subsection shall commence to run thirty (30) Days after the end of the 15-Day period.

E.5.1.4 In accordance with the provisions of ORS 279C.560, if the Owner accepts bonds, securities or other instruments deposited as provided in paragraphs (a) and (c) of subsection E.5.1.2, the Owner shall reduce the moneys held as retainage in an amount equal to the value of the bonds, securities and other instruments and pay the amount of the reduction to the Contractor in accordance with ORS 279C.570.

E.5.1.5 Contractor agrees that if Contractor elects to reserve a retainage from any progress payment due to any Subcontractor or supplier, such retainage shall not exceed five percent of the payment, and such retainage withheld from Subcontractors and suppliers shall be subject to the same terms and conditions stated in Subsection E.5 as apply to Owner's retainage from any progress payment due to Contractor. Provided, however, if in accordance with the provisions of ORS 279C.560 the Contractor has deposited bonds, securities or other instruments or has elected to have the Owner deposit accumulated retainage in an interest-bearing account, the Contractor shall comply with the provisions of ORS 701.435 respecting the deposit of bonds, securities or other instruments by Subcontractors and suppliers and the sharing of interest earnings with Subcontractors and suppliers.

E.5.2 As provided in subsections C.2.2 and C.2.3, additional retainage in the amount of 25% of amounts earned shall be withheld and released in accordance with ORS 279C.845(7) when the Contractor fails to file certified statements as required by section C.2.1.

## **E.6 FINAL PAYMENT**

E.6.1 Upon completion of all the Work under this Contract, the Contractor shall notify the Owner's Authorized Representative, in writing, that Contractor has completed Contractor's part of the Contract and shall request final payment. Upon receipt of such notice the Owner's Authorized Representative will inspect the Work, and if acceptable, submit to the Owner a recommendation as to acceptance of the completed Work and the final estimate of the amount due the Contractor. If the Work is not acceptable, Owner will notify Contractor within fifteen (15) Days of Contractor's request for final payment. Upon approval of this final estimate by the Owner and compliance by the Contractor with provisions in Section K. 3 AFFIDAVIT/RELEASE OF LIENS AND CLAIMS, and other provisions as may be applicable,

the Owner shall pay to the Contractor all monies due under the provisions of these Contract Documents.

E.6.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Owner's Authorized Representative (1) a notarized affidavit/release of liens and claims in a form satisfactory to Owner that states that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least thirty (30) Days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

E.6.3 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final application for payment.

## **SECTION F JOB SITE CONDITIONS**

### **F.1 USE OF PREMISES**

Contractor shall confine equipment, storage of materials and operation of Work to the limits indicated by Contract Documents, law, ordinances, permits or directions of the Owner's Authorized Representative. Contractor shall follow the Owner's Authorized Representative's instructions regarding use of premises, if any.

### **F.2 PROTECTION OF WORKERS, PROPERTY, AND THE PUBLIC**

F.2.1 Contractor shall maintain continuous and adequate protection of all of the Work from damage, and shall protect the Owner's Authorized Representative, workers and property from injury or loss arising in connection with this Contract. Contractor shall remedy acceptably to the Owner, any damage, injury, or loss, except such as may be directly due to errors in the Contract Documents or caused by authorized representatives or personnel of the Owner. Contractor shall adequately protect adjacent property as provided by law and the Contract Documents.

F.2.2 Contractor shall take all necessary precautions for the safety of all personnel on the job site, and shall comply with the Contract Documents and all applicable provisions of federal, state and municipal safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the Work is being performed. Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for protection of workers and the public against any hazards created by construction. Contractor shall designate a responsible employee or associate on the Work site, whose duty shall be the prevention of accidents. The name and position of the person designated shall be reported to the Owner's Authorized Representative. The Owner's Authorized Representative has no responsibility for Work site safety. Work site safety is the responsibility of the Contractor.

F.2.3 Contractor shall not enter upon private property without first obtaining permission from the property owner or its duly authorized representative. Contractor shall be responsible for the preservation of all public and private property along and adjacent to the Work contemplated under the Contract and shall use every precaution necessary to prevent damage thereto. In the event the Contractor damages any property, the Contractor shall at once notify the property owner and make, or arrange to make, full restitution. Contractor shall immediately and in writing, report to the Owner's Authorized Representative, all pertinent facts relating to such property damage and the ultimate disposition of the claim for damage.

F.2.4 Contractor is responsible for protection of adjacent work areas including impacts brought about by activities, equipment, labor, utilities, and materials on the site.

F.2.5 Contractor shall at all times direct its activities in such a manner as to minimize adverse effects on the environment. Handling of all materials will be conducted so no release will occur that may pollute or become hazardous.

F.2.6 In an emergency affecting the safety of life or of the Work or of adjoining property, the Contractor, without special instruction or authorization from the Owner's Authorized Representative, shall act reasonably to prevent threatened loss or injury, and shall so act, without appeal, if instructed by the Owner's Authorized Representative. Any compensation claimed by the Contractor on account of emergency work shall be determined in accordance with Section D.

### **F.3 CUTTING AND PATCHING**

F.3.1 Contractor shall be responsible for coordinating all cutting, fitting, or patching of the Work to make its several parts come together properly and fit to receive or be received by work of other contractors or Subcontractors shown upon, or reasonably implied by, the Contract Documents.

F.3.2 Contractor shall be responsible for restoring all cut, fitted, or patched surfaces to an original condition; provided, however, that if a different condition is specified in the Contract Documents, then Contractor

shall be responsible for restoring such surfaces to the condition specified in the Contract Documents.

### **F.4 CLEANING UP**

From time to time as may be ordered by the Owner the Contractor shall, at its own expense, clean up and remove all refuse and unused materials of any kind resulting from the Work. If Contractor fails to do so within twenty-four hours after notification by the Owner the work may be done by others and the cost charged to the Contractor and deducted from payment due the Contractor.

### **F.5 ENVIRONMENTAL CONTAMINATION**

F.5.1 Contractor will be held responsible for and shall indemnify, defend (with counsel of Owner's choice) and hold harmless Owner from and against any costs, expenses, damages, claims, and causes of action, (including attorney fees), or any of them, resulting from all spills, releases, discharges, leaks and disposal of environmental pollution, including storage, transportation, and handling during the performance of the Contract which occur as a result of, or are contributed by, the negligence or actions of Contractor or its personnel, agents, or Subcontractors or any failure to perform in accordance with the Contract Documents (except to the extent otherwise void under ORS 30.140). Nothing in this section F.5.1 shall limit Contractor's responsibility for obtaining insurance coverages required under Section G.3 of these General Conditions, and Contractor shall take no action that would void or impair such coverages

F.5.1.1 Contractor agrees to promptly dispose of such spills, releases, discharge or leaks to the satisfaction of Owner and proper regulatory agencies in a manner that complies with applicable federal, state, and local laws and regulations. Cleanup shall be at no cost to the Owner and be performed by properly qualified personnel.

F.5.1.2 Contractor shall obtain the Owner's written consent prior to bringing onto the Work site any (i) environmental pollutants or (ii) hazardous substances or materials, as the same or reasonably similar terms are used in any applicable federal, state, or local statutes, rules or ordinances. Notwithstanding such written consent from the Owner, the Contractor, at all times, shall:

- (a) properly handle, use and dispose of all environmental pollutants and hazardous substances or materials brought onto the Work site, in accordance with all applicable federal, state, or local statutes, rules, or ordinances;
- (b) be responsible for any and all spills, releases, discharges, or leaks of (or from) environmental pollutants or hazardous substances or materials which Contractor has brought onto the Work site; and
- (c) promptly clean up, without cost to the Owner, such spills, releases, discharges, or leaks to the Owner's satisfaction and in compliance with all

applicable federal, state, or local statutes, rules or ordinances.

F.5.2 Contractor shall report all reportable quantity releases to applicable federal, state, and local regulatory and emergency response agencies. Reportable quantities are found in 40 CFR Part 302, Table 302.4 for hazardous substances and in OAR 340-142-0050 for all products addressed therein. Upon discovery, regardless of quantity, Contractor must telephonically report all releases to the Owner. A written follow-up report shall be submitted to Owner within 48 hours of the telephonic report. Such written report shall contain, as a minimum:

- (a) Description of items released (identity, quantity, manifest no., and all other documentation required by law.)
- (b) Whether amount of items released is EPA/DEQ reportable, and, if so, when it was reported.
- (c) Exact time and location of release, including a description of the area involved.
- (d) Containment procedures initiated.
- (e) Summary of communications about the release Contractor has had with members of the press or State officials other than Owner.
- (f) Description of cleanup procedures employed or to be employed at the site, including disposal location of spill residue.
- (g) Personnel injuries, if any, resulting from, or aggravated by, the release.

#### **F.6 ENVIRONMENTAL CLEAN-UP**

F.6.1 Unless disposition of environmental pollution is specifically a part of this Contract, or was caused by the Contractor (reference F.5 Environmental Contamination), Contractor shall immediately notify Owner of any hazardous substance(s) which Contractor discovers or encounters during performance of the Work required by this Contract. "Hazardous substance(s)" means any hazardous, toxic and radioactive materials and those substances defined as "hazardous substances," "hazardous materials," "hazardous wastes," "toxic substances," or other similar designations in any federal, state, or local law, regulation, or ordinance, including without limitation asbestos, polychlorinated biphenyl (PCB), or petroleum, and any substances, materials or wastes regulated in 40 CFR, Part 261 and defined as hazardous in 40 CFR S 261.3. In addition to notifying Owner of any hazardous substance(s) discovered or encountered, Contractor shall immediately cease working in any particular area of the project where a hazardous substance(s) has been discovered or encountered if continued work in such area would present a risk or danger to the health or well-being of Contractor's or any Subcontractor's work force.

F.6.2 Upon being notified by Contractor of the presence of hazardous substance(s) on the project site, Owner shall arrange for the proper disposition of such hazardous substance(s).

#### **F.7 FORCE MAJEURE**

A party to this Contract shall not be held responsible for delay or default due to Force Majeure acts, events or occurrences unless they could have been avoided by the exercise of reasonable care, prudence, foresight, and diligence by that party. The Owner may terminate this Contract upon written notice after determining that delay or default caused by Force Majeure acts, events or occurrences will reasonably prevent successful performance of the Contract.

### **SECTION G INDEMNITY, BONDING, AND INSURANCE**

#### **G.1 RESPONSIBILITY FOR DAMAGES / INDEMNITY**

G.1.1 Contractor shall be responsible for all damage to property, injury to persons, and loss, expense, inconvenience, and delay that may be caused by, or result from, the carrying out of the Work to be done under this Contract, or from any act, omission or neglect of the Contractor, its Subcontractors, personnel, or agents.

G.1.2 To the fullest extent permitted by law, Contractor shall indemnify, defend (with counsel approved by Owner) and hold harmless the Owner, Owner's Authorized Representative, Architect/Engineer, Architect/Engineer's consultants, and their respective officers, directors, agents, employees, partners, members, stockholders and affiliated companies (collectively "Indemnitees") from and against all liabilities, damages, losses, claims, expenses (including reasonable attorney fees), demands and actions of any nature whatsoever which arise out of, result from or are related to, (a) any damage, injury, loss, expense, inconvenience or delay described in this Section G.1.2, (b) any accident or occurrence which happens or is alleged to have happened in or about the project site or any place where the Work is being performed, or in the vicinity of either, at any time prior to the time the Work is fully completed in all respects, (c) any failure of the Contractor to observe or perform any duty or obligation under the Contract Documents which is to be observed or performed by the Contractor, or any breach of any agreement, representation or warranty of the Contractor contained in the Contract Documents or in any subcontract, (d) the negligent acts or omissions of the Contractor, a Subcontractor or anyone directly or indirectly employed by them or any one of them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder (except to the extent otherwise void under ORS 30.140), and (e) any lien filed upon the project or bond claim in connection with the Work. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section G.1.2.

G.1.3 In claims against any person or entity indemnified under this Section G.1.2 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section G.1.2 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

## **G.2 PERFORMANCE AND PAYMENT SECURITY:**

### **PUBLIC WORKS BOND**

G.2.1 When the Contract Price is \$100,000 or more (or \$50,000 or more in the case of Contracts for highways, bridges and other transportation projects) the Contractor shall furnish and maintain in effect at all times during the Contract Period, a performance bond in a sum equal to the Contract Price, and a separate payment bond also in a sum equal to the Contract Price. The bonds may be required if the Contract Price is less than the above thresholds, if required by the Contract Documents.

G.2.2 Bond forms furnished by the Owner and notarized by awarded Contractor's surety company authorized to do business in Oregon are the only acceptable forms of performance and payment security, unless otherwise specified in the Contract Documents.

G.2.3 Before execution of the Contract Contractor shall file with the Construction Contractors Board, and maintain in full force and effect, the separate public works bond required by Oregon Laws 2005, Chapter 360, and OAR 839-025-0015, unless otherwise exempt under those provisions. The Contractor shall also include in every subcontract a provision requiring the Subcontractor to have a public works bond filed with the Construction Contractors Board before starting Work, unless otherwise exempt, and shall verify that the Subcontractor has filed a public works bond before permitting the Subcontractor to start Work.

## **G.3 INSURANCE**

G.3.1 Primary Coverage: Insurance carried by Contractor under this Contract shall be the primary coverage and non-contributory with any other insurance and self-insurance, and the Owner's insurance is excess and solely for damages or losses for which the Owner is responsible. The coverages indicated are minimums unless otherwise specified in the Contract Documents.

G.3.2 Workers' Compensation: All employers, including Contractor, that employ subject workers who work under this contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. This shall include Employer's Liability Insurance with coverage limits of not less than \$100,000 for each accident. Contractors who perform the Work without the assistance or labor of any employee need not obtain such coverage if the Contractor certifies so in writing. Contractor shall ensure that each of its Subcontractors complies with these requirements. The Contractor shall require proof of such Workers' Compensation by receiving and keeping on file a certificate of insurance from each Subcontractor or anyone else directly employed by either the Contractor or its Subcontractors.

G.3.3 Builder's Risk Insurance: The District will maintain Builder's Risk Insurance.

G.3.4 Liability Insurance:

G.3.4.1 Commercial General Liability: Contractor shall obtain, at Contractor's expense, and keep in effect during the term of this Contract, Commercial General Liability Insurance covering bodily injury and property damage in a form and with coverages that are satisfactory to the District. This insurance shall include personal injury liability, products and completed operations, and contractual liability coverage for the indemnity

provided under this Contract (to the extent contractual liability coverage for the indemnity is available in the marketplace), and shall be issued on an occurrence basis. Contractor shall provide proof of insurance of not less than the amounts listed in Exhibit 4 – Insurance Requirements.

G.3.4.2 Automobile Liability: Contractor shall obtain, at Contractor's expense, and keep in effect during the term of this Contract, Automobile Liability Insurance covering owned, non-owned and/or hired vehicles, as applicable. The coverage may be written in combination with the Commercial General Liability Insurance. Contractor shall provide proof of insurance of not less than the amounts listed in Exhibit 4 – Insurance Requirements.

G.3.4.3 "Tail" Coverage: If any of the required liability insurance is arranged on a "claims made" basis, "tail" coverage will be required at the completion of this Contract for a duration of 24 months or the maximum time period available in the marketplace if less than 24 months. Contractor will be responsible for furnishing certification of "tail" coverage as described or continuous "claims made" liability coverage for 24 months following Final Completion. Continuous "claims made" coverage will be acceptable in lieu of "tail" coverage, provided its retroactive date is on or before the effective date of this Contract. This will be a condition of the final acceptance of Work or services and related warranty (if any).

G.3.5 Excess/Umbrella Insurance: A combination of primary and excess/umbrella insurance is acceptable to meet the minimum coverage requirements for Commercial General Liability and Automobile Liability Insurance. In such case, the insurance certificate must include a list of the policies that fall under the excess/umbrella insurance. Sample wording is "The Excess/Umbrella policy is excess over primary Commercial General Liability and primary Automobile Liability Insurance."

G.3.6 Additional Insured: The liability insurance coverage, except Professional Liability if included, required for performance of this Contract shall include the Fern Ridge School District, its departments, divisions, officers, and employees, as Additional Insureds but only with respect to the Contractor's activities to be performed under this Contract.

If Contractor cannot obtain an insurer to name the Fern Ridge School District, its departments, divisions, officers and employees as Additional Insureds, Contractor shall obtain at Contractor's expense, and keep in effect during the term of this Contract, Owners and Contractors Protective Liability Insurance, naming the Fern Ridge School District, its departments, divisions, officers and employees as Named Insureds with not less than a \$2,000,000 limit per occurrence. This policy must be kept in effect for 12 months following Final Completion. As evidence of coverage, Contractor shall furnish the actual policy to Owner prior to execution of the Contract.

Certificate(s) of Insurance: As evidence of the insurance coverage required by this Contract, the Contractor shall furnish certificate(s) of insurance to the Owner prior to execution of the Contract. The certificate(s) will specify all of the parties who are Additional Insureds or Loss Payees. Insurance

coverage required under this Contract shall be obtained from insurance companies or entities acceptable to the Owner that are allowed to provide such insurance under Oregon law. Eligible insurers include admitted insurers that have been issued a certificate of authority from the Oregon Department of Consumer and Business Services authorizing them to do an insurance business in the state of Oregon, and certain non-admitted surplus lines insurers that satisfy the requirements of applicable Oregon law and are approved by the Owner. The Contractor shall be financially responsible for all deductibles, self-insured retentions and/or self-insurance included hereunder. Any deductible, self-insured retention and/or self-insurance in excess of \$50,000 shall be approved by the Owner in writing prior execution of the Contract and is subject to Owner's approval. The Contractor shall immediately notify the Owner's Authorized Representative in writing of any change in insurance coverage.

## **SECTION H SCHEDULE OF WORK**

### **H.1 CONTRACT PERIOD**

- H.1.1 **Time is of the essence on this Contract.** The Contractor shall at all times carry on the Work diligently, without delay and punctually fulfill all requirements herein. Contractor shall commence Work on the site within fifteen (15) Days of Notice to Proceed, unless directed otherwise.
- H.1.2 Unless specifically extended by Change Order, all Work shall be complete by the date contained in the Contract Documents. The Owner shall have the right to accelerate the completion date of the Work, which may require the use of overtime. Such accelerated Work schedule shall be an acceleration in performance of Work under Section D.1.2 (f) and shall be subject to the Change Order process of Section D.1.
- H.1.3 The Owner shall not waive any rights under the Contract by permitting the Contractor to continue or complete in whole or in part the Work after the date described in Section H.1.2 above.

### **H.2 SCHEDULE**

- H.2.1 Contractor shall provide, by or before the pre-construction conference, a detailed schedule for review and acceptance by the Owner. The submitted schedule must illustrate Work by significant project components, significant labor trades, long lead items, broken down by building and/or floor where applicable. Each schedule item shall account for no greater than five percent (5%) of the monetary value of the project or five percent (5%) of the available Contract Time. Schedules with activities of less than one day or valued at less than one percent (1%) of the Contract will be considered too detailed and will not be accepted. Schedules lacking adequate detail, or unreasonably detailed, will be rejected. Included within the schedule are the following: Notice to Proceed, Substantial Completion, and Final Completion. Schedules will be updated monthly and submitted with the monthly payment application. Acceptance of the Schedule by the Owner does not constitute agreement by the Owner, as to the Contractor's sequencing, means, methods, or allocated Contract Time. Any positive difference between the Contractor's scheduled completion and the Contract completion date is float owned by the

Owner. Owner reserves the right to negotiate the float if it is deemed to be in Owner's best interest to do so. In no case shall the Contractor make a request for additional compensation for delays if the Work is completed within the Contract Time but after Contractor's scheduled completion.

### **H.3 PARTIAL OCCUPANCY OR USE**

- H.3.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage, provided such occupancy or use is consented to by public authorities having jurisdiction over the Work.

Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have reasonably accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, insurance or self-insurance, maintenance, heat, utilities, and damage to the Work, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents with respect to such portion of the Work. Approval by the Contractor to partial occupancy or use shall not be unreasonably withheld. Immediately prior to such partial occupancy or use, the Owner and Contractor shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work. Partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

## **SECTION I CORRECTION OF WORK**

### **I.1 CORRECTION OF WORK BEFORE FINAL PAYMENT**

The Contractor warrants to the Owner that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects, and that the Work will conform to the requirements of the Contract Documents. Work failing to conform to these requirements shall be deemed defective. Contractor shall promptly remove from the premises and replace all defective materials and equipment as determined by the Owner's Authorized Representative, whether incorporated in the Work or not. Removal and replacement shall be without loss or expense to the Owner, and Contractor shall bear the cost of repairing all Work destroyed or damaged by such removal or replacement. Contractor shall be allowed a period of no longer than thirty (30) Days after Substantial Completion for completion of defective (punch list) work, unless otherwise agreed. At the end of that period, or earlier if requested by the Contractor, Owner shall arrange for inspection of the Work by the Architect/Engineer. Should the Work not be complete, and all corrections made, the costs for all subsequent re-inspections shall be borne by the Contractor. If Contractor fails to complete the punch list work within the above time period, Owner may perform such work and Contractor shall reimburse Owner all costs of the same within ten (10) days after demand without affecting Contractor's obligations.

### **WARRANTY WORK**

- I.1.1 Neither the final certificate of payment nor any

provision of the Contract Documents shall relieve the Contractor from responsibility for defective Work and, unless a longer period is specified, Contractor shall correct all defects that appear in the Work within a period of one year from the date of issuance of the written notice of Substantial Completion by the Owner except for latent defects which will be remedied by the Contractor at any time they become apparent.

The Owner shall give Contractor notice of defects with reasonable promptness. Contractor shall perform such warranty work within a reasonable time after Owner's demand. If Contractor fails to complete the warranty work within such period as Owner determines reasonable, or at any time in the event of warranty work consisting of emergency repairs, Owner may perform such work and Contractor shall reimburse Owner all costs of the same within ten (10) Days after demand without affecting Contractor's obligations.

- I.1.1 This provision does not negate guarantees or warranties for periods longer than one year including without limitation such guarantees or warranties required by other sections of the Contract Documents for specific installations, materials, processes, equipment or fixtures.
- I.1.2 In addition to Contractor's warranty, manufacturer's warranties shall pass to the Owner and shall not take effect until affected Work has been accepted in writing by the Owner's Authorized Representative.
- I.1.3 The one-year period for correction of Work shall be extended with respect to portions of Work performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work, and shall be extended by corrective Work performed by the Contractor pursuant to this Section, as to the Work corrected. The Contractor shall remove from the site portions of the Work which are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.
- I.1.4 Nothing contained in this Section I.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the period for correction of Work as described in this Section I.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.
- I.1.5 If the Owner prefers to accept Work which is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Price will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

## **SECTION J**

## **SUSPENSION AND/OR TERMINATION OF THE WORK**

### **J.1 OWNER'S RIGHT TO SUSPEND THE WORK**

J.1.1 The Owner and/or the Owner's Authorized Representative has the authority to suspend portions or all of the Work due to the following causes:

- (a) Failure of the Contractor to correct unsafe conditions;
- (b) Failure of the Contractor to carry out any provision of the Contract;
- (c) Failure of the Contractor to carry out orders;

### **J.2 OWNER'S RIGHT TO TERMINATE CONTRACT**

J.2.1 The Owner may, without prejudice to any other right or remedy, and after giving Contractor seven (7) Days' written notice and an opportunity to cure, terminate the Contract in whole or in part under the following conditions:

- (a) If Contractor should voluntarily or involuntarily, seek protection under the United States Bankruptcy Code and Contractor as debtor-in-possession or the Trustee for the estate fails to assume the Contract within a reasonable time;
- (b) If Contractor should make a general assignment for the benefit of Contractor's creditors;
- (c) If a receiver should be appointed on account of Contractor's insolvency;
- (d) If Contractor should repeatedly refuse or fail to supply an adequate number of skilled workers
- (e) or proper materials to carry on the Work as required by the Contract Documents, or otherwise fail to perform the Work in a timely manner;
- (f) If Contractor should repeatedly fail to make prompt payment to Subcontractors or for material or labor, or should disregard laws, ordinances or the instructions of the Owner or its Authorized Representative; or
- (g) If Contractor is otherwise in material breach of any part of the Contract.

J.2.2 At any time that any of the above occurs, Owner may exercise all rights and remedies available to Owner at law or in equity, and in addition, Owner may take possession of the premises and of all materials and appliances and finish the Work by whatever method it may deem expedient. In such case, the Contractor shall not be entitled to receive further payment until the Work is completed. If the Owner's cost of finishing the Work exceeds the unpaid balance of the Contract Price, Contractor shall pay the difference to the Owner.

### **J.5 TERMINATION FOR CONVENIENCE**

J.5.1 Owner may terminate the Contract in whole or in part



whenever Owner determines that termination of the Contract is in the best interest of the public.

- J.5.2 The Owner will provide the Contractor with seven (7) Days' prior written notice of a termination for public convenience. After such notice, the Contractor shall provide the Owner with immediate and peaceful possession of the premises and materials located on and off the premises for which the Contractor received progress payment under Section E. Compensation for Work terminated by the Owner under this provision will be according to Section E. In no circumstance shall Contractor be entitled to lost profits for Work not performed due to termination.

#### **J.6 ACTION UPON TERMINATION**

- J.6.1 Upon receiving a notice of termination, and except as directed otherwise by the Owner, Contractor shall immediately cease placing further subcontracts or orders for materials, services, or facilities. In addition, Contractor shall terminate all subcontracts or orders to the extent they relate to the Work terminated and, with the prior written approval of the Owner, settle all outstanding liabilities and termination settlement proposals arising from the termination of subcontracts and orders.
- J.6.2 As directed by the Owner, Contractor shall upon termination transfer title and deliver to the Owner all Record Documents, information, and other property that, if the Contract had been completed, would have been required to be furnished to the Owner.

### **SECTION K CONTRACT CLOSE OUT**

#### **K.1 RECORD DOCUMENTS**

As a condition of final payment (refer also to section E.6), Contractor shall comply with the following: Contractor shall provide to Owner's Authorized Representative, Record Documents of the entire project. Record Documents shall depict the project as constructed and shall reflect each and every change, modification, and deletion made during the construction. Record Documents are part of the Work and shall be provided prior to the Owner's issuance of final payment. Record Documents include all modifications to the Contract Documents unless otherwise directed.

#### **K.2 OPERATION AND MAINTENANCE MANUALS**

As part of the Work, Contractor shall submit two completed operation and maintenance manuals ("O & M Manuals") for review by the Owner's Authorized Representative prior to submission of any pay request for more than 75% of the Work. No payments beyond 75% will be made by the Owner until the O & M Manuals have been received. The O & M Manuals shall contain a complete set of all submittals, all product data as required by the specifications, training information, phone list of consultants, manufacturers, installer and suppliers, manufacturer's printed data, record and shop drawings, schematic diagrams of systems, appropriate equipment indices, warranties and bonds. The Owner's Authorized Representative shall review and return one O & M Manual for any modifications or additions required. Prior to submission of its final pay request, Contractor shall deliver three (3) complete and approved sets of O & M Manuals to the Owner's Authorized Representative.

#### **K.3 AFFIDAVIT/RELEASE OF LIENS AND CLAIMS**

As a condition of final payment, the Contractor shall submit to the Owner's Authorized Representative a notarized affidavit/release of liens and claims form, in a form satisfactory to Owner, which states that all Subcontractors and suppliers have been paid in full, all disputes with property owners have been resolved, all obligations on the project have been satisfied, all monetary claims and indebtedness have been paid, and that, to the best of the Contractor's knowledge, there are no claims of any kind outstanding against the project. The Contractor shall indemnify, defend (with counsel of Owner's choice) and hold harmless the Owner from all claims for labor and materials finished under this Contract. The Contractor shall furnish complete and valid releases or waivers, satisfactory to the Owner, of all liens arising out of or filed in connection with the Work.

#### **K.4 COMPLETION NOTICE**

- K.4.1 Contractor shall provide Owner notice of both Substantial and Final Completion. The certificate of Substantial Completion shall state the date of Substantial Completion, the responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and the time within which the Contractor shall finish all items on the punchlist accompanying the Certificate. Both completion notices must be signed by the Contractor and the Owner to be valid. The Owner shall provide the final signature on the notices. The notices shall take effect on the date they are signed by the Owner.

- K.4.2 Substantial Completion of a facility with operating systems (e.g., mechanical, electrical, HVAC) shall be that degree of completion that has provided a minimum of thirty (30) continuous Days of successful, trouble-free operation, which period shall begin after all performance and acceptance testing has been successfully demonstrated to the Owner's Authorized Representative. All equipment contained in the Work, plus all other components necessary to enable the Owner to operate the facility in the manner that was intended, shall be complete on the Substantial Completion date. The Contractor may request that a punch list be prepared by the Owner's Authorized Representative with submission of the request for the Substantial Completion notice.

#### **K.5 TRAINING**

As part of the Work, and prior to submission of the request for final payment, the Contractor shall schedule with the Owner's Authorized Representative, training sessions for all equipment and systems, as required in the individual specifications sections. Contractor shall schedule training sessions at least two weeks in advance of the date of training to allow Owner personnel adequate notice. The O & M Manual shall be used as a basis for training. Training shall be a formal session, held after the equipment and/or system is completely installed and operational in its normal operating environment.

#### **K.6 EXTRA MATERIALS**

As part of the Work, Contractor shall provide spare parts, extra maintenance materials, and other materials or products in the quantities specified in the specifications, prior to final payment. Delivery point for extra materials shall be designated by the Owner's Authorized Representative.

#### **K.7 ENVIRONMENTAL CLEAN-UP**

As part of the Final Completion notice, or as a separate

written notice submitted with or before the notice of Final Completion, the Contractor shall notify the Owner that all environmental pollution clean-up performed as a part of this Contract has been disposed of in accordance with all applicable rules, regulations, laws, and statutes of all agencies having jurisdiction over such environmental pollution. The notice shall reaffirm the indemnification given under Section F.5.1 above.

#### **K.8 CERTIFICATE OF OCCUPANCY**

The Contractor shall not be granted Final Completion or receive final payment if the Owner has not received an unconditioned certificate of occupancy from the appropriate state and/or local building officials, unless failure to obtain an unconditional certificate of occupancy is due to the fault or neglect of Owner.

#### **K.9 OTHER CONTRACTOR RESPONSIBILITIES**

The Contractor shall be responsible for returning to the Owner all items issued during construction such as keys, security passes, site admittance badges, and all other pertinent items. The Contractor shall be responsible for notifying the appropriate utility companies to transfer utility charges from the Contractor to the Owner. The utility transfer date shall not be before Substantial Completion and may not be until Final Completion, if the Owner does not take beneficial use of the facility and the Contractor's forces continue with the Work.

#### **K.10 SURVIVAL**

All warranty and indemnification provisions of this Contract, and all of Contractor's other obligations under this Contract that are not fully performed by the time of Final Completion or termination, shall survive Final Completion or any termination of the Contract

Bureau of Mines  
Bureau of Reclamation  
Geological Survey  
Minerals Management Service

U.S. Fish and Wildlife Service  
Labor, Department of  
Mine Safety and Health Administration  
Occupation Safety and Health Administration  
Transportation, Department of  
Federal Highway Administration  
Water Resources Council

#### **L.3 STATE AGENCIES**

Administrative Services, Department of  
Agriculture, Department of  
Soil and Water Conservation Commission  
Columbia River Gorge Commission Energy,  
Department of Environmental Quality,  
Department of Fish and Wildlife, Department  
of Forestry, Department of  
Geology and Mineral Industries, Department of  
Human Resources, Department of  
Consumer and Business Services, Department of Land  
Conservation and Development Commission Parks and  
Recreation, Department of  
State Lands, Division of  
Water Resources, Department of

#### **L.4 LOCAL AGENCIES**

City Councils  
County Courts  
County Commissioner, Board of  
Design Commissions  
Historical Preservation Commission  
Planning Commissions

### **SECTION L**

#### ***LEGAL RELATIONS & RESPONSIBILITIES***

#### **L.1 LAWS TO BE OBSERVED**

In compliance with ORS 279C.525, Sections L.2 through L.4 contain lists of federal, state and local agencies of which the Owner has knowledge that have enacted ordinances or regulations relating to environmental pollution and the preservation of natural resources that may affect the performance of the Contract:

#### **L.2 FEDERAL AGENCIES**

Agriculture, Department of  
Forest Service  
Soil Conservation Service  
Coast Guard  
Defense, Department of  
Army Corps of Engineers  
Energy, Department of  
Federal Energy Regulatory Commission  
Environmental Protection Agency  
Health and Human Services, Department of  
Housing and Urban Development, Department of  
Solar Energy and Energy Conservation Bank  
Interior, Department of  
Bureau of Land Management  
Bureau of Indian Affairs

## ADDITIONAL TERMS AND CONDITIONS

### TERMS AND CONDITIONS

The District expects to enter into a contract with the successful Proposer; however, the District does not guarantee that it will award any contract pursuant to this RFP. While this RFP provides instructions for the preparation of a proposal that will address all RFP requirements, the District reserves the right to reject any and all proposals. This RFP is not an offer to contract. Only the execution of a written contract will obligate the District, in accordance with the terms contained in the contract.

### QUESTIONS

All questions and contacts with the District regarding any information in this RFP must be addressed in written form via email to James Storey, Facilities Manager, at [jstorey@fernridge.k12.or.us](mailto:jstorey@fernridge.k12.or.us).

### CHANGES OR MODIFICATION TO RFP (ADDENDA)

The District reserves the right to amend this RFP in any manner prior to award of a contract. Any change or modification to the specifications or the procurement process will be in the form of an addendum to the RFP and will be made available to all Proposers via email. No information received in any manner different than as described herein will serve to change the RFP in any way, regardless of the source of the information. Any request for clarification or change or protest of anything contained in an addendum must be received by the date and time stated in the addendum, or they will not be considered.

### MODIFICATION OR WITHDRAWAL OF PROPOSALS

Proposers may modify or withdraw their submitted proposals only prior to the due date and time as indicated in the schedule of events. Any modification or withdrawal shall be made in writing, signed by an authorized representative of the Proposer, and shall state the action requested (i.e. the modified proposal supersedes the prior proposal; the submitted proposal is withdrawn).

Modifications or withdrawals must be submitted in an appropriately marked and sealed envelope to the person designated to receive proposals.

### MISTAKES BY PROPOSER

The District has the authority to waive any and all minor deviations, informalities or inadvertent nonjudgmental mistakes on any proposal. Such mistakes must be a matter of form, rather than substance that is clearly evident regarding the proposal or an insignificant mistake that can be waived or corrected promptly without prejudice to other Proposers or the District. Errors in judgment made in a proposal by a Proposer shall not be waived.

### CLARIFICATION OF RESPONSES

The District reserves the right to request clarification of any item in a firm's proposal or to request additional information necessary to properly evaluate a particular proposal. All requests for clarification and responses shall be in writing and shall be provided to each selection committee member.

### SELECTION PROTESTS

Any respondent to this RFP who claims to have been adversely affected or aggrieved by the selection of a General Conditions

competing respondent may submit a written protest of the selection within seven days after notification of that selection to:

Quanah Bennett – [qbennett@fernridge.k12.or.us](mailto:qbennett@fernridge.k12.or.us)  
Business Manager  
88834 Territorial Road  
Elmira, OR 97437

Any such protests must be received no later than seven days after the notification of selection has been made in order to be considered. The selection decision notification will be made via email.

### PROPRIETARY INFORMATION

The District will retain this RFP and one copy of each original response received, together with copies of all documents pertaining to the award of a contract. These documents will be made part of a file or record, which will be open to public inspection after responder selection and award is announced. If a response contains any information that is considered a trade secret under ORS 192.345(2), mark each sheet with the following legend: "This data constitutes a trade secret under ORS 192.345(2), and must not be disclosed except in accordance with the Oregon Public Records Law, ORS Chapter 192."

The Oregon Public Records Law exempts from disclosure only bonafide trade secrets, and the exception from disclosure applies only "unless the public interest requires disclosure in the

particular instance". Therefore, non-disclosure of documents or any portion of a document submitted as part of a response may depend upon official or judicial determination made pursuant to the Public Records Law.

In order to facilitate public inspection of the non-confidential portion of the response, material designated as confidential must accompany the response, but must be readily separable from it. Any response marked as a trade secret in its entirety will be considered non-responsive and will be rejected.

### INSURANCE PROVISIONS

Contractor shall not commence any work until Contractor obtains, at Contractor's own expense, all required insurance as specifically outlined in the resulting contract agreement between the District and Contractor. Such insurance must have the approval of Fern Ridge School District 28J as to limits, form, and amount. Major requirements are:

1. **COMMERCIAL GENERAL LIABILITY** insurance including personal injury, bodily injury and property damage with limits of \$2,000,000 Per Occurrence / \$2,000,000 General Aggregate / \$2,000,000 Products and Completed Operations Aggregate. Aggregates shall apply per Project. Limits may be provided by Excess or Umbrella policy.
2. **BUSINESS AUTOMOBILE LIABILITY** insurance comprehensive form with limits of at least \$2,000,000 per Accident. The coverage shall include owned, hired, and non-owned automobiles.
3. **SEXUAL ABUSE AND MOLESTATION.** The Contractor's General Liability policy must not specifically exclude coverage for sexual abuse and molestation. If sexual abuse and molestation coverage is excluded under the General Liability policy, evidence of separate sexual abuse and molestation coverage of not less than \$500,000 per

occurrence and \$1,000,000 aggregate each claim, incident, or occurrence must be provided to the District in the form of a certificate of insurance and must be approved by the District prior to the execution of this Agreement.

4. **WORKERS' COMPENSATION AND EMPLOYER'S LIABILITY** insurance as statutorily required for persons performing work under this Agreement. Any subcontractor hired by Contractor shall also carry Workers' Compensation and Employer's Liability coverage, with limits of at least \$500,000 each accident / \$500,000 policy limit / \$500,000 each employee.

#### **ADDITIONAL REQUIREMENTS**

Pursuant to ORS 279A.105, by submitting a proposal, the proposer certifies that the proposer has not discriminated against Minority, Women or Emerging Small Business Enterprises in obtaining any required subcontracts.

Pursuant to ORS 279A.105, proposers are hereby notified that policies applicable to consultants and contractors have been adopted that prohibit sexual harassment and that proposers and their employees are required to adhere to the District's policy prohibiting sexual harassment in their interactions.

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## **EQUAL OPPORTUNITY DIVISION 0 \* SECTION 00625**

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1. EQUAL OPPORTUNITY:

During the performance of this Contract, the Contractor shall comply fully with all applicable laws and prohibiting discrimination, including ORS 279A.105 and 279A.110.

2. NONDISCRIMINATION:

The Fern Ridge School District recognizes the diversity and worth of all individuals and groups. The Fern Ridge School District prohibits discrimination and harassment on any basis protected by law, including but not limited to, an individual's perceived or actual race, color, religion, sex, sexual orientation, national or ethnic origin, marital status, age, mental or physical disability or perceived disability, pregnancy, familial status, veterans' status, or because of the perceived or actual race, color, religion, sex, sexual orientation, national or ethnic origin, marital status, age, mental or physical disability or perceived disability, pregnancy, familial status, economic status, veterans' status of any other persons with whom the individual associates.

END OF SECTION 00625

School District complies with provisions of the various civil rights laws, such as the Fair Employment Practices Act, Title IX Regulations, and section 504 of PL 93.112 in employment and educational programs and activities.

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## **CONTRACTOR'S RELATIONS W/ SUB DIVISION 0 \* SECTION 00667**

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Contractor shall comply with the following ORS 279C.580, Contractors Relations with Subcontractors.

- (1) A contractor may not request payment from the contracting agency of any amount withheld or retained in accordance with subsection (5) of this section until such time as the contractor has determined and certified to the contracting agency that the subcontractor has determined and certified to the contracting agency that the subcontractor is entitled to the payment of such amount.
- (2) A dispute between a contractor and first-tier subcontractor relating to the amount or entitlement of a first-tier subcontractor to a payment or a late payment interest penalty under a clause included in the subcontract under subsection (3) or (4) of this section does not constitute a dispute to which the contracting agency is a party. The contracting agency may not be included as a party in any administrative or judicial proceeding involving such a dispute.
- (3) Each public contract awarded by a contracting agency shall include a clause that requires the contractor to include in each subcontract for property or services entered into by the contractor and a first-tier subcontractor, including a material supplier, for the purpose of performing a construction contract:
  - (a) A payment clause that obligates the contractor to pay the first-tier subcontractor for satisfactory performance under its subcontract within 10 days out of such amounts as are paid to the contractor by the contracting agency under the contract; and
  - (b) An interest penalty clause that obligates the contractor, if payment is not made within 30 days after receipt of payment from the contracting agency, to pay to the first-tier subcontractor an interest penalty on amounts due in the case of each payment not made in accordance with the payment clause included in the subcontract under paragraph (a) of this subsection. A contractor or first-tier subcontractor may not be obligated to pay an interest penalty if the only reason that the contractor or first-tier subcontractor did not make payment when payment was due is that the contractor or first-tier subcontractor did not receive payment from the contracting agency or contractor when payment was due. The interest penalty shall be:
    - (A) For the period beginning on the day after the required payment date and ending on the date on which payment of the amount due is made; and
    - (B) Computed at the rate specified in ORS 279C.515 (2).
- (4) The contract awarded by the contracting agency shall require the contractor to include in each of the contractor's subcontracts, for the purpose of performance of such contract condition, a provision requiring the first-tier subcontractor to include a payment clause and an interest penalty clause conforming to the standards of subsection (3) of this section in each of the first-tier subcontractor's subcontracts and to require each of the first-tier subcontractor's subcontractors to include such clauses in their subcontracts with each lower-tier subcontractor or supplier.
- (5) (a) The clauses required by subsections (3) and (4) of this section are not intended to impair the right of a contractor or a subcontractor at any tier to negotiate, and to include in the subcontract, provisions that:

- (A) Permit the contractor or a subcontractor to retain, in the event of a good faith dispute, an amount not to exceed 150 percent of the amount in dispute from the amount due a subcontractor under the subcontract without incurring any obligation to pay a late payment interest penalty, in accordance with terms and conditions agreed to by the parties to the subcontract, giving such recognition as the parties consider appropriate to the ability of a subcontractor to furnish a performance bond and a payment bond;
  - (B) Permit the contractor or subcontractor to make a determination that part or all of the subcontractor's request for payment may be withheld in accordance with the subcontract agreement; and
  - (C) Permit such withholdings without incurring any obligation to pay a late payment interest penalty if:
    - (i) A notice conforming to the standards of subsection (8) of this section has been previously furnished to the subcontractor; and
    - (ii) A copy of any notice issued by a contractor under sub-subparagraph (i) of this subparagraph has been furnished to the contracting agency.
- (b) As used in this subsection, "good faith dispute" means a documented dispute concerning:
- (A) Unsatisfactory job progress.
  - (B) Defective work not remedied.
  - (C) Third-party claims filed or reasonable evidence that claims will be filed.
  - (D) Failure to make timely payments for labor, equipment and materials.
  - (E) Damage to the prime contractor or subcontractor.
  - (F) Reasonable evidence that the subcontract cannot be completed for the unpaid balance of the subcontract sum.
- (6) If, after making application to a contracting agency for payment under a contract but before making a payment to a subcontractor for the subcontractor's performance covered by such application, a contractor discovers that all or a portion of the payment otherwise due the subcontractor is subject to withholding from the subcontractor in accordance with the subcontract agreement, the contractor shall:
- (a) Furnish to the subcontractor a notice conforming to the standards of subsection (8) of this section as soon as practicable upon ascertaining the cause giving rise to a withholding, but prior to the due date for subcontractor payment;
  - (b) Furnish to the contracting agency, as soon as practicable, a copy of the notice furnished to the subcontractor under paragraph (a) of this subsection;
  - (c) Reduce the subcontractor's progress payment by an amount not to exceed the amount specified in the notice of withholding furnished under paragraph (a) of this subsection;
  - (d) Pay the subcontractor as soon as practicable after the correction of the identified subcontract performance deficiency;
  - (e) Make such payment within:
    - (A) Seven days after correction of the identified subcontract performance deficiency unless the funds therefore must be recovered from the contracting agency because of a reduction under paragraph (f)(A) of this subsection; or
    - (B) Seven days after the contractor recovers such funds from the contracting agency;
  - (f) Notify the contracting agency upon:
    - (A) Reduction of the amount of any subsequent certified application for payment; or
    - (B) Payment to the subcontractor of any withheld amounts of a progress payment, specifying:
      - (i) The amounts of the progress payments withheld under paragraph (a) of this subsection; and
      - (ii) The dates that such withholding began and ended; and

- (g) Be obligated to pay to the contracting agency an amount equal to interest on the withheld payments computed in the manner provided in ORS 279C.570 from the 11th day after receipt of the withheld amounts from the contracting agency until:
  - (A) The day the identified subcontractor performance deficiency is corrected; or
  - (B) The date that any subsequent payment is reduced under paragraph (f)(A) of this subsection.
- (7) (a) If a contractor, after making payment to a first-tier subcontractor, receives from a supplier or subcontractor of the first-tier subcontractor a written notice asserting a deficiency in such first-tier subcontractor's performance under the contract for which the contractor may be ultimately liable and the contractor determines that all or a portion of future payments otherwise due such first-tier subcontractor is subject to withholding in accordance with the subcontract agreement, the contractor may, without incurring an obligation to pay a late payment interest penalty under subsection (6)(e) of this section:
  - (A) Furnish to the first-tier subcontractor a notice conforming to the standards of subsection (8) of this section as soon as practicable upon making such determination; and
  - (B) Withhold from the first-tier subcontractor's next available progress payment or payments an amount not to exceed the amount specified in the notice of withholding furnished under subparagraph (A) of this paragraph.
- (b) As soon as practicable, but not later than 10 days after receipt of satisfactory written notification that the identified subcontract performance deficiency has been corrected, the contractor shall pay the amount withheld under paragraph (a)(B) of this subsection to such first-tier subcontractor, or shall incur an obligation to pay a late payment interest penalty to such first-tier subcontractor computed at the rate specified in ORS 279C.570.
- (8) A written notice of any withholding shall be issued to a subcontractor, with a copy to the contracting agency of any such notice issued by a contractor, specifying:
  - (a) The amount to be withheld;
  - (b) The specified causes for the withholding under the terms of the subcontract; and
  - (c) The remedial actions to be taken by the subcontractor in order to receive payment of the amounts withheld.
- (9) Except as provided in subsection (2) of this section, this section does not limit or impair any contractual, administrative or judicial remedies otherwise available to a contractor or a subcontractor in the event of a dispute involving late payment or nonpayment by a contractor or deficient performance or nonperformance by a subcontractor.
- (10) A contractor's obligation to pay a late payment interest penalty to a subcontractor under the clause included in a subcontract under subsection (3) or (4) of this section is not intended to be an obligation of the contracting agency. A contract modification may not be made for the purpose of providing reimbursement of such late payment interest penalty. A cost reimbursement claim may not include any amount for reimbursement of such late payment interest penalty

END OF SECTION 00667



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## **LEAD CONTAINING MATERIALS DIVISION 0 \* SECTION 00668**

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Repair, Renovation, or Painting work being performed in "Child-Occupied Facilities" (facilities built prior to 1978 where children under the age of six regularly spend time) must be conducted by a "certified renovation firm" utilizing a "certified renovator".

For Renovation, Repair, and Painting work in Child-Occupied areas that are identified within in this document, the successful bidder will be responsible for compliance with all requirements of proposed OAR 333-70-0075 through 333-070-0160 when conducting work within identified Fern Ridge School District Child-Occupied areas. Proof of certifications to perform Renovation work in Child-Occupied areas will be prerequisite to final contract approval.

END OF SECTION 00668

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# **ASBESTOS CONTAINING MATERIALS DIVISION 0 \* SECTION 00669**

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## **ASBESTOS CONTAINING MATERIALS NOTIFICATION STATEMENT FOR CONTRACTORS**

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This form must be completed and signed by the Contractor prior to beginning work in any Fern Ridge School District building.

The presence of known and assumed asbestos containing materials is documented in the AHERA Management Plan for each building. Copies of the AHERA Management Plan are available at these locations 88834 Territorial Hwy, Elmira, OR 97437. Fern Ridge School District must be informed of the Contractor's activities in each building prior to the start of work so they can inform the Contractor on how to use the AHERA Management Plan and to determine if any asbestos containing material may be impacted by the Contractor's work.

The Contractor is responsible for notifying their employees and subcontractors of the presence of asbestos in the building. The Contractor shall not disturb known or assumed asbestos containing materials that are outside the contracted scope of work. If the Contractor discovers suspected asbestos containing materials that have not been identified, they must stop work and immediately notify Fern Ridge School District, so the material can be sampled. Any asbestos containing materials that must be removed to allow the Contractor to complete contracted work will be removed under separate contract by the District. If the Contractor disturbs asbestos containing materials that are outside the contracted scope of work, they will be responsible for the cost of the asbestos cleanup and decontamination.

I \_\_\_\_\_, Representing \_\_\_\_\_  
(Print Name of Representative) (Business Name)

have been notified of the location of the AHERA Management Plan, and agree to avoid impacting all known or assumed asbestos containing materials that are outside the contracted scope of work.

\_\_\_\_\_  
(Signature of Representative)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Fern Ridge School District)

\_\_\_\_\_  
(Title)

END OF SECTION 00669

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# PREVAILING WAGE RATES

## DIVISION 0 \* SECTION 00823

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### Prevailing Wage Rates (BOLI Requirements)

1. The Contractor and all subcontractors shall comply with the provisions of ORS 279C.800 through 279C.870, relative to Prevailing Wage Rates as outlined in Sections C.1 and C.2 of the General Conditions.
2. This Bid and the resulting Contract are subject to the following BOLI wage rate requirements, which are incorporated herein by reference:

*Prevailing Wage Rates for Public Works Contracts in Oregon*, issued **January 5, 2024**.

3. These BOLI wage rates are available online at:  
<https://www.oregon.gov/boli/workers/Prevailing%20Wage%20Rate%20Books/xPWR%20Rate%20Book%20for%20January%205,%202024.pdf>
4. If the publication *Prevailing Wage Rates for Public Works Contracts in Oregon Subject to BOTH PWR and federal Davis-Bacon Act* is specified then the Contract is subject to federal Davis-Bacon Act requirements in addition to BOLI requirements. If the federal funding provisions do apply then the Contractor shall pay the higher of the BOLI wages rates and fringe benefits, as identified in the above BOLI wage rate comparison booklet, or the federal wage rates and fringe benefits listed in the publication *General Wage Determinations Issued Under the Davis-Bacon and Related Acts* from the U.S. Secretary of Labor. Bidders are advised that federal Davis-Bacon rates may be amended at any time prior to Bid Closing and that contractors remain responsible for meeting federal requirements even if the BOLI wage rate comparison booklet has not been amended to show those federal changes.
5. The work will take place in Lane **County, Oregon**.

END OF SECTION 00823

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# SUMMARY OF THE WORK

## DIVISION 1 \* SECTION 01110

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### **PART 1 GENERAL**

#### **1.01 REQUIREMENTS INCLUDED**

- A. General Requirements.
- B. Work Covered by Contract Documents.
- C. Contractor Use of Premises.
- D. Related Work by Owner.
- E. Owner Furnished Products.
- F. Contractor Designed Elements.
- G. Project Coordination.
- H. Miscellaneous.

#### **1.02 WORK COVERED BY CONTRACT DOCUMENTS**

- A. General  
The intent of the Contract Documents is that the Contractor will provide a complete project with all materials and equipment in place and all systems operative.
- B. Description  
See Division 0, Section 00100 – Invitation to Bid for Public Improvements; Item 3.0 for project description.
- C. Provide for the work as shown in the Contract Documents required to complete the project.

#### **1.03 CONTRACTOR'S USE OF PREMISES**

- A. The Contractor's exterior work limits are indicated on the Drawings.
- B. Contractor shall limit his use of premise for Work and for storage to allow for:
  - 1. Owner occupancy
  - 2. Public use
  - 3. Coordinated use of premises under direction of Project Manager
  - 4. Full responsibility for protection and safekeeping of products under this Contract stored at Site.
  - 5. Moving stored products, under Contractor's control, which interfere with operations of Owner or separate Contractor.
  - 6. Obtaining and paying for use of additional storage or work areas needed for operations.
- C. Construction Operations:
  - 1. Do not unreasonably encumber Site with materials or equipment.
  - 2. Do not load structure with weight that will endanger structure.

#### 1.04 **EXCESSIVE NOISE**

- A. Comply with all City and County noise ordinances, start and completion times.
- B. Minimize noise during working hours. Notify Project Manager at least 24 hours prior to any necessary excessive noise. Comply with Owner's instructions.

#### 1.05 **RELATED WORK BY OWNER OR OTHERS**

- A. NIC & FIO Items: Items designated on the Drawings and/or described in the Project Manual as "NIC" (Not in Contract) or "FIO" (Furnished and Installed by Owner) are not included in the Contract.
- B. Contractor's Responsibilities:
  - 1. Designate delivery date for each portion of the Work in the Progress Schedule.
  - 2. Store products if requested.
  - 3. Coordinate installation with the Progress Schedule.
  - 4. Provide all preparatory work necessary for proper installation including blocking and backing and finish work including caulking, grouting, furring, preparation of subfloors for finish flooring materials, and painting adjacent surfaces as required for NIC or FIO equipment.

#### 1.06 **OWNER-FURNISHED PRODUCTS**

- A. Contractor's Responsibilities for OF/CI (Owner Furnished/Contractor Installed) Items:
  - 1. Designate submittals and delivery date for each product in Progress Schedule.
  - 2. Review shop drawings, product data, samples, and other submittals. Submit to Architect/Engineer with notification of any observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
  - 3. Receive and unload products at site.
  - 4. Inspect deliveries jointly with Owner, record shortages and damaged or defective items.
  - 5. Handle products at site, including uncrating and storage.
  - 6. Protect products from damage and from exposure to elements.
  - 7. Assemble, install, connect, adjust, and finish products as stipulated in respective specifications sections.
  - 8. Provide installation inspections required by public authorities.
  - 9. Clean, repair, or replace items damaged by Contractor.
  - 10. Remove and dispose of crating and packing materials for Owner-furnished materials and equipment delivered to the site.

#### 1.07 **CONTRACTOR DESIGNED ELEMENTS**

- A. Where work of this Contract requires bidder/designer design, comply with following requirements.
  - 1. Submit Shop Drawings and Calculations to Architect/Engineer for review.
  - 2. Submit Shop Drawings and Calculations to appropriate City and County agencies for approval and permits.
  - 3. All Shop Drawings and Calculations shall be stamped by Registered Architect/Engineer or Architect/Engineer licensed in State of Oregon.

#### 1.08 **COORDINATION OF WORK**

- A. Coordinate work of all Subcontractors, Sub-subcontractors, Suppliers, and Contractor's own forces to:
  - 1. Assure that requirements of Contract Documents are met.
  - 2. Provide efficient and orderly sequence of installation of interdependent construction elements.
  - 3. Minimize need for cutting, patching, and removal of poorly-timed work.

- B. Cooperate fully with the Owner, Architect/Engineer, testing laboratory, Project Manager, governmental agencies, utility companies, other contractors on site, and other affected parties to:
1. Protect existing structures, utilities, landscaping, and improvements.
  2. Facilitate project testing and inspection.
  3. Provide 48 hours notice of any work that will impact Owner's operations or scheduling of Owner's own work forces.
  4. Assure that project work is accomplished with a minimum of disruption to affected persons and neighboring properties.

#### 1.09 MISCELLANEOUS

- A. Work includes, but is not limited to:
1. Maintaining pedestrian and vehicular access to and around existing facilities.
  2. Not encumbering site access with materials or equipment.
  3. Obtaining and paying for use of additional storage or work areas needed for operations.
  4. Controlling all movement of water on project site to prevent erosion of soils, oversaturation of soils, down stream erosion and runoff, etc.
- B. The Fern Ridge School District assumes that walls, doors, etc., identified for demolition or alteration contain lead paint. The Contractor shall comply with all OSHA requirements. Per OAR 437 Division 2, General Occupancy Safety and Health Rules (29CFR1910 Subdivision Z, Toxic and Hazardous Substances).

#### 1.10 When Work Is Performed in or on School Sites, Contractor Shall Comply With the Following:

- A. Student Safety. As required by ORS 326.603, Contractor shall ensure that Contractor, any subcontractors, and their officers, employees, and agents will have no direct, unsupervised contact with students while on District property. Contractor shall work with the District to ensure compliance with this requirement. To ensure the safety of District staff and students, the Contractor must take reasonable precautions to ensure that individuals convicted of crimes listed in ORS 342.143 do not provide contracted services to the District. Furthermore, the Contractor shall provide timely notification to District once they become aware that an employee providing services within the District has been arrested or charged with a crime listed in ORS 342.143, and remove said individual from District premises until the issue is resolved
- B. Student Occupied Site. Prior to entry of a Contractor's employees onto a student occupied jobsite, the Contractor authorizes the District to obtain information about contractor personnel to conduct the appropriate criminal history verification per the District standards for background clearance as follows
- 1) Contractors, consultants and their employees must have a Fingerprint-Based Criminal History Verification in addition to a Nationwide Criminal History Verification if they are to be given unsupervised entry access to any school site.
  - 2) All other employees of the contractor or consultant who will be working on site must have successfully completed a Nationwide Criminal History Verification.
  - 3) The District will process the background checks and provide contractor personnel with photo id badges at the District's expense. Contractors will be charged a fee of \$200 for each badge not returned.
- C. Defense and Indemnity. The Contractor agrees to defend, indemnify, and hold harmless the District, its officers, employees and agents, from all liabilities, claims, suits, actions or expenses of any nature resulting from or arising out of the acts, errors, omissions or negligence of Contractor with regards to Contractor's duties and responsibilities under Paragraph 22 of this contract and ORS 326.603.
- D. Confidentiality. The Parties recognize that the Federal Education Privacy Rights Act (FERPA) imposes strict penalties for improper disclosure or re-disclosure of confidential student information including but not limited to denial of access to personally identifiable information from education records for at least five years (34 CFR 99.33(e)). Therefore, consistent with the requirements of FERPA, personally identifiable information obtained by the Contractor in the performance of this contract: may not be re-disclosed to third parties without written consent of the students' parents/guardians; and must be used only for the purposes identified in this contract.

**PART 2 PRODUCTS**

Not Used

**PART 3 EXECUTION**

Not Used

END OF SUMMARY OF WORK SECTION

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# MEETINGS

## DIVISION 1 \* SECTION 01310

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### **PART 1 GENERAL**

#### **1.01 DESCRIPTION**

A. Work included:

1. In general, project meetings will be held at the job site in accordance with a schedule established by the Project Manager. The Project Manager in conjunction with the A/E will conduct project meetings throughout the construction period.
2. The purpose of the project meetings is to enable orderly review of progress during construction and to provide for systematic discussion and analysis of problems that might arise between the Owner, A/E, Project Manager, and/or Contractor relative to execution of the Work.

B. Related work described elsewhere:

The Contractor's relations with his subcontractors and material suppliers, and discussions relative thereto, and the Contractor's responsibility as described in the General Conditions are not part of project meetings content.

#### **1.02 AUTHORITY DESIGNATION**

Persons designated by the Contractor to attend and participate in project meetings shall have all required authority to commit the Contractor to solutions as agreed upon in the project meetings.

#### **1.03 SUBMITTALS**

Agenda Items: To the maximum extent possible, advise the Project Manager at least twenty-four (24) hours in advance of the project meeting regarding all agenda items to be discussed.

#### **1.04 AGENDA**

A. Pre-construction Meeting

1. The Project Manager in conjunction with the A/E will conduct this meeting within fifteen (15) days after date of Notice to Proceed with work at the Project Site.
2. Location: Fern Ridge **School District Office Boardroom with tour of the site to follow.**
3. The Project Manager, A/E, Contractor, major subcontractors and suppliers and other interested parties should attend the pre-construction meeting.

School District complies with provisions of the various civil rights laws, such as the Fair Employment Practices Act, Title IX Regulations, and section 504 of PL 93.112 in employment and educational programs and activities.

B. Project Meetings



The Project Manager in conjunction with the A/E will conduct meetings weekly (or on another schedule established by the Project Manager) at the Project Site to coordinate the Work, answer questions, and resolve problems.

C. Special Meetings

The Project Manager may call special meetings at the project site or at other locations to coordinate the work, answer questions, and resolve problems.

1.05 **PRE-INSTALLATION CONFERENCES**

- A. When required in individual Specification Sections and/or as requested, convene pre-installation conference at work Site prior to commencing work of Section.
- B. Require attendance of parties directly affecting, or affected by, work of specific Section.
- C. Notify A/E four days in advance of meeting date.
- D. Prepare agenda, preside at conference, record minutes, and distribute copies within two days after conference to participants, with two copies to A/E.
- E. Review conditions of installation, preparation and installation procedures, and coordination with related work.

1.06 **MINUTES**

- A. The Project Manager/Architect/Contractor will compile minutes of each project meeting and will distribute copies to all interested parties within three (3) days after the meeting.
- B. The minutes compiled by the Project Manager/Architect/Contractor will be the official record minutes and all clarifications and/or corrections shall be transmitted in writing to the Project Manager within five (5) days of date of receipt of the minutes or unless noted during the next schedule meeting under the appropriate agenda item.

**PART 2 PRODUCTS**

Not Used

**PART 3 EXECUTION**

Not Used

END OF MEETINGS SECTION

01310-2

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# **SCHEDULES AND REPORTS**

## **DIVISION 1 \* SECTION 01320**

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### **PART 1 GENERAL**

#### **1.01 GENERAL REQUIREMENTS**

- A. The work under this Contract will be planned, scheduled, executed and reported using a bar chart schedule prepared, tracked and managed by the Contractor.
- B. The primary objective of the project schedule is to ensure the adequate planning, scheduling and execution of the construction activities so they may be prosecuted in an orderly and expeditious manner, within the Contract Time and the Milestones stipulated by the Contract, to provide optimum coordination between Contractors, to establish the basis for measuring and monitoring individual Contractor progress and overall project progress, to detect problems for the purpose of taking corrective action to maintain the scheduled program and to provide a mechanism, or tool for determining and monitoring such corrective actions.
- C. If the Contractor should desire or intend to complete the Work earlier than any required Milestone or Completion date, the Owner, A/E or the Project Manager shall not be liable to the Contractor for any costs or other damages should the Contractor be unable to complete the Work before this earlier date. The duties, obligations and warranties of the Owner to the Contractor shall be consistent with and applicable only to the completion of the Work on the Milestone and Completion dates required in the Owner-Contractor Agreement, unless Owner, the Project Manager and the Contractor otherwise agree in writing.

#### **1.02 CONSTRUCTION SCHEDULE - BAR CHART**

- A. Pursuant to the General Conditions of this Contract, the following additional scheduling requirements are a part of this Contract.
- B. Work under this Section shall consist of furnishing a Construction Schedule showing in detail how the Contractor plans to execute and coordinate the Work. The Contract Schedule shall be based on and incorporate the Contract Milestone and Completion dates specified in the Owner-Contractor Agreement and shall show the order in which Contractor shall perform the Work, projected dates for the start and completion of separable portions of the Work, and other information concerning Contractor's Work scheduling as Owner may request.
- C. The Construction Schedule shall be in the form of a bar chart and shall consist of horizontal lines, or bars, plotted along a daily time scale. The time-scale shall indicate all required Milestone and Completion dates as set forth in the Owner-Contractor Agreement. The horizontal bar(s) shall indicate the start and finish dates as well as the total time period of performance for each activity. The Contractor shall arrange the chart so as to show the activities which are necessary to fulfill each and every Milestone and Completion date requirement.
- D. Each work item on the Construction Schedule, as well as being correlated to the payment document, shall be broken into reasonable work segments/activities (where practicable) with individual starting and stopping dates. As a minimum Work shall be segmented to demonstrate its relationship to the various Milestone Dates, if any. Activity titles shall be self-explanatory; abbreviations shall be shown in the legend.

### **1.03 POST AWARD ACTIVITIES**

- A. The Contractor shall perform the following immediately after receipt of the Notice to Proceed:
  - 1. Prepare a detailed Construction Schedule that represents the Contractor's best judgement on how he shall execute and complete the Work in compliance with the Contract Milestone Dates and any Specific Dates stipulated in the Supplementary Conditions.
- B. Within 10 calendar days following Notice to Proceed, submit to the Project Manager a draft of the Construction Schedule for review and comment. Before the first Application for Payment, the Contractor shall submit to the A/E a Schedule of Values allocated to various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the A/E may require. This schedule, unless objected to by the A/E, shall be used as a basis for reviewing the Contractor's Applications for Payment. The Schedule of Values shall correspond to the Work segments/activities identified in the Construction Schedule.
- C. The Construction Schedule shall indicate completion date for the project that is not later than the project's required completion date. All activity durations shall be given in calendar days.
- D. It is to be expressly understood and agreed by the Contractor that the Construction Schedule is an estimate to be revised from time to time as progress proceeds, and that the Owner does not guarantee that Contractor can start work activities on the start dates or complete work activities on the finish date shown in the schedule, or as same may be updated or revised; nor does the Owner or the Project Manager guarantee that Contractor can proceed at all times in the sequence established by said schedule.
- E. The Project Manager will review the Contractor's Schedule. If required, a meeting will be held between the Project Manager and the Contractor to resolve any conflicts between the Contractor's schedule and the overall Project Construction. The Contractor shall revise his schedule as required by the Project Manager to support the Project Construction and shall submit his revised schedule to the Project Manager within five (5) days for final review and approval.
- F. Approval by the Owner and Project Manager of the Contractor's Construction Schedule is advisory only and shall not relieve the Contractor of the responsibility for accomplishing the Work within each and every Contract-required Milestone and Completion date. Omissions and errors in the approved Construction Schedule shall not excuse performance that is not in compliance with the Contract. Approval by the Owner and Project Manager in no way makes the Owner, Project Manager or the A/E an insurer of the Construction Schedule's success or liable for time or cost overruns flowing from its shortcomings. The Owner hereby disclaims any obligation or liability by reason of Owner, Project Manager or A/E approval of or acquiescence to the Construction Schedule.

### **1.04 PROGRESS PAYMENTS**

- A. The submission and approval of progress updates and the reports calculating the value of work done for any given pay period for each activity based on the percentages complete for that activity less the amount previously paid for past percentages complete and percent of retainage shall be an integral part and basic element of the application upon which Progress Payments shall be made pursuant to the provisions of the General Conditions. The Contractor shall be entitled to progress payments only as determined from the current updated and approved Schedule of Values. Applications for payment are to be submitted on AIA forms G702 and G703.
- B. All Applications for payment, must include Certified Payroll [Per Oregon Bureau of Labor & Industries (BOLI) requirements] for all work completed as reflected in the approved and updated schedule of values.

### **1.05 SPECIFIC DATES**

- A. The Contractor is required to adhere to the Specific Dates as set forth in the Invitation to Bid.

### **1.06 RECOVERY SCHEDULE**

- A. Should any conditions exist, such that certain activities shown on the Contractor's Detailed Construction Schedule fall behind schedule to the extent that any of the mandatory specific or Milestone States or Completion Dates are in jeopardy, the Contractor shall be required to, at no cost to the Owner, prepare and submit within three working days to the Project Manager a supplementary Recovery Schedule, in a form and detail appropriate to the need, to explain and display how he intends to reschedule those activities to regain compliance with the Detailed Construction Schedule during the immediate subsequent pay period.

#### **1.07 COORDINATION**

- A. The Contractor shall coordinate his work with activities of the Owner and shall cooperate fully with the Project Manager in maintaining orderly progress toward completion of the work as scheduled. The Project Manager's decisions regarding priority between the Contractor's work and the activities of the Owner at the site shall be final and shall not be cause for extra compensation or extensions of time, except where extensions of time is granted because of delay for which Contractor is otherwise entitled to an extension of time under the Contract Documents.

#### **PART 2 PRODUCTS**

Not Used.

#### **PART 3 EXECUTION**

Not Used

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# CERTIFICATE OF COMPLIANCE

## DIVISION 1 \* SECTION 01331

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No final payment shall be made until the Contractor shall file with the Owner, prior to acceptance of the Work, a notarized Certification of Compliance in the following form:

\*\*\*\*\*

The Contractor does hereby certify that all work has been performed and materials supplied in accordance with the drawings, specifications and Contract Documents for the above Work, and that:

No less than the prevailing rates of wages as ascertained by the governing body of the Contracting agency has been paid to laborers, workmen and mechanics employed on this Work;

There have been no unauthorized substitutes of Subcontractors; nor have any subcontracts been entered into without the names of the Subcontractors having been submitted to the Owner prior to the start of such subcontracted work;

No subcontract was assigned or transferred or performed by any Subcontractor other than the original Subcontractor, without prior notice having been submitted to the Owner together with the names of all Subcontractors;

All claims for material and labor and other service performed in connection with these specifications have been paid;

All monies due the State Industrial Accident Fund, the State Unemployment Compensation Trust Fund, the State Tax Commission, Hospital Associates and/or others have been paid.

To the best of my knowledge, no asbestos containing material has been used in the construction of this project. Material safety data sheets will be provided as requested by the Owner for all materials which may be questioned in the future.

In WITNESS WHEREOF, the undersigned has signed and sealed this instrument this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Firm Name\_\_\_\_\_

Signature\_\_\_\_\_

Title\_\_\_\_\_

(Attest)\_\_\_\_\_

(SEAL IF BIDDER IS A CORPORATION)

As determined necessary, evidence of compliance may be required to be submitted with and made a part of this Certificate of Compliance.

School District complies with provisions of the various civil rights laws, such as the Fair Employment Practices Act, Title IX Regulations, and section 504 of PL 93.112 in employment and educational programs and activities.

END OF CERTIFICATE OF COMPLIANCE SECTION

School District complies with provisions of the various civil rights laws, such as the Fair Employment Practices Act, Title IX Regulations, and section 504 of PL 93.112 in employment and educational programs and activities.

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# SHOP DRAWINGS, PRODUCT DATA, SAMPLES

## DIVISION 1 \* SECTION 01332

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### **PART 1 GENERAL**

#### **1.01 DESCRIPTION**

- A. Submit, to the A/E with copy to the Project Manager, shop drawings, product data and samples required by Specifications Sections.
- B. Related requirements specified elsewhere:
  - 1. Section 01320: Schedule and Reports
  - 2. Section 01700: Contract Closeout: Record Documents
- C. The Contractor shall prepare and submit to the Project Manager with Construction Schedule, a separate schedule listing dates for submission of all required shop drawings, product data and samples. Contractor to provide detailed submittal schedule which includes the date of submission, date of required approval, confirmed last date to order materials and products & on-site delivery dates.

#### **1.02 SHOP DRAWINGS**

- A. Shop Drawings are original drawings, prepared by Contractor, subcontractor, manufacturer, supplier or distributor, which illustrates some portion of the Work showing fabrication, layout, and setting or erection details.
- B. Shop drawings shall be prepared for this particular project. Drawings prepared specifically for other projects and revised for this project will be rejected.
- C. When necessary, base shop and setting drawings upon actual measurements taken at site and other job conditions. Show any variations and revisions to Contract Documents that are necessary for proper installation of work. Fabrication or installation of work shall not be started until shop or setting drawings have been checked and returned with "furnish as submitted" or "furnish as corrected" indicated by A/E.
- D. Identify details by reference to sheet and detail numbers shown on Contract Drawings.
- E. Provide shop drawings with cross-reference to drawing and detail numbers on Contract Drawings to facilitate review.
- F. Provide shop drawings which demonstrate to A/E that:
  - 1. Contractor understands design concept of certain portions of Work.
  - 2. Equipment and material to be provided meet design and technical requirements of Contract Documents.
  - 3. Methods of fabrication and installation.
- G. After review, reproduce and distribute in accordance with Article on Procedures above and for Record Documents described in Section 01700 - Contract Closeout.

1.03

## **PRODUCT DATA**

- A. Manufacturer's standard schematic drawings:
  - 1. Modify drawings to delete information that is not applicable to project.
  - 2. Supplement standard information to provide additional information applicable to project.
- B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance chart, illustrations and other standard descriptive data.
  - 1. Clearly mark each copy and identify pertinent materials, products or models.
  - 2. Show dimensions and clearances required.
  - 3. Show performance characteristics and capacities.
  - 4. Show wiring diagrams and controls.
- C. Provide product data with cross-reference to Specifications Section of Project Manual to facilitate review.
- D. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in Section 01700 - Contract Closeout.

1.04

## **SAMPLES**

- A. Samples are physical examples to illustrate materials, equipment or workmanship and to establish standards by which completed work is judged.
- B. Samples shall be of sufficient size and quantity to clearly illustrate:
  - 1. Functional characteristics of product or material, with integrally related parts and attachment devices.
  - 2. Full range of color, texture, and patterns available.
- C. After review, samples may be used in construction of Project.
- D. Include identification on each sample, with full Project information.
- E. Submit samples in ample time for review or selection, as applicable, so as to not delay Work. Take into account delivery time of all manufactured items when submitting samples.
- F. Submit samples of size and quantity specified, or, if not specified, of sufficient size and quantity to illustrate functional and aesthetic characteristics of Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- G. Field Samples:
  - 1. Construct each sample complete, including work of all trades required in finished Work.
  - 2. After acceptance, where appropriate and upon A/E's written approval, field samples may be incorporated into Project.
  - 3. When directed, remove field samples not incorporated into Project from site.

1.05

## **MANUFACTURER'S INSTRUCTIONS AND CERTIFICATES**

- A. When specified in individual specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturers' instructions and Contract Documents.



- C. When specified in individual specification Sections, submit manufacturers' certificate to A/E/Engineer for review, in quantities specified for Product Data.
- D. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.
- E. Certificates may be recent or previous test results on material or Product, but must be acceptable to A/E.

1.06

#### **REQUIRED SUBMITTAL QUANTITIES TO A/E**

Submit the following quantities plus such number of prints as are required for Contractor's own use: [If approved by A/E and Project Manager electronic submittals may be acceptable for this project]

	<u>A/E Team</u>	<u>Project Manager</u>
A. Construction Schedule:		
1. 8-1/2 x 11 inch size:	2	2
2. Larger than 8-1/2 x 11 inch:	2	2
B. Survey Data:		
1. 8-1/2 x 11 inch:	2	2
2. Larger than 8-1/2 x 11 inch:	2	
C. Shop Drawings: See specific section 1.08.B) covering Shop Drawing submittal requirements.		
D. Product Data:		
1. 8-1/2 x 11 inch:	2	2
2. Larger than 8-1/2 x 11 inch:	2	2
E. Samples: See specific section covering product or material.		
F. Schedule of Values	0	2

1.07

#### **CONTRACTOR RESPONSIBILITIES**

- A. Review shop drawings, product data and samples prior to submission to verify field measurements, catalog numbers, field construction criteria, fit with other Work, and errors or omissions in subcontractor's submittal data.
- B. Contractor's responsibility for errors and omissions in submittals is not relieved by A/E's review.
- C. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by A/E's review of submittals.
- D. Notify the Project Manager and A/E, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.
- E. Begin no work which requires submittals until return of submittals with A/E's stamp and initials or signature indicating "furnish as submitted" or "furnish as corrected".
- F. After A/E's review, distribute copies.

1.08

#### **SUBMITTAL REQUIREMENTS**

- A. Make all submittals far enough in advance of scheduled dates for installation to provide all required time for review, for securing necessary approvals, for possible revision and resubmittals and for placing orders and securing delivery. Submission of all shop drawings shall be through the General Contractor. Shop Drawings and product data shall be submitted not later than fifteen (15) days prior to contemplated or actual need date by the Contractor, and earlier where more time may be required for

review.

- B. Submit one (1) reproducible unfolded transparency and two (2) opaque print of shop drawings, and number of copies of product data which Contractor requires for distribution plus four (4) copies which will be retained by A/E and Project Manager.
- C. Submit number of samples specified in each specification section.
- D. Unless otherwise specifically permitted by the A/E, make all submittals in groups containing all associated items. Partial submittals may be rejected.
- E. Accompany submittals with transmittal letter, in duplicate, containing:
  - 1. Date
  - 2. Project title and number
  - 3. Contractor's name and address
  - 4. The number of each shop drawing, product data and sample submitted.
  - 5. Notification of deviations from Contract Documents.
  - 6. Specification section number
- F. Submittals shall include:
  - 1. Date and revision dates
  - 2. Project title and number
  - 3. The name of the Contractor, Subcontractor, and Supplier and/or Manufacturer.
  - 4. Identification of product or material
  - 5. Relation to adjacent structure or materials
  - 6. Field dimensions, clearly identified as such
  - 7. Specifications section number
  - 8. Applicable standards, such as ASTM number or Federal Specification
  - 9. A blank space, for A/E review stamp
  - 10. Identification of deviations from Contract Documents
  - 11. Contractor's stamp, initialed or signed, certifying to review and approval of submittal, verification of field measurements and compliance with Contract Documents.
- G. Electronic submission of shop drawings are as directed by the Project Manager or A/E.

#### 1.09 **RESUBMITTAL REQUIREMENTS**

- A. Shop Drawings:
  - 1. Revise initial drawings as required and resubmit as specified for initial submittal.
  - 2. Indicate on drawings any changes which have been made other than those requested by A/E.
- B. Product Data and Samples:

Submit new data and samples as required for initial submittal.
- C. Resubmittal of Shop Drawings, Product Data, and Samples necessitated by required corrections shall not be cause for extension of time.

#### 1.10 **DISTRIBUTION OF SUBMITTALS AFTER REVIEW**

Distribute two copies of shop drawings and product data that carry A/E's stamp to the A/E, (including one each for the A/E and Project Manager) and other copies as needed by the Contractor.

#### 1.11 **A/E'S DUTIES**

- A. Review submittals with reasonable promptness as mutually agreeable among the various parties.
- B. Review for conformance to the design concept and compliance with information given in the Contract Documents. Make notations directly on the reproducible.

- C. Review of separate item does not constitute review of an assembly in which item functions.
- D. Affix stamp and initials or signatures certifying the review of submittal.
- E. Return submittals to Contractor for distribution.
- F. The A/E or Project Manager may immediately reject any item without further review if it is not:
  - 1. Accompanied by a transmittal letter containing the required information.
  - 2. Submitted as a reproducible.
  - 3. Stamped "approved" by the Contractor.
- G. The review is intended to foresee unacceptable products and to avoid the possibility of their rejection at the site. The review shall not be construed as:
  - 1. Permitting a departure from the Contract Documents, unless specifically so noted.
  - 2. Relieving the Contractor of the responsibility for errors or omissions.
  - 3. Acceptance of an assembly in which an approved item is a part.
  - 4. Approval of variations from previously approved items.
  - 5. Approval of dimensions.
- H. The A/E will review all samples. Such review will be for appearance only. Compliance with all other requirements is the responsibility of the Contractor.
- I. Where the Contract Documents require the design of structural, mechanical or electrical systems or components of systems by a supplier, or where a Contractor initiates a change in the design of a system or component thereof, such systems or components shall be designed by a registered professional engineer and all calculations submitted to the A/E for his records, prior to starting fabrication or installation of the Work. The A/E will not be responsible for the designs of such other professional engineers.

#### 1.12 **VARIATIONS FROM CONTRACT DOCUMENTS**

- A. If the A/E determines a variation from the Contract Documents is in the best interest of the Owner, and it does not involve change in the Contract price or item, the A/E, through the Project Manager, with the Owner's concurrence, may permit such variation.
- B. Unless the A/E receives immediate written notification, he will assume the Contractor approves any variation shown.
- C. If the Contractor fails to mention variations from the Contract Documents, he will not be relieved of the responsibility for executing the Work in accordance with the Contract Documents.
- D. When a variation from the Contract Documents is permitted and such variation involves corresponding adjustment in an adjacent or related item, the responsibility for making and paying all costs for such adjustment rests with the Contractor requesting the original variation.

#### 1.13 **MOCK UPS**

Prepare mockups as directed by the A/E and/or Project Manager.

### **PART 2 PRODUCTS**

Not Used

### **PART 3 EXECUTION**

Not Used

END OF SHOP DRAWINGS, PRODUCT DATA AND SAMPLES SECTION

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# **SAFETY PROCEDURES**

## **DIVISION 1 \* SECTION 01411**

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### **PART 1 GENERAL**

#### **1.01 PRELIMINARY WORK**

- A. Prior to the start of and during the course of the Work (above and below ground) the Contractor shall make a thorough survey of the entire work site to determine all potential hazards. Workmen shall be made aware of those hazards and shall be instructed in procedures and the use of equipment for their protection. The Contractor shall verify the location and condition ("live" or "dead") of all utilities on and near the work site and take precautions to protect his/her employees, the general public, and the property.

#### **1.02 IMMINENT DANGER**

- A. The Contractor shall be wholly responsible for any accidents (including death) occurring at any time during the progress of the work and until the final acceptance of the work by the Owner which may happen to any of his workmen or those of any Subcontractor employed on the building, or for any damage or injuries (including death) which his work and operations may cause to the work being constructed, or to existing buildings, or to any tenants and occupants of the property, or of the adjoining properties, or to the public, or to any public or private property.

#### **1.03 SAFETY**

- A. The Contractor shall ensure that all employees, visitors, subcontractors' employees, and suppliers' employees, while on the work site, comply with the requirements of OSHA, these requirements and the safety precautions contained in the several Specifications Sections. The Contractor shall promptly and fully comply with, execute and, without separate charge thereof to the Owner, shall enforce compliance with the provisions of the Oregon State Employment Act Safety Requirements and Occupational Safety and Health Act requirements.
- B. The Contractor shall immediately advise the Owner of inspections conducted by OSHA, at the work site, and shall transmit copies of citations and violations to the Project Manager.
- C. The Contractor shall provide a site specific safety program for review by the District.

#### **1.04 SAFETY RESPONSIBILITIES**

- A. Contractor shall be responsible to:
  - 1. Ensure compliance with these requirements, OSHA requirements, and other safety requirements.
  - 2. Authorize immediate action to correct substandard safety conditions.
  - 3. Review and act to ensure compliance with safety procedures with his supervisors, subcontractors, and suppliers.
  - 4. Make thorough daily safety inspections of the work site and immediately act to eliminate unsafe acts and unsafe conditions.

School District complies with provisions of the various civil rights laws, such as the Fair Employment Practices Act, Title IX Regulations, and section 504 of PL 93.112 in employment and educational programs and activities.

5. Investigate worksite accidents and recommend immediate corrective action.
6. Assist in the preparation of accident investigation and reporting procedures.
7. Be responsible for the control, availability, and use of safety equipment, including employee personal protective equipment.

#### 1.05 **REQUEST FOR VARIANCES**

- A. Requests for variances to deviate from OSHA requirements must follow the current established procedures by that Agency.

#### 1.06 **FAILURE TO COMPLY**

- A. If the project is shut down due to the Contractor's failure to comply with the requirements of OSHA or other applicable safety requirements, no part of the time loss due to any such suspension of operations or stop orders shall be made the subject of a claim for extension of time or for increased cost or damage by the Contractor.

#### 1.07 **BASIC SAFETY WORK RULES**

- A. Roseburg School District is committed to the safety and health of all personnel: school students and staff, construction personnel, vendors, and the general public. In our effort to make projects hazard free and provide the safest working conditions possible, we expect all construction personnel to learn and practice the following basic safe work rules. In addition to the rules listed below, there are additional site specific work rules that must be observed on this project. All applicable OSHA and Oregon OSHA codes are to be strictly followed. See your supervisor for additional information.
  - All construction contractors shall develop for owner review, a safety program oriented to work in, or around, school occupied spaces: notification of planned work, safety barricades/barriers, restricted access locations, noise containment, worker conduct, noise and overhead lifts during school session, etc.
  - Work shall never commence until proscribed safety barriers are in place near student occupied areas.
  - Drugs, alcohol, smoking, are prohibited on school property.
  - Approved and unaltered hard hats and sturdy work boots/shoes are required at all times in all work areas.
  - Sleeveless shirts and short pants will not be permitted.
  - Approved (Z.87. I) safety glasses/goggles eye protection shall be worn when exposed, or potentially exposed, to harmful rays, dust, chemicals, or flying particles.
  - Hearing protection shall be worn in all high noise areas or while performing high noise tasks.
  - Approved respiratory protection shall be worn, as required.
  - Proper gloves are required when handling material that could cut, burn, bruise, or contaminate the skin.
  - Employees working on unguarded or unprotected work platforms 6 (six) feet or more above the ground shall wear a safety belt or harness as prescribed by OSHA.
  - No employee shall work on scaffolding higher than 6 (six) feet without proper guardrails and toe-boards, unless safety belts or barricades are used.
  - Do not climb on or work from any handrail, mid-rail or brace. Use the scaffold ladder to get on a scaffold.
  - Secure or cleat scaffold boards to prevent movement.
  - Inspect all ladders for damage or defects before use. Step ladders will only be used in the fully opened position.
  - Extension ladders shall not be separated, ladder feet set on a secure surface, and tied off at the top.
  - Good housekeeping shall be practiced at *all times*.
  - Projecting nails shall be bent over or removed from all lumber on site.
  - Clean up spills immediately and remove oily, flammable, or combustible waste/rags to approved containers.

- Access to safety and fire-fighting equipment shall be kept clear at all times. Learn how to use an extinguisher before you need it!
- Gasoline equipment shall not be refueled when running.
- Keep compressed gas cylinders in the upright position with caps on when not in use and secure from students.
- Never enter a confined space/excavation until you check with your supervisor. Supplied air may be required.
- Never enter an unshored excavation over 4 (*four*) *feet* deep unless the slopes are laid back.
- Excavations will be provided with an access/egress ladder requiring no more than 25 (twenty-five) feet of travel.
- Every tool is designed for a specific use - inspect before you use and *do not misuse/abuse*.
- Horseplay, fighting, gambling, cursing, offensive behavior, and fraternizing with school students and staff will not be tolerated.
- All electrical extension cords shall be three wire heavy duty and not laid across traffic areas.
- Tagout and lockout rules are to be strictly enforced.
- Wire rope chokers, slings, chainfalls, and come-a-longs are to be *inspected before use*.
- No person, other than the operator, shall ride on trucks, loaders, shovels or other moving equipment .
- Immediately report all near misses, accidents and injuries to your supervisor. Report unsafe conditions or practices to your supervisor immediately.
- HOT WORK permits are required for all flame and spark producing work.
- Use "911" for emergency response for fire and injuries requiring medical attention.
- All electrical/powder/air-powered equipment shall conform to the applicable OSHA code for construction .
- Safety meetings shall be held each week and documented properly.
- Contractors shall not allow its personnel to play sound/music devices (radios, stereos, etc.) on school property.

## **PART 2 PRODUCTS**

Not Used

## **PART 3 EXECUTION**

Not Used

END OF SAFETY PROCEDURES SECTION

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# **WAGE RATES**

## **DIVISION 1 \* SECTION 01412**

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### **PART 1 GENERAL**

#### **1.01 PREVAILING WAGE (IF APPLICABLE)**

- A. The provisions of the State of Oregon ORS 279C.800 to ORS 279C.870 are hereby incorporated by reference as if fully set forth herein. The failure of the Contractor to comply with each and every provision thereof shall be a breach of this Contract and shall entitle the Owner to pursue any remedies he deems necessary.
- B. The public agency must pay a fee to BOLI's PWR Unit for every contract awarded to a contractor. The amount of the fee due is one-tenth of one percent (.001) of the contract price; however, there is a minimum fee of \$250 and a maximum fee of \$7,500.  
Contractors working on public works projects must obtain and file with the Construction Contractors Board (CCB) a public works bond with a corporate surety authorized to do business in Oregon for the amount of \$30,000 before starting work on a contract or subcontract for a public works project, unless exempt. (Mandated by SB477 (2005))
- C. The Contractor shall be subject to any amendments to the said statutes whether occurring before or after the execution of the Contract without increase to the Contract Price.
- D. Under the provisions of ORS 279C.840, the hourly wages paid to laborers, workmen, or mechanics upon all public works of this State and upon work contemplated in this Contract, shall be not less than the prevailing rate of wage for an hour's work in the same trade or occupation in the locality within the State where such labor and work herein contemplated is to be performed, and established by the Oregon Bureau of Labor and Industries [BOLI].  
All laborers, workmen or mechanics shall be paid not less than the minimum hourly rate of wage which are incorporated herein, provided, however, that nothing herein contained shall be construed to prohibit the Contractor, Subcontractor or other person doing or contracting to do the whole or any part of the work under this Contract, from paying any such laborers, workmen or mechanics wages in excess of the hourly minimum rate above specified.
- E. The Owner does not guarantee that the labor can be procured for the minimum wages set forth. The rates of wages listed are minimums only, below which the Contractor cannot pay and they do not constitute a representation the labor can be procured for the minimum listed. It will be the responsibility of the Contractor to ascertain for himself the wages above the minimum he may have to pay.
- F. In accordance with ORS 279C.845 the Contractor shall file certified statements under oath with the Owner certifying the rate of hourly wage paid each classification of laborers, workmen, or mechanics employed upon the work by the Contractor or Subcontractor which shall be not less than the prevailing rate of wage. Such statement and any supplemental statements which may be necessary shall be filed in accordance with the practices and procedures required by the Bureau of Labor and Industries.
- G. In accordance with ORS 279C.850, inspections may be conducted by the Commissioner of the Bureau of Labor and Industries to confirm compliance with these laws.
- H. Copies of wage rate approvals will be furnished the awarding agency, and the Contractor (and the Prime Contractor in the case of Subcontractor) by the Industrial Statistician.
- I. Notarized certificates that the minimum wage rates have been paid the Contractor and each subcontractor shall be submitted with the Contractor's applications for payments.

### **PART 2 PRODUCTS**

Not Used

### **PART 3 EXECUTION**

Not Used

END OF WAGE RATES SECTION



**School District complies with provisions of the various civil rights laws, such as the Fair Employment Practices Act, Title IX Regulations, and section 504 of PL 93.112 in employment and educational programs and activities.**

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# QUALITY CONTROL

## DIVISION 1 \* SECTION 01450

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### **PART 1 GENERAL**

#### **1.01 SUMMARY**

A. Section Includes:

1. Quality assurance and control of installation.
2. References.
3. Inspection and testing laboratory services.
4. Contractor's inspection and testing responsibilities.
5. Manufacturers' field services and reports.

B. Related Sections:

1. Subsection B.6 General Conditions and Supplementary General Conditions: Inspection and testing.
2. Section 01332 - Submittals: Submission of Manufacturers' Instructions and Certificates.
3. Section 01600 - Material and Equipment: Requirements for material and product quality.

#### **1.02 QUALITY ASSURANCE/CONTROL OF INSTALLATION**

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from A/E before proceeding.
- D. Comply with specified standards as minimum quality for Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

#### **1.03 REFERENCES**

- A. Conform to reference standard by date of issue current on date of Contract Documents.
- B. Obtain copies of standards when required by Contract Documents.
- C. Should specified reference standards conflict with Contract Documents, request clarification from A/E before proceeding.

Title IX Regulations, and section 504 of PL 93.112 in employment and educational programs and activities.

- D. Contractual relationship of parties to Contract shall not be altered from Contract Documents by mention or inference otherwise in any reference document.

#### 1.04 **INSPECTION AND TESTING LABORATORY SERVICES**

Owner will appoint, employ, and pay for services of independent firm to perform inspection and testing.

#### 1.05 **CONTRACTOR'S INSPECTION AND TESTING RESPONSIBILITIES**

- A. Cooperate with independent firm:

1. Furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.
2. Provide access to work and manufacturer's operations.
3. Notify A/E and independent firm 24 hours prior to expected time for operations requiring services.
4. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
5. Furnish copies of mill test reports.
6. Furnish casual labor and facilities to facilitate testing.
7. Arrange with laboratory and pay for additional samples and tests required for Contractor's convenience.

- B. Retesting:

1. Retesting required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by A/E.
2. Should initial tests indicate non-compliance with Contract Documents, costs for both initial tests and subsequent retesting occasioned by non-compliance, and all other related costs, including additional A/E's services made necessary by such failure, will be charged to Contractor by deducting such costs from Contract Price.

- C. Contractor's Responsibility: The testing laboratory service provided by the Owner shall not relieve the Contractor of his responsibility for compliance with the requirements of the Contract Documents. Testing laboratory services are provided for the sole and exclusive benefit of the Owner in monitoring the quality and performance of the Contractor's work. Results of tests made by the Owner's testing laboratory will be made available to the Contractor and shall be a basis for rejection of non-conforming or defective work. Additional tests/inspections required by the Owner shall not be the basis for any claim by the Contractor for additional compensation.

#### 1.06 **MANUFACTURERS' FIELD SERVICES AND REPORTS**

- 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. Submit qualifications of observer to A/E in advance of required observations. Observer is subject to approval of A/E and Owner.
- C. Observers shall report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Submit report in duplicate within 30 days of observation to A/E and Project Manager for review.

### **PART 2 PRODUCTS**

Not Used

### **PART 3 EXECUTION**

Not Used

END OF QUALITY CONTROL SECTION

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# CONSTRUCTION FAC. & TEMP CONTROLS

## DIVISION 1 \* SECTION 01500

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### **PART 1 GENERAL**

#### **1.01 SUMMARY**

**A. Section Includes:**

1. Temporary Utilities: Electricity, lighting, heat, ventilation, telephone service, water and sanitary facilities.
2. Temporary Controls: Barriers, enclosures and fencing, protection of the Work and water control.
3. Construction Facilities: Access roads, parking, progress cleaning, and temporary buildings.
4. Removal: Utilities, facilities, and controls.

**B. Related Sections:**

Section 01700 - Contract Closeout: Final cleaning.

**C. Related work described elsewhere:**

1. Compliance with safety regulations: Compliance with all requirements of pertinent regulations is described in the Conditions of this Contract.
2. Subcontractor equipment: Equipment furnished by subcontractors shall comply with all requirements of pertinent safety regulations, the ladders, hoists, planks, and similar items normally furnished by individual trades in execution of their own portions of the Work which are not part of this Section of these Specifications.
3. Utility hook-up: Installation and hook-up of the various utility lines are described in other pertinent sections of these Specifications.
4. Construction Locks: Temporary construction cores for building door hardware is specified in Section 08700, if applicable.

#### **1.02 TEMPORARY UTILITIES**

**A. Temporary Electricity:**

Owner will provide and pay for power service required from Utility source, utilizing existing power at each site.

**B. Temporary Lighting and Heat:**

Provide and pay for lighting and heat devices as required to maintain adequate conditions for construction operations. Vent products of combustion directly to out of doors for all fuel-burning heaters and equip units with individual space thermostatic controls.

C. Temporary Ventilation:

1. Ventilate enclosed areas to:
  - a. Assist cure of materials.
  - b. Dissipate humidity.
  - c. Prevent accumulation of dust, fumes, vapors, or gases.
  - d. Provide local exhaust ventilation to prevent harmful dispersal of hazardous substances into atmosphere at all times.

D. Temporary Water Service:

Owner will provide, maintain and pay for suitable quality water service required for construction operations., utilizing existing water at each site.

E. Temporary Sanitary Facilities:

1. Provide and maintain adequate number of required facilities and enclosures for use of all persons and trades employed on Work during construction period.
  - a. Toilet facilities.
  - b. Washing facilities.

F. Temporary First Aid Facilities: Provide adequate first aid facilities for construction personnel.

G. Temporary Fire Protection:

1. Take all precautions to prevent possibility of fire resulting from construction operations. Particularly avoid hazardous accumulations of rubbish and unsecured flammable materials.
2. Provide emergency fire extinguishing equipment of adequate type and quantity, readily available and properly maintained.

**1.03 TEMPORARY CONTROLS**

A. Barriers, Fencing, and Exterior Enclosures:

1. Provide barriers to prevent unauthorized entry to construction areas and to protect persons and property from damage due to construction operations.
2. Provide temporary fencing as required by the Contract Documents and where needed to protect the work or Contractor's office, materials, and equipment.
3. Provide temporary weather-tight closure of exterior and roof openings to protect the Work, provide acceptable conditions, and allow for ambient temperatures required to perform the Work.
4. All temporary items to be reviewed and approved by the Owner and Project Manager.

B. Water Control:

1. Provide and maintain site drainage to keep all areas free of standing water.
2. Provide water barriers as required to protect site from soil erosion.

C. Dust Control:

Periodically wet down site as required by Project Manager and as needed to keep airborne dust to minimum.

D. Pollution Control:

1. Burning or burying of rubbish and waste materials on site is prohibited.
2. Disposal of volatile fluids (such as mineral spirits, oil, or paint thinner) in storm or sanitary sewer systems is prohibited.

E. Vegetation Damage Control:

Protect existing trees, shrubs, and landscaping from damage due to construction operations.

F. Security:

Provide locks, watchmen, or other security measures as needed to protect the Work and Owner's operations from unauthorized entry, vandalism, and theft.

#### 1.04 CONSTRUCTION FACILITIES

A. Access Roads and Parking:

1. Construct, relocate, and maintain temporary roads and parking areas to provide access for Contractor's and Owner's personnel to the Work, fire hydrants, and existing facilities and structures
2. Provide means of removing mud from vehicle wheels before entering the streets.

B. Progress Cleaning:

1. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
2. Dispose of waste materials, debris, and rubbish off site.

C. Field Office and Sheds:

Furnish and install a field office building adequate in size and accommodation for all Contractor's offices, supply room, tool room, and job site meetings conducted by the Project Manager.

D. During concrete installation, the Contractor is responsible for the first 24 hrs due to vandalism. Provide proper and secure measures around fresh concrete.

#### 1.05 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

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

C. Restore existing facilities, Owner's property, and adjacent private and public property damaged or used during construction, to original condition. Restore permanent facilities used during construction to specified condition.

### **PART 2 PRODUCTS**

Not Used

### **PART 3 EXECUTION**

Not Used

END OF CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS SECTION

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# MATERIALS AND EQUIPMENT

## DIVISION 1 \* SECTION 01600

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### **PART 1 GENERAL**

#### **1.01 SUMMARY**

A. Section Includes:

1. Transportation and handling.
2. Storage and protection.
3. Materials and equipment.
4. Manufactured and fabricated products.
5. Product options and substitutions.
6. Preparation and installation.
7. Starting systems
8. Demonstration and instruction.

B. Related Sections:

1. Section 01450 - Quality Control: Product quality monitoring.
2. Section 01700 - Contract Closeout: Operation and maintenance data; Warranties and Bonds.

#### **1.02 TRANSPORTATION AND HANDLING**

- A. Coordinate product deliveries to avoid work schedule conflicts or delays.
- B. Transport and handle products in accordance with manufacturer's instructions.
- C. Deliver products undamaged, in manufacturer's original containers, with labels intact and legible.
- D. Promptly inspect shipments to assure 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.

#### **1.03 STORAGE AND PROTECTION**

- A. Assume full responsibility for protection and safekeeping of products stored on premises.
- B. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures. Provide proper drainage, temperature, humidity, lighting, and protection.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS AND EQUIPMENT**

- A. All materials and equipment shall be new (except existing items specifically designated for reuse) and free from defects impairing strength, durability, or appearances.
  - 1. When two or more items of same kind are required under work, use items of single manufacturer except where specifically exempted.
  - 2. Electrical products shall bear Underwriters' Laboratories (UL) label properly attached in accordance with requirements of Regulatory Agencies.
  - 3. Components required in quantities greater than one shall be the same, and shall be interchangeable.
- B. All items incorporated into Work shall conform to Contract Documents and designated standards.

### **2.02 MANUFACTURED AND FABRICATED PRODUCTS**

- A. Design, fabricate and assemble products in accordance with current best engineering, industry, and shop practices.
- B. Contract Documents are based upon specific manufacturers listed in various Specification sections. Alternate manufacturers may require deviations from Contract Documents to properly install their particular product and to provide required results.
  - 1. Provide all additional work necessary to install such products, if approved, at no extra charge to Owner.
  - 2. Submit Shop Drawings showing all deviations from Contract Documents for each specific item.

### **2.03 PRODUCT OPTIONS AND SUBSTITUTIONS**

- A. A/E/ and Owner will consider requests for Substitutions only prior to five [5] days before receipt of Bids.
- B. After award, substitutions may be considered when a product becomes unavailable, incompatible, or obsolete through no fault of the Contractor.
- C. Document each request on the form provided at the ends of this section with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. Request constitutes representation that Contractor:
  - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
  - 2. Will provide same warranty for Substitution as for specified product.
  - 3. Will coordinate installation and make changes to other Work that may be required for 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 for review or redesign services associated with re-approval by authorities.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to Contract Documents.
- F. 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 proposed product equivalence.
  - 3. A/E will notify Contractor, by addendum (or after award, in writing), of decision to accept or reject



request.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

Examine existing conditions, Project requirements and Contract Documents. Verify that materials and equipment furnished meet specified requirements.

#### **3.02 INSTALLATION**

- A. Perform Work, handle, install, connect, clean, condition and adjust products in strict accordance with manufacturers' printed Instructions, and with Contract Document requirements.
- B. In case of conflict, Contract Documents shall govern. When in doubt, request clarification.

#### **3.03 STARTING SYSTEMS**

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify A/E prior to start-up.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions that may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of responsible manufacturer's representative or Contractor's personnel in accordance with manufacturer's instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in

#### **3.04 DEMONSTRATION AND INSTRUCTIONS**

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of final inspection.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. 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.

END OF MATERIAL AND EQUIPMENT SECTION

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# **APPROVAL FOR SUBSTITUTION & PRODUCT OPTION DIVISION 1 \* SECTION 01630**

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## **PART 1 GENERAL**

### **1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE**

- A. Substitutions During Bidding: Instructions to Bidders.
- B. Shop Drawings, Product Data, Samples: General Conditions and Section 01332.
- C. Material and Equipment - Product Options and Substitutions Section 01600.

### **1.02 PRODUCTS LIST**

- A. Within thirty (30) days after date of Contract, submit to the Architect/Engineer five (5) copies of complete list of all products which are proposed for installation.

### **1.03 CONTRACTOR'S OPTIONS**

- A. For products specified only by reference standards, select any product meeting standards, by any manufacturer.
- B. For products specified by naming several products or manufacturers, select any product and manufacturer named.

### **1.04 SUBSTITUTIONS**

- A. During bidding, the Architect/Engineer will consider written requests for substitutions only when received in triplicate on the form provided as pages in 01640. No request will be considered unless received at least ten (10) calendar days prior to the bid date. Requests for substitutions after the bid date will be only considered if in conformance to specified section 01630-1.07. Electronic submission allowed with A/E approval.
- B. In connection with the use of any substitute item approved by the Architect/Engineer, it shall be the Contractor's responsibility to see that such items meet all space requirements, and that any alterations to connecting items necessitated by use of the alternate items are properly made, at no increase in cost to the Owner.
- C. Specific reference in the specifications to any article, device, product, materials, form or type of construction, etc., by name, make or catalog number, shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition.
- D. In making request for substitution, Bidder/Contractor represents:
  - 1. He has personally investigated proposed product or method, and determined that it is equal or superior in all respects to that specified.
  - 2. He will provide the same guarantee for substitution as for product or method specified.
  - 3. He will coordinate installation of accepted substitution into Work, making such changes as may be required for Work to be complete in all respects at no additional cost to Owner.
  - 4. He waives all claims for additional costs related to substitution which consequently becomes apparent.

- E. In order to allow the fullest competition, consistent with the Owner's interests, the Architect/Engineer will  
School District complies with provisions of the various civil rights laws, such as the Fair Employment Practices Act, Title IX Regulations, and section 504 of PL 93.112 in employment and educational programs and activities.

give consideration, prior to submission of proposals, to requests for approval of products and materials competitive with and similar to those specified by proprietary name.

- F. To be considered and in order to facilitate review of requests for approval of substitutions for specified products or materials, all such requests shall be made in writing on the form included as a part of this section.
- G. Should any proposed product substitution require any redesign work by the Architect/Engineer or the Architect/Engineer's consultants to accommodate the substitute product, costs for such redesign work shall be included in the Bid amount and shall be paid to the Architect/Engineer at the Architect/Engineer's usual rates for the time expended in the required redesign work.

#### 1.05 **ARCHITECT/ENGINEER'S OPTIONS**

- A. Architect/Engineer will be sole judge of acceptability of any proposed substitution.
- B. Only approved substitutions may be used on Contract Work.
- C. Each request for substitution approval shall include:
  - 1. Identity of product for which substitution is requested; include specification page and paragraph number.
  - 2. Identity of substitution; include complete product description, drawings, photographs, performance and test data, and any other information necessary for evaluation.
  - 3. Quality comparison of proposed substitution with specified product.
  - 4. Changes required in other work because of substitution.
  - 5. Effect on construction progress schedule.
  - 6. Cost comparison of proposed substitution with specified product.
  - 7. Any required license fees or royalties.
  - 8. Availability of local maintenance service.
  - 9. Source of replacement materials.

#### 1.06 **DURING BIDDING PERIOD**

- A. No request for substitution approval will be considered unless a written request in triplicate has been submitted on Standard Form bound hereinafter, and has been received by Architect/Engineer at least ten (10) calendar days prior to bid.
- B. Request submitted without self-addressed and stamped envelope will not be individually acknowledged.
- C. Addenda will be issued to all prospective bidders identifying all approved submittals.

#### 1.07 **AFTER CONTRACT AWARD**

- A. Approval will be granted only when:
  - 1. Specified product cannot be delivered without project delay, or
  - 2. Specified product has been discontinued, or
  - 3. Specified product has been replaced by superior product, or
  - 4. Specified product cannot be guaranteed as specified, or
  - 5. Product will not perform properly, or
  - 6. Specified product will not fit within designated space, or
  - 7. Specified product does not comply with governing codes or regulations, or
  - 8. Substitution determined by the Owner to be in his best interest.

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# **SUBSTITUTION REQUEST FORM**

## **DIVISION 1 \* SECTION 01640**

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### **SUBSTITUTION REQUEST FORM**

TO: \_\_\_\_\_

PROJECT: \_\_\_\_\_

We hereby submit for your consideration the following product instead of the specified items for the above project:

Section	Page	Paragraph/Line	Submitted Item
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_____	_____	_____	_____
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Proposed Substitution:

Attach complete Product description, drawings, photographs, performance and test data, and other information necessary for evaluation.

- A. Will changes be required to building design in order to properly install proposed substitution:  
Yes \_\_\_ No \_\_\_\_.  
If Yes, explain \_\_\_\_\_
- B. Will the undersigned pay for changes to the building design, including engineering and drawing costs, caused by requested substitution?  
Yes \_\_\_ No \_\_\_\_.
- C. What difference exists between proposed substitution and specified item? \_\_\_\_\_  
\_\_\_\_\_
- D. Does substitution affect Drawing dimensions?  
Yes \_\_\_ No \_\_\_\_.  
If Yes, explain \_\_\_\_\_
- E. What affect does substitution have on other trades? \_\_\_\_\_
- F. Does manufacturer's warranty of proposed substitution differ from that specified? Yes \_\_\_ No \_\_\_\_.  
If Yes, explain \_\_\_\_\_
- G. Will substitution affect progress schedule?  
Yes \_\_\_ No \_\_\_\_.  
If Yes, explain \_\_\_\_\_
- H. Will substitution require more license fees or royalties than specified product? Yes \_\_\_ No \_\_\_\_.  
If Yes, explain \_\_\_\_\_
- I. Will substitution cost more than specified product?  
Yes \_\_\_ No \_\_\_\_  
If Yes, explain how much \_\_\_\_\_

J. Will maintenance and service parts be locally available for substitution?  
Yes \_\_\_\_ No \_\_\_\_.  
If No, explain \_\_\_\_\_

Submitted by:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Firm

\_\_\_\_\_  
Address

\_\_\_\_\_  
Date

\_\_\_\_\_  
Telephone

\_\_\_\_\_

For Architect/Engineer  
Use Only:

\_\_\_\_Accepted \_\_\_\_Accepted As Noted

\_\_\_\_Not Accepted\_\_\_\_Received Too Late

By\_\_\_\_\_

Date\_\_\_\_\_

Remarks\_\_\_\_\_

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END OF APPROVAL FOR SUBSTITUTION AND PRODUCT OPTION

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# CONTRACT CLOSEOUT

## DIVISION 1 \* SECTION 01700

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### **PART 1 GENERAL**

#### **1.01 SUMMARY**

- A. Section Includes:
  - 1. Description of Requirements.
  - 2. Closeout Procedures.
  - 3. Record Document Submittals.
  - 4. Final Cleaning.
  - 5. Testing.
  - 6. Training.
  - 7. Adjusting and Balancing.
  - 8. Operation and Maintenance Data.
  - 9. Warranties.
  - 10. Spare Parts and Maintenance Materials.
  - 11. Prerequisites to Substantial Completion.
  - 12. Final Inspection.
  - 13. Reinspection Fees
  - 14. Evidence of Payments and Release of Liens
  - 15. Final Adjustment of Accounts
- B. Related Sections:
  - 1. Section 01110 - Summary of Work.
  - 2. Individual specification sections for testing, training, O & M, warranty, spare parts, and adjusting requirements of equipment and systems.

#### **1.02 DESCRIPTION OF REQUIREMENTS**

- A. Definitions: Project Closeout is term used to describe certain collective project requirements, indicating completion of Work, that shall be fulfilled near end of Contract time in preparation for Final Acceptance and occupancy of Work by State, as well as final payment to Contractor and normal termination of Contract.
- B. Time of Contract Closeout is directly related to "Substantial Completion"; therefore, time of closeout may be either single time period for entire Work or series of time periods for individual elements of Work that have been certified as substantially complete at different dates. This time variation, if any, shall be applicable to other provisions of this Section.

#### **1.03 CLOSEOUT PROCEDURES**

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer/Engineer review.
- B. Provide submittals to Architect/Engineer/Engineer that are required by governing or other authorities.

- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- D. Completion of Contract Close-out requirements
  - Final Application for Payment
  - Final Certified Payroll
  - AIA forms (or facsimile thereof) G706 Contractor's Affidavit of Payment of Debts and Claims, G706A Contractor's Affidavit of Release of Leins, G707 Consent of Surety to Final Payment (from the bonding company)
  - Certificate of Compliance per 01331
  - Asbestos Containing Materials Notification Statement for Contractors per 00669
  - All Change Orders Approved, Accounted
  - All RFI's Filed
  - All Items from A/E Field Observation Reports are resolved
  - Final Inspections Complete
  - Certificate of Occupancy
  - Certificate of Substantial Completion (signed)
  - Punch List Complete and Accepted
  - Testing Agency Final Letter
  - Final Letter from Architect/Engineer/Engineer stating Work installed per Plans, Specifications and District Standards
  - Operation and Maintenance Manuals (per contract)
    - Hard Copy (2 Originals)
    - Electronic in PDF USB flash drive
  - Owner's Training Completed with Video
  - Extra Stock to Owners
  - Warranty – Contractor per 01790
  - Warranty – Manufacturer
  - Keys from contractor
  - ID Badges from contractor
  - As-Built Drawings and Specifications
    - Hard Copy (2 Originals)
    - Electronic in PDF USB flash drive
    - AutoCAD format if available

#### 1.04 **RECORD DOCUMENT SUBMITTALS**

- A. General: Specific requirements for Record Documents are indicated in individual Sections of these Specifications. Other requirements are indicated in General Conditions. General submittal requirements are indicated in Section 01332 - Shop Drawings, Product Data, Samples.
- B. Do not use Record Documents for construction purposes. Protect from deterioration and loss.
  - 1. Owner will monitor Record Documents and compare to Contractor's payment application on monthly basis.
  - 2. Up-to-date Record Documents are prerequisite to Final Acceptance and approval of Final Payment Request.
- C. Record Drawings:
  - 1. Maintain record set of blue or black line prints of Contract Drawings and Shop Drawings in clean, undamaged condition. Accurately indicate depth of all concealed mechanical items, buried piping, locations of cleanouts, etc., from walls and centerlines utilizing standard industry practice. Provide to

the Architect/Engineer prior to acceptance of the completed project three complete sets of drawings revised to show "As-Installed" conditions. Record drawings should include addenda and change order items.

2. Mark-up set of Record Drawings to show actual installation where installed work varies substantially from work as originally shown.
3. Mark whichever Drawing (Contract Drawings or Shop Drawings), most appropriate and most capable of showing actual "field" condition fully and accurately. Consolidate information on complete systems or units of work on minimum number of Drawing Sheets required to properly document changes.
4. Give particular attention to concealed work that would be difficult to measure and record at later date.
5. Mark record set with red erasable pencil and where feasible, use other color to distinguish between variations in separate categories of Work.
6. Show all backing material and other embedded or concealed items required for installation of future work by Owner.
7. Organize Record Drawing sheets into manageable sets, separated by construction discipline, and bind with durable cover sheet. Print suitable titles, dates and other identification on cover of each set.

D. Record Specifications:

1. Maintain one complete copy of Project Manual, including Specifications and Addenda, and one copy of other written Construction Documents such as change orders, supplemental instructions and similar modifications issued in printed form during construction.
2. Mark these documents to show substantial variations in actual Work performed in comparison with text of Specifications and modifications issued.
3. Note related Record Drawing information and Product Data, where applicable.
4. Upon completion of Work, submit two sets of Record Specifications to Architect/Engineer/Engineer for Owner's records.

E. Record Product Data:

1. Maintain one copy of each Product Data submittal approved for Project.
2. Mark documents to show significant variations in actual work performed in comparison with submitted information.
3. Include both variations in products as delivered to Site and variations from manufacturer's instructions and recommendations for installation.
4. Give particular attention to concealed products and portions of Work that cannot otherwise be readily discerned at later date by direct observation.
5. Note related change orders and markup of Record Drawings and Record Specifications.
6. Upon completion of mark-up, and no later than Final Acceptance of the Project, provide written verification that all Record Product Data has been transmitted to Architect/Engineer for Owner's records.

F. Record Sample Submittal:

1. Immediately prior to date or dates of Substantial Completion, Contractor shall meet at Site with Architect/Engineer and Owner's representative to determine which, if any, of submitted Samples that have been maintained by Contractor during progress of Work, shall be submitted to Owner for record purposes.
2. Comply with delivery to Owner's designated location.

G. Miscellaneous Record Submittals:

1. Refer to other Sections of these Specifications for requirements of miscellaneous record keeping and submittals in connection with actual performance of work.
2. Immediately prior to date or dates of Substantial Completion complete miscellaneous records and place in good order, properly identified and bound and filed, ready for continued use and reference.
3. Submit to Architect/Engineer for Owner's records.

## 1.05 FINAL CLEANING

- A. Cleaning: Provide final cleaning of Work prior to Final Inspection at time indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of work to condition expected from normal commercial building cleaning and maintenance program. Comply with manufacturer's recommendations. Complete following cleaning operations before requesting Architect/Engineer's review for Certification of Substantial Completion:



1. Clean equipment and fixtures to sanitary condition.
  2. Clean or replace filters of operating equipment.
  3. Clean debris from roofs, gutters, downspouts, and drainage systems.
  4. Clean mechanical and electrical equipment and spaces, including tops of pipes, ducts, equipment, etc.
  5. Re-clean areas or equipment, after final inspection, if dirtied as result of Contractor's work in preparing for final inspection or completion of punchlist.
  6. Clean all dust and dirt from immediate and adjoining areas created by the construction process.
- B. Removal of protection: Except as otherwise indicated or requested by Architect/Engineer, remove temporary protection devices and facilities which were installed during course of Work to protect previously completed Work during remainder of construction period or to protect public.
- C. Compliance:
1. Comply with safety standards and governing regulations for cleaning operations.
  2. Do not burn waste materials at Site.
  3. Do not bury debris or excess materials on Owner's property.
  4. Do not discharge volatile or other harmful or dangerous materials into drainage systems.
  5. Remove waste materials from Site and dispose of in lawful manner.

#### 1.06 TESTING

- A. Operating equipment and systems shall be tested in presence of Owner's Representative and Engineer to demonstrate compliance with specified requirements.
1. Notify Owner, in writing, seven (7) days prior to tests scheduled under requirements of this Section.
  2. Testing shall be conducted under specified design operating conditions as recommended or approved by Owner and Engineer.
  3. Provide copies of all test reports and records to Owner.
- B. All elements of systems shall be tested to demonstrate that total systems satisfy all requirements of these Specifications. Testing shall be accomplished on hierarchical basis. Test each piece of equipment for proper operation, followed by each subsystem, followed by entire system, followed by inter-ties to other major systems.
- C. All special testing materials and equipment shall be provided by Contractor.
- D. Perform all tests to demonstrate operation or function with Owner or Architect/Engineer present.
- E. Performance Period:
1. Upon successful completion of tests, Performance Period (30 consecutive calendar days) shall commence on first day following performance test. This period shall be completed prior to final acceptance of the project. The commencement of the warranty period is scheduled from the beginning date of the performance period that has been successfully completed. In event of failure to meet standard of performance during any initiated performance period, it is not required that one 30-calendar day period expire in order for another performance period to begin.
  2. If equipment or system operates so as to demonstrate continuing compliance with specified requirements for period of 30 consecutive calendar days from commencement date of performance period, it shall be deemed to have met standard of performance. In addition, equipment or systems shall operate in conformance with all Contract Specifications and with Contractor's bid and published Specifications in effect on date Contract is executed, provided such specifications are equal to or better than specifications submitted with Contractor's bid.
  3. Equipment shall not be accepted by Owner, and final payment shall not be made by Owner, until standard of performance is met.
  4. Systems which shall be first tested as independent building systems to meet the building substantial completion requirements; followed by successful tests systems tied into Owner's systems which include one off-site security/alarm monitoring agency.

## 1.07 TRAINING

- A. Contractor shall provide, at Site, training for Owner's personnel in operation and maintenance of all systems, sub-systems and items of equipment. Refer also to individual specifications Sections. Verify with Owner amount of training required for various systems, sub-systems and items of equipment.
  - 1. Contractor training shall be provided by EXPERIENCED, FACTORY-TRAINED personnel.
  - 2. Contractor shall submit, for Owner's approval, resumes of proposed training staff.
- B. Use approved operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.
- C. All equipment operation and maintenance instructions and training shall be video taped by the Contractor and the edited film delivered to the Owner.

## 1.08 ADJUSTING AND BALANCING

- A. Adjusting and balancing shall be performed as element of preparation for testing procedures. Adjusting and balancing shall be completed prior to start of Performance Period.
- B. Submit to Architect/Engineer/Engineer and to Owner reports indicating observations and results of tests and compliance or non-compliance with specified requirements and with requirements of Contract Documents.

## 1.09 OPERATION AND MAINTENANCE DATA

- A. Format:
  - 1. Binders: Commercial quality, 8-1/2 x 11 inch 3-ring binders with hardback, cleanable, plastic covers. When multiple binders are used, correlate data into related consistent groupings.
  - 2. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; list title of Project; identify subject matter of contents with neatly typed index inside front cover.
  - 3. Arrange contents by systems under section numbers and sequence of Table of Contents of this Project Manual.
  - 4. Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
  - 5. Test: Manufacturer's printed data, or typewritten data.
  - 6. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- B. Contents, Each Volume:
  - 1. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect/Engineer/Engineer, sub-consultants, and Contractor with names of responsible parties; schedule of products and systems, indexed to content of volume.
  - 2. Manufacturers recommended replacement parts and part number of parts not stocked locally to be purchased by Owner for emergency repair of equipment. Provide for each type of equipment, name and address of nearest vendor with replacement parts.
  - 3. Written equipment operating sequences, control sequences, and maintenance instructions for each item of equipment requiring inspection, lubrication or service, describing and scheduling performance of such maintenance.
  - 4. Valve list with valve size, location, normal position and function. Standard valve tagging legends may be obtained from Owner's representative. Tag all valves with brass disc and chain.
  - 5. Record wiring diagrams and schematics for equipment and control system showing as-built conditions, flow charts, logic diagrams, control sequences, and high level program listing, where applicable, for programmable systems.
  - 6. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

7. 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.
8. Type Text: As required to supplement Product Data. Place logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01450 - Quality Control.
9. Warranties and Bonds: Bind in copy of each as issued on all equipment installed.

C. Manual for Equipment and Systems:

1. Each item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
2. Panelboard Circuit Directories: Provide electrical service characteristics, controls and communications.
3. Include color coded wiring diagrams as installed.
4. 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 instruction.
5. Maintenance Requirements: Include routine procedures and guide for trouble-shooting; disassembly, repair and reassembly instructions; and alignment, adjusting, balancing and checking instructions.
6. Provide servicing and lubrication schedule, and list of lubricants required.
7. Include sequence of operation by controls manufacturer.
8. Provide original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
9. Provide control diagrams by controls manufacturer as installed.
10. Provide Contractor's coordination drawings, with color-coded piping diagrams as installed.
11. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

D. Schedule and Quantity

1. Prior to submission of any pay application for more than 75% of the Work, submit two (2) copies/preliminary drafts of proposed operation and maintenance manuals. Architect/Engineer will review and return one manual with comments.
2. Make corrections based on copy returned and submit approved data in a final form in an electronic format specified by the district as well as two (2) printed copies of each section prior to submission of final pay request. The completed operation and maintenance manuals shall be bound in standard 3-hole binders. The Architect/Engineer will be the sole judge of the completeness of the manual.

## 1.10 WARRANTIES

A. Submittal Form:

1. Issue copies of each warranty as indexed section of Operation and Maintenance Manual.
2. Separate each warranty with index tab sheets keyed to Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier and manufacturer, with address and telephone number of responsible principal.

B. Preparation of Submittals:

1. Obtain warranties executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item or work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Completion is determined.
2. Verify that documents are in proper form, contain full information, and are notarized.

3. Retain warranties and bonds until time specified for submittal.

#### 1.11 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual Specifications Sections.
- B. Deliver, as specific work is completed, to Project Site and place in location as directed by Owner; obtain receipt prior to Substantial Completion.
- C. Provide spare construction materials in similar fashion as indicated in appropriate Sections of Specifications.

#### 1.12 PREREQUISITES TO SUBSTANTIAL COMPLETION

- A. General: Complete following before requesting Architect/Engineer's review for certification of Substantial Completion, either for entire Work or for portions of Work. List known exceptions in request.
  1. In progress payment request that coincides with, or is first request following date Substantial Completion is claimed, show either 100% completion for portion of Work claimed as "substantially complete", or list incomplete items, value of incomplete Work, and reason for Work being incomplete.
  2. Submit statement showing accounting of changes to Contract Sum.
  3. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.
  4. Deliver tools, spare parts, extra stock of material and similar physical items to Owner.
  5. Complete start-up testing of systems, Performance Periods, and instruction of Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools and facilities mock-ups and similar elements.
  6. Complete final cleanup requirements, including touch-up painting of blemished surfaces.
  7. Test fire and life safety systems in presence of Owner's Representative, Architect/Engineer and governmental officials.
  8. Obtain Certificates of Occupancy.
  9. Complete major punchlist items.
  10. Contractor shall submit copy of Contractor's Punchlist to Architect/Engineer, clearly stating that building is ready for review with exception of items noted in Contractor's Punchlist.
- B. Review procedure: Upon receipt of Contractor's request for review, Architect/Engineer will either proceed with review or advise Contractor of unfulfilled prerequisites.
- C. Following initial review, Architect/Engineer will either prepare Certificate of Substantial Completion or will advise Contractor of Work which must be performed before Certificate will be issued.
- D. Results of completed review will form initial "punchlist" for final acceptance.

#### 1.13 FINAL INSPECTION

- A. When Contractor considers Work complete, he shall submit written certification that:
  1. Contract Documents have been reviewed.
  2. Contractor has inspected Work for compliance with Contract Documents.
  3. Work has been completed in accordance with Contract Documents.
  4. The Project, properties, and streets are finally cleaned of debris and dirt caused by Contractor operations.
  5. Work is complete and ready for final inspection.
  6. All mechanical, electrical, controls, and special systems and equipment have been operating successfully for a period of at least thirty days.
- B. Architect/Engineer/Engineer will inspect Work to verify completion status as soon as possible after receipt of

Contractor's certification.

- C. Should Architect/Engineer/Engineer consider Work incomplete or defective:
  - 1. Architect/Engineer will promptly notify Contractor in writing, through Project Manager, listing incomplete or defective work.
  - 2. Contractor shall immediately remedy deficiencies, and send second written certification to Architect/Engineer that Work is complete.
  - 3. Architect/Engineer will reinspect Work.
- D. When Architect/Engineer and Project Manager find Work acceptable under Contract Documents, they will jointly request Contractor to make closeout submittals.

#### 1.14 REINSPECTION FEES

Should Architect/Engineer be required to make more than two Substantial inspections or one Final inspection due to Contractor's failure to correct specified deficiencies, the Contractor shall bear all costs (including compensation for the Architect/Engineer's and Project Manager's additional services) made necessary thereby.

#### 1.15 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

- A. Contractor shall submit to the Project Manager the following:
  - 1. Contractor's Affidavit of Payment of Debt and Claims (AIA Documents G706, or similar form approved by the Project Manager and Owner).
  - 2. Contractor's Affidavit of Release of Liens (AIA Documents G706A or similar form approved by the Project Manager and Owner) including the following:
    - a. Contractor's Release or Waiver of Liens.
    - b. Separate releases or Waivers of Lien for each Subcontractor, supplier, and others with lien rights against Owner's property, together with list of those parties.
- B. Duly sign and execute all submittals, before delivery to Project Manager .

#### 1.16 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit final statement of accounting to Project Manager, including the following:
  - 1. Original Contract Sum.
  - 2. Additions and deductions resulting from:
    - a. Previous Change Orders.
    - b. Deductions for uncompleted Work. (if any)
    - c. Deductions for Liquidated Damages. (if any)
    - d. Deductions for Reinspection Payments (if any)
  - 3. Total Contract Sum, as adjusted.
  - 4. Previous Payments
  - 5. Sum remaining due.
- B. The Project Manager will prepare and issue final Change Order, reflecting approved adjustments to Contract Sum not previously made by Change Orders.

#### 1.17 FINAL APPLICATION FOR PAYMENT

- A. Follow procedures specified in General and Supplementary General Conditions.

### **PART 2 PRODUCTS**

Not Used

**PART 3 EXECUTION**

Not Used

END OF CONTRACT CLOSEOUT SECTION

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# PROJECT LAYOUT

## DIVISION 1 \* SECTION 01720

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### **PART 1 GENERAL**

#### **1.01 CONTRACT CONDITIONS**

Work of this Section is bound by the General Conditions, and Division 1 bound herewith in addition to this Specification and accompanying Drawings.

#### **1.02 WORK INCLUDED**

Provide survey work by an Oregon State registered land surveyor, as required for execution of Project.

#### **1.03 RELATED WORK SPECIFIED ELSEWHERE**

Project Record Documents, Section 01700.

#### **1.04 QUALITY CONTROL**

Before starting work, the Contractor shall locate all general reference points. The Contractor shall employ a registered surveyor (licensed by the State of Oregon) to perform such work. The Contractor shall take such steps as are necessary to prevent the dislocation or destruction of the reference points, and shall be responsible for the accuracy of the site and building layout and elevations for the work.

#### **1.05 SURVEY REFERENCE POINTS**

- A. Existing Points: See Drawings.
- B. Locate existing points prior to starting site work, and preserve during construction.
- C. Make no Changes to existing points without Engineer's and Project Manager's approval.
- D. Notify Project Director when any point is lost, destroyed or requires relocation.

#### **1.06 PROJECT LAYOUT**

- A. Establish existing control points.
- B. Record benchmark locations with horizontal and vertical dimensions on Project Record Drawings.
- C. Using survey instruments, establish lines and levels for the following:
  - 1. Stakes for grading, fill, and all earthwork.
  - 2. Building foundation, floor elevations, and similar elements.
- D. All public and private locates by Contractor

### **PART 2 PRODUCTS & PART 3 EXECUTION**

Not Used

END OF PROJECT LAYOUT SECTION

School District complies with provisions of the various civil rights laws, such as the Fair Employment Practices Act, Title IX Regulations, and section 504 of PL 93.112 in employment and educational programs and activities.

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# **CUTTING AND PATCHING**

## **DIVISION 1 \* SECTION 01730**

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### **PART 1 GENERAL**

#### **1.01 CONTRACT CONDITIONS**

- A. Work of this Section shall be bound by the General Conditions, Supplementary Conditions, Division 1 bound herewith, in addition to these Specifications, and accompanying Drawings.

#### **1.02 RELATED WORK SPECIFIED ELSEWHERE**

- A. Section 01600: Materials and Equipment: Substitutions.
- B. Individual Specifications Sections:
  - 1. Cutting and patching incidental to work of the Section.
  - 2. Advance notification to other Sections of openings required in work of those Sections.
  - 3. Limitations on cutting structural members.

#### **1.03 SUBMITTALS**

- A. Submit written request for cutting approval to Architect well in advance of any cutting which affects:
  - 1. Work of Owner or any separate Contractor.
  - 2. Structural value or integrity of any completed or existing work.
  - 3. Waterproof value or integrity of any weather exposed or moisture resistant work.
  - 4. Efficiency, operational life, maintenance, or safety of any completed or existing work.
  - 5. Visual qualities of any sight exposed work.
- B. Request shall include:
  - 1. Date of planned work.
  - 2. Location and Description of affected work.
  - 3. Necessity for cutting, alteration, or excavation.
  - 4. Effect on Owner's or separate Contractor's work.
  - 5. Effect on structural or weatherproof integrity on completed or existing work.
  - 6. Description of proposed work.
  - 7. Alternative to cutting and patching.
  - 8. Cost proposal, when applicable.



## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Products similar to those specified elsewhere in this Project Manual:  
Follow those Specifications.
- B. Other Products:  
Follow Architect's instructions.
- C. Change in Materials:

For any change in materials, submit request for substitution under provisions of Section 01600.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Maintain adequate temporary support necessary to assure structural integrity of affected work; provide devices and methods to protect other portions of project from damage.
- B. Protect work exposed by cutting against damage and discoloration.
- C. Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

### **3.02 PERFORMANCE**

- A. Provide proper surfaces for repairs.
- B. Employ qualified installer or fabricators.
- C. Restore cut or removed work with new products to provide work complete in accordance with Contract Documents. At penetrations of fire-rated wall, ceiling, or floor construction, completely seal voids with fire-rated material, full thickness of the construction element. Provide required fire resistant rating.
- D. Fit work air-tight to pipes, sleeves, ducts, conduits, and other surface penetrations.
- E. Where patching occurs, refinish entire surface to provide even finish to match adjacent work as follows:
  - 1. Continuous surfaces: refinish to nearest intersection.
  - 2. Assemblies: refinish entire unit.

### **3.03 CUTTING STRUCTURAL FRAMING**

- A. Exposed members, including any columns and posts:  
Not permitted, unless shown on Drawings or otherwise approved.

### **3.04 CLEANING AND REPAIRING**

- A. Including work of other Sections, clean, repair, and touchup, or replace when directed, products which have been soiled, discolored, or damaged by work of this Section.
- B. Remove debris from Project Site upon work completion or sooner, if required by Owner.

END OF CUTTING AND PATCHING SECTION

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# OPERATING & MAINTENANCE DATA

## DIVISION 1 \* SECTION 01760

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### PART 1 GENERAL

#### 1.01 DESCRIPTION

##### A. DESCRIPTION

1. Coordinate related requirements specified in other parts of the Project Manual.
2. Compile product data and related information appropriate for Owner's maintenance and operation.
3. Prepare operating and maintenance data specified in this Section and referenced in other Sections.
4. Prior to Owner's acceptance, instruct Owner's personnel in maintenance, equipment, and systems operation.
5. For additional data requirements, see respective Specifications Sections.

##### B. FORMS OF SUBMITTALS

1. Prepare data in instructional form for use by Owner's personnel.
2. Format:
  - a. Size: 8-1/2" x 11".
  - b. Paper: 20 pound minimum, white for typed pages.
  - c. Text: Manufacturer's printed data or neatly typewritten.
  - d. Drawings
    - 1) Provide reinforced punched binder tab, bound in with text.
    - 2) Fold larger drawings to text page size.
  - e. Provide fly-leaf for each separate product, or each piece of operating equipment.
    - 1) Provide typed description of product and major component parts of equipment.
    - 2) Provide indexed tabs
  - f. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS." List:
    - 1) Title of Project.
    - 2) Identity of general subject matter covered in the Manual.

3. Binders:

- a. Commercial quality stiff cover, metal-hinged three-ring binders with durable and cleanable plastic covers. Binders shall be Wilson Jones #344 Series or equivalent, as approved by the Architect.
- b. Minimum ring size: 1".
- c. When multiple binders are used, correlate data into related consistent groupings.

1.02 **OPERATING INSTRUCTIONS & MAINTENANCE MANUALS**

A. CONTENTS OF OPERATING INSTRUCTION & MAINTENANCE MANUALS FOR OPERATIONAL EQUIPMENT

1. General: For all operational equipment installed, including general, mechanical and electrical operational equipment, Contractor shall submit operation and maintenance manuals as specified herein. Manuals shall have a neatly typewritten table of contents for each volume, arranged in a systematic order.

- a. Contractor, name of responsible principal, address, and telephone number.
- b. A list of each product required to be included, indexed to content of volume.
- c. List, with each project, the name, address, and telephone number of:
  - 1) Subcontractor or Installer.
  - 2) Maintenance Contractor, as appropriate.
  - 3) Identify the area of responsibility for each.
  - 4) Local source of supply for parts and replacement.
- d. Identify each product by name and other identifying symbols as set forth in Contract Documents.

2. Product Data:

- a. Product data shall contain detailed information, where applicable, relative to the following:
  - 1) Equipment functions, operating characteristics, and limiting conditions.
  - 2) Assembly, installation, alignment, adjustment, and checking instructions.
  - 3) Operating instructions for start-up, routine and normal operation, regulation and control, shutdown, and emergency conditions.
  - 4) Detailed lubrication and routine and preventative maintenance instruction, including a schedule of recommended checks.
  - 5) List of all parts and components of equipment stating catalog number and size of part used in or on equipment.
  - 6) Safety precautions and safety features.
  - 7) Outline, cross-section and assembly drawings, engineering data, and wiring diagrams.
  - 8) Test data and performance curves.
- b. Include only sheet pertinent to specific product.
- c. Annotate each sheet to:
  - 1) Clearly identify specific product or part installed.
  - 2) Clearly identify data applicable to installation.
- d. Delete references to inapplicable information.

3. Drawings:
  - a. Supplement product data with drawings as necessary to clearly illustrate relations of component parts of equipment and system.
  - b. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
4. Supplement product/installation data with written text:
  - a. Organize in consistent format under separate headings for different procedures.
  - b. Provide logical sequence of installations for each procedure.
5. Warranties, Bonds and Service Contracts: Copy of each warranty, bond and service contract issued, signed over to the Owner and exercisable by Owner. Provide information sheet for Owner's personnel indicating:
  - a. Proper procedures in event of failure.
  - b. Instances which might affect validity of warranties and bonds.

#### B. CONTENTS OF MAINTENANCE MANUALS FOR NON-OPERATIONAL ITEMS

1. Submit two (2) copies of complete manual in final form.
2. For all architectural non-operational products, applied materials and finish items installed, including but not limited to, writing boards and tackboards, toilet partitions, and floor and wall coverings such as carpet, sheet vinyl, vinyl composition tile, epoxy flooring, ceramic tile, vinyl wall covering, acoustical ceiling panels, etc., Contractor shall submit maintenance manuals as specified herein. Each manual shall contain detailed information, where applicable, relative to the following:
  - a. Manufacturer's data, given full information on products.
    - 1) Catalog number, size, composition.
    - 2) Color and texture designations.
    - 3) Information required for reordering special manufactured products.
  - b. Instructions for care and maintenance:
    - 1) Manufacturer's recommendation for types of cleaning agents and methods.
    - 2) Cautions against cleaning agents and methods which are detrimental to the product.
    - 3) Recommended schedule for cleaning and maintenance.
    - 4) Instructions and recommendations for repair of finish.
3. For additional requirements for maintenance data, see respective Specification Sections.

### 1.03 OPERATION & MAINTENANCE INSTRUCTIONS

#### A. INSTRUCTION OF OWNER'S PERSONNEL

1. After substantial completion and prior to final inspection or full acceptance of the Project, Contractor shall provide qualified personnel for conducting full operation and maintenance training and instructions in the operation, adjustment, and maintenance of all operating equipment and systems to Owner's designated personnel; include all general, mechanical, and electrical operating systems and equipment. Provide a minimum of 32 hours of such training and instructions, conducted to Owner's satisfaction.

2. Except as otherwise specified, arrange for each installer of work requiring continuing maintenance or operation, to meet with Owner's personnel, at project site, to provide basic instructions needed for proper operation and maintenance of entire work. Include instructions by manufacturer's representatives where installers are not expert in the required procedures.
3. Use operating and maintenance manuals as the basis for instruction. Review contents of Manual with personnel in full detail to explain all aspects of operations and maintenance; include as a minimum record documentation, tools, spare parts and materials, lubricants, fuels, identification system, control sequences, hazards, cleaning and renewal of finishes, and similar procedures and facilities.
4. For operational equipment, demonstrate start-up, shut-down, emergency operations, noise and vibration adjustments, safety, economy/efficiency adjustments, and similar operations. Review maintenance and operations in relation with applicable warranties, agreements to maintain bonds and similar continuing commitments.
5. All equipment operation and maintenance instructions and training shall be video taped by the Contractor and the edited film delivered to the Owner.
6. For additional requirements for operations instruction, see respective Specification Sections.

#### 1.04 SUBMITTALS

##### A. SUBMITTAL SCHEDULE

1. Prior to submission of any pay application for more than 75% of the Work, submit two (2) copies/preliminary drafts of proposed operation and maintenance manuals. Architect will review and return one manual with comments.
2. Make corrections based on copy returned and submit five (5) copies of approved data in final form prior to submission of final pay request. The completed operation and maintenance manuals shall be bound in standard three-hole binders. The Architect will be the sole judge of the completeness of the manual.

#### 1.05 ELECTRONIC MEDIA

- A. From the Contractor, All As-built drawings shall be provided as a pdf placed on a USB flash drive media. Include ALL addenda, ALL RFIs, etc.
- B. From the Contractor, All Specifications shall be provided as a pdf in its entirety on a USB flash drive media. Include ALL addenda, ALL RFIs, etc.
- C. From the Contractor, All Operations and Maintenance Manuals shall be provided as a pdf in its entirety on a USB flash drive.

### **PART 2 PRODUCTS**

Not Used

### **PART 3 EXECUTION**

Not Used

END OF OPERATING & MAINTENANCE DATA SECTION

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# **WARRANTIES AND BONDS**

## **DIVISION 1 \* SECTION 01787**

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### **PART 1 GENERAL**

#### **1.01 REQUIREMENTS INCLUDED**

- A. Compile specified Warranties and Bonds.
- B. Compile specified Service and Maintenance Contracts.
- C. Review submittals to verify compliance with Contract Documents.

#### **1.02 RELATED REQUIREMENTS**

- A. Bid Bond: See General and Supplementary General Conditions.
- B. Performance Bond and Labor and Material Payment Bond: See General and Supplementary General Conditions.
- C. Warranty of Work After Final Payment: See General and Supplementary General Conditions.
- D. Contract Closeout: Section 01700.

#### **1.03 SUBMITTAL REQUIREMENTS**

- A. Assemble Warranties, Bonds, and Service and Maintenance Contracts, executed by each of the respective Manufacturer, Suppliers, and Subcontractors.
- B. Number of original signed copies required: Four (4) each.
- C. Table of Contents: Neatly type in orderly sequence.
- D. Provide complete information for each item:
  - 1. Product or Work Item.
  - 2. Firm, with name of principal, address, and telephone number.
  - 3. Beginning date of Warranty, Bond, or Service and Maintenance Contract.
  - 4. Duration of Warranty, Bond, or Service and Maintenance Contract.
  - 5. Provide the following information for Owner's Personnel:
    - a. Procedure in case of failure or malfunction.
    - b. Instances which affect Warranty or Bond validity.
  - 6. Contractor, name of responsible principal, address, and telephone number.

#### **1.04 SUBMITTAL FORM**

- A. Punch sheets for standard 3-ring binder.
- B. Size: 8-1/2 x 11 inches.
- C. Fold larger sheets to fit into binder.
- D. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS": List:
  - 1. Title of Project.
  - 2. Name of Contractor.

#### **1.05 SUBMITTAL TIME**

- A. See Section 01700

#### **1.06 SUBMITTAL LOCATION**

- A. Bind with Owner's Maintenance Manual specified in Section 01700.

### **PART 2 PRODUCTS**

Not Used

### **PART 3 EXECUTION**

Not Used

END OF WARRANTIES AND BOND SECTION

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# PROJECT RECORD DOCUMENTS

## DIVISION 1 \* SECTION 01789

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### **PART 1 GENERAL**

#### **1.01 RELATED REQUIREMENTS SPECIFIED ELSEWHERE**

- A. Shop Drawings, Product Data, and Samples: Section 01332

#### **1.02 MAINTENANCE OF DOCUMENTS**

- A. Maintain at job site, one copy of:
  - 1. Contract Drawings
  - 2. Specifications
  - 3. Addenda
  - 4. Change Orders
  - 5. RFI's & Responses
  - 6. Requests for Proposal
  - 7. Other Modifications to Contract
  - 8. Field Test Records
  - 9. Truck tickets for all imported material
  - 10. Current Construction Schedule
  - 11. Certified Payroll copies
  - 12. Owner/Contractor Contract
  - 13. Submittals & Responses
- B. Store Documents in approved location, apart from documents used for construction.
- C. Maintain documents in clean, dry, legible condition.
- D. Do not use record documents for construction purposes.
- E. Make documents available at all times for inspection by Project Manager, Architect/Engineer, and Owner.

#### **1.03 RECORDING**

- A. In addition to copies of Contract Documents to be furnished by Project Manager, the Project Manager will furnish the Contractor one (1) complete set of new prints of Contract Drawings. The Contractor and/or Subcontractors under his direction shall record one set of clean, new prints each and every change that is made from general drawings at time it is made. This includes any changes that are made in partitions, doors, or otherwise in arrangements of construction of buildings as well as a complete record of exact manner in which electrical and mechanical work, piping, etc., are installed. Dimensions shall be made included where necessary to accurately locate piping and other items that will be concealed underground or in finished building that may later be necessary to service.
- B. Contract Drawings: Legibly mark to record actual construction:
  - 1. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
  - 2. Field changes of dimensions and detail.
  - 3. Changes made by Change Order.
  - 4. Details not on original Contract Drawings.
  - 5. Conditions discovered in the course of construction that do not appear on Contract Drawings.

School District complies with provisions of the various civil rights laws, such as the Fair Employment Practices Act, Title IX Regulations, and section 504 of PL 93.112 in employment and educational programs and activities.

- C. Shop Drawings: Not Required.
1. Changes made by Change Order.
  2. Other matters not originally specified.

E. **Energy Incentive Project Documentation Guideline**

*Applies when documentation is required for BETC, SB 1149 or other incentive programs*

1. Pre-Construction Documentation of Existing Conditions–
  - a) If windows are included in project scope - Total count of windows and total glazing to be installed
  - b) If HVAC-Controls are included in project scope - Description of existing HVAC equipment and/or controls
  - c) If lighting is included in project scope - Inventory and description of existing lighting fixtures/components
  - d) If roof insulation is included in project scope - Measure of existing insulation
2. Windows
  - a) Product data sheets showing the following:
    - I. Project site name
    - II. Type of equipment
    - III. The full make and model number of the product(s) purchased
    - IV. The efficiency ratings and specifications
      - i. Frame
      - ii. Glazing
      - iii. Or assembly as a whole
  - b) Manufacturer's bill of materials showing the following:
    - I. Description of item purchased including glazing dimensions and solar and thermal ratings
    - II. Quantity of item purchased - Itemized invoice for product(s)
    - III. The full make and model number of the product(s) purchased
    - IV. The date of purchase
  - c) Verification that product was installed – photo of an installed window or wall of windows along with a confirmation letter from project architect
  - d) Verification of payment – copy of the check used to purchase the products for the energy measure – along with a schedule of values that show how this check relates to the product.
3. HVAC Equipment and/or Controls
  - a) Product data sheets showing the following:
    - I. Project site name
    - II. Type of equipment
    - III. The full make and model number of the product(s) purchased
    - IV. The efficiency ratings and specifications
  - b) Manufacturer's bill of materials showing the following:
    - I. Description of item(s) purchased
    - II. Quantity of item purchased - Itemized invoice for product(s)
    - III. The full make and model number of the product(s) purchased
    - IV. The date of purchase
  - c) Verification that product was installed – photo of installed product(s) or example of one of multiples, along with a confirmation letter from project architect
  - d) Verification of payment – copy of the check used to purchase the product for the energy measure – along with a schedule of values that show how this check relates to the products
  - e) Engineering cost – if any, of the system or components that allow the equipment to perform more efficiently that code requires.
  - f) Commissioning cost of new system
4. Lighting
  - a) Product data sheets showing the following:
    - I. Project site name
    - II. Type of equipment – fixtures, lamps, ballasts, controls
    - III. The full make and model number(s) of the product(s) purchased



- IV. The efficiency ratings and specifications
  - b) Manufacturer's bill of materials showing the following:
    - I. Description of item(s) purchased
    - II. Quantity of item(s) purchased - Itemized invoice for product(s) (lighting & controls)
    - III. The full make and model number of the product(s) purchased
    - IV. The date of purchase
  - c) Verification that product was installed – photo of typical installed product along with a confirmation letter from project architect
  - d) Verification of payment – copy of the check used to purchase the products – along with a schedule of values that show how this check relates to the products
  - e) Cost of disposal of old product
5. Roof Insulation
- a) Product data sheets showing the following:
    - I. Type of equipment
    - II. The full make and model number of the product(s) purchased
    - III. The efficiency ratings and requirements
    - IV. Specific insulation product used
  - b) Manufacturer's bill of materials showing the following:
    - I. Description of item purchased – only insulation costs
    - II. Quantity of insulation applied/installed – Square footage as well as R number and thickness of insulated sheets installed
    - III. The full make and model number of the product purchased
    - IV. The date of purchase
  - c) Verification that product was installed – photo of sample installed product along with a confirmation letter from project architect
  - d) Verification of payment – copy of the check used to purchase the material for the energy measure – along with a schedule of values that show how this check relates to the product
  - e) Any design cost associated with the additional insulation
  - f) Additional curbing costs, if necessary for the upgrade
6. Any other product/equipment as directed by the Owner/Project Manager
7. Post-Construction Documentation
- a) Complete list of any variances of installation of products from original project scope

Energy product documentation is considered part of the O & M's document requirements.

- F. Label each document "PROJECT RECORD" in one-half inch high printed letters.
- G. Keep record documents current.

#### 1.04 SUBMITTAL

- A. Upon completion of the Project, and prior to final payment, the Contractor shall submit Project Record Documents to Architect/Engineer for approval through the Project Manager.
  - 1. This submittal shall include an electronic copy of the final As-built drawings and two (2) sets of printed As-built drawings; and a complete manual in final form in an electronic format specified by the district and two (2) printed copies of each section.
- B. If not approved by Architect/Engineer, records of changes shall be revised and resubmitted by the Contractor.
- C. Accompany submittal with transmittal letter to Project Manager containing:
  - 1. Date
  - 2. Project title and number
  - 3. Contractor's name and address
  - 4. Title and number of each record document
  - 5. Certification that each document as submitted is complete and accurate.
  - 6. Signature of Contractor, or his authorized representative

**PART 2 PRODUCTS & PART 3 EXECUTION**

Not Used

END OF PROJECT RECORD DOCUMENTS SECTION

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# **WARRANTY OF WORK**

## **DIVISION 1 \* SECTION 01790**

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### **PART 1 GENERAL**

#### **1.01 DESCRIPTION:**

- A. The Contractor does hereby warrant all work and materials to be in full and complete accordance with the Contract Documents and Agreement between Owner and Contractor, and requirements appertaining thereto; free of imperfections, and fully suitable for the use and purposes for which each and every part is intended. The Contractor also agrees that, should any defect develop or appear that was not caused by improper use, the Contractor shall promptly, upon demand, fully correct, substitute and make good any such defective material without any cost to the Owner and will save the Owner harmless against any claim, demand, loss or damage by reason of any breach of this warranty.
- B. The period of this warranty shall commence on the date of Final Acceptance by the Owner.
- C. The warranty shall continue to be in full force and effect for the period of one (1) year, except for those items for which a longer period of warranty is specifically stated in the Warranties for work in Technical Sections of the Specifications. Warranties for work stated in Technical Sections shall continue in full force and effect for the respective periods expressly stated.

### **PART 2 PRODUCTS**

Not Used

### **PART 3 EXECUTION**

Not Used

END OF WARRANTY OF WORK AFTER FINAL PAYMENT SECTIONS

## **SECTION 02 41 19 - SELECTIVE DEMOLITION**

### **PART 1 - GENERAL**

#### **RELATED DOCUMENTS**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### **SUMMARY**

**This Section** requires the selective removal and subsequent offsite disposal of the following:

Portions of existing building indicated on drawings and as required to accommodate new construction.

Removal and protection (when noted to remain owner's property or when being re-installed) of existing fixtures, materials, and equipment items as indicated or as required by new work.

Removal of electrical, communications mechanical, plumbing and HVAC equipment as shown, and as required by the new work.

Removal of sheetrock, wood framing, cmu walls, columns, and ceilings where noted or required by the work.

Removal of existing doors and HM frames where noted or required.

Remove existing improvements as required to complete the work.

Removal of roofing for tie ins and removal of roof structure as shown. Removal of single ply, BUR, and standing seam metal roofing as shown and as required by the work. This includes parapet walls, copings, etc.

Rubber Base and flooring where required or noted on drawings.

Removal of structure and siding, battens, trims, where required for upgrades.

**Removal work** specified elsewhere: See Electrical and telecom sheets for specific equipment removal and coordinate with Security and Data Equipment providers to ensure that required work is included but not included by multiple parties.

**Related work** specified elsewhere: Cutting and Patching and Painting.

**Remodeling** construction work and patching are included within the respective sections of specifications, including removal of materials for reuse and incorporation into remodeling or new construction.

**Relocation** of pipes, conduits, ducts, and other mechanical and electrical work is specified in other Divisions.

#### **DEFINITIONS**

**Remove:** Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

**Remove and Salvage:** Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.

**Remove and Reinstall:** Detach items from existing construction, clean and prepare for reuse, and reinstall where indicated.

**Existing to Remain:** Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed, and salvaged, or removed and reinstalled.

## **MATERIALS OWNERSHIP**

**Unless otherwise indicated,** demolition waste becomes property of Contractor.

Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

Carefully salvage in a manner to prevent damage and promptly return to Owner.

## **PREINSTALLATION MEETINGS**

**Predemolition Conference:** Conduct conference at Project site.

Inspect and discuss condition of construction to be selectively demolished.

Review structural load limitations of existing structure.

Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.

Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

Review areas where existing construction is to remain and requires protection.

## **SUBMITTALS**

**General:** Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

**Schedule** indicating proposed sequence of operations for selective demolition work to Owner's Representative for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.

**Provide detailed sequence of demolition** and removal work to ensure uninterrupted progress of Owner's on-site operations. This work shall be coordinated with District to ensure ability to complete all work over the summer vacation schedule.

**Photographs** of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Owner's Representative prior to start of work. Submit photos on a thumb drive.

## **INFORMATIONAL SUBMITTALS**

**Proposed Protection Measures:** Submit report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.

**Schedule of Selective Demolition Activities:** Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

**Inventory:** Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.

**Predemolition Photographs:** Submit before Work begins.

## **CLOSEOUT SUBMITTALS**

**Inventory:** Submit a list of items that have been removed and salvaged.

**Landfill Records:** Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

## **JOB CONDITIONS**

**Occupancy:** Owner will occupy portions of the building immediately adjacent to areas of selective demolition until summer vacation begins. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities that will affect Owner's normal operations if occurring prior to summer vacation and approved by owner.

**Condition of Structures:** Owner assumes no responsibility for actual condition of items or structures to be demolished.

Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable. However, minor variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition work.

**Partial Demolition and Removal:** Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.

Storage or sale of removed items on site will not be permitted.

**Protections:** Provide temporary barricades and other forms of protection to protect Owner's personnel and public from injury due to selective demolition work.

Provide protective measures as required to provide free and safe passage of Owner's personnel and public to occupied portions of building.

Erect temporary covered passageways as required by authorities having jurisdiction.

Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities or work to remain.

Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.

Protect floors with suitable coverings as necessary as well as any finishes to remain.

Construct temporary insulated dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks. Barriers will be required at RHS to separate work from lobby and work from administrative areas to remain, at Eastwood across hallway, at fir grove across office hallway.

Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building. Provide security as required for demolition that may leave the building vulnerable to theft.

Remove protections at completion of work.

**Damages:** Promptly repair damages caused to adjacent facilities by demolition work and repair as required at no expense to the owner.

**Traffic:** Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

Do not close, block, or otherwise obstruct streets, walks, or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

**Flame Cutting:** Do not use cutting torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.

**Utility Services:** Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.

Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

Maintain fire protection services during selective demolition operations.

**Environmental Controls:** Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.

Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

**Hazardous Materials:**

**Asbestos:**

During the execution of this contract it is possible that asbestos containing materials could be encountered while working in and around District buildings and property. A District ASBESTOS CONTAINING MATERIALS NOTIFICATION STATEMENT FOR CONTRACTORS form must be completed and signed by the contractor prior to beginning any work in any Roseburg School District building.

The presence of known and assumed asbestos containing materials are documented in the AHERA Management Plan for each building. Copies of the AHERA Management Plan are available in the main office of each building and in the maintenance offices at 1419 NW Valley View Drive, Roseburg, OR 97471. Mr. Tracy Grauf, AHERA Program Manager, must be informed of the contractor's activities in each building prior to the start of the work so they can inform the Contractor how to use the AHERA Management Plan and to determine if any asbestos containing material may be impacted by the Contractor. Please allow this to serve as official notice that is your responsibility as a contractor when performing work or hiring subcontractors to perform work on District property to verify the presence or absence of asbestos in the areas in which your work will be performed.

The Contractor shall not disturb known or assumed asbestos containing materials. If the Contractor discovers suspect asbestos containing materials that have not been identified, they must stop work and notify Mr. Tracy Grauf, Maintenance Manager, or Mr. Tracy Grauf, AHERA Program Manager, so the material can be sampled. Any asbestos containing materials that must be removed to allow the Contractor to complete contracted work will be removed under separate contract by the District. IF the Contractor disturbs asbestos containing materials identified in the buildings AHERA Management Plan, they will be responsible for the cost of cleanup and decontamination.

The Districts abatement contractor will remove asbestos-containing plaster where identified on the drawings. General Contractor is to clearly mark asbestos-containing plaster surfaces to be removed or drilled prior to the start of abatement. Either before or after the abatement phase, all demolition and installation work performed by the General Contractor that will disturb identified asbestos-containing building materials is the responsibility of the General Contractor. It is the General Contractors responsibility to hire a certified asbestos abatement contractor to conduct the planning and work on asbestos-containing building materials unless the General Contractor holds required certifications for asbestos work. Any persons planning or performing work on asbestos-containing building materials must be properly certified in the State of Oregon (Asbestos Work, AHERA Project Designer, etc..

Roseburg School District will abate, under separate contract prior to or concurrent with the work of this contract, materials that will be impacted by the work and that contain at least 1% asbestos. Materials containing less Than 1% asbestos will not be abated by the School District.

**Lead:**

Due to the age of these buildings, painted surfaces should be assumed to contain lead. Contractor is responsible to conform with all applicable State and Federal environmental regulations related to the disruption, removal, and disposal of hazardous materials.

Repair, Renovation, or Painting work being performed in "Child-Occupied Facilities" (facilities built prior to 1978 where children under the age of six regularly spend time) must be conducted by a "certified renovation firm" utilizing a "certified renovator".

For Renovation, Repair, and Painting work in Child-Occupied areas that are identified within in this document, the successful bidder will be responsible for compliance with all requirements of proposed OAR



333-70-0075 through 333-070-0160 (at <http://oregon.gov/DHS/ph/leadpaint/docs/proposedtext.pdf>) when conducting work within identified RSD Child-Occupied areas. Proof of certifications to perform Renovation work in Child-Occupied areas will be prerequisite to final contract approval.

## **PART 2 - PRODUCTS**

### **PERFORMANCE REQUIREMENTS**

**Regulatory Requirements:** Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

**Standards:** Comply with ANSI/ASSE A10.6 and NFPA 241.

**Security:** Provide 24-hour security to guard against vandalism.

## **PART 3 - EXECUTION**

### **PREPARATION**

**General:** Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.

Cease operations and notify Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.

**Cover and protect** furniture, equipment, and fixtures from soilage or damage when demolition work is performed in areas where such items have not been removed.

**Erect and maintain dust-proof partitions** and closures as required to prevent spread of dust or fumes to occupied portions of the building.

Provide weatherproof closures for exterior openings resulting from demolition work.

Provide complete dustproof protection during concrete grinding and polishing operations for all finishes to remain including preventing dust from entering fan coil units and all cabinets.

**Locate, identify, stub off, and disconnect** utility services that are not indicated to remain.

Provide bypass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Owner if shutdown of service is necessary during changeover.

### **DEMOLITION**

**General:** General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering, and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.

Maintain adequate ventilation when using cutting torches.

Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.

Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

Dispose of demolished items and materials promptly.

Where demolition includes removing ceiling tiles or other finish materials that will be required to patch surfaces, use care to remove and maintain usability.

## **SALVAGED MATERIALS**

**Salvaged Items:** Where indicated on Drawings as "Salvage -Deliver to Owner," carefully remove indicated items, clean, store, and turn over to Owner and obtain receipt.

Historic artifacts, including cornerstones and their contents, commemorative plaques and tablets, antiques, and other articles of historic significance, remain property of Owner. Notify Owner's Representative if such items are encountered and obtain acceptance regarding method of removal and salvage for Owner.

Carefully remove, clean, and deliver to Owner the following items:

## **DISPOSAL OF DEMOLISHED MATERIALS**

Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off site.

If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

Burning of removed materials is not permitted on project site.

**CLEANUP AND REPAIR**

**General:** Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave interior areas broom clean.

Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

**END OF SECTION 02 41 19**

## **SECTION 03 10 00 - CONCRETE FORMING AND ACCESSORIES**

### **PART 1 - GENERAL**

#### **SECTION INCLUDES**

- A. Formwork for cast-in place concrete, with shoring, bracing, and anchorage.
- B. Openings for other work.
- C. Forming accessories.
- D. Form stripping.

#### **RELATED REQUIREMENTS**

- A. Section 03 20 00 - Concrete Reinforcing.
- B. Section 03 30 00 - Cast-in-Place Concrete.

#### **REFERENCE STANDARDS**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
- B. ACI 301 - Specifications for Structural Concrete.
- C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- D. ACI 347R - Guide to Formwork for Concrete.

#### **SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

#### **QUALITY ASSURANCE**

- A. Designer Qualifications: Design formwork under direct supervision of a Professional Engineer experienced in design of concrete formwork and licensed in Oregon.

### **PART 2 – PRODUCTS**

#### **FORMWORK - GENERAL**

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in- place concrete work.
- B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.
- C. Comply with applicable State and local codes with respect to design, fabrication, erection, and removal of formwork.
- D. Comply with relevant portions of ACI 347R, ACI 301, and ACI 318.

### **WOOD FORM MATERIALS**

- A. Softwood Plywood, PS 1, B-B Class 1 or better, mill oiled, and edge sealed for concealed structural concrete.
- B. Softwood Plywood, PS 1, B-B Medium Density Concrete Form Overlay, Class I for surfaces exposed to public view.

### **FORMWORK ACCESSORIES**

- A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, 1 inch back break dimension, free of defects that could leave holes larger than 1 inch in concrete surface.
- B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bug holes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
- C. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- D. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- E. Filler Strips for Chamfered Corners: Wood strip type; 1 by 1 inch size; maximum possible lengths.
- F. Reveal Strips: Wood or rubber strips, kerfed for ease of form removal.
- G. Flashing Reglets: Galvanized steel, at least 22 gage, 0.0299 inch thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing concrete formwork.
- H. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- I. Embedded Anchor Shapes, Plates, Angles and Bars: As specified in Section 05 12 00.

## **PART 3 EXECUTION**

### **EXAMINATION**

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

### **ERECTION - FORMWORK**

- A. Design and erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
  - 1. At formwork for exposed concrete, lay out form ties in a regular pattern.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
  - 1. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
    - a. Class A, 1/8 inch for smooth-formed finished surfaces.
    - b. Class C, 1/2 inch for rough-formed finished surfaces.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.
- E. Obtain approval before framing openings in structural members that are not indicated on drawings.
- F. Coordinate this section with other sections of work that require attachment of components to formwork.

- G. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Engineer before proceeding.
- H. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

### **APPLICATION - FORM RELEASE AGENT**

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

### **INSERTS, EMBEDDED PARTS, AND OPENINGS**

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Install water stops at all cold joints in accordance with manufacturer's instructions, so they are continuous without displacing reinforcement.
- F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
- G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

### **FORM CLEANING**

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
  - 1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
  - 2. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

### **FORMWORK TOLERANCES**

- A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.
- B. Construct and align formwork for elevator hoist way in accordance with ASME A17.1.
- C. Camber slabs and beams in accordance with ACI 301.

### **FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
- B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

- C. Do not reuse wood formwork more than 2 times for concrete surfaces to be exposed to view. Do not patch formwork.

### **FORM REMOVAL**

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing concrete if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
  - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
  - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by the Architect.
- D. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- E. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

**END OF SECTION 03 10 00**

## **SECTION 03 20 00 - CONCRETE REINFORCEMENT**

### **PART 1 - GENERAL**

#### **SECTION INCLUDES**

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

#### **RELATED REQUIREMENTS**

- A. Section 03 10 00 - Concrete Forming and Accessories.
- B. Section 03 30 00 - Cast-in-Place Concrete.

#### **REFERENCE STANDARDS**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
- B. ACI 301 - Specifications for Structural Concrete.
- C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- D. ACI 347R - Guide to Formwork for Concrete.

#### **SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
  - 1. Prepare shop drawings under seal of a Professional Engineer experienced in design of work of this type and licensed in Oregon.
- C. Sustainable Submittals: See Section 01 33 29 - Sustainable Design Reporting.
  - 1. Product Data for Credit M2.1: For products having recycled content such that the sum of post-consumer recycled content plus one-half of the pre-consumer recycled content constitutes at least 10 percent of the total cost of the materials in the project, submit documentation indicating percentages by weight of postconsumer and preconsumer recycled content.
    - a. Include a statement indicating material costs for each product having recycled content.
- D. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.
- E. Welders' Certificates: Submit certifications for welders employed on the project, verifying AWS qualification within the previous 12 months.
- F. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

#### **QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301.



## **PART 2 PRODUCTS**

### **REINFORCEMENT**

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 10 percent.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
  - 1. Deformed billet-steel bars.
  - 2. Unfinished.
- C. Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars.
  - 1. Unfinished.
- D. Steel Welded Wire Reinforcement (WWR): Plain type; ASTM A1064/A1064M.
  - 1. Form: Flat Sheets.
  - 2. WWR Style: As indicated on drawings.
- E. Joint Dowel Bars: ASTM A615/A615M, Grade 60 (420), plain-steel bars, cut bars true to length with ends square and free of burrs.
- F. Reinforcement Accessories:
  - 1. Tie Wire: Annealed, minimum 16 gage, 0.102 inch.
  - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
  - 3. Provide stainless steel components for placement within 1-1/2 inches of weathering surfaces.

### **RE-BAR SPLICING:**

- A. Coupler Systems: Mechanical devices for splicing reinforcing bars; capable of developing full steel reinforcing design strength in tension and compression.
- B. Dowel Bar Splicer with Dowel-Ins: Mechanical devices for connecting dowels; capable of developing full steel reinforcing design strength in tension and compression.

### **FABRICATION**

- A. Fabricate concrete reinforcement in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is not permitted.
- C. Welding of reinforcement is permitted only with the specific approval of the Architect. Perform welding in accordance with AWS D1.4/D1.4M.
- D. Locate reinforcing splices not indicated on drawings at point of minimum stress.
  - 1. Review locations of splices with Engineer.

## **PART 3 EXECUTION**

### **GENERAL**

- A. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- B. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing

reinforcing bars.

- C. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

### **PLACEMENT**

- A. Place, support and secure reinforcement against displacement. Do not deviate from the required position.
- B. Do not displace or damage vapor barrier.
- C. Accommodate placement of formed openings.
- D. Maintain concrete cover around reinforcing as follows:
  - 1. Footings and Concrete Formed Against Earth: 3 inches.
  - 2. Slabs on Fill: 1-1/2 inches.
- E. Conform to applicable code for concrete cover over reinforcement.

### **FIELD QUALITY CONTROL**

- A. An independent testing agency, as specified in Section 01 40 00, will inspect installed reinforcement for conformance to contract documents before concrete placement.
- B. Refer to Section 03 30 00 - Cast-in-Place Concrete for scope of testing.

**END OF SECTION 03 20 00**

## **SECTION 03 30 00 - CAST-IN-PLACE CONCRETE**

### **PART 1 GENERAL**

#### **SECTION INCLUDES**

- A. Concrete building frame members.
- B. Floors and slabs on grade.
- C. Concrete footings.
- D. Joint devices associated with concrete work.
- E. Concrete curing.

#### **RELATED REQUIREMENTS**

- A. Section 01 40 00 - Quality Requirements: Testing and Inspection Agency.
- B. Section 01 50 00 - Temporary Facilities and Controls: Recycling concrete truck wash-down waste.
- C. Section 03 10 00 - Concrete Forming and Accessories: Forms and accessories for formwork.
- D. Section 03 20 00 - Concrete Reinforcing.
- E. Section 07 92 00 - Joint Sealants: Products and installation for 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.
- B. ACI 301 - Specifications for Structural Concrete.
- C. ACI 302.1R - Guide for Concrete Floor and Slab Construction.
- D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
- E. ACI 305R - Hot Weather Concreting.
- F. ACI 306R - Cold Weather Concreting.
- G. ACI 308R - Guide to Curing Concrete.
- H. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
- I. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic Cement Concrete.
- J. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
- K. ASTM C157/C157M - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
- L. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete.
- M. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- N. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- O. ASTM C33/C33M - Standard Specification for Concrete Aggregates.

- P. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- Q. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
- R. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens).
- S. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete.
- T. ASTM C150/C150M - Standard Specification for Portland Cement.
- U. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
- V. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.
- W. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- X. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
- Y. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
- Z. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- AA. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
- BB. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
- CC. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.
- DD. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.
- EE. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- FF. ASTM E1155 - Standard Test Method for Determining F (F) Floor Flatness and F (L) Floor Levelness Numbers.
- GG. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- HH. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
- II. OSSC - Oregon Structural Specialty Code, Section 1811, Radon Control Methods Public Buildings.
- JJ. SCAQMD 1113 - South Coast Air Quality Management Owner Rule No.1113.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
  - 1. Provide design mixtures for each concrete mixture containing fly ash as a replacement for Portland cement or other Portland cement replacements and for equivalent concrete mixtures that do not contain Portland cement replacements.
- C. Mix Design: Submit proposed concrete mix design.
  - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.

2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.
3. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
4. Indicate amounts of mixing water to be withheld for later addition at Project site.
- D. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
- E. Floor surface flatness and levelness measurements to determine compliance with specified tolerances.
- F. Minutes of preinstallation conference.
- G. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

### **1.05 QUALITY ASSURANCE**

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

### **1.06 PREINSTALLATION CONFERENCE**

- A. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 01 30 00 - Administrative Requirements.
  1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
    - a. Contractor's superintendent.
    - b. Independent testing agency responsible for concrete design mixtures.
    - c. Ready-mix concrete manufacturer.
    - d. Concrete subcontractor.
  2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

### **1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Warrant floor covering installed over SC-1 against failure due to moisture vapor migration or moisture-borne contaminants for a period of 15 years from date of original installation.
  1. Warranty shall cover all labor and materials needed to replace floor covering that fails due to moisture vapor emission and moisture borne contaminants.

## **PART 2 PRODUCTS**

### **2.01 FORMWORK**

- A. Comply with requirements of Section 03 10 00.

### **2.02 REINFORCEMENT**

- A. Comply with requirements of Section 03 20 00.

### **2.03 CONCRETE MATERIALS**

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
  - 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. Fly Ash: ASTM C618, Class C or F.
- D. Slag: Ground granulated blast-furnace slag, ASTM Grade 100 or 120
- E. Color Additives: Pure, concentrated mineral pigments specifically intended for mixing into concrete and complying with ASTM C979.
  - 1. Concentration: Base dosage rates on weight of Portland cement, fly ash, silica fume, and other cementitious materials but not aggregate or sand.
  - 2. Packaging: If pigments are to be added to mix at site, furnish pigments in premeasured disintegrating bags to minimize job site waste.
  - 3. Colors:
    - a. Integral Base Color: Dark Gray, as approved.
    - b. Powder Release Agent: Gray, as approved.
    - c. Integral Base Color (Courtyard Planks): Cedar, as approved.
  - 4. Products:
    - a. Butterfield Color: [www.butterfieldcolor.com](http://www.butterfieldcolor.com).
    - b. L.M. Scofield Company: [www.scofield.com](http://www.scofield.com).
    - c. Substitutions: See Section 01 60 00 – Product Requirements.
- F. Water: Clean and not detrimental to concrete.

### **2.04 ADMIXTURES**

- A. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
- B. Air Entrainment Admixture: ASTM C260/C260M.
- C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
- D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
- E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.
- F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
- G. Accelerating Admixture: ASTM C494/C494M Type C.

- H. Retarding Admixture: ASTM C494/C494M Type B.
- I. Water Reducing Admixture: ASTM C494/C494M Type A.
  - 1. Shall not increase concrete shrinkage or promote water-bleeding.

## **2.05 ACCESSORY MATERIALS**

- A. Underslab Vapor Retarder: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
  - 1. Installation: Comply with ASTM E1643.
  - 2. Perm Rating: 0.1 maximum.
  - 3. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations in vapor retarder.
  - 4. Manufacturers:
    - a. Insulation Solutions, Inc; Viper VaporCheck II 15-mil (Class A): [www.insulationsolutions.com](http://www.insulationsolutions.com).
    - b. Poly-America; Husky Yellow Guard 15 Mil Vapor Barrier: [www.yellowguard.com](http://www.yellowguard.com).
    - c. Raven Industries; VaporBlock 15: [www.vaporblock.com](http://www.vaporblock.com).
    - d. Stego Industries, LLC; Stego Wrap Vapor Barrier 15-mil (Class A): [www.stegoindustries.com](http://www.stegoindustries.com).
    - e. W.R. Meadows, Inc; PERMINATOR Class A - 15 mils: [www.wrmeadows.com](http://www.wrmeadows.com)
    - f. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
  - 1. Grout: Comply with ASTM C1107/C1107M.
  - 2. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
  - 3. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.
- C. Coatings, General: Provide products with VOC limits as established in SCAQMD 1113, Architectural Coatings.
  - 1. Floor Coatings: 50 g/L maximum.
  - 2. Sealers: 100 g/L maximum.
  - 3. Concrete Curing Compounds: 100 g/L maximum.
  - 4. Waterproofing Sealers: 100 g/L maximum.
- D. Sealer SC-1: ASTM C1315, Type 1, Class A, ASTM C309, Type 1 Class A, penetrating product with no less than 34 percent solids content, leaving no sheen, VOC content rating as required to suit regulatory requirements with a 5 year documented history in controlling moisture vapor emission from damaging floor coverings.
  - 1. Products:
    - a. Creteseal; SC2000: [www.creteseal.com](http://www.creteseal.com).
    - b. Curranseal PMC3300: [www.curranseal.com](http://www.curranseal.com).
- E. Sealer SC-2: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.

1. Products:
  - a. Dayton Superior Corporation; Sure Hard Densifier J17: [www.daytonsuperior.com](http://www.daytonsuperior.com).
  - b. Euclid Chemical Company (The); Euco Diamond Hard: [www.euclidchemical.com](http://www.euclidchemical.com).
  - c. L&M Construction Chemicals, Inc; Seal Hard: [www.laticrete.com](http://www.laticrete.com).
  - d. Master Builders Solutions by BASF; MasterKure HD 300 WB: [www.master-builders-solutions.basf.us](http://www.master-builders-solutions.basf.us).
  - e. Meadows, W. R., Inc; Liqui-Hard: [www.wrmeadows.com](http://www.wrmeadows.com).
  - f. US Mix Products Company; US Spec Industraseal: [www.usspec.com](http://www.usspec.com).
- F. Snap Tie Plugs: Preformed, non-shrink grout plugs to fill holes left by form ties; size to flush with wall surface; compatible permanent adhesive.

## **2.06 BONDING AND JOINTING PRODUCTS**

- A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
- B. Epoxy Bonding System:
  1. Complying with ASTM C881/C881M and of Type required for specific application.
- C. Waterstops: Preformed mineral colloid strips, 3/4 inch thick, moisture expanding. Provide products from same manufacturer as sheet waterproofing.
  1. Available Products:
    - a. Waterstop RX101 manufactured by Cetco: [www.cetco.com](http://www.cetco.com).
    - b. SuperStop WaterStop manufactured by Tremco: [www.tremcosealants.com](http://www.tremcosealants.com).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Reglets: Formed steel sheet, galvanized, with temporary filler to prevent concrete intrusion during placement.
  1. Size: As indicated on drawings.
- E. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
  1. Material: ASTM D1751, cellulose fiber.
- F. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard or felt, complying with ASTM D 1781, 1/4 inch and 4 inches deep; tongue and groove profile.

## **2.07 CURING MATERIALS**

- A. Moisture-Retaining Sheet: ASTM C171. Provide one of the following:
  1. Curing paper, regular or white.
  2. Polyethylene film, clear or white, minimum nominal thickness of 0.0040 in.
  3. White-burlap-polyethylene sheet, weighing not less than 10 ounces per linear yard, 40 inches wide.
- B. Water: Potable, not detrimental to concrete.

## **2.08 CONCRETE MIX DESIGN**

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.



1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations except as specified on plan sheet S0.1 Concrete Note 8.
- 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 or required by manufacturer.
- D. Normal Weight Concrete: Refer to Structural Drawings.
- E. Strength shall conform to Concrete Notes on sheet S0.1

## **2.09 MIXING**

- A. Transit Mixers: Comply with ASTM C94/C94M.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

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

### **3.02 PREPARATION**

- A. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- B. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent 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.
- C. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- D. Install vapor retarder under interior slabs on grade according to ASTM E1643 and manufacturer's written instructions. Lap joints minimum 12 inches and seal watertight by taping edges and ends with manufacturer's recommended tape. Use vapor retarder sheet to boot around all penetrations and seal with tape to create a continuous vapor retarder. Do not penetrate vapor retarder with screed pins, wood stakes or other items.
  1. Comply with requirements of Section 1811 of the OSSC for Radon Control Methods.
  2. Place vapor retarder under the entire soil-contact area of the floor in a manner that minimizes the required number of joints and seams. Take care to prevent damage to the membrane during the construction process.
  3. Where the slab edge is cast against a foundation wall or grade beam, install the membrane to seal to the foundation element.
  4. Fit membrane to all penetrations to within 1/2 inch of the penetration and seal with tape or mastic.

5. Repair all damaged portions of the membrane with tape or with a patch made from the same or compatible material as the membrane, cut so as to provide a minimum 12-inch lap from any opening and taped continuously about its perimeter.
6. Arrange for inspection of the installed membrane by the governing agency prior to placement of concrete.

### **3.03 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Notify Architect not less than 24 hours prior to commencement of placement operations.
- D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- F. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer. Where approved, record the amount of water added on site and provide with the special inspection reports.
- G. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
  1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- H. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  2. Maintain reinforcement in position on chairs during concrete placement.
  3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  4. Slope surfaces uniformly to drains where required.
  5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- I. Cold-Weather Placement: Comply with ACI 306R and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  1. When average high and low temperature is expected to fall below 40 degrees F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- J. Hot-Weather Placement: Comply with ACI 305R and as follows:
  1. Maintain concrete temperature below 90 degrees F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.
- K. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

### **3.04 SLAB JOINTING**

- A. Locate joints as indicated on the drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
- D. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
  3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- E. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one- third of concrete thickness as follows:
  1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  2. Sawed Joints: Form contraction joints with power saws as indicated below. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
    - a. Equipment Control Joint Saw: "Soff-Cut System," early-entry dry-cut saw with Skid Plate, by Soff-Cut. 1112 Olympic Drive, Corona, CA 92881 909-272-2330.
    - b. Comply with the Soff-Cut instructions for the SOFF-CUT System
    - c. Troweled Finish: Install cuts 0 to 2 hours after final finish at each joint location.

- d. Broom Finish: Install cuts at each control joint location as soon as concrete will support weight of saw and operator without disturbing final finish.
  - e. Cut depth not less than 10 percent of slab thickness with a 1-inch minimum.
  - f. Remove debris in path of cut and under Skid Plate before cutting. Skid Plate must remain flat on surface.
  - g. Use Soff-Cut blades and Skid Plates, using a new Skid Plate with each new blade.
  - h. Install Soff-Cut joint protector at saw-cut intersection prior to cross-cut.
  - i. Remove dry powder without disturbing finish.
  - j. Avoid traffic across saw cut until sufficient strength is gained to protect joint edges.
- F. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
- 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
  - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 07 92 00 - Joint Sealants are indicated.
  - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- G. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.
- H. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

### **3.05 FLOOR FLATNESS AND LEVELNESS TOLERANCES**

- A. An independent testing agency, as specified in Section 01 40 00, will inspect finished slabs for conformance to specified tolerances.
- B. For floors below wood athletic flooring or resilient athletic flooring, provide surface flatness of +/- 1/8 inch in a 10 foot radius.
- C. Coordinate with Work of Section 09 64 66 - Wood Athletic Flooring or Section 09 65 66 - Resilient Athletic Flooring for depth of recess to receive athletic flooring.
- D. Correct the slab surface if tolerances are less than specified.
- E. Grind high spots and fill low spots with approved leveling compound.
- F. Maximum Variation of Surface Flatness for Upper Floors Only:
- G. Exposed Concrete Floors: 1/4 inch in 10 feet.
- H. Under Seamless Resilient Flooring and Thinset Tile: 1/4 inch in 10 feet.
- I. Under Carpeting: 1/4 inch in 10 feet.
- J. Minimum F (F) Floor Flatness and F (L) Floor Levelness Values:
- K. Exposed to View and Foot Traffic: F (F) of 20; F (L) of 15, on-grade only.
- L. Under Carpeting and Entry Mats: F (F) of 25; F (L) of 20, on-grade only.
- M. Under Thin Resilient Flooring and Thinset Tile: F (F) of 35; F (L) of 25, on-grade only.

- N. Correct defects by grinding if affected area is concealed from view. If not concealed, removal and replacement of the defective work is required. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

### **3.06 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. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
  - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
  - 2. Smooth Formed Finish: At below-stair seating at Stairs 3 and 4, provide smooth formed (as cast) finish. Do not rub.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows: See 03 31 00 for Concrete Grinding & Polishing and architectural drawings for locations.
  - 1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include thin set ceramic tile, resilient flooring, resilient athletic flooring, carpeting, and entry mat.
  - 2. Surfaces to Receive Wood Athletic Flooring: Smooth "steel trowel" as described in ACI 302.1R.
  - 3. Exterior Steps and Ramps: "Broom Finish." Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
  - 4. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1/4 inch per foot or as indicated on drawings.

### **3.07 MISCELLANEOUS CONCRETE ITEMS**

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in- place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts, nosings and accessories as shown on Drawings. Screed, tamp, and trowel- finish concrete surfaces.
- E. Concrete Fill for Bollards: Fill bollards with concrete. Smooth trowel concrete to one inch high convex curve at top of bollards unless otherwise indicated on Drawings.

### **3.08 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.
  - 1. Normal concrete: Not less than 7 days.
  - 2. High early strength concrete: Not less than 4 days.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
- D. Surfaces Not in Contact with Forms:
  - 1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
    - a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.
    - b. Spraying: Spray water over floor slab areas and maintain wet.
    - c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
  - 2. Final Curing: Begin after initial curing but before surface is dry.
    - a. Moisture-Retaining Sheet: Lap strips not less than 3 inches and seal with waterproof tape or adhesive; secure at edges.
- E. Sealer Application: Comply with manufacturer's recommendations.
  - 1. Sealer SC-1: Apply sealer the day of the concrete pour just after final finishing and soff cutting. Apply with a low-pressure industrial sprayer at 200 square feet per gallon. After the concrete sealer is applied, broom evenly across the concrete slab until completely absorbed into the concrete surface.
    - a. Locations of Use: All areas scheduled or indicated to receive resilient flooring, carpeting, and entry mats.
    - b. Verify with resilient flooring manufacturers that sealer is compatible with flooring and adhesive materials prior to application.
  - 2. Sealer SC-2: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
    - a. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
    - b. Do not apply to concrete that is less than three days' old.
    - c. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.
    - d. Locations of Use: At floors exposed to view, unless indicated otherwise.

### **3.09 FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

- D. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
- E. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- F. Inspections:
  - 1. Steel reinforcement placement.
  - 2. Steel reinforcement welding.
  - 3. Headed bolts and studs.
  - 4. Verification of use of required design mixture.
  - 5. Concrete placement, including conveying and depositing.
  - 6. Curing procedures and maintenance of curing temperature.
  - 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
  - 8. Placement of vapor retarder - inspection by governing agency.
- G. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C172/C172M shall be performed according to the following requirements:
  - 1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  - 2. Slump: ASTM C143/C143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  - 3. Air Content: ASTM C231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  - 4. Concrete Temperature: ASTM C1064/C1064M; one test hourly when air temperature is 40 degrees F and below and when 80 degrees F and above, and one test for each composite sample.
  - 5. Compression Test Specimens: ASTM C31/C31M. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
  - 6. Compressive-Strength Tests: ASTM C39/C39M; test one set of one laboratory-cured specimens at 7 days and one set of three specimens at 28 days.
    - a. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
  - 7. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
  - 8. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
  10. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders or by other methods as directed by Architect.
  11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
  12. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.
- H. Measure floor and slab flatness and levelness according to ASTM E1155 within 48 hours of finishing.

### **3.10 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.

### **3.11 PROTECTION**

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.
- B. For concrete floors indicated to remain exposed to view, protect to prevent damage, including staining, gouges and scratching by construction traffic and activities.
  1. Inspect tires for debris prior to use on slab. Remove embedded items which may cause damage to the floor slab.
  2. Clean up spills on slab immediately.
- C. Develop a concrete protection procedure which addresses the following:
  1. Communication of protection plan to subcontractors and vendors.
  2. Procedures for cleaning spills, including use of and availability of cleaning chemicals and absorptive materials at site.

**END OF SECTION 03 30 00**



**03 31 00 CONCRETE GRINDING AND POLISHING****PART 1 GENERAL****SUMMARY**

- A. This section includes the following.
  - 1. Applying Lythic Densifier with Duet Colors for Concrete and polishing concrete to specified finish level.
  - 2. Applying Lythic SPD Protector.
- B. Related Work:
  - 1. Section 03 30 00 Cast-In-Place Concrete

**REFERENCES**

- A. American Society for Testing and Materials:
  - 1. ASTM-C501, Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces
- B. American Concrete Institute
  - 1. ACI 302. 1R-89, Guide for Concrete Floor and Slab Construction
- C. Other Test:
  - 1. Reflectivity

**SUBMITTALS**

- A. Comply with pertinent provisions of Section 01 60 00- Product Requirements:
  - 1. Provide submittal information within 35 calendar days after the contractor has received the owner's notice to proceed.
- B. Product data:
  - 1. Submit special concrete finishes manufacturer's specifications and test data.
  - 2. Submit special concrete finishes describing product to be provided, giving manufacturer's name and product name for the specified material proposed to be provided under this section.
  - 3. Submit special concrete finishes manufacturer's recommended installation procedures; which when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.
  - 4. Submit special concrete finishes technical data sheet giving descriptive data, curing time, and application requirements.
  - 5. Submit special concrete finishes manufacturer's Material Safety Data Sheet (MSDS) and other safety requirements.
  - 6. Follow all special concrete finishes published manufacturer's installation instructions.
- C. Test Reports:
  - 1. Provide certified test reports, prepared by an independent testing laboratory, confirming compliance with specified performance criteria.

- D. Samples:
  - 1. Each floor has its own unique appearance when completed. Manufacturer's lab samples are supplied only to show a smooth shiny surface. The final appearance of the finished floor cannot be guaranteed to match a sample due to the natural variations in concrete.
- E. Product Variations:
  - 1. The variegated colors produced are unique to each concrete surface and depend on the chemical composition, mix design, porosity, age, texture, and color of the concrete substrate. Mottling and wide variations in color and intensity may occur. If contaminants remain on the surface, the penetration of Lythic Densifier and colors may be blocked. Concrete from different loads or pours, and in patched in areas, may appear significantly different in color than adjacent areas, when treated with acid stains, dyes and densified.

## **QUALITY ASSURANCE**

- A. Installer Qualifications:
  - 1. Use a certified installer and an adequate number of skilled workmen who are thoroughly trained and experienced in the necessary craft.
  - 2. The special concrete finish manufacturer shall certify the applicator.
  - 3. Applicator shall be familiar with the specified requirements and the methods needed for proper performance of work of this section. Applicator must have availability of proper equipment to perform work within scope of this project on a timely basis. Applicator should have successfully performed a minimum of 5 projects of at least 5000 square feet each.
- B. Manufacturer's Certification:
  - 1. Provide letter of certification from concrete finish manufacturer stating that installer is certified applicator of special concrete finishes, and is familiar with proper procedures and installation requirements required by the manufacturer.
- C. Protection
  - 1. No satisfactory chemical or cleaning procedure is available to remove petroleum stains from the concrete surface. Prevention is therefore essential.
    - a. All hydraulic powered equipment must be diapered to avoid staining of the concrete.
    - b. No trade will park vehicles on the inside slab. If necessary to complete their scope of work, drop cloths will be placed under vehicles at all times.
    - c. No pipe cutting machine will be used on the inside floor slab.
    - d. Steel will not be placed on interior slab to avoid rust staining.
    - e. All equipment must be equipped with non-marking tires.
- D. Pre-Installation Conference:
  - 1. Conduct conference at project site to comply with requirements in Division 1 Section "Project Management and Coordination"

## **DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials in original containers, with seals unbroken, bearing manufacturer labels indicating brand name and directions for storage.

- B. Dispense special concrete finish material from factory numbered and sealed containers. Maintain record of container numbers.

## **PROJECT CONDITIONS**

- A. Environmental limitations:
  - 1. Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting topping performance.
    - a. Concrete must have a Floor Flatness rating of at least 40.
    - b. Concrete must have a Floor Levelness rating of at least 40.
    - c. Concrete must be cured a minimum of 28 days or as directed by the manufacturer before application of Lythic Densifier can begin.
    - d. Application of Lythic Densifier shall take place 10 days prior to installation of equipment and substantial completion, thus providing a complete, uninhibited concrete slab for application.
- B. Close areas to traffic during floor application and after application, for time period recommended in writing by manufacturer.

## **PART 2 – PRODUCTS**

### **MATERIALS AND MANUFACTURERS**

- A. Densifying and Sealing Agents
  - 1. Lythic Densifier,  
Lytic SPD Protector  
manufactured by:  
Lytic Solutions, Inc., Vancouver, WA  
360 694 5347
    - a. Performance Criteria:
      - i. Abrasion Resistance: ASTM C501  
Certified Applicator required

## **PART 3- EXECUTION**

### **SURFACE CONDITIONS**

- A. Examine substrate, with installer present, for conditions affecting performance of finish. Correct conditions detrimental to timely and proper work. Do not proceed until unsatisfactory conditions are corrected.
- B. Verify that base slab meet finish and surface profile requirements in Division 3 Section "Cast-In-Place Concrete," and Project Conditions above.
- C. Prior to application, verify that floor surfaces are free of laitance and construction materials.

- D. Concrete must be in place a minimum of 28 days or as directed by the manufacturer before application can begin.

### **PROCESSING OF FLOORS**

- A. Floor surfaces shall be ground to remove surface contamination and expose fine aggregate for salt & pepper finish.
- B. Floor surfaces shall be polished to an average minimum gloss meter reading of 50 *matte finish (typically 200-400 grit)*.
- C. Edges shall be polished to match floor area to within 1/8" of wall.
- D. Sealing, Hardening and Polishing of Concrete Surface
  - 1. Application is to take place at least 10 days prior to racking and other in-store accessory installation, thus providing a complete, uninhibited concrete slab for application
  - 2. Only a certified applicator shall apply Lythic Densifier with Duet Color. Applicable procedures must be followed as recommended by the product manufacturer and as required to match approved test sample.
  - 3. Achieve hardening, dust-proofing, and abrasion resistance of the surface without changing the natural appearance of the concrete, except for the sheen.
  - 4. Finish to within 1/2" of vertical surfaces where practical.
  - 5. Polish to pre-determined level based on test sample.
- E. Sealer
  - 1. Apply "Lythic SPD Protector" by Lythic Solutions, Inc. on the entire floor as a final finish of the polished concrete. Follow application directions and burnish with the recommended pad for final sheen.

### **FINAL PROTECTION OF POLISHED CONCRETE**

- 1. Following completion of the final polishing, surface must be covered to protect from other trades. Cover with breathable product, such as kraft paper or thin curing blanket. DO NOT COVER WITH MASONITE, PLYWOOD OR VISQUINE.

### **WORKMANSHIP AND CLEANING**

- A. The premises shall be kept clean and free of debris at all times.
- B. Remove spatter from adjoining surfaces, as necessary.
- C. Repair damages to surface caused by cleaning operations.
- D. Remove debris from jobsite
  - 1. Dispose of materials in separate, closed containers as provided by the owner, and in accordance with local regulations.

**SPECIFIC QUALIFICATIONS / EXCLUSIONS**

- A. Any unforeseen or hidden conditions requiring repair will be billed at time and materials basis.
- B. That the floor has not been exposed to the elements. If weather damage has occurred, additional grinding will be at time and materials.
- C. Removal of contamination of the slab by soil, foot prints, drag marks, welding marks, hydraulic fluids, or any other outside contaminant will be at time and materials, and will be performed to the best of ability, but without guarantee of removal.
- D. No other trades will be allowed in the area being worked on due to possible safety and floor contamination issues.
- E. The areas to receive Lythic Densifier will be delivered to the applicator in clean and swept condition. All equipment and supplies will be removed prior to turning the space over to the applicator. If the applicator is required to clean the space, and/or move other's supplies, staging and equipment, it will be done at time and materials.
- F. If a curing agent establishes a bond barrier and requires removal prior to the application of the densifier/hardener, this will be done at time and material.
- G. PROTECTION OF THE FLOOR IS THE RESPONSIBILITY OF THE CONTRACTOR.**

**PROTECTION**

- A. Protect finished work until fully cured in accordance with manufacturer's recommendations.

**END OF SPECIFICATION**

**SECTION 04 20 00 – UNIT MASONRY**

**PART 1 GENERAL**

**SECTION INCLUDES**

- A. Concrete Block.
- B. Mortar and Grout.
- C. Reinforcement and Anchorage.
- D. Flashings.
- E. Lintels.
- F. Accessories.

**RELATED REQUIREMENTS**

- A. Section 07 19 00 - Water Repellents: Water repellents and graffiti resistant coatings applied to unpainted exterior masonry.
- B. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.
- C. Section 09 00 01 - Finish Legend: Masonry colors.

**REFERENCE STANDARDS**

- A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless-Steel Sheet, Strip, Plate, and Flat Bar.
- E. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile
- F. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units.
- G. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units.
- H. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units.
- I. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
- J. ASTM C150/C150M - Standard Specification for Portland Cement.
- K. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
- L. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
- M. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.
- N. ASTM C476 - Standard Specification for Grout for Masonry.
- O. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
- P. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- Q. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.
- R. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing.

**SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Shop Drawings: Provide shop drawings for reinforcing steel showing bar sizes, bends and dimensions.
- D. Samples: Submit four samples of decorative block and face brick units to illustrate color, texture, and extremes of color range.
- E. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

### **QUALITY ASSURANCE**

- A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.
- B. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with a minimum of five years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

### **PREINSTALLATION CONFERENCE**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.
  - 1. Meeting shall include review of integrated exterior mock-up to confirm installation procedures.
  - 2. Establish requirements for patching and repairing any penetrations or damage to water- resistive barrier caused by the Work of this Section and material required for use for such repairs.

### **MOCK-UP**

- A. Refer to Section 01 40 00 - Quality Requirements for general mock-up requirements.
- B. Build mock-up of typical exterior wall in sizes indicated on Drawings.
  - 1. Include sealant-filled joints, cavity drainage material, weep vents and through-wall flashings matching conditions that will occur on the project.
  - 2. Clean one-half of exposed faces of mock-ups with masonry cleaner as indicated.
  - 3. Include test application of water repellents and graffiti-resistant coating as specified in Section 07 19 00 - Water Repellents.
  - 4. Protect accepted mock-ups from the elements with weather-resistant membrane.
  - 5. Approval of mock-ups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
    - a. Approval of mock-ups is also for other material and construction qualities specifically approved by Architect in writing.
    - b. Approval of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless such deviations are specifically approved by Architect in writing.
- C. Locate where directed.
- D. Accepted mock-up may remain as part of the Work.

### **DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

## **PART 2 PRODUCTS**

### **CONCRETE MASONRY UNITS**

- A. CMUs: ASTM C 90.
  - 1. Manufacturers:
    - a. Basalite Concrete Products, LLC.
    - b. Cement Products Manufacturing Co.
    - c. Mutual Materials Company.
    - d. Willamette Graystone, Inc.
- B. Concrete Block: Comply with referenced standards and as follows:
  - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on the drawings for specific locations.
  - 2. Special Shapes: Provide non-standard blocks configured for corners, lintels, control joint edges, and other detailed conditions.
    - a. Provide bullnose units for outside corners at the building interior, unless otherwise indicated.
  - 3. Load-Bearing Units: ASTM C90, medium weight.
    - a. Hollow block, as indicated.
    - b. Exposed Face, as indicated.
  - 4. Non-Loadbearing Units: ASTM C129.
    - a. Hollow block.
    - b. Medium weight.

### **MORTAR AND GROUT MATERIALS**

- A. Portland Cement: ASTM C150/C150M, Type I.
  - 1. Not more than 0.60 percent alkali.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Mortar Aggregate: ASTM C144.
- D. Grout Aggregate: ASTM C404.
- E. Water: Clean and potable.
- F. Accelerating Admixture: Nonchloride type for use in cold weather.
- G. Integral Water Repellent Admixture for Mortar: Polymeric liquid admixture added to mortar at the time of manufacture.
  - 1. Available Products:
    - a. ACM Chemistries; RainBloc for Mortar Admixture.
    - b. BASH Aktiengesellschaft; Rheopel Plus Mortar Admixture.
    - c. GCP Applied Technologies; Dry-Brick Mortar Admixture.
    - d. Substitutions: See Section 01 60 00 - Product Requirements.
  - 2. Locations of Use: Exposed exterior brick.

### **REINFORCEMENT AND ANCHORAGE**

- A. Manufacturers:
  - 1. CTP, Inc: [www.ctpanchors.com](http://www.ctpanchors.com).
  - 2. Heckmann Building Products: [www.heckmannanchors.com](http://www.heckmannanchors.com).
  - 3. Hohmann & Barnard, Inc: [www.h-b.com](http://www.h-b.com).
  - 4. WIRE-BOND: [www.wirebond.com](http://www.wirebond.com).
- B. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi), deformed billet bars; galvanized.
- C. Strap Anchors: Bent steel shapes configured as required for specific situations, 1-1/4 in width, 0.105 in thick, lengths as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage from masonry face, corrugated for embedment in masonry joint, hot dip galvanized to ASTM A 153/A 153M, Class B.
- D. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
  - 1. Anchor plates: Not less than 0.075 inch thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing



- and insulation to provide positive anchorage.
2. Wire Ties: Manufacturer's standard shape, 0.1875 inch thick.
  3. Vertical adjustment: Not less than 2 inches.
  4. Seismic Feature: Provide lip, hook, or clip on end of wire ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 9 gage diameter.
  5. Products:
    - a. CTP, Inc: CTP-16 with WT: [www.ctpanchors.com](http://www.ctpanchors.com).
    - b. Heckmann Building Products; Pos-I-Tie: [www.heckmannanchors.com](http://www.heckmannanchors.com).
    - c. Hohmann & Barnard, Inc; HB-213-2X S.I.S. with Seismiclip: [www.h-b.com](http://www.h-b.com).
    - d. WIRE-BOND; #2401 RJ-711 with Welded Seismic Clip: [www.wirebond.com](http://www.wirebond.com).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.

## **FLASHINGS**

- A. Stainless Steel Flashing: ASTM A666, Type 304, soft temper; 26 gage, 0.0187 inch thick; finish 2B to 2D.
  1. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual."
  2. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.
  3. Provide formed watertight non-sealant dependent end dams at all end terminations.
  4. Solder lap joints watertight. Provide expansion joints at panel ends as required.

## **ACCESSORIES**

- A. Preformed Control Joints: Rubber material designed to fit sash block and to maintain lateral stability in masonry wall. Provide size and configuration as applicable to masonry width and conditions, fused joints.
  1. Manufacturers:
    - a. Hohmann & Barnard, Inc; #RS Series Rubber Control Joint: [www.h-b.com](http://www.h-b.com)
    - b. WIRE-BOND; Series 2900 Rubber Control Joint: [www.wirebond.com](http://www.wirebond.com).
- B. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
  1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
    - a. Manufacturers:
      - i. Advanced Building Products Inc; Mortar Break: [www.advancedflashing.com/sle](http://www.advancedflashing.com/sle).
      - ii. Hohmann & Barnard, Inc; Mortar Trap: [www.h-b.com](http://www.h-b.com).
      - iii. Mortar Net Solutions; Mortar Net with Insect Barrier: [www.mortarnet.com](http://www.mortarnet.com).
      - iv. WIRE-BOND; Cavity New DT: [www.wirebond.com](http://www.wirebond.com).
      - v. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Weeps: Cellular plastic. One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.
  1. Manufacturers:
    - a. Advanced Building Products Inc; Mortar Maze weep vent.
    - b. Hohmann & Barnard, Inc; Quadro-Vent: [www.h-b.com/sle](http://www.h-b.com/sle).
    - c. WIRE-BOND; Cell Vent #3601: [www.wirebond.com](http://www.wirebond.com).
    - d. Mortar Net Solutions; Mortar Net CellVent: [www.mortarnet.com](http://www.mortarnet.com).
    - e. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Cork Board: 1/2-inch thick, 5.0 lb/cf minimum density cork.
- E. Insulation: 1.5 to 3 lb/cf glass or mineral fiber insulation.
- F. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.
  1. Cleaners for Red and Light-Colored Brick Not Subject to Metallic Staining with Mortar Not Subject to Bleaching:

- a. 202 New Masonry Detergent; Diedrich Technologies, Inc. b. Masonry Cleaner Type L; Fabrikem Manufacturing Ltd.
    - b. NMD 80; EaCo Chem Inc.
    - c. Sure Klean 600 New Masonry Cleaner; ProSoCo, Inc.
  - 2. Cleaners for Concrete Masonry Units:
    - a. 202V Vana-Stop; Diedrich Technologies, Inc.
    - b. Masonry Cleaner Type L; Fabrikem Manufacturing Ltd.
    - c. NMD 80; EaCo Chem Inc.
    - d. Heavy Duty Concrete Cleaner; ProSoCo, Inc.
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.
- G. Self-Adhered Membrane (SAM): Self-adhesive sheet flashing, ASTM D1970/D1970M and ASTM E2178.
  - 1. Self-Adhered Membrane: Composite, self-adhesive, flashing product consisting of a pliable, rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.036 inch.
    - a. Verify material selection with Work of Section 07 25 00 - Weather Barriers for compatibility of materials.
    - b. Available Products:
      - i. BASF; TF Membrane.
      - ii. GCP Applied Technologies; Perm-A-Barrier Wall Flashing.
      - iii. Henry Company; Blueskin SA.
      - iv. Tremco Inc; ExoAir 110 or ExoAir 110 LT.
      - v. Substitutions: See Section 01 60 00 - Product Requirements.

### **MORTAR AND GROUT MIXES**

- A. Mortar for Unit Masonry: ASTM C270, using the Property Specification. Use Type S throughout.
- B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.
- C. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly
- D. Mixing: Use mechanical batch mixer and comply with referenced standards.

## **PART 3 EXECUTION**

### **EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that built-in items are in proper location, and ready for roughing into masonry work.

### **PREPARATION**

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain it in place until the building structure provides permanent bracing.
- C. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
  - 1. Mix units from several pallets or cubes as they are placed.

### **PROJECT CONDITIONS**

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.

2. Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
3. After completion of walls, protect top of wall until permanent wall caps are installed.

### **COLD AND HOT WEATHER REQUIREMENTS**

- A. Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.

### **COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  1. Bond: Running
  2. Coursing: One unit and one mortar joint to equal 16 inches.
  3. Mortar Joints: Concave.
    - a. Provide flush joints at substrates for water-resistive barriers, fluid-applied waterproofing, wall tile, and resilient base.

### **PLACING AND BONDING**

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Lay solid masonry units in full bed of mortar, with double buttered full head joints, uniformly joined with other work.
- C. Lay hollow masonry units with face shell bedding on double buttered head and bed joints.
- D. Double strike head and bed joints.
- E. Remove excess mortar and mortar smears as work progresses.
- F. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high-pressure cleaning methods.
- G. Interlock intersections and external corners.
- H. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar, and replace.
- I. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- J. Cut mortar joints flush where wall tile is scheduled, fluid-applied waterproofing, water-resistive membrane is applied, or resilient base is scheduled.
- K. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- L. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with cork board and insulation as detailed.

### **WEEPS/CAVITY VENTS**

- A. Install weeps in veneer walls at 24 inches on center horizontally above through-wall flashing, above shelf angles and lintels, at bottom of walls, and at tops of walls.
  1. Use cellular plastic weep vents in open head joints to form weep holes.

### **CAVITY MORTAR CONTROL**

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

### **REINFORCEMENT AND ANCHORAGE - GENERAL**

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches horizontally and 24 inches vertically.

### **REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY**

- A. Install horizontal joint reinforcement 8 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Reinforce joint corners and intersections with strap anchors 16 inches on center.

### **MASONRY FLASHINGS**

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
  - 1. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under water-resistive barrier, lapping at least 4 inches.
  - 2. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
  - 3. Remove or cover protrusions or sharp edges that could puncture flashings.
  - 4. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Extend metal flashings through exterior face of masonry and turn down to form drip. Install joint sealer below drip edge to prevent moisture migration under flashing.
- C. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.
- D. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
  - 1. Use cellular plastic weep/vents in open head joints to form weep holes.
  - 2. Space weep holes 24 inches o.c. unless otherwise indicated.

### **LINTELS**

- A. Install loose steel lintels over openings.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
- C. Maintain minimum 8-inch bearing on each side of opening.

### **GROUTED COMPONENTS**

- A. Reinforce components as indicated on Structural Drawings.
- B. Lap splices minimum 48 bar diameters, unless otherwise indicated.
- C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- D. Place and consolidate grout fill without displacing reinforcing.
- E. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of openings.

### **CONTROL AND EXPANSION JOINTS**

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device designed to fit standard sash block in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Space control joints as follows, unless Drawings indicate closer spacing:
  - 1. Concrete Masonry Units: 3 to 1, length to height. 30 feet maximum.
  - 2. Brick Veneer: 3 to 1, length to height. 30 feet maximum.

### **BUILT-IN WORK**

- A. As work progresses, install built-in metal door frames, glazed frames, anchor bolts, plates, and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
  - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.

### **TOLERANCES**

- A. Maximum Variation from Alignment of Columns: 1/4 inch.
- B. Maximum Variation from Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

### **CUTTING AND FITTING**

- A. Cut and fit for pipes, conduit, and sleeves. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

### **FIELD QUALITY CONTROL**

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
- B. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- C. Inspections: Level 1 special inspections according to the International Building Code. Refer to Structural Drawings for special inspection tables.
  - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
  - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
  - 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- D. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for conformance to requirements of this specification.
- E. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

**CLEANING**

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Clean masonry with specified cleaners applied according to manufacturer's written instructions.

**PROTECTION**

- A. Without damaging completed work, protect exposed external corners that are subject to damage by construction activities.

**END OF SECTION 04 20 00**

## **SECTION 05 12 00 – STRUCTURAL STEEL FRAMING**

### **PART 1 GENERAL**

#### **SECTION INCLUDES**

- A. Steel columns.
- B. Steel edge angles, closures, stiffeners, continuity plates and shear tabs.
- C. Other steel framing and accessories.
- D. Shop and field welding.
- E. Field bolting.
- F. Base plates, shear stud connectors and anchor bolts, with nuts and washers.
- G. Grouting under base plates.

#### **RELATED REQUIREMENTS**

- A. Section 05 12 13 - Architecturally Exposed Structural Steel Framing: Steel indicated on Drawings as AESS.
- B. Section 05 21 00 - Steel Joist Framing.
- C. Section 05 31 00 - Steel Decking: Support framing for small openings in deck.
- D. Section 05 50 00 - Metal Fabrications: Steel fabrications affecting structural steel work.
- E. Section 09 96 00 - High-Performance Coatings: Primers.

#### **REFERENCE STANDARDS**

- A. AISC (MAN) - Steel Construction Manual.
- B. AISC 360 - Specification for Structural Steel Buildings.
- C. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges.
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
- E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- F. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.
- G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- H. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- I. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.
- J. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- K. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
- L. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric).
- M. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.
- N. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
- O. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.
- P. ASTM E94 - Standard Guide for Radiographic Examination.
- Q. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments.
- R. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry.
- S. ASTM E709 - Standard Guide for Magnetic Particle Testing.
- T. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.
- U. ASTM F436 - Standard Specification for Hardened Steel Washers.

- V. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
- W. ASTM F1852 - Standard Specification for "Twist Off" Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
- X. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- Y. AWS D1.8/D1.8M - Structural Welding Code - Seismic Supplement.
- Z. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections.
- AA. SCAQMD 1113 - South Coast Air Quality Management Owner Rule No.1113.
- BB. SSPC-PA 1 - Shop, Field, and Maintenance Painting of Steel.
- CC. SSPC-SP 11 - Power Tool Cleaning to Bare Metal.
- DD. SSPC-SP 2 - Hand Tool Cleaning.
- EE. SSPC-SP 3 - Power Tool Cleaning.

## **DEFINITIONS**

- A. Structural Steel: Elements of structural-steel frame, as classified by AISC S303, "Code of Standard Practice for Steel Buildings and Bridges."
- B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.
- C. Heavy Sections: Rolled and built-up sections as follows:
  - 1. Shapes included in ASTM A6/A6M with flanges thicker than 1-1/2 inches.
  - 2. Welded built-up members with plates thicker than 2 inches.
  - 3. Column base plates are thicker than 2 inches.
- D. Protected Zone: Structural members or portions of structural members indicated as "Protected Zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.
- E. Demand Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the Seismic-Load-Resisting System, and which are indicated as "Demand Critical" or "Seismic Critical" on Drawings.

## **SUBMITTALS**

- F. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- G. Shop Drawings/Erection Drawings: Show fabrication of structural-steel components.
  - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
  - 2. Include embedment drawings.
  - 3. Indicate welds by standard AWS symbols, distinguish between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
  - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts.
  - 5. Identify pretensioned and slip-critical high-strength bolted connections.
  - 6. Identify members and connections of the seismic-load-resisting system.
  - 7. Indicate locations and dimensions of protected zones.
  - 8. Identify demand critical welds.
- H. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
- I. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.
  - 1. Structural steel.
  - 2. Bolts, nuts and washers.
- J. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
- K. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.



## **QUALITY ASSURANCE**

- A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
- B. Comply with Section 10 of AISC S303 "Code of Standard Practice for Steel Buildings and Bridges" for architecturally exposed structural steel.
- C. Fabricator: Company specializing in performing the work of this section with a minimum of five years of documented experience.
- D. Erector: Company specializing in performing the work of this section with a minimum of five years of documented experience.
- E. Design connections not detailed on the drawings under direct supervision of a Professional Engineer experienced in design of this work and licensed in Oregon.
- F. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  - 1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

## **COORDINATION**

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

## **PART 2 PRODUCTS**

### **MATERIALS**

- A. See General Structural Notes in Drawings for specification and grade of framing members.
- B. Steel Angles, Plates, and Channels: ASTM A36/A36M.
- C. Steel W Shapes and Tees: ASTM A992/A992M.
- D. Rolled Steel Structural Shapes: ASTM A992/A992M.
- E. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.
- F. Pipe: ASTM A53/A53M, Grade B, finish black and galvanized, as indicated
- G. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.
- H. Structural Bolts and Nuts: Carbon steel, ASTM A307, Grade A and galvanized in compliance with ASTM A153/A153M, Class C.
- I. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436 washers.
- J. Unheaded Anchor Rods: ASTM F1554, Grade 36, plain, with matching ASTM A563 or ASTM A563M nuts and ASTM F436 Type 1 washers.
- K. Headed Anchor Rods: ASTM F 1554, Grade 36, plain.
- L. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F1852, Type 1, round head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers. Finish: Plain.
- M. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- N. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
  - 1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
  - 2. Minimum Compressive Strength at 28 Days: 5,000 pounds per square inch.
- O. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A108, Grade 1030.

- P. All paints and coating wet applied on the building interior must meet the applicable limits of SCAQMD 1113.
- Q. Shop and Touch-Up Primer:
  - 1. Concealed Interior Steel: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.
  - 2. Exposed Interior Surfaces: Either Tnemec Series 27 Typoxy WB at 3 to 4 mils DFT or primer specified in Section 09 96 00 - High-Performance Coatings.
- R. Primer and Touch-Up Primer for Galvanized Surfaces: Either Tnemec Series 27 Typoxy WB at 2 to 2.5 mils or primer specified in Section 09 96 00 - High-Performance Coatings, complying with VOC limitations of authorities having jurisdiction.

## **FABRICATION**

- A. Shop fabricate to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.
  - 1. Camber structural-steel members where indicated.
  - 2. Fabricate beams with rolling camber up.
  - 3. Identify high-strength structural steel according to ASTM A6/A6M and maintain markings until structural steel has been erected.
  - 4. Mark and match-mark materials for field assembly.
  - 5. Complete structural-steel assemblies, including welding of units, before starting shop- priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
  - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, "Hand Tool Cleaning."
- F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.
- G. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.
  - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
  - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
  - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.
- H. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- I. Fabricate connections for bolt, nut, and washer connectors.

## **FINISH**

- A. Shop prime steel surfaces except the following:
  - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches. Hold back is not required for Tnemec Series 394.
  - 2. Surfaces to be field welded.
  - 3. Surfaces to be high-strength bolted with slip-critical connections. Hold back is not required for Tnemec Series 394.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
  - 1. Concealed Interior Steel: SSPC-SP 3 "Power Tool Cleaning."
  - 2. Exposed Interior Surfaces: SSPC-SP 3 "Power Tool Cleaning."

- C. Preparing Galvanized Steel for Shop Priming: After galvanizing, thoroughly clean steel of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
  - 1. Clean surfaces of weld seams according to SSPC-SP 11, "Power Tool Cleaning to Bare Metal" unless otherwise recommended by coating manufacturer for substrate and exposure conditions.
- D. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
  - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
  - 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change the color of the second coat to distinguish it from the first.
- E. Galvanize all exterior structural steel members to comply with ASTM A123/A123M. Provide minimum 1.85 oz/sq ft galvanized coating.
  - 1. Fill vent and drain holes that will be exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.
  - 2. Galvanize lintels and shelf angles attached to structural-steel frame and located in exterior walls.

### **SOURCE QUALITY CONTROL**

- A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
  - 1. Provide testing agency with access to places where structural steel work is being fabricated or produced to perform tests and inspections.
    - a. Pay for any additional cost required caused by travel to and from the job site.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".
- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
  - 1. Liquid Penetrant Inspection: ASTM E165/E165M.
  - 2. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
  - 3. Ultrasonic Inspection: ASTM E164.
  - 4. Radiographic Inspection: ASTM E94.
- E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
  - 1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360- degree flash or welding repairs to any shear connector.
  - 2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

### **PART 3 EXECUTION**

#### **EXAMINATION**

- A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
  - 1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## **ERECTION**

- A. Erect structural steel in compliance with AISC S303 "Code of Standard Practice for Steel Buildings and Bridges".
- B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Field weld components and shear studs indicated on shop drawings.
- D. Use carbon steel bolts only for temporary bracing during construction, unless otherwise specifically permitted on drawings. Install high-strength bolts in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".
- E. Base Bearing and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting plates. Clean bottom surface of plates.
  - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
  - 2. Weld plate washers to top of baseplate.
  - 3. Pretension anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
  - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- F. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- G. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
  - 1. Level and plumb individual members of structure.
  - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- H. Splice members only where indicated.
- I. Do not use thermal cutting during erection unless approved by Engineer. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.
- J. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- K. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.
- L. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

## **FIELD CONNECTIONS**

- A. High-Strength Bolts: Install high-strength bolts according to RCSC (HSBOLT) for type of bolt and type of joint specified.
  - 1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M and AWS D1.8/D1.8M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  - 1. Comply with AISC S303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
  - 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
  - 3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

## **TOLERANCES**

- A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset from True Alignment: 1/4 inch.

### **FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections. Refer to Structural Drawings for Special Inspection Program.
- B. Bolted Connections: Bolted connections will be tested and inspected according to RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts".
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.
  - 1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
    - a. Liquid Penetrant Inspection: ASTM E165/E165M.
    - b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
    - c. Ultrasonic Inspection: ASTM E164.
    - d. Radiographic Inspection: ASTM E94.
- D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
  - 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
  - 2. Conduct tests on additional shear connectors to see if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.
- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

### **REPAIRS AND PROTECTION**

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A780/A780M.
  - 1. Repair galvanizing prior to installation where repair areas will be inaccessible.
  - 2. Clean surfaces of weld seams according to SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA1 for touching up shop-painted surfaces.

**END OF SECTION 05 12 00**

**SECTION 05 12 13 – ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING**

**PART 1 GENERAL**

**SECTION INCLUDES**

- A. Architecturally exposed structural-steel framing, including, but not limited to, the following:
  - 1. Steel columns (at Covered Walkways)
  - 2. Requirements in Section 05 12 00 - Structural Steel Framing also apply to AESS framing.

**RELATED REQUIREMENTS**

- A. Section 01 40 00 - Quality Requirements: Independent testing agency procedures and administrative requirements.
- B. Section 05 12 00 - Structural Steel Framing: Additional requirements applicable to AESS.
- C. Section 09 96 00 - High-Performance Coatings: Surface preparation and priming requirements.

**REFERENCE STANDARDS**

- A. AISC 360 - Specification for Structural Steel Buildings.
- B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges.
- C. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- D. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
- E. ASTM F1852 - Standard Specification for "Twist Off" Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel.
- G. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections.
- H. SCAQMD 1113 - South Coast Air Quality Management Owner Rule No.1113.
- I. SSPC-PA 1 - Shop, Field, and Maintenance Painting of Steel.
- J. SSPC-SP 3 - Power Tool Cleaning.

**DEFINITIONS**

- A. Architecturally Exposed Structural Steel: Structural steel designated as "architecturally exposed structural steel" or "AESS" in the Contract Documents.

**SUBMITTALS**

- A. Shop Drawings: Show fabrication of AESS components.
  - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
  - 2. Include embedment drawings.
  - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain. Indicate grinding, finish, and profile of welds.
  - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections. Indicate orientation of bolt heads.
  - 5. Indicate exposed surfaces and edges and surface preparation being used.
  - 6. Indicate special tolerances and erection requirements.
- B. Samples: Submit samples of AESS to set quality standards for exposed welds.
  - 1. Two steel plates, 3/8 by 8 by 4 inches, with long edges joined by a groove weld and with weld ground smooth.

2. Steel plate, 3/8 by 8 by 8 inches, with one end of a short length of rectangular steel tube, 4 by 6 by 3/8 inches, welded to plate with a continuous fillet weld and with weld ground smooth and blended.
3. Apply specified finish to 1/2 of each sample, including the weld area.

### **MOCK-UPS**

- A. Mock-ups: Build mock-ups of AESS to set quality standards for fabrication and installation.
  1. Build mock-up of typical portion of AESS as shown on Drawings.
  2. Coordinate finish painting requirements with Division 09 painting Sections.

### **DELIVERY, STORAGE, AND HANDLING**

- A. Use special care in handling to prevent twisting, warping, nicking, and other damage. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
  1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

### **PROJECT CONDITIONS**

- A. Field Measurements: Where AESS is indicated to fit against other construction, verify actual dimensions by field measurements before fabrication.

### **COORDINATION**

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

## **PART 2 PRODUCTS**

### **BOLTS, CONNECTORS, AND ANCHORS**

- A. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F1852, Type 1, round-head assemblies, consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
  1. Finish: Mechanically deposited zinc coating.

### **PRIMER**

- A. All paints and coating wet applied on the building interior must meet the applicable limits of SCAQMD 1113.
- B. Primer: Comply with Section 09 96 00 - High-Performance Coatings.
- C. Shop and Touch-Up Primer for Interior Ferrous Metal: Either Tnemec Series 27 Typoxy WB at 3 to 4 mils DFT or primer specified in Section 09 96 00 - High-Performance Coatings, complying with VOC limitations specified in Section 09 96 00.

### **FABRICATION**

- A. Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.
- B. In addition to special care used to handle and fabricate AESS, comply with the following:
  1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, and roughness.
  2. Grind sheared, punched, and flame-cut edges of AESS to remove burrs and provide smooth surfaces and edges.

3. Fabricate AESS with exposed surfaces free of mill marks, including rolled trade names and stamped or raised identification.
4. Fabricate AESS with exposed surfaces free of seams to maximum extent possible.
5. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.
6. Fabricate with piece marks fully hidden in the completed structure or made with media that permits full removal after erection.
7. Fabricate AESS to the tolerances specified in AISC S303.
8. Seal-weld open ends of hollow structural sections with 3/8-inch closure plates.
- C. Coping, Blocking, and Joint Gaps: Maintain uniform gaps of 1/8 inch with a tolerance of 1/32 inch.
- D. Bolt Holes: Cut, drill or punch standard bolt holes perpendicular to metal surfaces.
- E. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.
  1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
  2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
  3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

### **SHOP CONNECTIONS**

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC (HSBOLT) for type of bolt and type of joint specified.
  1. Joint Type: Snug tightened, unless otherwise indicated.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work, and comply with the following:
  1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding specified tolerances.
  2. Use weld sizes, fabrication sequence and equipment for AESS that limit distortions to allowable tolerances.
  3. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where AESS is exposed to weather.
  4. Provide continuous welds of uniform size and profile where AESS is welded.
  5. Grind butt and groove welds flush to adjacent surfaces within tolerance of plus 1/16 inch, minus 0 inch.
  6. Remove backing bars or runoff tabs; back-gouge and grind steel smooth.
  7. At locations where welding on the far side of an exposed connection occurs, grind distortions and marking of the steel to a smooth profile aligned with adjacent material.
  8. Make fillet welds oversize and grind to uniform profile with smooth face and transition.

### **SHOP PRIMING**

- A. Shop prime steel surfaces except the following:
  1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches. Hold back is not required for Tnemec Series 394.
  2. Surfaces to be field welded.
  3. Surfaces to be high-strength bolted with slip-critical connections. Hold back is not required for Tnemec Series 394.
- B. Surface Preparation for Nongalvanized Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
  1. Interior Surfaces: SSPC-SP 3, "Power Tool Cleaning."



- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate specified, unless otherwise recommended by primer manufacturer. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
  - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
  - 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

### **PART 3 EXECUTION**

#### **EXAMINATION**

- A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
  - 1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Examine AECS for twists, kinks, warping, gouges, and other imperfections before erecting.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **PREPARATION**

- A. Provide temporary shores, guys, braces, and other supports during erection to keep AECS secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
  - 1. If possible, locate welded tabs for attaching temporary bracing and safety cabling where they will be concealed from view in the completed Work.

#### **ERECTION**

- A. Set AECS accurately in locations and to elevations indicated and according to AISC S303 and AISC 360.
  - 1. Erect AECS to the tolerances specified in AISC S303 for steel that is designated AECS.
- B. Do not use thermal cutting during erection.

#### **FIELD CONNECTIONS**

- A. High-Strength Bolts: Install high-strength bolts according to RCSC (HSBOLT) for type of bolt and type of joint specified.
  - 1. Joint Type: Snug tightened, unless otherwise indicated.
  - 2. Orient bolt heads in same direction for each connection and to maximum extent possible in same direction for similar connections, unless otherwise indicated.
- B. Weld Connections: Comply with requirements in "Weld Connections" Paragraph in "Shop Connections" Article.
  - 1. Remove backing bars or runoff tabs; back-gouge and grind steel smooth.
  - 2. Remove erection bolts, fill holes and grind smooth.
  - 3. Fill weld access holes and grind smooth.

**FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect AESS as specified in Section 05 12 00 - Structural Steel Framing and as indicated on Structural Drawings. The testing agency will not be responsible for enforcing requirements relating to aesthetic effect.
- B. Architect will observe AESS in place to determine acceptability relating to aesthetic effect.

**REPAIRS AND PROTECTION**

- A. Remove welded tabs that were used for attaching temporary bracing and safety cabling and that are exposed to view in the completed Work. Grind steel smooth.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Clean and prepare surfaces by SSPC-SP 3 power-tool cleaning at interior surfaces.

**END OF SECTION 05 12 13**

## **SECTION 06 10 00 ROUGH CARPENTRY**

### **PART 1 GENERAL**

#### **SECTION INCLUDES**

- A. Preservative treated wood materials.
- B. Structural dimension lumber framing.
- C. Non-Structural dimension lumber framing.
- D. Rough opening framing for doors, windows, and roof openings.
- E. Miscellaneous framing and sheathing.
- F. Wood nailers associated with roofing and flashing.
- G. Concealed wood blocking, nailers, and supports
- H. Structural floor, wall, and roof framing.
- I. Floor sheathing / underlayment.
- J. Miscellaneous wood nailers, furring and grounds.
- K. Installation of Owner furnished wood columns and beams.
- L. Communications and electrical room mounting boards.
- M. Sheathing.

#### **RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary: Description of Owner Furnished Contractor Installed items.
- B. Section 01 22 00 - Unit Prices
- C. Section 06 18 00 - Glue-Laminated Construction
- D. Section 07 25 00 - Weather Barriers: Water-resistive barrier over sheathing.
- E. Section 07 90 05 - Joint Sealers: Sill Sealer for exterior sill plates
- F. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.

#### **REFERENCE STANDARDS**

- A. APA PRP-108 - Performance Standards and Qualification Policy for Structural-Use Panels (Form E445).
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood.
- E. PS 1 - Structural Plywood.
- F. PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
- G. PS 20 - American Softwood Lumber Standard.
- H. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17.
- I. WWPA G-5 - Western Lumber Grading Rules.

#### **SUBMITTALS**

- A. See Section 01 30 00 – Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on insulated sheathing, wood preservative materials, and application instructions.
- C. Samples: For rough carpentry members that will be exposed to view, submit two samples, 4x6 inch in size illustrating wood grain, color, and general appearance.

#### **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. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

- C. Fire-Rated and Acoustical-Rated Construction: Comply with installation requirements for systems as indicated on Drawings.

### **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**

### **GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. Species: Douglas Fir-Larch or Douglas Fir, unless otherwise indicated.
  - 2. 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.
  - 3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://www.alsc.org)) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

### **DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Grading Agency: West Coast Lumber Inspection Bureau; WCLIB (GR).
- B. Grading Agency: Western Wood Products Association; WWPA G-5.
- C. Sizes: Nominal sizes as indicated on drawings, S4S.
- D. Moisture Content: 19 percent, maximum.
- E. Stud Framing (2 by 2 through 2 by 6); S4S:
  - 1. Species: Douglas Fir-Larch.
  - 2. Grade: See Structural Drawings.
- F. Beams (4 x 5 and larger):
  - 1. Species: Douglas Fir-Larch.
  - 2. Grade: See Structural Drawings.
- G. Posts:
  - 1. Species: Douglas Fir-Larch.
  - 2. Grade: See Structural Drawings.
- H. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.
- I. Miscellaneous Blocking, Furring, and Nailers:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.
- J. Lumber to Receive Preservative Pressure Treatment:
  - 1. Species: Hem-fir or Douglas fir, S-Dry.
  - 2. Grade: No. 2.

### **CONSTRUCTION PANELS**

- A. Subfloor/Underlayment Combination: Any PS 2 type, rated Single Floor.
  - 1. Bond Classification: Exterior.
  - 2. Span Rating: See Structural Drawings.
  - 3. Thickness: See Structural Drawings.
- B. Roof Sheathing: APA PRP-108, Structural I Rated Sheathing, Exterior Exposure Class, and as follows:
  - 1. Span Rating: See Structural Drawings.
  - 2. Thickness: See Structural Drawings.
- C. Wall Sheathing: APA PRP-108, Rated Sheathing, Exterior Exposure Class, and as follows:

1. Span Rating: See Structural Drawings.
2. Thickness: See Structural Drawings.
- D. Shear Wall Sheathing: Structural Plywood or Oriented strand board wood structural panel, conforming to requirements of PS 1 or PS 2.
  1. Span Rating: See Structural Drawings.
  2. Thickness: See Structural Drawings.
- E. Other Applications:
  1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
  2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
  3. Other Locations: PS 1, C-D Plugged or better.

## **ACCESSORIES**

- A. Fasteners and Anchors:
  1. Metal and Finish: Hot-dipped galvanized steel per ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
  2. Anchors: Toggle bolt type for anchorage to hollow masonry.
- B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
  1. For contact with preservative treated wood, provide minimum G185 galvanizing per ASTM A 653/A 653M.
  2. See Structural Drawings.
- C. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions.
  1. For contact with preservative treated wood, provide minimum G185 galvanizing per ASTM A 653/A 653M.
  2. See Structural Drawings.
- D. Subfloor Glue: Waterproof, waterbase, air cure type, cartridge dispensed.

## **FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Preservative Treatment:
  1. Preservative Pressure Treatment of Lumber Above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
    - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
    - b. Treat lumber exposed to weather.
    - c. Treat lumber in contact with roofing or flashing.
  2. Preservative Pressure Treatment of Plywood Above Grade: AWWA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
    - a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
    - b. Treat plywood in contact with roofing or flashing.
    - c. Treat plywood in contact with masonry or concrete.

## **PART 3 EXECUTION**

### **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.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

### **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.
- 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.
- G. 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.
- H. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.
- I. Coordinate installation of sill sealer with section 07 90 05 – Joint sealers; set exterior wall sill plates with sill sealer.

### **BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
  - 1. Provide 1-inch thick AC, fire-resistive plywood 12 inches by stud width for door hardware, toilet accessories, hand towel and soap dispensers.
- D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- E. Provide the following specific non-structural framing and blocking:
  - 1. Cabinets and shelf supports.
  - 2. Countertop supports.
  - 3. Wall brackets.
  - 4. Handrails.
  - 5. Grab bars.
  - 6. Toilet and bath accessories.
  - 7. Wall-mounted door stops.
  - 8. Marker boards and tackboards.
  - 9. Joints of rigid wall coverings that occur between studs.

### **ROOF-RELATED CARPENTRY**

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.
- C. Provide nailers as required for a complete roofing assembly.

### **INSTALLATION OF CONSTRUCTION PANELS**

- A. Roof Nailers and Fascia Backing: Secure panels with long dimension perpendicular to framing members with ends staggered and over firm bearing.
- B. Subflooring/Underlayment Combination: Glue and nail to framing; staples are not permitted.

- C. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
  - 1. At strong edges provide solid edge blocking where joints occur between roof framing members.
  - 2. Provide a 1/8-inch space between panel edge and end joints to allow for expansion.
  - 3. Screw panels to framing; staples are not permitted.
- D. Wall Sheathing for Plywood Cladding WS-1: Secure with long dimension parallel to wall studs, with ends over firm bearing, using screws.
- E. Communications and Electrical Room Mounting Boards: Secure to studs, where applicable, with edges over firm bearing; space fasteners on all edges and in field of board.
  - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  - 2. Mount 4 foot by 8 foot sheets vertically, unless other sizes are indicated.
  - 3. Install adjacent boards without gaps.
  - 4. Mount boards 6 inches from floor; cover all walls within each telecommunications space as shown in Drawings.
  - 5. Mount boards with the smooth A surface facing away from the wall. Paint the backboard with two coats of fire-resistant paint prior to mounting. Paint white.
  - 6. Install boards plumb, level and secured to studs or solid concrete or masonry walls. Use countersunk galvanized or stainless steel fasteners spaced to provide completely smooth surface.
  - 7. Power drive anchors, molly bolts, drywall screws and tappets are not allowed.

### **TOLERANCES**

- A. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

### **CLEANING**

- A. Waste Disposal: Comply with the requirements of Section 01 74 19 – Construction Waste Management and Disposal.
  - 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 06 10 00**

## **SECTION 06 16 00 SHEATHING**

### **PART 1 GENERAL**

#### **SECTION INCLUDES:**

- A. Wall sheathing.
- B. Roof sheathing.
- C. Subflooring.
- D. Underlayment.
- E. Sheathing joint and penetration treatment.

#### **RELATED REQUIREMENTS:**

- A. Section 061000 "Rough Carpentry" for plywood backing panels.
- B. Section 072500 "Weather Barriers" for water-resistive barrier applied over wall sheathing.

### **SUBMITTALS**

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

### **QUALITY ASSURANCE**

- A. Testing Agency Qualifications: For testing agency providing classification marking, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

### **DELIVERY, STORAGE, AND HANDLING**

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

## **PART 2 PRODUCTS**

### **WOOD PANEL PRODUCTS**

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.
- B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- C. Factory mark panels to indicate compliance with applicable standard.

### **WALL SHEATHING**

- A. Plywood Sheathing: Either DOC PS 1 or DOC PS 2, Exterior, Structural I sheathing.
  - 1. Span Rating: Not less than 32/16
  - 2. Nominal Thickness: Not less than 1/2 inch.
- B. Oriented-Strand-Board Sheathing: DOC PS 2, Exposure 1, Structural I sheathing.



1. Span Rating: Not less than 32/16.
2. Nominal Thickness: Not less than 1/2 inch.

### **ROOF SHEATHING**

- A. Plywood Sheathing: Either DOC PS 1 or DOC PS 2, Exterior, Structural I sheathing.
  1. Span Rating: Not less than 48/24.
  2. Nominal Thickness: Not less than 3/4.
- B. Oriented-Strand-Board Sheathing: DOC PS 2, Exposure 1, Structural I sheathing.
  1. Span Rating: Not less than 48/24.
  2. Nominal Thickness: Not less than 3/4 inch.

### **SUBFLOORING AND UNDERLAYMENT**

- A. Plywood Combination Subfloor-Underlayment: DOC PS 1, Exposure 1, Structural I, Underlayment single-floor panels.
  1. Span Rating: Not less than 48.
  2. Nominal Thickness: Not less than 23/32 inch.
  3. Edge Detail: Tongue and groove.
- B. Oriented-Strand-Board Combination Subfloor-Underlayment: DOC PS 2, Exposure 1 single-floor panels.
  1. Span Rating: Not less than 48.
  2. Nominal Thickness: Not less than 23/32 inch.
  3. Edge Detail: Tongue and groove.
- C. Plywood Subflooring: Either DOC PS 1 or DOC PS 2, Exterior, Structural I single-floor panels or sheathing.
  1. Span Rating: Not less than 48.
  2. Nominal Thickness: Not less than 23/32 inch.
- D. Oriented-Strand-Board Subflooring: DOC PS 2, Structural I sheathing.
  1. Span Rating: Not less than 48.
  2. Nominal Thickness: Not less than 23/32 inch.

### **FASTENERS**

- A. Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  1. For wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M of Type 304 stainless steel.
  2. Nails, Brads, and Staples: ASTM F 1667.
  3. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
  4. Screws for Fastening Sheathing to Wood Framing: ASTM C 1002.

### **MISCELLANEOUS MATERIALS**

- A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with APA AFG-01 ASTM D 3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

## **PART 3 EXECUTION**

### **INSTALLATION - GENERAL**

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
  - 1. Table 2304.9.1, "Fastening Schedule," in The Oregon Structural Specialty Code.
  - 2. ICC-ES evaluation report for fastener.
- D. Retain first paragraph below if using wood framing. Revise to indicate other kinds of nails if required.
- E. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
- F. Coordinate wall parapet and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- G. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- H. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

### **WOOD STRUCTURAL PANEL INSTALLATION**

- A. Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Combination Subfloor-Underlayment:
    - a. Nail to wood framing.
    - b. Space panels 1/8 inch apart at edges and ends.
  - 2. Subflooring:
    - a. Nail to wood framing.
    - b. Space panels 1/8 inch apart at edges and ends.
  - 3. Wall and Roof Sheathing:
    - a. Nail to wood framing. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
    - b. Space panels 1/8 inch apart at edges and ends.

**END OF SECTION 06 16 00**

## **SECTION 06 18 00 - GLUE-LAMINATED CONSTRUCTION**

### **PART 1 GENERAL**

#### **SECTION INCLUDES**

- A. Glue laminated wood beams.

#### **RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Wood framing and supports.

#### **REFERENCE STANDARDS**

- A. AITC A190.1 - American National Standard for Wood Products - Structural Glued Laminated Timber; American Institute of Timber Construction; 2007.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2008.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2012.
- D. ASTM D2559 - Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions; 2012a.
- E. WWP A G-5 - Western Lumber Grading Rules; Western Wood Products Association; 2011.

#### **SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials, application technique and resultant performance information.
- C. Shop Drawings: Indicate framing system, sizes and spacing of members, loads and cambers, bearing and anchor details, bridging and bracing, framed openings.

#### **QUALITY ASSURANCE**

- A. Manufacturer/Fabricator Qualifications: Company specializing in manufacture of glue laminated structural units with three years of documented experience, and certified by AITC in accordance with AITC A190.1.

#### **DELIVERY, STORAGE, AND HANDLING**

- A. Protect members to AITC requirements for not wrapped.
- B. Leave individual wrapping in place until finishing occurs.

### **PART 2 PRODUCTS**

#### **GLUED-LAMINATED UNITS**

- A. Glued-Laminated Units - Exposed: Fabricate in accordance with AITC 117 Premium grade.
  - 1. Verify dimensions and site conditions prior to fabrication.
  - 2. Cut and fit members accurately to length to achieve tight joint fit.
  - 3. Fabricate member with camber built in.
  - 4. Do not splice or join members in locations other than those indicated without permission.
  - 5. After end trimming, seal with penetrating sealer in accordance with AITC requirements.
- B. Glued-Laminated Units - Concealed: Fabricate in accordance with AITC 117 Industrial grade.
  - 1. Verify dimensions and site conditions prior to fabrication.
  - 2. Cut and fit members accurately to length to achieve tight joint fit.
  - 3. Fabricate member with camber built in.
  - 4. Do not splice or join members in locations other than those indicated without permission.

5. After end trimming, seal with penetrating sealer in accordance with AITC requirements.

### **MATERIALS**

- A. Lumber: Douglas Fir lumber conforming to WWPA grading rules with 12 percent maximum moisture content before fabrication. Design for the following values:
  1. See General Structural Notes on Drawings.
  2. Lumber fabricated from old growth timber is not permitted.
- B. Steel Connections and Brackets: ASTM A 36/A 36M weldable quality, galvanize per ASTM A123/A123M.
  1. Products as indicated on Drawings by Simpson Strong-Tie: [www.strongtie.com](http://www.strongtie.com).
  2. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Laminating Adhesive: Tested for wet/exterior service in accordance with ASTM D2559.

### **FABRICATION**

- A. Combination Symbol: As indicated on Drawings.
- B. Fabricate glue laminated structural members in accordance with AITC Industrial grade for concealed members.
- C. Verify dimensions and site conditions prior to fabrication.
- D. Cut and fit members accurately to length to achieve tight joint fit.
- E. Fabricate member with camber built in.
- F. Do not splice or join members in locations other than those indicated without permission.
- G. Fabricate steel hardware and connections with joints neatly fitted, welded, and ground smooth.

## **PART 3 EXECUTION**

### **EXAMINATION**

- A. Verify that supports are ready to receive units.
- B. Verify sufficient end bearing area.

### **PREPARATION**

- A. Coordinate placement of bearing items.

### **ERECTION**

- A. Lift members using protective straps to prevent visible damage.
- B. Set structural members level and plumb, in correct positions or sloped where indicated.
- C. Provide temporary bracing and anchorage to hold members in place until permanently secured.
- D. Fit members together accurately without trimming, cutting, splicing, or other unauthorized modification.

### **TOLERANCES**

- A. Framing Members: 1/2 inch maximum from true position.

## **END OF SECTION 06 18 00**

## **SECTION 06 20 13 -EXTERIOR FINISH CARPENTRY**

### **PART 1 - GENERAL**

#### **RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

#### **DESCRIPTION OF WORK:**

**Definition:** Finish carpentry includes carpentry work, which is exposed to view, is non-structural, and which is not specified as part of other sections.

**Types of finish carpentry work** in this section include:

Exterior Siding, running, fascia boards, and standing trim.

Exterior Soffit Boards & Vents and weather barriers.

Fiber cement panels, trim, fascia, and accessories; James Hardie HZ10 Engineered for Climate Siding.

Fry Reglet for Vertical, Horizontal, and drip edges for Exterior Siding Panels

**Rough carpentry is specified** in another Division-6 section.

**Builder's Hardware and** wood doors are specified in Division-8 sections.

**Architectural woodwork is** specified in another Division-6 section.

#### **REFERENCES**

ASTM International (ASTM):

ASTM B136 - Standard Method for Measurement of Stain Resistance of Anodic Coatings on Aluminum.

ASTM B244 - Standard Test Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments.

ASTM C834 - Standard Specification for Latex Sealants.

ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

ASTM C1186 - Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets.

ASTM D523 - Standard Test Method for Specular Gloss.

ASTM D1117 - Standard Guide for Evaluating Nonwoven Fabrics.

ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.

ASTM D1730 - Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.

ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

ASTM D3363 - Standard Test Method for Film Hardness by Pencil Test.

ASTM D3359 - Standard Test Methods for Rating Adhesion by Tape Test.

ASTM D4585 - Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation.

ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

ASTM E96 - Test Methods for Water Vapor Transmission of Materials.

ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure

AATCC127 - Water Resistance: Hydrostatic Pressure Test.

TAPPI – T460 - Air Resistance of Paper (Gurley Method).

### **QUALITY ASSURANCE:**

**Mock-Up:** Provide a mock-up for evaluation of surface preparation techniques

Finish areas designated by Architect.

Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.

Refinish mock-up area as required to produce acceptable work.

### **SUBMITTALS:**

Submit under provisions of Section 01300.

**Product Data:** Manufacturer's data sheets on each product to be used, including:

Installation instructions and recommendations.

Storage and handling requirements and recommendations.

Manufacturer's best practice guide.

Technical data sheet.

Standard CAD drawings

**Shop Drawings:** Provide detailed drawings of atypical non-standard applications of cladding junctions and penetrations which are outside the scope of the standard details and specifications provided by the manufacturer.

**Selection Samples:** For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

**Verification Samples:** For each finish product specified, two samples, minimum size 4 by 6 inches (100 by 150 mm), representing actual product, color, and patterns.

## **PRODUCT DELIVERY, STORAGE AND HANDLING:**

**Protect finish carpentry materials** during transit, delivery, storage, and handling to prevent damage, soiling and deterioration. Store products in manufacturer's unopened packaging until ready for installation

**Do not deliver finish carpentry materials**, until painting, wet work, grinding and similar operations, which could damage, soil, or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, finish carpentry materials must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

**Stack lumber**, plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

**Store siding** on edge or lay flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing

## **JOB CONDITIONS:**

**Environmental Limitations:** Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

**Weather Limitations for exterior carpentry:** Proceed with installation only when existing and forecast weather conditions permit work to be performed and at least one coat of specified finish can be applied without exposure to rain, snow, or dampness.

**Do not install finish carpentry** materials that are wet, moisture damaged, or mold damaged.

**Indications that materials** are wet, or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

**Indications that materials** are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

**Manufacturer's Warranty for Siding and Trim:** Manufacturer agrees to repair or replace siding that fails in materials or workmanship within specified warranty period. Failures include, but are not limited to, deformation or deterioration beyond normal weathering.

**Warranty Period for Siding and Trim (Excluding Finish):** 30 years from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **WOOD PRODUCT QUALITY STANDARDS:**

**Softwood Lumber Standards:** Comply with PS 20 and with applicable grading rules of the respective grading and inspecting agency for the species and product indicated.

**Plywood Standard:** Comply with PS 1/ANSI A199.

**Hardwood Lumber Standard:** Comply with National Hardwood Lumber Association (NHLA) rules.

**Glued-up Lumber Standard:** Comply with PS 56.

**MDF:** ANSI A208.2, Grade 130

**Woodworking Standard:** Where indicated for a specific product comply with specified provision of the following:

Architectural Woodwork Institute (AWI) "Quality Standards."

## **MATERIALS:**

### **General:**

**Nominal sizes are indicated,** except as shown by detailed dimensions. Provide dressed or worked and dressed lumber, as applicable, manufactured to the actual sizes as required by PS 20 or to actual sizes and pattern as shown, unless otherwise indicated.

**Moisture Content of Softwood Lumber:** Provide kiln-dried (KD) lumber having a moisture content from time of manufacture until time of installation not greater than values required by the applicable grading rules of the respective grading and inspecting agency for the species and product indicated.

**Lumber for Transparent Finish** (Stained or Clear): Use pieces made of solid lumber stock.

**Lumber for Painted Finish:** At Contractor's option, use pieces that are either glued-up lumber or made of solid lumber stock.

**For exterior finish carpentry work** use glued-up lumber complying with PS 56 for "wet use" and certified so by respective grading and inspecting agency for species and product indicated.

## **Exterior Finish Carpentry:**

### **MANUFACTURERS**

**Acceptable Vertical Panel & Trim Manufacturer:** James Hardie Building Products, Inc., which is located at: 231 South LaSalle Street Unit 2000, Chicago, IL 60606. ASD. Toll Free Tel: 866-274-3464; Tel: 312-705-6000; Email: request info (info@jameshardie.com); Web: <http://www.jameshardiepros.com/Products/Hardie-Reveal-Panel-System>

**Substitutions: Not permitted.**

### **PANEL VERTICAL SIDING**

Vertical Siding: HardiePanel HZ10 siding as manufactured by James Hardie Building Products, Inc.

**Type:** Stucco Vertical siding panel 4 feet by 10 feet.



**Artisan Trim Trim Boards & Battens:** Hardie Artisan Trim as manufactured by James Hardie Building Products, Inc. 1.5 inches thick, 3.5 inches wide by 144 inches long. Product shall be engineered for climate conditions.

Manufacturer's Climate Zone Product: HZ10 for hot humid and wet climates with a yellow tint prime.

Fiber-cement siding, complies with ASTM C 1186 Type A Grade II.

Fiber-cement siding, complies with ASTM E 136 as a noncombustible material.

Fiber-cement siding, complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.

Fiber-cement siding, complies with ASTM E 119 1 hour and 2 hour fire resistive assemblies listed with Warnock Hersey.

Fiber-cement siding, tested to ASTM E330 for Transverse Loads.

Intertek Warnock Hersey Product Listing.

Manufacturer's Technical Data Sheet.

#### **VERTICAL, HORIZONTAL AND DRIP EDGES @ NEW PANEL VERTICAL SIDING**

**Manufacturer:** Fry Reglet Corporation, no substitutes.

**Finish:** Primed

**Vertical Reglet's:** V12 T FCT- T BATTEN

**Horizontal Reglet's:** H1 FCP-HOZ-50-375

**Drip Edges:** H8 FCP-DRIP-CAP

**Locations:** See drawings.

**FASCIA BOARDS:** 5/4" x 8" Prime Trim by Hardie.

#### **WEATHER BARRIER**

**Weather Barrier:** James Hardie Hardie Wrap and HardieWrap Pro-Flashing and Seam Tapes.

**Code Compliance** Requirement for Weather Barrier:

- 1.1 Thickness, 11 mil sheets.
- 1.2 Breathability in accordance with ASTM E96.
- 1.3 Tear strength in accordance with ASTM D1117.
- 1.4 Water resistance in accordance with AATCC127.
- 1.5 Air Penetration in accordance with TAPPI – T460.
- 1.6 HardieWrap Weather Barrier ICC-ES Evaluation Report ESR-2258

#### **ACCESSORIES**

**Trims:** Reveal™ Trims manufactured by Custom Aluminum of Elgin, IL in the following profiles supplied by James Hardie. Aluminum alloy 6063-T5 with a minimum thickness of 0.050 inch. All reveal trims are 8 feet in length.

Surround horizontal trim.  
Surround vertical trim.  
Surround horizontal end cut transition trim.  
Surround outside corner trim.  
Surround inside corner trim.  
Surround J channel trim.  
Surround drainage flashing.  
Recess horizontal trim.  
Recess vertical trim.  
Recess horizontal edge trim.  
Recess vertical F-trim.  
Recess outside corner trim.  
Recess drainage flashing.

**Finishes of Reveal Trims:**

Primed for field painting; coating tested to ASTM D3363, ASTM D3359, D2794, D4585, D523, and D1308.  
Clear anodized; conforming to ASTM B244 and ASTM B136.

**FASTENERS**

**Fasteners:** For attaching Hardie Reveal Panel direct to sheathing to a rain screen provide the following:

Wood Framing, Exposed Screws: No. 10 by 0.472 inch head diameter by 1.5 inch long.  
Wood Framing, Countersunk Screws: No 8 by 0.39 inch head diameter by 1-5/8 inch long

**FINISHES**

**Factory Primer:** Provide factory applied universal primer.

**Primer:** Factory applied sealer/primer by James Hardie. Apply flat sheen finishes to panels.

Topcoat: Refer to Section 09 91 13 and Exterior Finish Schedule.

**Factory Finish for Trim:**

Trim for Factory-Applied Coating and Field-Applied Finish: Chem Film.  
Trim for Factory-Applied Finish and No Field-Applied Finish: Clear anodized.

**PART 3 – EXECUTION**

**EXAMINATION**

Do not begin installation until substrates have been properly prepared.

If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

## **PREPARATION**

Clean surfaces thoroughly prior to installation.

Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

Ensure that drainage plane is intact and all penetrations are sealed.

## **INSTALLATION**

**Wood Framing:** Nominal 2 inch by 4 inch (51 mm by 102 mm) wood framing selected for minimal shrinkage and complying with local building codes, including the use of water-resistive barriers or vapor barriers where required. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.

Install water-resistive barriers and claddings to dry surfaces.

Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.

Protect siding from other trades.

## **FINISHING**

Finish factory primed siding with a minimum of one coat of high quality 100 percent acrylic exterior flat grade paint with flat finish within 180 days of installation. Follow paint manufacturer's written product recommendation and written application instructions.

Field cut edges shall be coated during the installation process using an exterior grade primer/sealer that is compatible with the type of paint to be used on project.

## **PROTECTION**

Protect installed products until completion of project.

Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION 06 20 13**

## **SECTION 06 20 23 – INTERIOR FINISH CARPENTRY**

### **PART 1 - GENERAL**

#### **RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

#### **DESCRIPTION OF WORK:**

**Definition:** Finish carpentry includes carpentry work, which is exposed to view, is non-structural, and which is not specified as part of other sections.

**Types of finish carpentry work** in this section include:

Spruce Ceiling & Trim  
Interior running and standing trim.

**Rough carpentry is specified** in another Division-6 section.

#### **QUALITY ASSURANCE:**

**Factory-mark each piece of lumber** and plywood with type, grade, mill and grading agency identification; except omit marking from surfaces to receive transparent finish, and submit mill certificate that material has been inspected and graded in accordance with requirements if it cannot be marked on a concealed surface.

#### **SUBMITTALS:**

**Product Data:** For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

Include data for wood-preservative treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.

Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.

Include copies of warranties from chemical-treatment manufacturers for each type of treatment.

**Samples:** Submit the following samples for each species and cut or pattern of finish carpentry. Samples for Initial Selection: For each type of product involving selection of colors, profiles, or textures.

#### **Samples for Verification:**

For each species and cut of lumber and panel products with non-factory-applied finish, with 1/2 of exposed surface finished, 50 sq. in. for lumber and 8 by 10 inches for panels.

**interior standing and running trim** 2'-0" long x full board or molding width, unfinished.

## **INFORMATIONAL SUBMITTALS**

### **Compliance Certificates:**

For lumber that is not marked with grade stamp.

For preservative-treated wood that is not marked with treatment-quality mark.

## **PRODUCT DELIVERY, STORAGE AND HANDLING:**

**Protect finish carpentry materials** during transit, delivery, storage, and handling to prevent damage, soiling, and deterioration.

**Do not deliver finish carpentry materials**, until painting, wet work, grinding and similar operations, which could damage, soil, or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, finish carpentry materials must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

**Stack lumber**, plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

**Deliver interior finish carpentry** materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

## **JOB CONDITIONS:**

**Environmental Limitations:** Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

**Do not install finish carpentry** materials that are wet, moisture damaged, or mold damaged.

**Indications that materials** are wet, or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

**Indications that materials** are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

## **PART 2 - PRODUCTS**

### **WOOD PRODUCT QUALITY STANDARDS:**

**Softwood Lumber Standards:** Comply with PS 20 and with applicable grading rules of the respective grading and inspecting agency for the species and product indicated.

**Plywood Standard:** Comply with PS 1/ANSI A199.

**Hardwood Lumber Standard:** Comply with National Hardwood Lumber Association (NHLA) rules.

**Glued-up Lumber Standard:** Comply with PS 56.

**MDE:** ANSI A208.2, Grade 130

**Woodworking Standard:** Where indicated for a specific product comply with specified provision of the following:

Architectural Woodwork Institute (AWI) "Quality Standards."

## **MATERIALS:**

### **General:**

**Nominal sizes are indicated,** except as shown by detailed dimensions. Provide dressed or worked and dressed lumber, as applicable, manufactured to the actual sizes as required by PS 20 or to actual sizes and pattern as shown, unless otherwise indicated.

**Moisture Content of Softwood Lumber:** Provide kiln-dried (KD) lumber having a moisture content from time of manufacture until time of installation not greater than values required by the applicable grading rules of the respective grading and inspecting agency for the species and product indicated.

**Lumber for Transparent Finish** (Stained or Clear): Use pieces made of solid lumber stock.

**Lumber for Painted Finish:** At Contractor's option, use pieces that are either glued-up lumber or made of solid lumber stock.

## **Interior Finish Carpentry:**

### **EXPOSED WOOD DECK CEILINGS:**

### **WOOD DECKING, GENERAL**

**General:** Comply with DOC PS 20 and with applicable grading rules of inspection agencies certified by ALSC's Board of Review.

**Moisture Content:** Provide wood decking with 13 percent maximum moisture content at time of dressing.

### **SOLID-SAWN WOOD DECKING**

**Decking Species:** Southern pine, spruce pine-fir (North).

Decking Nominal Size: **2x6**.

- A. Decking Grade: **Select** Decking.
- B. Grade Stamps: Factory mark each item with grade stamp of grading agency. Apply grade stamp to surfaces that will not be exposed to view.
- C. Face Surface: **Smooth**.

D. Edge Pattern: **Vee grooved**, TO MATCH EXISTING.

**Standing and Running Trim for Painted Finish:** Spruce to match decking material manufactured to sizes and patterns (profile) shown from selected First Grade lumber (NHLA); complying with following grade requirements of referenced woodworking standard, for quality of materials and manufacture:

**Grade:** Custom. (AWI)

### **Miscellaneous Materials:**

**Fasteners and Anchorage's:** Provide nails, screws and other anchoring devices of the type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible, and complying with applicable Federal Specifications. Where finish carpentry is exposed on exterior or in areas of high relative humidity, provide fasteners and anchorages with a hot-dipped zinc coating (ASTM A 153).

## **PART 3 – EXECUTION**

### **PREPARATION:**

**Clean substrates of projections** and substances detrimental to application.

**Condition wood materials to average** prevailing humidity conditions in installation areas prior to installing.

**Backprime lumber** for painted finish exposed on the exterior or, where indicated, to moisture and high relative humidities on the interior. Comply with requirements of section on painting within Division 9 for primers and their application.

**Pre-installation Meeting:** Meet at project site prior to delivery of finish carpentry materials and review coordination and environmental controls required for proper installation and ambient conditioning in areas to receive work. Include in meeting the Contractor, Architect, and other Owner Representatives (if any), Installers of finish carpentry, wet work including plastering, other finishes, painting, mechanical work and electrical work, and firms and persons responsible for continued operation (whether temporary or permanent) of HVAC system as required to maintain temperature and humidity conditions. Proceed with finish carpentry on interior only when everyone concerned agrees that required ambient conditions can be properly maintained.

### **INSTALLATION:**

**Discard units of material** which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements, or which are of defective manufacturer with respect to surfaces, sizes, or patterns.

**Install the work plumb,** level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level countertops; and with 1/16" maximum offset in flush adjoining 1/8" maximum offsets in revealed adjoining surfaces.

**Scribe and cut work** to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.

**Install to tolerance of** 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.

**Coordinate interior finish carpentry** with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

**Install solid-sawn wood decking** to comply with referenced decking standard.

Locate end joints for **controlled random lay-up** to match existing.

### **Standing and Running Trim:**

**Install with minimum number of joints possible**, using full-length pieces (from maximum length of lumber available) to the greatest extent possible. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment. Match color and grain pattern of trim for transparent finish (stain or clear finish) across joints. Install trim after gypsum-board joint finishing operations are completed. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.

**Anchor finish carpentry work** to anchorage devices or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where pre-finished matching fasteners heads are required, use fine finishing nail for exposed nailings, countersunk and filled flush with finished surface, and matching final finish where transparent is indicated.

### **ADJUSTMENT, CLEANING, FINISHING AND PROTECTION:**

**Repair damaged and defective finish** carpentry work wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.

**Clean finish carpentry work** on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.

**Refer to Division 9** sections for final finishing of installed finish carpentry work.

**Protection:** Installer of finish carpentry work shall advise Contractor of final protection and maintained conditions necessary to ensure that work will be without damage or deterioration at time of acceptance.

**END OF SECTION 06 20 23**



## **SECTION 07 17 50 - WATER REPELLENTS**

### **PART 1 - GENERAL**

#### **RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 specification sections, apply to work of this section.

**Joints & Sealants** are specified in Division 7.

**Painting** is specified in Division 9.

#### **DESCRIPTION OF WORK:**

**Extent of surfaces** to receive water repellent is all exterior ground face masonry and by provisions of this section.

**Following applications** of water repellent are required:

Exterior ground face unit masonry surfaces.

#### **QUALITY ASSURANCE:**

**Manufacturers Qualifications:** A firm with not less than 5 years of successful experience in actual production of specified products. Manufacturer's production facilities must be certified for quality by ISO under 9002 provisions. Provide a statement of qualifications for reference

**Applicator Qualifications:** A firm with not less than 3 years of successful experience in application of water repellents of types required on substrates similar in size and complexity to those of this project. Provide a statement of qualifications for reference checking prior to signing subcontract with General Contractor. In addition the following: Acceptable to or licensed by manufacturer; successfully completed not less than 3 comparable scale projects using this system.

**Project Mock-Up:** Apply water repellent to mock-up, either partial or full coverage as directed, before proceeding with installation. Comply with installation requirements of this section.

**Manufacturer Warranty:** Provide a 10-year job specific weathertight warranty. Contractor shall verify with and comply with manufacturer's requirements for issuance thereof. Contractor shall verify prior to bidding.

**Applicators Warranty:** Applicator shall provide 5-year workmanship warranty, and shall be a certified applicator of the product. Certification shall be from the manufacturer.

**Certificates:** Provide a statement of compliance with Regulatory Requirements, field quality control as per manufacturer, and Manufacturer's field reports.

**Product Qualifications:** Comply with the provisions of the following standards for concrete masonry:

- No change in surface texture, no blotchy appearance
- ASTM E514 "Water Leakage of Masonry"
  - 95% reduction in leakage rate over the control wall.
  - Control wall must have a leakage rate of at least 6.0 liters per hour.
- ASTM C140 "Concrete Masonry Units" 24 hour water soak.
  - 90% reduction in water absorption.

Control should absorb at least 5% water

- Penetration: 0.25 inches average

**Regulatory Requirements:** Products shall comply with state and local regulations concerning AIM coatings regarding Volatile Organic Content (VOC).

The use of 1,1,1 – trichloroethane as an exempt solvent shall not be allowed.

### **SUBMITTALS:**

**Product Data:** Submit manufacturer's specifications, installation instructions, and general recommendations for water repellents. Include data substantiating that materials are recommended by manufacturer for applications indicated and comply with requirements, including information required above.

### **DELIVERY, STORAGE & HANDLING:**

**Packing and Shipping:** Deliver products in original unopened packaging with legible manufacturer's identification.

**Storage:** Comply with manufacturer's recommendations.

### **JOB CONDITIONS:**

**Weather and Substrate Conditions:** Do not proceed with application of water repellent (except with written recommendation of manufacturer), when ambient temperature is less than 50o F (10oC), when substrate surfaces have cured for less than a period of 2 months, when rain or temperatures below 40o F (4oC), are predicted for a period of 24 hours, or earlier than 3 days after surfaces became wet from rainfall or other moisture sources, when substrate is frozen, at surface temperature of less than 40o F (4oC).

**Sealer Coordination:** Verify compatibility with curing compounds, patching materials, mortar, paints, sealants, etc. to be used on substrate to ensure compatibility with the water repellent.

### **SPECIAL WARRANTIES**

Manufacturer shall warrant respective products applied in accordance with Manufacturer's specifications for a period of 10 years, per Materials, from Date of Substantial Completion against all the conditions indicated below. When notified in writing from Owner, manufacturer shall correct said deficiencies promptly and without inconvenience and cost to Owner.

Loss of water repellency

CMU: 1.0 ml or greater/20 minutes (60 mph wind driven rain equivalent)

### **PRE-APPLICATION CONFERENCE:**

Contractor and subcontractor shall schedule a pre-application conference to discuss all requirements of the manufacturer, and the Owner for this product. This conference should occur after the subcontractor has inspected the conditions and verified they are satisfactory for application and after all submittals have been approved. A mock up area will be identified during this conference as a test and a separate meeting to inspect the mock up will be scheduled. Upon approval, the work may begin.

## **PART 2 - PRODUCTS**

### **MATERIALS:**

**Manufacturer:** Subject to compliance with requirements, provide products of one of the following for application to Concrete Masonry:

Chem-Trete PB VOC by Protectosil/Evonik, with Anti Graffiti Coating at all locations, of ground face CMU.

## **PART 3 - EXECUTION**

### **EXAMINATION:**

**Verification of Conditions:** Examine areas and conditions under which work is to be performed and identify concerns detrimental to proper or timely completion. Do not proceed until satisfactory conditions have been corrected. Beginning of work, means acceptance of conditions.

### **PREPARATION:**

**Protection:** Install coverings to protect adjacent surfaces.

**Surface Preparation:** Verify masonry joints found to be unsound, hollow, or otherwise defective have been raked out to a depth of ½" and pointed with mortar. Verify cracks, which exceed 1/64 inch wide, have been filled with pointing mortar.

**Test Application:** Prior to performance of water repellent work, including bulk purchase/delivery of products, prepares a small application in an unobtrusive location and in a manner acceptable to Architect, for purpose of demonstrating final effect (visual and physical/chemical) of planned installation. Proceed with work only after Architect's acceptance of test application, or as otherwise directed.

**Revision of planned installation,** if any and as requested by Architect, will be by change order where it constitutes a departure from requirements of contract documents at time of contracting.

**Clean substrate of substances** which might interfere with penetration/adhesion of water repellents. Test for moisture content, in accordance with repellent manufacturer's instructions, to ensure that surface is sufficiently dry.

**Coordination with Sealants:** Where feasible, delay application of water repellents until installation of sealants has been completed in joints adjoining surfaces to be coated with repellent.

**Protect adjoining work,** including sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass where there is possibility of water repellent being deposited on surfaces. Cover live plant materials with drop cloths. Clean water repellent from adjoining surfaces immediately after spillage. Comply with manufacturer's recommendations for cleaning.

### **INSTALLATION:**

**Product shall be applied** as supplied by the manufacturer without dilution or alteration unless noted in the manufacturer's data sheet.

**Apply with a low pressure** (15psi) airless spray equipment with a fan spray coarse nozzle, flooding the surface to obtain uniform coverage unless otherwise recommended by the manufacturer.

**Apply at a rate of not less** than per square foot/gallon, unless field tests have determined that a heavier rate of application is necessary to meet the performance requirements.

**Apply at temperature** and weather conditions recommended by the manufacturer or as written in this specification, whichever is more restrictive.

**Follow manufacturer's recommendations** concerning protection of glass, metal and other non-porous substrates. Contractor will be responsible to clean all surfaces, which are contaminated by water repellent. Contractor will be responsible for replacing any items damaged by water repellent.

Apply water repellent by brush only at locations where overspray would affect adjacent materials and where not applicable for spray applications.

Start application at bottom of wall and work up surface with a flood coat that has a six to eight inch rundown from the spray pattern. **Use disappearing additive to ensure full coverage of surfaces.**

### **FIELD QUALITY CONTROL**

**Spray Test:** After water repellent has dried, spray coated surfaces with water. After surfaces have adequately dried, recoat surfaces that show water absorption.

**Manufacturer's Field Services:** Written certification that surface preparation methods and final condition have manufacturer's approval and comply with the warranty.

**Furnish Test Area:** Furnish results of test area absorption on each type of substrate. Test results shall determine application rate.

**Test Area:** Before a sealer application, the following field evaluation will be done. The cost of the field testing will be the responsibility of the Water Repellent Manufacture.

Prepare a three foot by three foot area to be sprayed with the water repellent. The area will be determined by the Owner. Apply the water repellent at a rate to achieve a flood coat application. If recommended by the manufacturer, apply a second coat of the water repellent.

After allowing 5 days for the sample to cure, run a RILEM uptake test on the treated area.

Place one tube on the treated area and one tube on an untreated area. For masonry substrates, place a tube on the block, head joint and bed joint. Owner must be present for the application of the water repellent and the test.

Acceptable minimum results are as stated in the warranty provisions. Coverage rate used to pass this test section must be used on the entire project.

### **CLEANING**

**As the work progresses,** clean spillage and overspray from adjacent surfaces using materials and methods as recommended by water repellent manufacturer.

**Remove protective coatings** from adjacent surfaces when no longer needed.

**COMPLETION**

**Work which does not conform** to specified requirements shall be corrected and or replaced as directed by the Owner's Representative at the Contractors' expense without extension of time.

**END OF SECTION 07 17 50**

## **SECTION 07 21 00 - INSULATION**

### **PART 1 - GENERAL**

#### **RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

#### **DESCRIPTION OF WORK:**

**Extent of insulation** work is shown on drawings and indicated by provisions of this section.

**Applications of insulation** specified in this section include the following:

Blanket-type building insulation.

#### **QUALITY ASSURANCE:**

**Thermal Resistivity:** Where thermal resistivity properties of insulation materials are designated by r-values they represent the rate of heat flow through a homogenous material exactly 1" thick, measured by test method included in referenced material standard or otherwise indicated. They are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

**Fire Performance Characteristics:** Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.

Surface Burning Characteristics: ASTM E 84.

Fire Resistance Ratings: ASTM E 136

Combustion Characteristics: ASTM E 136.

#### **SUBMITTALS:**

**Product Data:** Submit manufacturer's product literature and installation instructions for each type of insulation and vapor retarder material required.

**Certified Tests Reports:** With product data, submit copies of certified test reports showing compliance with specified performance values, including r-values (aged values for plastic insulation's), densities, compression strengths, fire performance characteristics, perm ratings, water absorption ratings and similar properties.

#### **DELIVERY, STORAGE, AND HANDLING:**

**General Protection:** Protect insulations from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage, and protection during installation.

### **PART 2 - PRODUCTS**

**ACCEPTABLE MANUFACTURERS:**

**Manufacturer:** Subject to compliance with requirements, provide products of one of the following:

**Manufacturers of Glass Fiber Insulation:**

CertainTeed Corp.  
Manville Corp.  
Owens-Corning Fiberglas Corp.

**INSULATING MATERIALS**

**General:** Provide insulating materials which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics.

**Preformed Units:** Sizes to fit applications indicated, selected from manufacturer's standard thickness, widths, and lengths.

**Unfaced Mineral Fiber Blanket/Batt Insulation:** Thermal insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing); and as follows:

**Mineral Fiber Type:** Fibers manufactured from glass.

Combustion Characteristics: Passes ASTM E 136 test.

**Surface Burning Characteristics:** Maximum flame spread, and smoke developed values of 25 and 50, respectively.

**Faced Mineral Fiber Blanket/Batt Insulation:** Thermal insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type III, Class A (blankets with reflective vapor-retarder membrane facing with flame spread of 25 or less); foil-scrim-kraft vapor-retarder membrane on one face, respectively; and as follows:

**Mineral Fiber Type:** Fibers manufactured from glass.

**Combustion Characteristics:** Unfaced blanket/batt passes ASTM E 136 test.

**Surface Burning Characteristics:** Maximum flame spread, and smoke developed values of 25 and 50, respectively.

**INSULATION SCHEDULE:** Contractor shall insulate any exterior or interior wall which has been opened up by construction operations or all new construction. Insulate areas opened as instructed by architect.

**Hard Ceilings:** R-38 Batts or as required to allow ventilation above.

**Sheet Vapor Retarder:** ASTM C1136, flame retardant facing consisting of 0.00030-inch aluminum foil, fiberglass reinforcing and kraft paper laminated together with flame retardant adhesive **See vapor retarders in section 07 26 00.**

### **AUXILIARY INSULATING MATERIALS:**

**Polyethylene Vapor Retarder:** 6-mil polyethylene film, with laboratory-tested vapor transmission rating of 0.2 perms, natural color; to be applied on inside face of exterior cmu.

**Metal Foil/Paper Vapor Retarder:** 0.3-mil reflective aluminum foil laminated with scrim reinforcing to plastic-coated Kraft paper; laboratory-tested vapor transmission rating of 0.03 perms.

**Mechanical Anchors:** Type and size indicated or, if not indicated, as recommended by insulation manufacturer for type of application and condition of substrate.

**Adhesive for Bonding Insulation:** Type recommended by insulation manufacturer and complying with requirements for fire performance characteristics.

### **PART 3 - EXECUTION**

#### **INSPECTION AND PREPARATION:**

**Require Installer to examine substrates** and conditions under which insulation work is to be performed. A satisfactory substrate is one that complies with requirements of the section in which substrate and related work is specified. Obtain Installer's written report listing conditions detrimental to performance of work in this section. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

**Clean substrates of substances** harmful to insulation's or vapor retarders, including removal of projections which might puncture vapor retarders.

#### **INSTALLATION , GENERAL:**

**Comply with manufacturer's instructions** for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.

**Extend insulation full thickness** as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.

**Apply a single layer** of insulation of required thickness, unless otherwise noted on wall schedule on plans, shown or required to make up total thickness.

#### **INSTALLATION OF GENERAL BUILDING INSULATION:**

**Apply insulation** units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

**Protect insulation** on vertical surfaces (from damage during backfilling) by application of protection board. Set in adhesive in accordance with recommendations of manufacturer of insulation.

**Protect top surface** of horizontal insulation (from damage during concrete work) by application of protection board.

**Seal joints between closed-cell** (non-breathing) insulation units by applying mastic or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with mastic or sealant.



**Set vapor retarder** faced units with vapor retarder to warm side of construction, except as otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.

**Tape joints and ruptures in vapor retarder** and seal each continuous area of insulation to surrounding construction to ensure air-tight installation.

**Set reflective foil-faced** units accurately with air space in front of foil as shown. Provide not less than 0.75" air space where possible.

**Place loose glass fiber** insulation into spaces and onto surfaces as shown, either by pouring or by machine-blowing. Level horizontal applications to uniform thickness as indicated, lightly settled to uniform density, but not excessively compacted.

**Stuff loose glass fiber** insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40% of normal maximum volume (to a density of approximately 2.5 lbs. per cu. ft.)

### **INSTALLATION OF VAPOR RETARDERS:**

**General:** Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those which have been stuffed with loose fiber type insulation.

**Seal vertical joints** in vapor retarders over framing by lapping not less than 2 wall studs. Fasten vapor retarders to framing at top, end, and bottom edges, at perimeter of wall openings and at lap joints; space fasteners 16" o.c.

**Seal joints caused by pipes,** conduits, electrical boxes, and similar items penetrating vapor retarders with cloth or aluminized tape of type recommended by vapor retarder manufacturer to create an air-tight seal between penetrating objects and vapor retarder.

**Repair any tears** or punctures in vapor retarders immediately before concealment by other work. Cover with tape or another layer of vapor retarder.

### **PROTECTION:**

**General:** Protect installed insulation and vapor retarders from harmful weather exposures and from possible physical abuses, where possible by nondelayed installation of concealing work or, where that is not possible, by temporary covering or enclosure.

**END OF SECTION 07 21 00**

**SECTION 07 41 10 – STANDING SEAM METAL ROOFING**

**PART 1 - GENERAL**

**RELATED DOCUMENTS**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

**SUMMARY**

**This Section includes** the following:

The work includes, but is not necessarily limited to, furnishing and installation of all preformed metal roofing, and accessories as indicated on the drawings and specified herein.

Metal flashings & counter flashing at walls.

Metal roof edging.

Gutters, downspouts, (rain drainage).

Exposed metal trim/fascia units.

**RELATED SECTIONS:**

Thermal Insulation:	Section 07 21 00
Flashing and Sheetmetal:	Section 07 62 00
Joint Sealants not specified herein:	Section 07 92 00
Finish Painting not specified herein:	Division 9

**PERFORMANCE REQUIREMENTS:**

**A. TESTING AND CERTIFICATION**

1. **Wind Uplift:** UL 580 test, Class 90 rated per (select applicable construction:)  
Construction # 364 minimum 24 gauge panels when installed over 5/8 plywood, with roof panel fastener clips spaced 2'-0" on center maximum.
2. **Air Infiltration:** Panel to meet the following standard when tested in accordance with ASTM E283:
  - a. With factory-applied continuous sealant – 0.14 cfm/lft. at 20 psf.
3. **Water Penetration:** Panel to meet the following standard when tested in accordance with ASTM E331:
  - a. With factory-applied continuous sealant, no leakage at 20 psf.

**SUBMITTALS:**

**GENERAL:** Submit in accordance with Section 01300. Submit letter of compliance and conformance from the manufacturer.

**A. PRODUCT DATA**

1. Submit manufacturer's technical product data, installation instructions and recommendations for each type of roofing required. Include data substantiating that materials comply with requirements.

**B. SAMPLES**

1. Prior to ordering products, submit Manufacturer's standard color Samples for Architect's selection.
2. Prior to starting work, submit 24"x 12" long Panel Samples showing shape and a representative color chip for Architect's acceptance.

**C. SHOP DRAWINGS**

1. Submit complete shop drawings detailing all perimeter flashings and joints in accordance with manufacturer's standard recommendations.
2. Describe all proposed details that deviate from what is shown on the plans.
3. Details must allow for expansion and contraction.

**D. DESIGN CRITERIA**

1. **Wind Uplift:** The roof system manufacturer shall provide an attachment schedule or supporting calculations to resist the following uplift loads:
  - a. Uplift loads as calculated using the 2010 Edition of the OSSC with a 80 MPH basic wind speed, Exposure Factor 1.0, and importance Factor 1.0.
2. **Drag Loading:** The roof panel manufacturer shall provide an attachment schedule calculations to resist drag loads induced by a snow load of 30 psf.

**QUALITY ASSURANCE:**

**A. INSTALLER'S QUALIFICATIONS**

1. Installer must be approved by the Panel Manufacturer in writing prior to work commencing.
2. Installer shall meet the following:
  - a. Successfully applied five metal roofs of comparable size and complexity which reflect a quality and weathertight installation.

**B. MANUFACTURER'S QUALIFICATIONS**

1. Manufacturer shall have a minimum of 10 years experience supplying metal roofing to the region where the work is to be done.
2. Comply with current independent testing and certification as specified.
3. Manufacturer shall provide proof of liability insurance for their metal roof system.
4. The roof panel manufacturer must also subscribe to Underwriters Laboratories' "Follow Up Service" assuring continuing product compliance with UL requirements. Shipment packaging of panel and attachment clips must bear UL classification markings.
5. Panel manufacturers without full supporting literature; Flashings & Details Guides, Guide Specifications and Technical Support, shall not be considered equal to the specified product.

**C. REGULATORY AGENCY REQUIREMENTS**

1. Comply with UBC and local Building Code requirements if more restrictive than those specified herein.
2. Compliance with certification must be submitted with bid.
3. Comply with latest edition of SMACNA details.

**PRODUCT DELIVERY, STORAGE, AND HANDLING.**

- A. Protect against damage and discoloration.
- B. Handle panels with non-marring slings.
- C. Do not bend panels.
- D. Store panels above ground, with one end elevated for drainage.
- E. Protect panels against standing water and condensation between adjacent surfaces.

- F. If panels become wet, immediately separate sheets, wipe dry with clean cloth, and allow to air dry.
- G. Painted panels shall be shipped with a protective plastic sheeting or a strippable film coating between all panels. [Remove any strippable film coating prior to installation and in any case, do not allow the strippable film coating to remain on the panels in extreme heat, cold, or direct sunlight or other UV source.

**PROJECT CONDITIONS:**

- A. Examine the conditions and substrates in which metal roofing work is to be installed. Substrate shall be installed level, flat and true to avoid panel stresses and distortion.
- B. Field measurements shall be taken prior to fabrication of panels.
- C. Proceed with roofing installation only after satisfactory conditions are met.

**WARRANTY****A. MANUFACTURER'S PRODUCT WARRANTY**

- 1. Manufacturer's standard coating performance warranty, as available for specified installation and environmental conditions.

**B. CONTRACTOR'S WARRANTY**

- 1. Warrant panels, flashings sealants, fasteners and accessories against defective materials and/or workmanship, to remain watertight and weatherproof with normal usage for two (2) years following Project Substantial Completion date.

**PART 2 - PRODUCTS****ACCEPTANCE MANUFACTURER:**

- A. Bruce & Dana, or approved equal

**MATERIALS:****A. PANELS****1. Base Metal:**

- a. Material: Steel conforming to ASTM A924/A792 (Formerly ASTM A792) Grade 40, minimum yield 43,500 psi, thickness 24 gauge.
- b. Protective Coating: Match Existing

**2. Finish:**

- a. Match Existing

**3. Color:**

- a. Match Existing

**4. Factory-Applied Seam Sealant:**

- a. Cold-applied butyl.

**5. Configuration:**

- a. Match existing: **Length shall be continuous without any joints.**

**B. ACCESSORIES****6. Fastener clip:**

- a. UL 90 rated 18 gauge Zincalume steel, 40 ksi yield strength, 3-1/2" long triple fastener type.

7. Fasteners:
  - a. Per manufacturer's recommendation, 24" oc maximum.
8. Sealant:
  - a. Gunnable Grade Caulking: Single component polyurethane Caulk.
  - b. Tape Sealant: Butyl, comply with TT-C-1796-A.
9. Bearing Plate:
  - a. 22 gauge 4" x 6" Zincalume steel bearing plate
10. Profile Closures: Use material of same gauge and finish as the roofing panels.  
Use neoprene or polyethylene foam, die cut or formed to panel configuration.
11. Flashings: Use material of same gauge and finish as the roof material, dissimilar materials will not be allowed.
12. Gutters & Downspout material shall be formed from same material with gutters in 24 ga. Fascia style, and downspouts in 24 ga. to match existing.

**B. FLASHING**

1. Material, gauge and finish to match panels. Do not use lead or copper.

**C. FABRICATION**

1. Unless otherwise shown on drawings or specified herein, fabricate panels in continuous one-piece lengths and fabricate flashings and accessories in longest practical lengths.
2. Roofing panels shall be factory formed. Field formed panels are not acceptable.

**PART 3 - EXECUTION****EXAMINATION****A. EXISTING CONDITIONS**

1. Verify that members to receive panels are complete, accurately sized and located, in true plane, secure and otherwise properly prepared.
2. Prior to starting work, notify General Contractor about defects requiring correction.
3. Do not start work until conditions are satisfactory. Metal panels shall be installed only when the substrate is installed and aligned to acceptable tolerances as reviewed or recommended by the panel manufacturer.

**PREPARATION****A. FIELD MEASUREMENTS**

1. Verify prior to fabrication.
2. If field measurements differ from drawing dimensions, notify Resident/Engineer prior to fabrication.

**B. PROTECTION**

1. Treat, or isolate with protective material, any contacting surfaces of dissimilar materials to prevent electrolytic corrosion.
2. Require workmen who will be walking on Roofing Panels to wear clean, soft-soled work shoes that will not pick up stones or other abrasive material, which could cause damage and discoloration.
3. Protect Work of other Trades against damage and discoloration.

**C. SURFACE PREPARATION**

1. Clean and dry surfaces prior to applying sealant.

**INSTALLATION:****A. PANELS:** Install per approved submittal drawings only.

1. Follow roof panel manufacturer's directions.
2. Install panel seams vertically.
3. Lap panels away from prevailing wind direction.
4. Do not stretch or compress panel side-lap interlocks.
5. Secure panels without warp or deflection.
6. Fully engage interlocking seams.
7. Remove strippable protective film, if used, immediately preceding panel installation.
8. Caulk, seal and fasten so as to provide a complete weathertight installation.
9. Discrepancies between job site conditions and drawings as approved shall be brought to the attention of the Architect for resolution.

**B. ALLOWABLE ERECTION TOLERANCE**

1. Maximum Alignment Variation: ¼ inch in 40 feet.

**C. FLASHING**

1. Follow manufacturer's direction and approved Shop Drawings.
2. Install flashings to allow for thermal movement.
3. Remove strippable protective film, if use, immediately preceding flashing installation.

**D. CUTTING AND FITTING**

1. Neat, square and true. Torch cutting is prohibited.
2. Openings 6 inches and larger in any direction: Shop fabricate and reinforce to maintain original load capacity.
3. Where necessary to saw and cut panel, debur and treat with galvanic paint.

**CLEAN UP AND CLOSE OUT****A. PANEL DAMAGE AND FINISH SCRATCHES**

1. Do not apply touch-up paint to damaged paint areas that involve minor scratches.
2. Panels or flashings that have severe paint and/or substrate damage shall be replaced as directed by the Government.

**B. CLEANING AND REPAIRING**

1. At completion of each day's work and at Work Completion, sweep Panels, Flashings and Gutters clean. Do not allow fasteners, cuttings, fillings or scraps to accumulate.
2. Remove debris from Project Site upon work completion each day, or sooner, if directed.
3. Leave project at completion free of stains and scraps.
4. Touch up areas as required or directed with the manufacturer's standard touch up paint. Follow instructions for application carefully.

The architect will perform final inspection. **END OF SECTION 07 41 10**

**SECTION 07 51 00 – MODIFIED BUILT UP ASPHALT ROOFING**

**PART 1 - GENERAL**

**RELATED DOCUMENTS**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**SUMMARY**

- A. This Section includes the following:
  - 1. Modified Bitumen/glass-fiber felt roof membrane with mineral surfaced cap sheet.
- B. This Section also includes the following roofing related work:
  - 1. Roof insulation.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Section 06 10 00 - Rough Carpentry for wood nailers, curbs, and wood cants.
  - 2. Section 07 62 00 - Sheet Metal Flashing and Trim for metal flashings and counter flashings.

**REFERENCE STANDARDS**

- A. ASTM C728 - Standard Specification for Perlite Thermal Insulation Board.
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- C. ASTM D41/D41M - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
- D. ASTM D312/D312M - Standard Specification for Asphalt Used in Roofing.
- E. ASTM D2178/D2178M - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
- F. ASTM D3909/D3909M - Standard Specification for Asphalt Roll Roofing (Glass Felt) Surfaced with Mineral Granules.
- G. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- H. ASTM D4601/D4601M - Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing.
- I. FM DS 1-28 - Wind Design.
- J. NRCA ML104 - The NRCA Roofing and Waterproofing Manual.
- K. UL (FRD) - Fire Resistance Directory.

**DEFINITIONS**

- A. Thermal Resistivity: Where thermal resistivity properties of insulating materials are designated by "R-Values", they represent the reciprocal of thermal conductivity (k-value). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch thick. Thermal resistivities (R-Values) are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.
- B. Thermal Resistance: Where thermal resistance properties of insulating materials are designated by "R-Values," they represent the reciprocal of thermal conductance (C-value). Thermal conductance is the rate of heat flow through a material of thickness indicated. Thermal resistance's (R-Values) are expressed by the temperature difference in degrees F between the two

exposed faces required to cause on BTU to flow through one square foot per hour at mean temperatures indicated.

### **SUBMITTALS**

- A. Product Data, including manufacturer's technical product data, installation instructions, and recommendations for each type of roofing product required. Include data substantiating that materials comply with requirements.
- B. For modified asphalt bitumen, provide label on each container or certification with each load of bulk bitumen, indicating flash point (FP), finished blowing temperature (FBT), softening point (SP), and equiviscous temperature (EVT).
- C. Manufacturer's Certification indicating that bulk bituminous materials (if any) delivered to project comply with required standards. Include quantity and statistical and descriptive data for each product. Submit certificate with each load before it is used.
- D. Include continuous log showing time and temperature for each load of bulk bitumen, indicating date obtained from manufacturer, where held, and how transported prior to final heating and application on roof.

### **QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experienced Installer ("Roofer") to perform modified built-up asphalt roofing work who has specialized in the installation of guaranteed modified built-up asphalt roofing systems similar to that required for this project, for a minimum of 5 years and who is certified by the manufacturer of approved roofing system. Installer must be pre-approved by the District prior to bidding.
- B. Installer Certification: Obtain written certification from manufacturer of modified built-up roofing system certifying that Installer has been approved by manufacturer, for 5 years, for installation of specified roofing system. Provide copy of certification to Architect along with other requested data.
- C. Installer's Field Supervision: Require Installer to maintain a full-time supervisor/foreman who is on jobsite during times that modified built-up asphalt roofing work is in progress and who has a minimum of 3 years' experience in installing the specified roofing system. Submit name of field supervisor with pre-qualification form. Submit names of all crew members to work on the project along with their years of experience with the specified system.
- D. Manufacturer Qualifications: Obtain primary products, including each type of roofing sheet (felt), modified bitumen, composition flashings, and vapor retarder, from a single approved manufacturer. Provide secondary products as recommended by manufacturer of primary products for use with roofing system specified. Manufacturer must be one of the pre-approved manufacturers using the approved system in accordance with District Standards.
- E. UL Listing: Provide modified built-up roofing system and component materials that have been tested for application and slopes indicated and are listed by Underwriters Laboratories, Inc. (UL) for Class B external fire exposure.
- F. Fire Performance Characteristics: Provide insulation materials that are identical to materials whose fire performance characteristics, per requirements listed in Part 2 of this Section, have been determined by testing by UL or other testing and inspecting agency acceptable to authorities having jurisdiction, when tested for the assemblies of which the insulation materials are a part and in accordance with the following test methods:
- G. Preapplication Roofing Conference: Approximately two weeks prior to scheduled commencement of built-up roofing installation and associated work, meet at project site with Installer, installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in and around roofing that must precede or follow roofing work (including mechanical work if any), Architect, Owner, roofing system manufacturer's representative, and other representatives directly concerned with performance of the work, including (where applicable) Owner's insurers, test agencies, and governing authorities.



1. Review requirements (Contract Documents), submittals, status of coordinating work, availability of materials, and installation facilities and establish preliminary installation schedule.
  2. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).
  3. Discuss roofing system protection requirements for construction period extending beyond roofing installation.
  4. Review foreseeable methods and procedures related to roofing work, including but not necessarily limited to the following:
  5. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations, and other preparatory work performed by other trades.
  6. Review roofing system requirements (drawings, specifications, and other contract documents).
  7. Review required submittals, both completed and yet to be completed.
  8. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  9. Review required inspection, testing, certifying, and material usage accounting procedures.
  10. Record (Contractor) discussions of conference, including decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.
- H. Wind-Uplift Resistance: The roofing system shall resist minimum wind-uplift pressures based on ASCE 7 (2010) calculations. ASCE 7 (2010) wind-uplift pressure calculations shall be project specific and based on the following criteria:
1. Project Address and Location.
  2. Building Height in Feet.
  3. Building Exposure Category.
  4. Wind-Speed Design, V (mph) based on project location.
  5. Building Risk Category.
- Note 1: As part of the submittal process, the roofing manufacturer shall provide written documentation confirming the proposed roofing system will satisfy the ASCE 7 (2010) wind-uplift calculations as defined above. Note 2: Conformance with ASCE 7 calculations is only required when screw fasteners and plates are used for insulation and/or cover board attachment. Manufacturer conformance is not required where/when bituminous base sheets are nailed to the roof deck substrate, and subsequent insulation and BUR components are hot-mopped.
- I.. Project must be registered with the manufacturer prior to any work starting.

## **PROJECT CONDITIONS**

- A. Weather Condition Limitations: Proceed with roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturers' recommendations and warranty requirements.

## **INSPECTIONS**

- A. Required Inspection Sequence: Contractor will be required to adhere to strict inspections during the job cycle. The sequence of inspections are as follows:
1. Deck will be inspected before any base will be nailed.

2. Architect will inspect roof after all plies and before any cap sheet is applied.
3. Manufacturer's representative will inspect complete job for guarantee.
- B. The Owner may authorize an independent field inspector, and/or a manufacturer's representative to:
  1. Render any inspection services the Owner may Request.
  2. Keep the Owner informed after periodic inspections as to the progress and quality of the work observed.
  3. Call to the attention of the Contractor those observed matters which he considers to be in violation of the contract requirements.
  4. Report to the Owner any failure or refusal of the Contractor to correct unacceptable practices called to his attention.
  5. Supervise the taking of test cuts and the restoration of such areas.
  6. Certify, after completion of the work and based upon his observations and tests, his opinion as to the extent to which the Contractor has complied with these specifications, as well as the published Instructions of the material manufacturer. Final payment will not be released until such time that this certification is received by the Owner.
- C. Non-compliance with the terms of this specification and ensuing contract can result in either the cancellation of the contract or complete replacement of the defective areas at the Contractor's expense. In the event of cancellation, the Owner will not be obligated to compensate the Contractor for any work undertaken.

### **DELIVERY, STORAGE, AND HANDLING**

- A. Store and handle roofing materials in a manner that will ensure that there is no possibility of significant moisture pickup. Store in a dry, well-ventilated, weather-tight place. Unless protected from weather or other moisture sources, do not leave unused felts on the roof overnight or when roofing work is not in progress. Store rolls of felt and other sheet materials on end on pallets or other raised surface. Handle and store materials or equipment in a manner to avoid significant or permanent deflection of deck.

### **WARRANTIES**

- A. Manufacturer's Warranty: Submit executed copy of roofing manufacturer's standard "Unlimited Penal Sum Warranty" agreement including flashing endorsement, signed by an authorized representative of modified built-up roofing system manufacturer, on form that was published with product literature as of date of Contract Documents, for the following period of time:
  1. 2 years after date of Substantial Completion.
- B. Applicator's Warranty: Before final payment, furnish a written guarantee that the contractor will repair any leaks caused by faulty material or workmanship including sheet metal work, for a period of 2 years after Substantial Completion of the roof system without additional cost to the Owner.

## **PART 2 – PRODUCTS**

### **ROOF INSULATION, COVER BOARD, AND SUBSTRATE BOARD**

- A. Provide preformed roof insulation boards that comply with the requirements and referenced standards, selected from Manufacturer's standard sizes and of thickness indicated.
- B. Polyiso Insulation Materials - Flat Stock: Provide polyisocyanurate flat-stock insulation materials to thicknesses and as noted on drawings, typical at all locations. Flat stock materials shall be provided in two (2) layers of 2.0-inch thick and (1) layer of 1" thick 4x8 panels (R-30 req) Polyiso roof insulation type shall meet the requirements of ASTM C 1289, Type II, Class 1, Grade 2, and shall have a minimum compressive value of 20 psi.
- C. Tapered Polyiso Insulation and/or Cricketing Materials: At specified locations and/or where defined on the architectural roof plan page, provide polyisocyanurate tapered insulation and/or cricketing materials. Tapered insulation and cricketing materials shall achieve a minimum 1/2:12 finished roof slope, unless otherwise noted on the architectural plan page documents. Tapered polyiso roof

insulation type shall meet the requirements of ASTM C 1289, Type II, Class 1, Grade 2, and shall have a minimum compressive value of 20 psi.

- D 1/2-inch High-Density Perlite-Based Cover Board Materials: Provide 1/2-inch thick high-density perlite-based cover board materials. Perlite-based cover board shall meet the requirements of ASTM C 728, Type 3.

### **MODIFIED BUILT-UP ROOF MEMBRANE SYSTEM**

- A. Insulated-Deck /Std Asphalt/Glass-Fiber/Modified Mineral Roofing (NAGM-BUR):
1. Provide modified built-up asphalt roof system as follows:
    - a. Locations: As indicated on roof plans.
  2. Manufacturers:
    - a. Malarkey Roofing Products M4-BBB.
    - b. Johns Manville 4GIC system.
  3. Base Sheet:
    - a. Malarkey #501.
    - b. PermaPly 28.
  4. Inner Plies:
    - a. Malarkey #501.
    - b. Glas Ply Premier Type VI.
  5. Cap Sheet:
    - a. Malarkey #601.
    - b. Glas Kap.
  6. Bitumen: ASTM D312, Type III or Type IV as recommended by manufacturer.
    - a. PermaMop modified asphalt.
  7. Base Flashing Membrane for Wall & Curb Flashings:
    - a. Malarkey Base Flashing Membrane - Glass/Polyester Reinforced.
    - b. JM DynaFlex Base Flashing Membrane - Glass/Polyester Reinforced.
  8. Cold Liquid-Applied Flashing Materials (for difficult flashing conditions):
    - a. Urethane-Based Liquid Applied Flashing System: As manufactured and/or supplied by Malarkey or Johns Manville.
    - b. Polymethyl-Methacrylate (PMMA) Liquid-Applied Flashing System: As manufactured and/or supplied by Malarkey or Johns Manville.
    - c.
  9. Vapor Barrier:

SAHT membrane as approved by roofing mfr. equal to Grace Ultra.B.

Comply with NRCA Roofing and Waterproofing Manual.

### **BUILT-UP ASPHALT ROOFING SYSTEM EDGE/PENETRATION MATERIALS**

- A. Roofing Cement: Asphaltic cement, asbestos free; comply with ASTM D4586/D4586M.
- B. Cricket Material behind, Preformed Edge Strips: Rigid insulation units may be of plywood, rigid roof insulation, or asphalt-impregnated organic fiber insulation units, molded to form 3-1/2-inch by 3-1/2-inch by 45-degree cant strips and 1 inch by 24-inch tapered edge strips to receive roofing ply-sheet courses and lift edges above main roofing surface. OR AS REQUIRED BY MANUFACTURER.

### **SHEET METAL ACCESSORY MATERIALS**

- A. Refer to Section 07 62 00 - Sheet Metal Flashing and Trim.

### **MISCELLANEOUS MATERIALS**

- A. Wood Members, Units: Comply with requirements of Section 06 10 00 - Rough Carpentry for nailers, walkway units, and other wood members indicated as roofing system work. Provide wood pressure treated with waterborne preservatives for above-ground use (AWPB LP-2).
- B. Walkway Protection Boards: Mineral-surfaced bituminous composition boards, approximately 1/2 inch thick, manufactured specifically for hot bituminous application on built-up roofing as a protection course for foot traffic. Rubber walk pads are also acceptable. See roofing notes for locations.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Roof-Tred; W. R. Meadows, Inc.
    - b. Malarkey #141 recycled rubber walk pads.
    - c. JM Dyna Tred.
- C. Mastic Sealant: Polysio-butylene (plain or bituminous modified), nonhardening, nonmigrating, nonskinning, and nondrying.
- D. Asphaltic Primer: Comply with ASTM D41/D41M.
- E. Fasteners: Provide industry-standard types of mechanical fasteners for built-up asphalt roofing system work, tested by manufacturer for required pull-out strength where applicable and compatible with deck type and roofing products used. Comply with Manufacturer's recommendations for attachment.
- F. Pipe and Conduit Supports: No pipes or conduits shall be allowed to rest on the roofing. All such existing pipes and conduits shall be supported with "ERICO Caddy Pyramid 50" or approved supports at a spacing determined by pipe/conduit size for proper support. The use of pressure treated wood is not acceptable.

### **FABRICATION OF SHEET METAL ACCESSORIES**

- A. SMACNA (ASMM) and NRCA (RM) Details: Conform work with details shown and with applicable fabrication requirements of "Architectural Sheet Metal Manual" by SMACNA. Comply with installation details of "Roofing and Waterproofing Manual" by NRCA.
- B. Prefabricate units as indicated or provide standard manufactured units complying with requirements; fabricate from sheet metal indicated or, if not otherwise indicated, from lead-coated copper.
- C. Provide 4-inch-wide flanges for setting on built-up asphalt roofing system membrane with concealment by composition stripping.
- D. Fabricate work with flat-lock soldered joints and seams; except where joint movement is necessary, provide 1-inch-deep interlocking hooked flanges filled with mastic sealant.
- E. Fabricate penetration sleeves with minimum 8-inch-high stack, of diameter 1 inch larger than penetrating element. Counterflashing is specified as work of another section of these specifications.

### **PART 3 - EXECUTION**

#### **EXAMINATION**

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips and curbs are in place.

- F. Examine substrate surfaces to receive built-up roofing system and associated work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
- G. Install preformed acoustical glass fiber insulation strips specified in Section 05 31 00 - Steel Decking in roof deck flutes. Install in accordance with manufacturer's instructions.

### **GENERAL INSTALLATION REQUIREMENTS**

- A. Cooperate with inspection and test agencies engaged or required to perform services in connection with built-up roofing system installation.
- B. Protect other work from spillage of modified built-up roofing materials, and prevent liquid materials from entering or clogging drains and conductors. Replace/restore other work damaged by installation of modified built-up roofing system work.
- C. Coordinate the installation of insulation, roofing sheets, flashings, stripping, coatings, and surfacing's so that insulation and felts are not exposed to precipitation or exposed overnight. Provide cut offs at end of each day's work, to cover exposed felts and insulation with a course of coated felt with joints and edges sealed with roofing cement. Remove cut offs immediately before resuming work. Glaze-coat installed ply-sheet courses at end of each day's work where final surfacing has not been installed.
- D. Asphalt Bitumen Heating: Heat and apply bitumen in accordance with equiviscous temperature method ("EVT Method") as recommended by NRCA. Do not raise temperature above minimum normal fluid-holding temperature necessary to attain EVT (plus 5 deg F or 14 deg C, at point of application) more than one hour prior to time of application. Discard bitumen that has been held at temperature, exceeding finished blowing temperature (FBT) for a period exceeding 3 hours. Determine flash point, finished blowing temperature and EVT or bitumen, either by information from bitumen producer or by suitable tests, and determine maximum fire-safe handling temperature and do not exceed that temperature in heating bitumen; but in no case heat bitumen to a temperature higher than 25 deg F (14 deg C) below flash point.
- E. Bitumen Mopping Weights: For interply mopping, and for other moppings except as otherwise indicated, apply bitumen at the rate of 25 pounds of asphalt (plus or minus 25 percent on a total-job average basis) per roof square (100 sq. ft.) between plies.
- F. Substrate Joint Penetrations: Do not allow bitumen to penetrate substrate joints and enter building or damage insulation, vapor barriers (retarders), or other construction.
- G. Cutoffs: Phased construction will not be allowed. The entire roof membrane shall be completed and edges made weathertight around completed roof sections by the end of each day's work. Provide a watertight removable seal between new and existing roofs with 2 layers of felts and a glaze coat of hot asphalt before work stops each night. Remove these sealing felts before resuming work.

### **BUR ROOF TYPE R1 ROOF ASSEMBLY - WOOD ROOF DECK SUBSTRATES:**

- A. General: Comply with membrane and insulation manufacturer's instructions and recommendations for the handling, installation, and bonding or anchorage of insulation to substrate. Remove existing BUR as required by mfr. to allow for tie in as per mfr details.
- B. 1/2-inch Perlite Cover Board: Over the plywood, proceed to fully adhere 1/2-inch perlite cover board in compliance with wind lift without penetrating plywood.
- C. Cant Strips/Tapered Edge Strips: Except as otherwise shown, install preformed 45-degree insulation cant strips at junctures of built-up asphalt roofing system membrane with vertical surface. Provide preformed, tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- D. Apply Roofing Materials in strict accordance with the manufacturer's instructions.
- E. Waterways: Install an extra layer of ply sheets 36 inches wide at all valleys and waterways before the membrane plies are installed.

- F. Ply Sheet Application: Install 3-ply of specified Type VI ply sheet at all main field of roof locations. Ply sheets shall extend up to the top of the cant strips and no further. Ply sheets shall be set cap sheet in uniform mopping of same hot bitumen used in ply-sheet courses, at an average rate of 25 pounds per square.
- G. Cap Sheet Application: Promptly after completion of ply-sheet membrane (same day where possible), apply one lapped course of cap sheet of type indicated. Set cap sheet in uniform mopping of same hot bitumen used in ply-sheet courses, at average rate of 25 pounds per square, with no bitumen exposed. Lap ends 6 inches minimum.
- H. Base Flashings: Provide base flashing as per manufacturer's specifications. Turned up roofing plies and cap sheet will not be accepted in lieu of base flashings. When and where possible, extend base flashing membrane materials up above finished roof elevation height a minimum of 8-inches.
- I. Cold Liquid-Applied Flashing Membrane Materials: At difficult to flash through-roof penetrations, including pipe penetrations, through-wall scupper drains and/or overflows, or other unusually shaped through-roof penetrations that are difficult to flash with standard sheet-membrane type materials, apply the specified Urethane-based Asphalt or PMMA based liquid-applied membrane materials. Substrate shall first be primed, a base layer of liquid-applied membrane then installed, a polyester reinforcing scrim then set into place, and a final top layer of liquid-applied flashing installed. Refer to membrane manufacturer installation instructions of additional information.

**BUR ROOF INSTALLATION - ALL ROOF AREAS:**

- A. Pipe, Conduit, Gravel Stop, and other Flanged Metal Flashings: Set on top of roofing plies in mastic, nail, and strip with 2 layers of ply sheet before installing cap sheets.
- B. Counter-flashings: Counter-flashings, cap flashings, expansion joints, and similar work to be coordinated with built-up roofing are specified in other sections of these specifications.
- C. Roof Accessories: Miscellaneous sheet metal accessory items, including insulation vents and other devices, and major items of roof accessories (if any) to be coordinated with built-up roofing system work, are specified in other sections of these specifications.

**PROTECTION OF ROOFING**

- A. Upon completion of roofing (including associated work), institute appropriate procedures for surveillance and protection of roofing during remainder of construction period. At end of construction period, or at a time when remaining construction will in no way affect or endanger roofing, inspect roofing and prepare a written report, with copies to Architect and Owner, describing nature and extent of deterioration or damage found.
- B. Repair or replace (as required) deteriorated or defective work found at time of above inspection to a condition free of damage and deterioration at time of Substantial Completion and in accordance with requirements of specified warranty.
- C. Workmanship: Appearance of the roof is considered a factor relative to workmanship. Excessive asphalt on the surface of the cap sheet, torn or wrinkled roofing, or other such defects may be cause for rejection.
- D. Cleaning: Clean adjacent surfaces of asphalt stains, drippings, or adhered materials. Remove and replace products which have been damaged by work in this section. All drips and debris shall be cleaned up immediately and all damage restored to original condition.

**END OF SECTION**

## **SECTION 07 54 19 - POLYVINYL-CHLORIDE (PVC) ROOFING**

### **PART 1 GENERAL**

#### **RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **SECTION INCLUDES**

- A. PVC thermoplastic membrane adhered with solvent-based adhesive from pre-approved manufacturer's as listed in Section 2.1 and vapor barrier.
- B. Insulation/recover boards as approved by each manufacturer, and as specified herewith.
- C. Miscellaneous flashings, corners, parapets, stacks, vents, and related details by each manufacturer including prefabricated products by each manufacturer.
- D. Fasteners, adhesives, and other accessories required for a complete roofing installation.
- E. Accessories and Walkways.

#### **RELATED REQUIREMENTS**

- A. Section 06 10 00 Rough Carpentry
- B. Section 07 62 00 Flashings and Sheet Metal
- C. Section 07 92 00 Sealants

#### **EXTENT OF THE WORK**

- A. Provide all labor, material, tools, equipment, and supervision necessary to complete the installation of the PVC Roof membrane adhered roofing system including flashings and insulation/recover board as specified herein and as indicated on the drawings in accordance with the manufacturer's most current specifications and details.
- B. The roofing contractor shall be fully knowledgeable of all requirements of the contract documents and shall make themselves aware of all job site conditions that will affect their work.
- C. The roofing contractor shall confirm all given information and advise the General Contractor prior to bid, of any conflicts that will affect their cost proposal.
- D. Any contractor who intends to submit a bid using a roofing system other than the approved manufacturer's systems understands their bid will not be opened and will be disqualified.

#### **REFERENCES**

- A. NRCA - The NRCA Roofing and Waterproofing Manual.
- B. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. UL - Roofing Materials and Systems Directory, Roofing Systems (TGFU.R10128).

- D. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- E. ASTM D 751 - Standard Test Methods for Coated Fabrics.
- F. ASTM D 4434- Type III - Standard Specification for Poly(Vinyl Chloride) Sheet Roofing.
- G. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings.
- H. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

### **SYSTEM DESCRIPTION**

- A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience. Coordinate with installation of associated flashings, counterflashing's, and wall metal installed by other sections.
- C. Physical Properties:
  - 1. Roof product must meet the requirements of Type III PVC sheet roofing as defined by ASTM D 4434 and must meet or exceed the following physical properties.

### **SUBMITTALS**

- A. Submit under provisions of Section 01300.
- B. Data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
  - 4. Maintenance requirements.
- C. Shop Drawings: Indicate insulation pattern, overall membrane layout, field seam locations, joint or termination detail conditions, and location of fasteners, details and identification of materials.
- D. Verification Samples: For each product specified, two samples, representing actual product, color, and finish.
  - 1. 4 inch by 6 inch sample of roofing membrane, of color specified.
  - 2. 4 inch by 6 inch sample of walkway pad.
  - 3. Termination bar, fascia bar with cover, drip edge and gravel stop if to be used.
  - 4. Each fastener type to be used for installing membrane, insulation/recover board, termination bar and edge details.
- E. Installer Certification: Certification from the roofing system manufacturer that Installer is approved, authorized, or licensed by manufacturer to install roofing system along with training completed, by whom, and on what dates.



- F. Manufacturer's warranties. (samples)
- G. Upon completion of work, submit copies of manufacturer's final inspection to the Architect prior to issue of the manufacturer's warranty.
- H. Certification of the manufacturer's warranty reserve.

### **QUALITY ASSURANCE**

- A. Perform work in accordance with manufacturer's installation instructions.
- B. Manufacturer Qualifications: A manufacturer specializing in the production of PVC membranes systems and utilizing a Quality Control Manual during the production of the membrane roofing system that has been approved by and is inspected by Underwriters Laboratories.
- C. Installer Qualifications: Company specializing in installation of roofing systems similar to those specified in this project and approved by the roofing system manufacturer.
- D. Source Limitations: Obtain components for membrane roofing system from roofing membrane manufacturer. Manufacturer must warrant full system including vapor barrier, insulation, recover board and membrane. If manufacturer has any concern with any of these items as specified herein, it is their responsibility to RFI prior to bidding to allow for an addendum to address specific concerns, failure to do so indicates manufacturer's compliance with this specific requirement. Failure to comply may be grounds for determining bid is non-responsive.
- E. There shall be no deviations from the roof membrane manufacturer's specifications & details, or the approved shop drawings without the prior written approval of the manufacturer.

### **REGULATORY REQUIREMENTS**

- A. Conform to applicable code for roof assembly wind uplift and fire hazard requirements.
- B. Fire Exposure: Provide membrane roofing materials with the following fire-test-response characteristics. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
  - 1. Exterior Fire-Test Exposure:
    - a. Class A; ASTM E 108, for application and roof slopes indicated.
  - 2. Fire-Resistance Ratings: Comply with ASTM E 119 for fire-resistance-rated roof assemblies of which roofing system is a part.
  - 3. Conform to applicable code for roof assembly fire hazard requirements.
- C. Wind Uplift:
  - 1. Roofing System Design: Provide a roofing system designed to resist uplift pressures calculated according to the current edition of the ASCE-7 -10 Specification *Minimum Design Loads for Buildings And Other Structures*. All edges must comply with current IBC requirements.

### **PRE-INSTALLATION MEETING**

- A. Convene meeting not less than one week before starting work of this section.
- B. Review methods and procedures related to roof deck construction and roofing system including, but not limited to, the following.
  - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing installer, roofing system manufacturer's representative, deck installer, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.
  - 2. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 3. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
  - 4. Review structural loading limitations of roof deck during and after roofing.
  - 5. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
  - 6. Review governing regulations and requirements for insurance and certificates if applicable.
  - 7. Review temporary protection requirements for roofing system during and after installation.
  - 8. Review roof observation and repair procedures after roofing installation.

### **DELIVERY, STORAGE AND HANDLING**

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components. Deliver in sufficient quantities to permit work to continue without interruption.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Store roof materials and place equipment in a manner to avoid permanent deflection of deck.
- E. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.
- F. Comply with manufacturer's written instructions for proper storage of all materials and accessories.

### **WARRANTY**

- A. Contractor's Warranty: The contractor shall warrant the roof application with respect to workmanship and proper application for two (2) years from the effective date of the warranty issued by the manufacturer.
- B. Manufacturer's Warranty: Must be no-dollar limit type and provide for completion of repairs, replacement of membrane or total replacement of the roofing system at the then-current material and labor prices throughout the life of the warranty. In addition, the warranty must meet the following criteria:

1. Warranty Period: 20 years from date issued by the manufacturer.
2. No exclusion for damage caused by ponding water.
3. No exclusion for damage caused by biological growth.
4. Issued direct from and serviced by the roof membrane manufacturer.
5. Transferable for the full term of the warranty.
6. Warranty claims must be legally resolvable within the State of Oregon.
7. Mfr. shall provide wind speed protection up to 72 mph.

**FIELD CONDITIONS**

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F, unless otherwise approved by manufacturer.
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- E. Comply with Inspections Article in Part 3 of this specification.
- F. If discrepancies are discovered between the existing conditions and those noted on the drawings, immediately notify the architect and general contractor by phone and solicit the manufacturer's approval prior to commencing with the work. Necessary steps shall be taken to make the building watertight until the discrepancies are resolved.

**PART 2 PRODUCTS****MANUFACTURERS**

- A. Approved Manufacturers:
  - Carlisle 60 ml Sureflex PVC Membrane
  - GAF 60 ml Everguard PVC Membrane
  - JM 60 ml PVC MembraneAll roofing system components to be provided by these approved manufacture's.
- B. Substitutions: Not permitted.

**ROOFING SYSTEM COMPONENTS**

- A. Roofing Membrane: Carlisle 60 ml Sureflex PVC membrane, GAF 60 ml Everguard PVC membrane, or JM 60 ml PVC membrane. Membrane properties as follows:
  1. Thickness:
    - a. 60 mil.
  2. Exposed Face Color:
    - a. White.

- B. Accessory Materials: Provide accessory materials supplied by or approved for use by the approved PVC roofing manufacturer.
  - 1. Sheet Flashing: Manufacturer's standard reinforced PVC sheet flashing.
  - 2. Manufacturer's standard details or Prefabricated Flashings: manufactured using Manufacturer's standard reinforced PVC membrane.
    - a. Stack Flashings.
    - b. Curb Flashings.
    - c. Inside and Outside Corners.
    - d. Drain Boots, Composite Drain Rings (CDR) and Dome Strainers.
    - e. Membrane Scupper Liners.
    - f. Vinyl Coated Metal Scupper Inserts.
  - 3. Sealants and Adhesives: Compatible with roofing system and supplied by PVC roofing manufacturer.
  - 4. Slip Sheet: Compatible with roofing system and supplied by PVC roofing manufacturer.
  - 5. Fasteners and Plates and Bars: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane and insulation to substrate. Supplied by PVC roofing manufacturer.
  - 6. Termination and Edge Details: Supplied by PVC roofing manufacturer. Details shall be tested and meet ANSI/SPRI ES-1 standards and comply with International Building Code as adopted by the State of Oregon. Metal colors as selected by architect.
- C. Recover/Substrate Board:
  - 1. As required by PVC roofing manufacturer.
    - a. 1/4" inch thick, prime dens-deck mechanically attached or secure rock gypsum fiber.
- D. Vapor Barrier: Carlisle 725TR Air & Vapor Barrier; JM Vapor Barrier SA; GAF Liberty Base/Ply self-adhered; or 30 ml self- adhered vapor barrier minimum. Vapor permeance rating of .28 minimum
- E. Walkways:
  - 1. Provide non-skid, maintenance-free walkway pads in areas of heavy foot traffic and around mechanical equipment.
    - a. As per PVC roofing manufacturer.

### **PART 3 EXECUTION**

#### **GENERAL**

- A. Comply with the manufacturer's published instructions for the installation of the membrane roofing system, including proper substrate preparation, job site considerations and weather restrictions.
- B. Position sheets to accommodate contours of the roof deck and shingle splices to avoid bucking water.

#### **EXAMINATION**

- A. Verify that the surfaces and site conditions are ready to receive work.

- B. Verify that the deck is supported and secured.
- C. Verify that the deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to drains, valleys, eaves, scuppers or gutters.
- D. Verify that the deck surfaces are dry and free of standing water, ice or snow.
- E. Verify that all roof openings or penetrations through the roof are solidly set.
- F. If substrate preparation is the responsibility of another contractor, notify Architect of unsatisfactory preparation before proceeding.

## **PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Surfaces shall be clean, smooth, free of fins, sharp edges, loose and foreign material, oil, grease, and bitumen.

## **INSTALLATION**

- 1. Install vapor barrier/insulation/recover board in accordance with the roof manufacturer's requirements for fully adhered system. **Self-Adhering Vapor Barrier Installation:** Self-adhere vapor barrier membrane material directly to roof deck substrate. Overlap side and end joints as per manufacturer recommendations. At wall and/or curb conditions, extend the vapor barrier membrane material to the top of the finished roof insulation elevation height. **Note:** Vapor barrier materials shall not extend above the insulation height, as PVC membrane wall and curb flashings are to be adhered directly to the wall and/or curb substrates.
- A. Roof Membrane: 60 mil, PVC thermoplastic membrane.
  - 1. Use only membrane adhesive acceptable to the roof manufacturer's that meets the applicable design requirements.
    - a. Solvent-based membrane adhesive.
  - 2. Cut membrane to fit neatly around all penetrations and roof projections.
  - 3. Unroll roofing membrane and positioned with a minimum 6 inch overlap.
  - 4. Apply adhesive in accordance with the roof manufacturer's requirements.
    - a. Apply at the required rate in smooth, even coatings without voids, globs, puddles or similar irregularities. Use care not to contaminate the area of the membrane where hot air welding will occur.
  - 5. Apply adhesive to both the substrate and the bottom side of roof membrane.
  - 6. Follow guidelines outlined in the adhesive's Product Data Sheet.
  - 7. Read the adhesive's Material Safety Data Sheet (MSDS) prior to using the adhesive.
- B. Seaming:
  - 1. Weld overlapping sheets together using hot air, overlap sheets 2" minimum to allow for a minimum weld width of 1-1/2 inches.
  - 2. Check field welded seams for continuity and integrity and repair all imperfections by the end of each work day.

- C. Membrane Termination/Securement: All membrane terminations shall be completed in accordance with the membrane manufacturer's requirements.
  - 1. Provide securement at all membrane terminations at the perimeter of each roof level, roof section, curb flashing, skylight, expansion joint, interior wall, penthouse, and other similar condition.
  - 2. Provide securement at any angle change where the slope or combined slopes exceeds two inches in one horizontal foot.
- D. Flashings: Complete all flashings and terminations as indicated on the drawings and in accordance with the membrane manufacturer's requirements.
  - 1. Provide securement at all membrane terminations at the perimeter of each roof level, roof section, curb flashing, skylight, expansion joint, interior wall, penthouse, and other similar condition.
    - a. Do not apply flashing over existing thru-wall flashings or weep holes.
    - b. Secure flashing on a vertical surface before the seam between the flashing and the main roof sheet is completed.
    - c. Extend flashing membrane a minimum of 6 inches (152 mm) onto the main roof sheet beyond the mechanical securement.
    - d. Use care to ensure that the flashing does not bridge locations where there is a change in direction (e.g. where the parapet meets the roof deck).
  - 2. Penetrations:
    - a. Flash all pipes, supports, soil stacks, cold vents, and other penetrations passing through the roofing membrane as indicated on the Drawings and in accordance with the membrane manufacturer's requirements.
    - b. Utilize custom prefabricated flashings supplied by the membrane manufacturer.
    - c. Existing Flashings: Remove when necessary to allow new flashing to terminate directly to the penetration.
  - 3. Pipe Clusters and Unusual Shapes:
    - a. Clusters of pipes or other penetrations which cannot be sealed with prefabricated membrane flashings shall be sealed by surrounding them with a prefabricated vinyl-coated metal pitch pan and sealant supplied by the membrane manufacturer.
    - b. Vinyl-coated metal pitch pans shall be installed, flashed and filled with sealant in accordance with the membrane manufacturer's requirements.
    - c. Pitch pans shall not be used where prefabricated or field fabricated flashings are possible.
- E. Roof Drains:
  - 1. Coordinate installation around existing roof drains and vents as required by membrane manufacturer.
  - 2. Remove existing flashing and asphalt at existing drains in preparation for sealant and membrane.
  - 3. Provide a smooth clean surface on the mating surface between the clamping ring and the drain base.
- F. Edge Details:

1. Provide edge details as indicated on the Drawings. Install in accordance with the membrane manufacturer's requirements.
  2. Join individual sections in accordance with the membrane manufacturer's requirements.
  3. Coordinate installation of metal flashing and counter flashing specified in Section 07600.
  4. Manufactured Roof Specialties: Coordinate installation of copings, counter flashing systems, gutters, downspouts, and roof expansion assemblies specified in Section 07600.
- G. Walkways:
1. Install walkways in accordance with the membrane manufacturer's requirements.
  2. Provide walkways where indicated on the Drawings.
  3. Install walkway pads at roof hatches, access doors, rooftop ladders and all other traffic concentration points regardless of traffic frequency. Provided in areas receiving regular traffic to service rooftop units or where a passageway over the surface is required.
  4. Do not install walkways over flashings or field seams until manufacturer's warranty inspection has been completed.
- H. Water cut-offs:
1. Provide water cut-offs on a daily basis at the completion of work and at the onset of inclement weather.
  2. Provide water cut-offs to ensure that water does not flow beneath the completed sections of the new roofing system.
  3. Remove water cut-offs prior to the resumption of work.
  4. The integrity of the water cut-off is the sole responsibility of the roofing contractor.
  5. Any membrane contaminated by the cut-off material shall be cleaned or removed.

### **FIELD QUALITY CONTROL**

- A. The membrane manufacturer's representative shall provide a comprehensive final inspection after completion of the roof system. All application errors shall be addressed and final punch list completed.
- B. See 07 62 00 for special flashings required by the project.

### **DAILY SEAL**

- A. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.
- B. Complete an acceptable membrane seal in accordance with the manufacturer's requirements.

### **CLEAN UP**

- A. Perform daily clean up to collect all wrappings, empty containers, paper and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.
- B. Prior to the manufacturer's inspection for warranty, the applicator must perform pre-inspection to review all work and to verify all flashings have been completed as well as the application of all caulking.

**PROTECTION**

- A. Protect installed roofing products from construction operations until completion of project.
- B. Where traffic is anticipated over completed roofing membrane, protect from damage using durable materials that are compatible with membrane.
- C. Repair or replace damaged products after work is completed.

**END OF SECTION**



## **SECTION 07 62 00 - FLASHING AND SHEET METAL**

### **PART 1 - GENERAL**

#### **RELATED DOCUMENTS**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

#### **SUMMARY**

**This Section includes** the following:

Gutters, downspouts, (rain drainage).

Exposed metal trim/fascia units.

Miscellaneous sheet metal accessories.

**Roofing accessories** installed integral with roofing membrane are specified in roofing system sections as roofing work.

#### **SUBMITTALS**

**General:** Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

**Product data, Flashing, Sheet Metal, and Accessories:** Manufacturer's technical product data, installation instructions and general recommendations for each specified sheet material and fabricated product.

**Samples** of the following flashing, sheet metal, and accessory items:

**12-inch-long samples** of factory-fabricated products exposed as finished work. Provide complete with specified factory finish.

**Shop drawings** showing layout, profiles, methods of joining, and anchorages details, including major counterflashings, trim/fascia units, gutters, downspouts. Provide layouts at 1/4-inch scale and details at 3-inch scale.

Provide plans & details of all roofs. Submit within 1 week of contract award, for approval by owner & architect. Submit 6 copies.

#### **PROJECT CONDITIONS**

**Coordinate work** of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.

### **PART 2 - PRODUCTS**

#### **SHEET METAL FLASHING AND TRIM MATERIALS**

**Zinc-Coated Steel:** Commercial quality with 0.20 percent copper, ASTM A 526 except ASTM A 527 for lock-forming, G90 hot-dip galvanized. Gauge as detailed. For use at locations not visible, where compatible with surrounding material, and only as approved by architect.

**Lead:** ASTM B 749, Type L51121, copper-bearing sheet lead, minimum 4 lb/sq. ft. (0.0625 inch) except not less than 6 lb/sq. ft. (0.0937 inch thick) for burning (welding) unless otherwise indicated. Use only at plumbing vents or other roof penetrations as detailed.

### **Miscellaneous Materials and Accessories:**

**Solder:** For use with steel or copper, provide 50 - 50 tin/lead solder (ASTM B 32), with rosin flux.

**Solder:** For use with stainless steel, provide 60 - 40 tin/lead solder (ASTM B 32), with acid-chloride type flux, except use rosin flux over tinned surfaces.

**Fasteners:** Same metal as flashing/sheet metal or other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.

**Bituminous Coating:** SSPC - Paint 12, solvent-type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.

**Reglets:** Metal or plastic units of type and profile indicated, compatible with flashing indicated, noncorrosive.

**Mastic Sealant:** Polyisobutylene; nonhardening, nonskinning, non-drying, nonmigrating sealant.

**Elastomeric Sealant:** Generic type recommended by manufacturer of metal and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealers."

**Epoxy Seam Sealer:** 2-part noncorrosive metal seam cementing compound, recommended by metal manufacturer for exterior/interior nonmoving joints including riveted joints.

**Adhesives:** Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of flashing sheet.

**Paper Slip Sheet:** 5-lb. rosin-sized building paper.

**Polyethylene Underlayment:** Minimum 6-mil carbonated polyethylene film resistant to decay when tested in accordance with ASTM E 154

**Reglets:** Metal or plastic units of type and profile indicated, compatible with flashing indicated, noncorrosive.

**Metal Accessories:** Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.

**Elastic Flashing Filler:** Closed-cell polyethylene or other soft closed-cell material recommended by elastic flashing manufacturer as filler under flashing loops to ensure movement with minimum stress on flashing sheet.

**Roofing Cement:** ASTM D 2822, asphaltic.

## **FABRICATED UNITS**

**General Metal Fabrication:** Shop-fabricate work to greatest extent possible. Field measure site conditions prior to fabricating work. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems. **All flashing & sheet metal shall have a Kynar 500 finish with a 30 year warranty and shall be 24 ga. with all colors selected by architect or as noted on drawings.**

**Seams:** Fabricate nonmoving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges to be seamed, form seams, and solder. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required

**Expansion Provisions:** Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

**Sealant Joints:** Where movable, nonexpansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.

**Separations:** Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

**Shop Finish, Rain Drainage:** Provide manufacturer's Kynar 500 shop finish (30 year warranty) on sheet metal rain drainage units (gutters, downspouts, and similar exposed units); 1.0-mil dry film thickness. Minimum gutter size shall match existing or as noted on plans. Color as selected by architect. **Gutters shall be 6" ogee style gutters as required to match existing, Downspouts which are located on grade shall REMAIN IF CONDITION WARRANTS, OR SHALL BE REPLACED WITH galv. steel or cast iron pipe, made in USA, 4"-6" diameter, up to 10 ft. above grade at which point standard sheet metal downspouts may be used. Downspouts shall be attached with straps with concealed fasteners that do not penetrate the downspout. All colors shall be selected by architect or as noted on drawings. DS shall match wall color behind it.**

Provide 22 ga. sheet metal splash pans as noted on drawings, adhere to roofing as per roofing mfr.

## **PART 3 EXECUTION**

### **INSTALLATION REQUIREMENTS**

**General:** Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations and with SMACNA "Architectural Sheet Metal Manual." Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weatherproof. Verify shapes and dimensions of surface to be covered. Beginning of installation constitutes acceptance of existing conditions. Prime all sheet flanges that are to be mopped into the roofing

with asphalt primer. Secure flashings in place with concealed fasteners. Use exposed fasteners only in locations approved by owner.

**Underlayment:** Where stainless steel or aluminum is to be installed directly on cementitious or wood substrates, install a slip sheet of red rosin paper and a course of polyethylene underlayment.

**Bed flanges** of work in a thick coat of bituminous roofing cement where required for waterproof performance

**Install reglets** to receive counterflashing in manner and by methods indicated. Where shown in concrete, furnish reglets to trades of concrete work for installation as work of Division 3 sections. Where shown in masonry, furnish reglets to trades of masonry work, for installation as work of Division 4 sections.

**Install counterflashing** in reglets, either by snap-in seal arrangement or by welding in place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure.

**Install elastic flashing** in accordance with manufacturer's recommendations. Where required, provide for movement at joints by forming loops or bellows in width of flashing. Locate cover or filler strips at joints to facilitate complete drainage of water from flashing. Seam adjacent flashing sheets with adhesive, seal and anchor edges in accordance with manufacturer's recommendations.

**Nail flanges** of expansion joint units to curb nailers, at maximum spacing of 6 inches o.c. Fabricate seams at joints between units with minimum 3-inch overlap, to form a continuous, waterproof system.

## **CLEANING AND PROTECTION**

**Clean exposed metal** surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

**Protection:** Advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering at time of Substantial Completion. Touch up minor chipping of prepainted items with approved touch up paint. Excessive damage to finish shall result in rejection of the material.

**END OF SECTION 07 62 00**

**SECTION 07 92 00 - JOINT SEALANTS****PART 1 - GENERAL****RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section. It shall be the General Contractors responsibility to ensure all areas requiring sealant are included in the bid. Any fire rated penetrations shall be fully sealed as required by code and local fire marshal. This shall include all edges and perimeters.

**SUMMARY:**

**Extent** of each form and type of joint sealer is indicated on drawings and schedules.

**This Section includes:**

Preparing sealant substrate surfaces.  
Sealant and backing.

**RELATED SECTIONS**

**Sealants for Aluminum Entrance & Storefront** are specified in Division-8 Section 08410; Aluminum Entrance & Storefront.

**Sealants for glazing purposes** are specified in Division-8 Section "Glass and Glazing."

**Sealing concealed perimeter joints of gypsum drywall partitions** to reduce sound transmission characteristics is specified in Division-9 Section "Gypsum Drywall."

**SYSTEM PERFORMANCES:**

**Provide joint sealers** that have been produced and installed to establish and maintain watertight and airtight continuous seals.

**SUBMITTALS:**

**Product Data** from manufacturers for each joint sealer product required, including instructions for joint preparation and joint sealer application.

**Shop Drawings or catalog illustrations** in sufficient detail to show installation and interface of the work of this Section with the work of adjacent trades.

**Samples for Initial Selection Purposes:** Manufacturer's standard bead samples consisting of strips of actual products showing full range of colors available, for each product exposed to view.

**Samples for verification purposes** of each type and color of joint sealer required. Install joint sealer samples in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealers.

**Certificates** from manufacturers of joint sealers attesting that their products comply with specification requirements and are suitable for the use indicated.

**Qualification data** complying with requirements specified in "Quality Assurance" article. Include list of completed projects with project name, addresses, names of Architects and Owners, plus other information specified.

**Compatibility and adhesion test reports** from elastomeric sealant manufacturer indicating that materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion.

**Product test reports** for each type of joint sealers indicated, evidencing compliance with requirements specified.

**Preconstruction field test reports** indicating which products and joint preparation methods demonstrated acceptable adhesion to joint substrates.

## **QUALITY ASSURANCE:**

### **Perform work in accordance with the following:**

Building Joints: ASTM C 1193.

### **Laboratory Pre-Construction Testing:**

Test sealants, joint accessories, and joint substrates in accordance with the following, before starting work of this section:

Obtain samples of joint substrate products specified in other sections.

Adhesion: ASTM C 794 and ASTM C 719; determine surface preparation and required primer.

Compatibility: ASTM C 1087; determine materials forming joints and adjacent materials do not adversely affect sealant materials and do not affect sealant color.

Staining: ASTM D 2203, ASTM C 510, or ASTM C 1248; determine sealants will not stain joint substrates.

**Pre-construction testing** is not be required when sealant manufacturer can furnish data acceptable to Architect based on previous testing for materials matching those of the Work. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.

Identification of testing agency.

Arrange for tests to take place with joint-sealant manufacturer's technical representative present.

- a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C1193 or Method A, Tail Procedure in ASTM C1521.

### **Field Quality Control Plan:**

Visual inspection of entire length of sealant joints.

Destructive field adhesion testing of sealant joints, except interior acrylic latex sealant.

- b. For each different sealant and substrate combination, allow for one test every 100 feet in the first 1000 linear feet, and one test per 1000 linear feet thereafter, or once per floor on each elevation.
- c. If any failures occur in the first 1000 linear feet, continue testing at frequency of one test per 500 linear feet at no extra cost to Owner.

## **QUALIFICATIONS**

**Manufacturer:** Company specializing in manufacturing products specified in this section with minimum ten years documented experience.

### **Applicator Qualifications:**

Company specializing in performing work of this section with minimum three years documented experience, minimum three successfully completed projects of similar scope and complexity and approved by manufacturer.

Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this section.

Designate one individual as project foreman who shall be on site at all times during installation.

## **MOCKUP**

Install sealants in mockups specified in other sections including sealant and joint accessories to illustrate installation quality and color.

Incorporate accepted mockup as part of Work.  
Repair seal joint mockups used for field adhesion testing.

## **PRE-INSTALLATION MEETINGS**

Convene meeting minimum one week prior to commencing work of this section.

**Single Source Responsibility for Joint Sealer Materials:** Obtain joint sealer materials from a single manufacturer for each different product required.

**Investigate materials** failing compatibility or adhesion tests and obtain joint sealer manufacturer's written recommendations for corrective measures, including use of specially formulated primers.

**Report** whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.

**Evaluation of Field Test Results:** Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants, which fail to adhere to joint substrates during testing.

**Perform work** in accord with ASTM C-1193 guidelines except where more stringent requirements are indicated or specified.

## **DELIVERY, STORAGE, AND HANDLING:**

**Deliver materials** to Project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.

**Store and handle materials** in compliance with manufacturers' recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

### **PROJECT CONDITIONS:**

**Environmental Conditions:** Do not proceed with installation of joint sealers under the following conditions:

When ambient and substrate temperature conditions are outside the limits permitted by joint sealer manufacturers.

When joint substrates are wet due to rain, frost, condensation, or other causes.

**Joint Width Conditions:** Do not proceed with installation of joint sealers where joint widths are less than allowed by joint sealer manufacturer for application indicated.

**Joint Substrate Conditions:** Do not proceed with installation of joint sealers until contaminants capable of interfering with their adhesion are removed from joint substrates.

### **SEQUENCING AND SCHEDULING:**

**Sequence installation** of joint sealers to occur not less than 21 nor more than 30 days after completion of waterproofing, water repellents, unless otherwise indicated.

### **WARRANTY**

**Deliver to Architect** signed copies of the following written warranties against adhesive and cohesive failure of the sealant and against filtration of water and air through the sealed joint for a period of 3 years from date of substantial completion.

Manufacturer's standard warranty covering sealant materials;  
Applicators standard warranty covering workmanship

## **PART 2 - PRODUCTS**

### **MATERIALS, GENERAL:**

**Compatibility:** Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience. Provide all sealants from one manufacturer to insure compatibility.

**Colors:** Provide color of exposed joint sealers indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.

- B. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: [ASTM C920](#), Type S, Grade NS, Class 50, for Use NT.
  - 1. Products:
    - a. Dow Corning Corporation; DOWSIL 795 Silicone Building Sealant.
    - b. Momentive Performance Materials; SilPruf SCS2000.
    - c. Pecora Corporation; 864.
    - d. Sika Corporation, Construction Products Division; Sikasil WS-295.
    - e. Tremco Commercial Sealants & Waterproofing; Spectrem 2.
  - 2. Locations of Use:



- a. Control, expansion and isolation joints in steel or aluminum.
- C. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: [ASTM C920](#), Type S, Grade NS, Class 100/50, for Use NT.
  - 1. Products:
    - a. Dow Corning Corporation; DOWSIL 790 Silicone Building Sealant.
    - b. Momentive Performance Materials; SilPruf LM SCS2700.
    - c. Pecora Corporation; 890.
    - d. Sika Corporation, Construction Products Division; Sikasil WS-290.
    - e. Tremco Commercial Sealants & Waterproofing; Spectrem 1.
  - 2. Sanding of Joints: Provide sanded joints at joints occurring in concrete and masonry surfaces.
  - 3. Stain-Test-Response Characteristics: Nonstaining to porous substrates per [ASTM C1248](#).
  - 4. Locations of Use:
    - a. Exterior joints in vertical and nontraffic surfaces, unless otherwise indicated.
    - b. Vertical control and expansion joints on exposed interior surfaces of exterior walls.
    - c. Interior perimeter joints of exterior openings.
- D. Mildew-Resistant, Single-Component, Silicone Joint Sealant: [ASTM C920](#), Type S, Grade NS, Class 25, for Use NT.
  - 1. Products:
    - a. Dow Corning Corporation; DOWSIL 786 Mildew Resistant Silicone Sealant.
    - b. Momentive Performance Materials (formerly GE Advanced Materials); Sanitary SCS1700.
    - c. Pecora Corporation; 898.
    - d. Sika Corporation, Construction Products Division; Sikasil-GP.
    - e. Tremco Commercial Sealants & Waterproofing; Tremsil 200 Sanitary or Tremsil 600.
  - 2. Locations of Use:
    - a. Interior joints between plumbing fixtures and adjoining walls, floors, and counters.
    - b. Interior joints between cabinetry and counters and adjoining walls.
- E. Single-Component, Silicone USDA Approved Joint Sealant: [ASTM C920](#), Type S, Grade NS, Class 25, for Use NT.
  - 1. Products:
    - a. Dow Corning Corporation; DOWSIL 786 Mildew Resistant Silicone Sealant.
    - b. Momentive Performance Materials (formerly GE Advanced Materials); Sanitary SCS1002.
    - c. Pecora Corporation; 898.
    - d. Sika Corporation, Construction Products Division; Sikasil-N-Plus.
    - e. Tremco Commercial Sealants & Waterproofing; Tremsil 600.
  - 2. Locations of Use:
    - a. Interior joints in contact with food.
- F. Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: [ASTM C920](#), Type M, Grade NS, Class 25, for Use T.
  - 1. Products:
    - a. BASF Building Systems; MasterSeal NP 2.
    - b. Pecora Corporation; Dynatred.
    - c. Sika Corporation, Construction Products Division; Sikaflex - 2c NS.
    - d. Tremco Commercial Sealants & Waterproofing; Dymeric 240FC.
  - 2. Locations of Use:
    - a. Interior ceramic tile expansion control and isolation joints in vertical surfaces.
    - b. Vertical joints on exposed surfaces of interior concrete and masonry walls.
- G. Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant: [ASTM C920](#), Type M, Grade P, Class 25, for Use T and I.

1. Products:
  - a. BASF Building Systems; MasterSeal SL 2.
  - b. Pecora Corporation; Urexpan NR-200.
  - c. Sika Corporation, Construction Products Division; Sikaflex - 2c SL.
  - d. Tremco Commercial Sealants & Waterproofing; THC 901 or Vulkem 455 SL.
2. Locations of Use:
  - a. Interior ceramic tile expansion, control, construction, and isolation joints in horizontal traffic surfaces.
  - b. Exterior paving joints.
- H. Single-Component, Nonsag, Urethane Joint Sealant: [ASTM C920](#), Type S, Grade NS, Class 50, for Use NT.
  1. Products:
    - a. BASF Building Systems, MasterSeal NP 100.
    - b. Sika Corporation, Construction Products Division; Sika Hyflex 150.
    - c. Tremco Commercial Sealants & Waterproofing; Dymonic 100.
  2. Locations of Use:
    - a. Within the field of fiber cement siding.
    - b. Interior painted concrete and unit masonry surfaces.
- I. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, [ASTM C834](#), Type OP, Grade NF.
  1. Products:
    - a. Pecora Corporation; AC-20+.
    - b. Tremco Commercial Sealants & Waterproofing; Tremflex 834.
  2. Locations of Use: Perimeter joints between interior wall surfaces and frames of interior doors and elevator entrances.
- J. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, aromatic polyurea with a Type A shore durometer hardness range of 80 to 95 per [ASTM D2240](#).
  1. Products:
    - a. BASF Building Systems; MasterSeal CR 100.
    - b. Euclid Chemical Company, QUIKjoint 200.
    - c. L&M Construction Chemicals, Inc; Joint Tite 750.
    - d. Sika Corporation, Construction Products Division; Loadflex 524.
  2. Locations of Use:
    - a. Interior joints in floor slabs.
- K. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with [ASTM C834](#). Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to [ASTM E90](#).
  1. Products:
    - a. Pecora Corporation; AC-20 FTR
    - b. Tremco Commercial Sealants & Waterproofing; Tremflex 834.
    - c. Tremco Commercial Sealants & Waterproofing; Tremco Acoustical Sealant (where fully concealed from view).
    - d. USG Corporation; SHEETROCK Acoustical Sealant or Firecode Smoke-Sound Sealant (where fully concealed from view).
- L. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application. Oversize 30 to 50 percent larger than joint width.
  1. Manufacturers:
    - a. Nomaco, Inc; SOF Rod: [www.nomaco.com/#sle](http://www.nomaco.com/#sle).
    - b. MasterSeal 921: [www.master-builders-solutions.basf.us](http://www.master-builders-solutions.basf.us).
- M. Sanding Joint Sealants: At concrete surfaces and masonry surfaces, sand sealant joints full height of wall as follows:
  1. Dry tool the sealant assuring a minimum sealant thickness of 1/4 inch in the middle of the joint.

2. Before the sealant has skinned, deposit the selected dry sand particles to the tacky sealant surface using whatever method is site appropriate (casting, tossing, air-blowing). Catch the excess particles, if possible, for reuse. Start at the lower levels and work up to minimize substrate contamination below.
  3. Compress the particles into the surface of the un-skinned sealant to a depth of not greater than 1/16-inch, using a dry tool or other technique.
  4. Allow the joint sealant to cure a minimum of seven days before testing the adhesion of the particles to the sealant or the sealant to the substrate.
- N. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
1. Warranty Period for Silicone Sealants: 20 years from Date of Substantial Completion.
  2. Warranty Period for Polyurea Sealants: 1 year from Date of Substantial Completion.
  3. Warranty Period for All Other Types of Sealants: 5 years from Date of Substantial Completion.

### **FIRE-RESISTANT JOINT SEALANTS:**

**General:** Provide manufacturer's standard fire-stopping sealant, with accessory materials, having fire-resistance ratings indicated as established by testing identical assemblies per ASTM E 814 by Underwriters Laboratory, Inc. or other testing and inspecting agency acceptable to authorities having jurisdiction.

**Foamed-In-Place Fire-Stopping Sealant:** Two-part, foamed-in-place, silicone sealant formulated for use in a through-penetration fire-stop system for filling openings around cables, conduit, pipes and similar penetrations through walls and floors.

**One-Part Fire-Stopping Sealant:** One part elastomeric sealant formulated for use in a through-penetration fire-stop system for sealing openings around cables, conduit, pipes and similar penetrations through walls and floors.

**Products:** Subject to compliance with requirements, provide one of the following:

#### **Foamed-In-Place Fire-Stopping Sealant:**

"Dow Corning Fire Stop Foam"; Dow Corning Corp.  
"Pensil 851"; General Electric Co.

**One-Part Fire-Stopping Sealant:** <http://www.tremcosealants.com/commercial/firestop/default.asp>

"Dow Corning Fire Stop Sealant"; Dow Corning Corp.  
"3M Fire Barrier Caulk CP-25"; Electrical Products Div./3M.  
"RTV 7403"; General Electric Co.  
"Fyre Putty"; Standard Oil Engineered Materials Co.

### **JOINT SEALANT BACKING:**

**General:** Provide sealant backings of material and type which are nonstaining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

**Plastic Foam Joint Fillers:** Preformed, compressible, resilient, nonwaxing, nonextruding strips of flexible, nongassing plastic foam of material indicated below; nonabsorbent to water and gas; and of size, shape and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

**Either open-cell polyurethane** foam or closed-cell polyethylene foam, unless otherwise indicated, subject to approval of sealant manufacturer, for cold-applied sealants only.

**Elastomeric Tubing Joint Fillers:** Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, capable of remaining resilient at temperatures down to -26 deg F (-15 deg C). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.

**Bond-Breaker Tape:** Polyethylene tape or other plastic tape as recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

### **MISCELLANEOUS MATERIALS:**

**Primer:** Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealer-substrate tests and field tests.

**Cleaners for Nonporous Surfaces:** Provide nonstaining, chemical cleaners of type which are acceptable to manufacturers of sealants and sealant backing materials, which are not harmful to substrates and adjacent nonporous materials, and which do not leave oily residues or otherwise have a detrimental effect on sealant adhesion or in-service performance.

**Masking Tape:** Provide nonstaining, nonabsorbent type compatible with joint sealants and to surfaces adjacent to joints.

**Accessory Materials for Fire-Stopping Sealants:** Provide forming, joint fillers, packing and other accessory materials required for installation of fire-stopping sealants as applicable to installation conditions indicated.

## **PART 3 - EXECUTION**

### **EXAMINATION:**

**Examine joints indicated** to receive joint sealers, with Installer present, for compliance with requirements for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealer performance. Do not proceed with installation of joint sealers until unsatisfactory conditions have been corrected.

### **PREPARATION:**

**Surface Cleaning of Joints:** Clean out joints immediately before installing joint sealers to comply with recommendations of joint sealer manufacturers and the following requirements:

**Remove all foreign material** from joint substrates which could interfere with adhesion of joint sealer, including dust; paints, except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer; old joint sealers; oil; grease; waterproofing; water repellants; water; surface dirt; and frost.

**Clean concrete, masonry,** unglazed surfaces of ceramic tile and similar porous joint substrate surfaces, by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealers. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

Remove laitance and form release agents from concrete.

**Clean metal, glass, porcelain enamel,** glazed surfaces of ceramic tile; and other nonporous surfaces by chemical cleaners or other means which are not harmful to substrates or leave residues capable of interfering with adhesion of joint sealers.

**Joint Priming:** Prime joint substrates where indicated or where recommended by joint sealer manufacturer based on preconstruction joint sealer-substrate tests or prior experience. Apply primer to comply with joint sealer manufacturer's recommendations. Confine primers to areas of joint sealer bond, do not allow spillage or migration onto adjoining surfaces.

**Masking Tape:** Use masking tape where required to prevent contact of sealant with adjoining surfaces which otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### **INSTALLATION OF JOINT SEALERS:**

**General:** Comply with joint sealer manufacturers' printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

**Elastomeric Sealant Installation Standard:** Comply with recommendations of ASTM C 962 for use of joint sealants as applicable to materials, applications and conditions indicated.

**Solvent-Release-Curing Sealant Installation Standard:** Comply with requirements of ASTM C 804 for use of solvent-release-curing sealants.

**Latex Sealant Installation Standard:** Comply with requirements of ASTM C 790 for use of latex sealants.

**Acoustical Sealant Application Standard:** Comply with recommendations of ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

**Installation of Sealant Backings:** Install sealant backings to comply with the following requirements:

**Install joint fillers** of type indicated to provide support of sealants during application and at position required to produce the cross-sectional shapes and depths of installed sealants relative to joint widths which allow optimum sealant movement capability.

Do not leave gaps between ends of joint fillers.

Do not stretch, twist, puncture, or tear joint fillers.

**Remove absorbent joint fillers** which have become wet prior to sealant application and replace with dry material.

**Install bond breaker tape** between sealants and joint fillers, compression seals, or back of joints where adhesion of sealant to surfaces at back of joints would result in sealant failure.

**Install compressible seals** serving as sealant backings to comply with requirements indicated above for joint fillers.

**Installation of Sealants:** Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths which allow optimum sealant movement capability.

**Tooling of Nonsag Sealants:** Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents which discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

Provide concave joint configuration per Figure 6A in ASTM C 962, unless otherwise indicated.

Use masking tape to protect adjacent surfaces of recessed tooled joints.

Provide Recessed joint configuration per Figure 6C in ASTM C 962, of recess depth and at locations indicated.

**Installation of Preformed Foam Sealants:** Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, and to comply with sealant manufacturer's directions for installation methods, materials, and tools which produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in conformance with sealant manufacturer's recommendations.

**Installation of Preformed Hollow Neoprene Gaskets:** Install gaskets, with minimum number of end joints, in joint recesses with edges free of spalls and sides straight and parallel, both within tolerances specified by gasket manufacturer. Apply manufacturer's recommended adhesive to joint substrates immediately prior to installing gaskets. For straight sections provide gaskets in continuous lengths; where changes in direction occur, adhesively splice gasket together to provide watertight joint. Recess gasket below adjoining joint surfaces by 1/8 inch to 1/4 inch.

**Installation of Fire-Stopping Sealant:** Install sealant, including forming, packing, and other accessory materials to fill openings around mechanical and electrical services penetrating floors and walls to provide fire-stops with fire resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.

### **CLEANING:**

**Clean off excess sealants** or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealers and of products in which joints occur.

### **PROTECTION:**

**Protect joint sealers** during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealers immediately and reseal joints with new materials to produce joint sealer installations with repaired areas indistinguishable from original work.

END OF SECTION 07 92 00 

## **SECTION 08 12 13 - HOLLOW METAL DOORS & FRAMES**

### **PART 1 - GENERAL**

#### **RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

**Coordinate for installation of new interior hollow metal frames with wood doors.**

#### **DESCRIPTION OF WORK:**

**Extent of standard steel doors and frames** is indicated on drawings and as noted below.

Interior hollow metal frame near the main entrance.

**Finish hardware** is specified elsewhere in Division 8.

#### **QUALITY ASSURANCE:**

**Provide doors and frames** complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.

#### **SUBMITTALS:**

**Product Data:** Submit manufacturer's technical product data substantiating that products comply with requirements.

**Shop Drawings:** Submit for fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

**Provide schedule of doors** and frames using same reference numbers for details and openings as those on contract drawings. Submittals which use different numbers, are confusing, or unorganized, difficult to compare to the contract documents, will be returned without review, stamped "revise and resubmit." Contract shall coordinate and carefully select frame width based upon wall types shown on plans. Contractor is responsible to ensure proper frame widths for each wall type.

**Indicate coordinate of** glazing frames and stops with glass and glazing requirements.

#### **DELIVERY, STORAGE AND HANDLING:**

**Deliver hollow metal work cartoned** or crated to provide protection during transit and job storage. Provide additional sealed plastic wrapping for factory-finished doors.

**Inspect hollow metal work** upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

**Store doors and frames** at building site under cover. Place units on minimum 4" high wood blocking. Avoid use of non-vented plastic or canvas shelters, which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4" spaces between stacked doors to promote air circulation.

## **PART 2 - PRODUCTS**

### **ACCEPTABLE MANUFACTURERS:**

**Manufacturer:** Subject to compliance with requirements, provide steel doors and frames by one of the following:

#### **Hollow Metal Doors & Frames, (General):**

Curries, an Assa Abloy Group company: [www.assaabloydss.com](http://www.assaabloydss.com).  
Steelcraft, an Allegion brand: [www.allegion.com/#sle](http://www.allegion.com/#sle).  
Stiles Custom Metal, Inc: [www.stiles.com](http://www.stiles.com).

**Interior & Exterior Door Frames** Non-Fire Rated: Full profile/continuously welded type.

**Frame Metal Thickness:** 14 gage, 0.067 inch, minimum.

**Frame Finish:** Factory primed, and field finished.  
Provide primer compatible with primers specified in Section 09 96 00 - High-Performance Coatings. Provide rust inhibiting, complying with ANSI/SDI A250.10.

### **MATERIALS:**

**Hot-Rolled Steel Sheets and Strip:** Commercial quality carbon steel, pickled and oiled, complying with ASTM A 569 and ASTM A 568.

**Cold-Rolled Steel Sheets:** Commercial quality carbon steel, complying with ASTM A 366 and ASTM A 568.

**Galvanized Steel Sheets:** Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A 526, with ASTM A 525, G60 zinc coating, mill phosphatized.

**Supports and Anchors:** Fabricate of not less than 18- gage galvanized sheet steel.

**Inserts, Bolts and Fasteners:** Manufacturer's standard units, except hot-dip galvanized items to be built into exterior walls, complying with ASTM A 153, Class C or D as applicable.

#### **Shop Applied Paint:**

**Primer: Rust-inhibitive enamel** or paint, either air-drying or baking, suitable as a base for specified finish paints.

**Mineral-Fiber Insulation:** [ASTM C665](#), Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame- spread and smoke-development indexes of 25 and 50, respectively; passing [ASTM E136](#) for combustion characteristics.

**Grout for Frames:** Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.



**Coat inside of frames** to be installed in concrete and masonry or to be grouted, with corrosion resistant coating at 4 mil DFT, prior to installation.

**Stud Partitions:** Solidly pack mineral-fiber insulation behind frames.

### **FABRICATION, GENERAL:**

**Fabricate steel frame** units to be rigid, neat in appearance and free from defects, warp, or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site. Comply with SDI-100 requirements as follows:

**Fabricate exposed faces** of doors and panels, including stiles and rails of nonflush units, from only cold-rolled steel. Seamless in addition to the requirements for full flush doors as defined in ANSI/SDI A250.8, no visible seams are permitted along the vertical edges of doors. Fabricate seams on the vertical edge of one of the following methods: Intermittently welded seams, edge filled, dressed smooth or continuously welded seam dressed smooth.

**Fabricate exterior doors,** panels, and frames from galvanized sheet steel. Close top and bottom edges of exterior doors as integral part of door construction with addition of minimum 14-gage inverted steel channels surround and for reinforcement at all Locks, Closers, and Exit Devices. All out swinging doors shall have flush top caps sealed with silicone.

### **Thermal-Rated (Insulating) Assemblies:**

**At exterior locations** and elsewhere as shown or scheduled,

1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
  - a. Level 3 - Extra Heavy-duty.
  - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
  - c. Model 2 - Seamless.
  - d. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.
  - e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
2. Core Material: Vertical steel stiffeners with fiberglass batts. Stiffeners to be minimum 20 gage, 0.032-inch, at 6 inches on center.
3. Door Thickness: 1-3/4-inch, nominal.
4. Insulating Value: U-Value of 0.50, when tested in accordance with ASTM C1363.

**Finish Hardware Preparation:** Prepare doors and coordinate with alum storefront frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templated provided by hardware supplier. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparation for hardware.

**For concealed overhead door closers,** provide space, cutouts, reinforcing and provisions for fastening in top rail of doors or head of frames, as applicable.

**Reinforce doors and frames** to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.

**Locate finish hardware** as indicated on final shop drawings or, if not shown, in accordance with "Recommended Locations for Builder's Hardware," published by Door and Hardware Institute.

**Exposed Fasteners:** Unless otherwise indicated, provide countersunk flat Phillips heads for exposed screws and bolts.

**Shop Painting:**

**Clean, treat, and paint** exposed surfaces of steel door and frame units, including galvanized surfaces.

**Clean steel surfaces** of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.

**Apply shop coat of prime paint** of even consistency to provide a uniformly finished surface ready to receive finish paint.

**STANDARD STEEL DOORS:**

Provide metal doors of types and styles indicated on drawings or schedules. Comply with the following minimum requirements:

**Doors Non-Fire Rated:**

Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).

Level 3 - Extra Heavy-duty.

Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.

Model 2 - Seamless.

Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.

Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.

Core Material: Vertical steel stiffeners, minimum 20 gage, 0.032-inch, at 6 inches on center.

Door Thickness: 1-3/4 inch, nominal.

**Door Silencers:** Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-swing frames and 2 silencers on heads of double-swing frames.

**Plaster Guards:** Provide 26-gage steel plaster guards or mortar boxes, welded to frame, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

**STANDARD STEEL DOOR FRAMES**

Frame Finish: Factory primed, and field finished.

1. Provide primer compatible with primers specified in Section 09.11- High- Performance Coatings.

Door Frames: Full profile/continuously welded type.

1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvanized) in accordance with ASTM A653/A653M, with A60/ZF180 coating. Double rabbet masonry frames.

Frame Metal Thickness: 14 gage, 0.067 inch, minimum.

Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, and compatible with finish coats specified in Section 09.11 - High-Performance Coatings.

Corrosion Resistant Coating: High-build, water-resistant, resilient coating NFPA 101 Class A.

1. Product: Hi-Build Epoxoline II N69 manufactured by Tnemec or equal.

Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

Coat inside of frames to be installed in concrete and masonry or to be grouted, with corrosion resistant coating at 4 mil DFT, prior to installation.

### **PART 3 - EXECUTION**

#### **INSPECTION:**

#### **INSTALLATION:**

**General:** Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.

#### **Door Installation:**

**Fit hollow metal doors accurately in** frames, within clearances specified in SDI-100.

#### **ADJUST AND CLEAN:**

**Prime Coat Touch-up:** Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

**Protection Removal:** Immediately prior to final inspection, remove protective plastic wrappings from prefinished doors.

**Final Adjustments:** Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

**END OF SECTION 08 12 13**

## **SECTION 08 80 00 - GLAZING**

### **PART 1 - GENERAL**

#### **RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

#### **SUMMARY:**

**Extent** of glass and glazing work is indicated on drawings and schedules.

**Types** of work in this section include glass and glazing for:

Aluminum Storefront and Storefront Doors.

#### **SYSTEM DESCRIPTION:**

**Provide glass and glazing** that has been produced, fabricated, and installed to withstand normal thermal movement, wind loading and impact loading (where applicable), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials, and other defects in the work.

**Certificate:** Submit certificates from respective manufacturers attesting that glass and glazing materials furnished for project comply with requirements.

Separate certification will not be required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authorities having jurisdiction.

#### **SAMPLES:**

Provide sample of glazing for District approval.

#### **QUALITY ASSURANCE:**

**Perform Work in** accordance with GANA (GM), GANA (SM), GANA (LGRM) and IGMA TM-3000 for glazing installation methods. Maintain one copy on site.

**Glazing Standards:** Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.

**Safety Glazing Standard:** All glazing shall be safety glass. Provide products which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials.

**Single Source Responsibility for Glass:** To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type and class required.

**Glass Testing Agency Qualifications:** A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

**Sealant Testing Agency Qualifications:** An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

**Source Limitations for Glazing Accessories:** Obtain from single source from single manufacturer for each product and installation method.

**Glazing Publications:** Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

**IGMA Publication for Insulating Glass:** SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

**Safety Glazing Labeling:** Permanently mark glazing with certification label of **the SGCC**. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

**Insulating-Glass Certification Program:** Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

1. Install glazing in mockups specified in Division 08 Section "**Aluminum Storefronts**" to match glazing systems required for Project, including glazing methods.

## **DELIVERY, STORAGE, AND HANDLING:**

**Protect glass and glazing materials** during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

## **PROJECT CONDITIONS:**

**Environmental Conditions:** Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation, or other causes.

## **WARRANTY:**

**General:** Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

### **Warranty:**

**Insulating Glass Units:** Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

**Laminated Glass:** Provide a ten (10) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

**Coated Glass:** Provide a ten (10) year manufacturer warranty to included deterioration of coated glass including peeling, cracking and other indications of deterioration of coating.

## **PRECONSTRUCTION TESTING**

**Preconstruction Adhesion and Compatibility Testing:** Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.

Test no fewer than **eight** Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.

Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

## **PART 2 - PRODUCTS**

### **MANUFACTURERS:**

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

### **Manufacturers of Tempered Insulating Glass:**

OldCastle Building Envelope.

Guardian Industries Corp.

PPG Industries Inc.

## **GLASS PRODUCTS, GENERAL**

**Thickness:** Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated. **Minimum Glass Thickness for Door Lites:** Not less than 1/4 inch at each pane.

**Strength:** At fully tempered glass, provide Kind FT heat-treated float glass.

**Heat-Treated Glass Standard:** Provide heat-treated glass which complies with ASTM C 1048 requirements, including those indicated by reference to kind, condition, type, quality, class, and, if applicable, form, finish, and pattern.

**Sizes:** Fabricate glass to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Provide thicknesses indicated or, if not otherwise indicated, as recommended by glass manufacturer for application indicated.

**Laminated Safety Glass** (Type LT-X): Clear; fully tempered.

Laminated with 0.030 inch thick polyvinyl butyral interlayer; comply with ASTM C1172.

a. Interlayer Color: Clear.

Glass Thickness: Two layers 3 mm nominal clear tempered safety glass.

Locations of Use: Doors and adjacent re-lites. See Schedule at end of this Section.

**Insulated Clear Tempered Safety Glass Units** (Type IT-1): Double pane with silicone sealant edge seal.

Outer pane of 6 mm clear tempered float glass, inner pane of 6 mm clear tempered float glass.

Interspace Content: Argon.

Durability: Certified by an independent testing agency to comply with ASTM E2190.

Total unit thickness of 1 inch.

Visible Light Transmittance: 68 percent minimum.

Winter Nighttime U-Factor: 0.25 maximum.

**Solar Heat Gain Coefficient: 0.36 maximum.**

**Locations of Use:** All exterior storefront, & entrance doors, unless otherwise indicated.

**Structural Glazing Sealant:** Single component, neutral-curing; ASTM C920, Type S, Grade NS, Class 50, Use NT, G and A; ASTM C1184.

Product:

Dow Corning Corporation; 995 Silicone.

Locations of Use: Security Glazing for Glass Type(s).

**Kind FT** (fully tempered) at all locations.

All other glass:

Insulated Safety Glass

## **MISCELLANEOUS GLAZING MATERIALS:**

**Compatibility:** Provide materials with proven record of compatibility with surfaces contacted in installation.

**Cleaners, Primers, and Sealers:** Type recommended by sealant or gasket manufacturer.

**Setting Blocks:** Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.

**Spacers:** Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.

**Edge Blocks:** Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.

## **PART 3 - EXECUTION**

### **EXAMINATION:**

**Require Glazier** to inspect work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required face or edge clearances; and for effective sealing of joinery. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

### **PREPARATION:**

**Clean glazing channels** and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

## **GLAZING, GENERAL:**

**Comply with combined printed recommendations** of glass manufacturers, of manufacturers of sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

**Glazing channel dimensions** as indicated in detail are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.

**Protect glass from edge damage** during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass, and impairs performance and appearance.

**Apply primers to joint surfaces** where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

## **GLAZING:**

**Install setting blocks** of proper size in sill rabbet, located one quarter of glass width from each corner, but with edge nearest corner not closer than 6" from corner, unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.

**Provide spacers inside and out**, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.

**Provide edge blocking** to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.

**Set units of glass** in each series with uniformity of pattern, draw, bow and similar characteristics.

**Force sealants into glazing channels** to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.

**Tool exposed surfaces** of sealants to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, to eliminate dirt and moisture pockets.

**Where wedge-shaped gaskets** are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.

**Miter cut wedge-shaped gaskets** at corners and install gaskets in manner recommended by gasket manufacturer to prevent pull away at corners; seal corner joints and butt joints with sealant recommended by gasket manufacturer.



**PROTECTION AND CLEANING:**

**Protect exterior glass from breakage** immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.

**Protect glass** from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.

**Examine glass surfaces** adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.

**Remove and replace glass** which is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents, and vandalism.

**Wash glass** on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Wash glass by method recommended by glass manufacturer.

**END OF SECTION 08 80 00**

## **SECTION 08 71 00 - DOOR HARDWARE**

### **PART 1 - GENERAL**

#### **RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to the work of this section.

#### **DESCRIPTION OF WORK:**

**Definition: "Builders" Hardware** includes items known commercially as builder's hardware which are required for swing, sliding and folding doors, except special types of unique and non-matching hardware specified in the same section as the door and door frame.

**Extent of finish hardware required** is indicated on drawings and in schedules.

**Types of finish hardware required** include the following:

Hinges  
Lock cylinders and keys  
Lock and latch sets  
Exit devices  
Closers  
Door trim units  
Protection plates  
Astragals or meeting seals on pairs of doors  
Thresholds  
Security products  
Silencers included integral with hollow metal frames are specified with door frames elsewhere in Division 8.

#### **QUALITY ASSURANCE:**

**Manufacturer:** Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from only one manufacturer, although several may be indicated as offering products complying with requirements.

**Supplier:** A recognized architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than 2 years, and who is, or who employs an experienced **architectural hardware consultant** (AHC) who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor. Supplier shall be a factory direct distributor for specified hardware.

The manufacturer's representative for locking devices and closing devices must inspect and approve, in writing, the installation of their products. Hardware installed incorrectly must be reported to the architect prior to the architect's final punch list.

The manufacturer's representative for the door closers must inspect and adjust all door closers at the completion of the project. The HVAC system must be completed and balanced before the door closer are adjusted.

#### **SUBMITTALS:**

**Product Data:** Submit manufacturer's technical product data for each item of hardware in accordance with Division-1 section "Submittals". Include whatever information may be necessary to show compliance with requirements and include instructions for installation and for maintenance of operating parts and finish.

**Hardware Schedule:** Submit final hardware schedule in manner indicated below. Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware. Incomplete, or confusing submittals will be returned without review.

**Final Hardware Schedule Content:** Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:

**Type, style, function, size and finish** of each hardware item.

Name and manufacturer of each item.

Fastenings and other pertinent information.

**Location of hardware set** cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.

**Explanation of all abbreviations**, symbols, codes, etc. contained in schedule.

Mounting locations for hardware.

Door and frame sizes and materials.

**Submittal Sequence:** Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinated review of hardware schedule.

**Keying Schedule:** Furnish all lock cylinders, including cabinet locks, to be keyed to match owner's master key system. Subcontractor shall contact owner's representative to verify keying prior to performing work.

Provide construction locks on all exterior doors.

**Templates:** Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.

## **PRODUCT HANDLING:**

**Tag each item or package separately,** with identification related to final hardware schedule, and include basic installation instructions with each item or package.

**Packaging of hardware**, is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.

Inventory hardware jointly with representatives of the hardware supplier and the hardware installer until each is satisfied that the count is correct.

**Deliver individually packaged hardware** items at the proper times to the proper locations (shop or project site) for installation.

**Provide secure lock-up for hardware** delivered to the project, but not yet installed. Control handling and installation of hardware items which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses, both before and after installation.

## **PART 2 - PRODUCTS**

### **SCHEDULED HARDWARE:**

**Requirements for design, grade, function, finish, size** and other distinctive qualities of each type of finish hardware is indicated in the Finish Hardware Data Sheet and Hardware Schedule at the end of this section. Products are identified by using hardware designation numbers of the following.

**Manufacturer's product designations:** One or more manufacturers are listed for each hardware type required. An asterisk (\*) after a manufacturer's name indicates whose product designation is used in the Hardware Schedule for purposes of establishing minimum requirements. Provide either the product designated, or, where more than one manufacturer is listed, the comparable product of one of the other manufacturers which comply with requirements including those specified elsewhere in this section.

**ANSI/BHMA designations used elsewhere** in this section or in schedules to describe hardware items or to define quality or function are derived from the following standards. Provide products complying with these standards and requirements specified elsewhere in this section.

Butts and Hinges: ANSI A156.1 (BHMA 101)

Locks & Lock Trim: ANSI A156.2 (BHMA 601)

Exit Devices: ANSI A156.3 (BHMA 701)

Door Controls - Closers: ANSI A156.4 (BHMA 301)

Auxiliary Locks: ANSI A 156.5 (BHMA 501).

Architectural Door Trim: ANSI A156.6 (BHMA 1001)

Template Hinge Dimensions: ANSI A156.7.

Closer Holder Release Devices: ANSI A156.15 (BHMA 321)

Auxiliary Hardware: ANSI A156.16 (BHMA 1201)

Materials & Finishes: ANSI A156.18 (BHMA 1301)

### **MATERIALS AND FABRICATION:**

#### **General:**

**Hand of door:** Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

**Base Metals:** Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially recognized) quality than specified for the applicable hardware units by applicable ANSI A156 series standard for each

type hardware item and with ANSI A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

**Fasteners:** Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

**Furnish screws for installation,** with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.

**Provide concealed fasteners for hardware units** which are exposed when door is closed, except to extent no standard units of the type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on the opposite face is exposed in other work, except where it is not feasible to adequately reinforce the work. In such cases, provide sleeves for each thru-bolt or use sex screw fasteners.

**Tools and Maintenance Instructions for Maintenance:** Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

## **HINGES, BUTTS AND PIVOTS:**

**Templates:** Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

**Screws:** Furnish Phillips flat-head or machine screws for installation of units, except furnish Phillips flat-head or wood screws for installation of units into wood. Finish screw heads to match surface of hinges or pivots.

**Hinge Pins:** Except as otherwise indicated, provide hinge pins as follows:

**Steel Hinges:** Steel pins.

**Out-swing Corridor Doors:** Non-removable pins.

**Interior Doors:** Non-rising pins.

**Tips:** Flat button and matching plug, finished to match leaves, except where hospital tip (HT) indicated.

**Number of hinges:** Provide number of hinges indicated but not less than 3 hinges for door leaf for doors 90" or less in height and one additional hinge for each 30" of additional height.

## **LOCK CYLINDERS AND KEYING:**

**General:** Supplier will furnish all locks to be keyed to Owner master system.

Equip locks with manufacturer's standard 6-pin tumbler cylinders.

**Manufacturer:** Subject to compliance with requirements, provide products of one of the following:

**Schlage**

**Metals:** Construct lock cylinder parts from brass.

**Key Material:** Provide keys of nickel silver only.

**Key Quantity:** Furnish the following:

- 10 ea. Master Keys
- 5 ea. Change Keys each keyed core
- 5 ea. Construction Master Keys

Deliver keys to Owner's representative.

### **LOCKS, LATCHES AND BOLTS:**

**Strikes:** Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set.

**Lock Throw:** Provide 3/4" minimum throw of latch and deadbolts. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.

**Exit Device Dogging:** Except on fire-rated doors, wherever closers are provided on doors equipped with exit devices, equip the units with keyed dogging device to hold the push bar down and the latch bolt in the open position.

### **CLOSERS AND DOOR CONTROL DEVICES:**

**Size of Units:** Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather and anticipated frequency of use.

**Access-Free Manual Closers:** All manual closers are required to be accessible to the physically handicapped, provide adjustable units complying with ANSI A 117.1 provisions for door opening force and delayed action closing.

**Combination Door Closers and Holders:** Provide units designed to hold door in open position under normal usage and to release and automatically close door under fire conditions. Incorporate an integral electromagnetic holder mechanism designed for use with UL listed fire detectors, provided with normally closed switching contacts.

Provide integral smoke detector device in combination door closers and holders complying with UL 228.

### **DOOR TRIM UNITS:**

**Fasteners:** Provide manufacturer's standard exposed fasteners for door trim units (kick plates, edge trim, viewers, knockers, mail drops and similar units); either machine screws or self-tapping screw.

Fabricate edge trim of stainless steel, not more than 1/2" nor less than 1/16" smaller in length than door dimension.

Fabricate protection plates (armor, kick or mop) not more than 1-1/2" less than door width on stop side and not more than 1/2" less than door width on pull side, x the height indicated.

Metal **Plates:** Stainless Steel, 16 gauge #4 finish.

### **HARDWARE FINISHES:**

**Provide matching finishes** for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lock set (or push-pull units if no latch-lock sets) for color and texture.

**Provide finishes which match those established by** BHMA and those of the existing hardware located within the building.

**Provide quality of finish, including thickness** of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than specified for the applicable units of hardware by referenced standards.

**The designations used in schedules** and elsewhere to indicate hardware finishes are the industry-recognized standard commercial finishes, except as otherwise noted.

### **MANUFACTURERS:**

**Doors and Frames** used in positive pressure opening assemblies shall meet UBC 7-2-97 and UL10C in areas where this has been adopted by the local authority having jurisdiction.

**The following hardware** is designed around Vancouver "S" labeled rated doors. If any other hardware is required by another door manufacturer, that manufacturer shall provide necessary hardware at no additional charge to the owner.

**Numbers appearing on Hardware** Schedule have been taken from the catalogs of the following manufacturers:

Locksets/Cylinders	Sch	Schlage
Butts	I	Ives
Kickplates	I	Ives
Stops	I	Ives
Panic Devices	VD	Von Duprin
Closers	LCN	LCN
Weatherstrip/Threshold	P	Pemko
Push / Pull	R	Rockwood
Others	As indicated	

### **HARDWARE SCHEDULE**

#### **GROUP NO. 1 Door #1**

#### **HM x HM**

4 ea.	Butts	I	5BB1 4.5x 4.5 NRP	630
1 ea.	Storeroom	SCH	L9465P 06N	619
1 ea.	Kickplate	I	8400 10" x 2" LDW x B4E	US32D
1 ea.	Seal	P	S88D	BL
1 ea.	Threshold	P	1715	AL
2 ea.	Sweep	P	90100 NB	AL

**GROUP NO. 2 Door #2,3, 4, 5, 6, 7, 8****HM x HM**

4 ea.	Butts	I	5BB1 4.5x 4.5 NRP	630
1 ea.	Privacy	SCH	L9485R 06N L283-722	619
1 ea.	Kickplate	I	8400 10" x 2" LDW x B4E	US32D
1 ea.	Seal	P	S88D	BL

**GROUP NO. 3 Door #9****HM x HM**

4 ea.	Butts	I	5BB1 4.5x 4.5 NRP	630
1 ea.	Storeroom	SCH	L9465P 06N	619
1 ea.	Kickplate	I	8400 10" x 2" LDW x B4E	US32D
1 ea.	Seal	P	S88D	BL

**GROUP NO. 4 Doors #10 from Exterior to Restroom****AL x AL**

4 ea.	Butts	BY ALUM STOREFRONT MFR.		
1	Cylinder	MED	10-0400 Y02 @ 1B	626
1 ea.	Closer	LCN	4041 XP-S-CUSH	689
			WMS	
1 ea.	Pull/Push	Rockwood	VRP 30 (cylinder prep)	US32D
1 ea.	Kickplate	I	8400 10" x 2" LDW x B4E	US32D
1 ea.	Threshold	BY ALUMINUM STOREFRONT MFR.		
2 ea.	Sweep	BY ALUM STOREFRONT MFR.		
1 ea.	Seals	BY ALUM STOREFRONT MFR		
1 ea.	Elect. Trans.	VD	EPT-2	CLR
1 ea.	Power Supply	VD	PS871-2	626

All wiring & card access by security contractor or electrician as required.

**PART 3 – EXECUTION****INSTALLATION:**

**Mount hardware units at heights indicated** in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations, and except as may be otherwise directed by Architect. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protections with finishing work specified in the Division-9 sections. Do not install surface -mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant.

**ADJUST AND CLEAN:**



**Adjust and check each operating item** of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

**Clean adjacent surfaces soiled** by hardware installation.

**Final Adjustment:** Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

**Continued Maintenance Service:** Approximately six months after the acceptance of hardware in each area, the Installer, (General Contractor) shall return to the project and re-adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

**END OF SECTION 08 71 00**

## **SECTION 08 80 00 - GLAZING**

### **PART 1 - GENERAL**

#### **RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

#### **SUMMARY:**

**Extent** of glass and glazing work is indicated on drawings and schedules.

**Types** of work in this section include glass and glazing for:

Aluminum Storefront and Storefront Doors.

#### **SYSTEM DESCRIPTION:**

**Provide glass and glazing** that has been produced, fabricated, and installed to withstand normal thermal movement, wind loading and impact loading (where applicable), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials, and other defects in the work.

**Certificate:** Submit certificates from respective manufacturers attesting that glass and glazing materials furnished for project comply with requirements.

Separate certification will not be required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authorities having jurisdiction.

#### **SAMPLES:**

Provide sample of glazing for District approval.

#### **QUALITY ASSURANCE:**

**Perform Work in** accordance with GANA (GM), GANA (SM), GANA (LGRM) and IGMA TM-3000 for glazing installation methods. Maintain one copy on site.

**Glazing Standards:** Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.

**Safety Glazing Standard:** All glazing shall be safety glass. Provide products which comply with ANSI Z97.1 and testing requirements of 16 CFR Part 1201 for category II materials.

**Single Source Responsibility for Glass:** To ensure consistent quality of appearance and performance, provide materials produced by a single manufacturer or fabricator for each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type and class required.

**Glass Testing Agency Qualifications:** A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

**Sealant Testing Agency Qualifications:** An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

**Source Limitations for Glazing Accessories:** Obtain from single source from single manufacturer for each product and installation method.

**Glazing Publications:** Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

**IGMA Publication for Insulating Glass:** SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

**Safety Glazing Labeling:** Permanently mark glazing with certification label of **the SGCC**. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

**Insulating-Glass Certification Program:** Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

1. Install glazing in mockups specified in Division 08 Section "**Aluminum Storefronts**" to match glazing systems required for Project, including glazing methods.

## **DELIVERY, STORAGE, AND HANDLING:**

**Protect glass and glazing materials** during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass, and damage to glass and glazing materials from effects of moisture including condensation, of temperature changes, of direct exposure to sun, and from other causes.

## **PROJECT CONDITIONS:**

**Environmental Conditions:** Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation, or other causes.

## **WARRANTY:**

**General:** Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.

### **Warranty:**

**Insulating Glass Units:** Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

**Laminated Glass:** Provide a ten (10) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

**Coated Glass:** Provide a ten (10) year manufacturer warranty to included deterioration of coated glass including peeling, cracking and other indications of deterioration of coating.

## **PRECONSTRUCTION TESTING**

**Preconstruction Adhesion and Compatibility Testing:** Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.

Test no fewer than **eight** Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.

Schedule sufficient time for testing and analyzing results to prevent delaying the Work.

For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

## **PART 2 - PRODUCTS**

### **MANUFACTURERS:**

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

### **Manufacturers of Tempered Insulating Glass:**

OldCastle Building Envelope.

Guardian Industries Corp.

PPG Industries Inc.

## **GLASS PRODUCTS, GENERAL**

**Thickness:** Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated. **Minimum Glass Thickness for Door Lites:** Not less than 1/4 inch at each pane.

**Strength:** At fully tempered glass, provide Kind FT heat-treated float glass.

**Heat-Treated Glass Standard:** Provide heat-treated glass which complies with ASTM C 1048 requirements, including those indicated by reference to kind, condition, type, quality, class, and, if applicable, form, finish, and pattern.

**Sizes:** Fabricate glass to sizes required for glazing openings indicated, with edge clearances and tolerances complying with recommendations of glass manufacturer. Provide thicknesses indicated or, if not otherwise indicated, as recommended by glass manufacturer for application indicated.

**Laminated Safety Glass** (Type LT-X): Clear; fully tempered.

Laminated with 0.030 inch thick polyvinyl butyral interlayer; comply with ASTM C1172.

a. Interlayer Color: Clear.

Glass Thickness: Two layers 3 mm nominal clear tempered safety glass.

Locations of Use: Doors and adjacent re-lites. See Schedule at end of this Section.

**Insulated Clear Tempered Safety Glass Units** (Type IT-1): Double pane with silicone sealant edge seal.

Outer pane of 6 mm clear tempered float glass, inner pane of 6 mm clear tempered float glass.

Interspace Content: Argon.

Durability: Certified by an independent testing agency to comply with ASTM E2190.

Total unit thickness of 1 inch.

Visible Light Transmittance: 68 percent minimum.

Winter Nighttime U-Factor: 0.25 maximum.

Solar Heat Gain Coefficient: 0.38 maximum.

**Locations of Use:** All exterior storefront, & entrance doors, unless otherwise indicated.

**Structural Glazing Sealant:** Single component, neutral-curing; ASTM C920, Type S, Grade NS, Class 50, Use NT, G and A; ASTM C1184.

Product:

Dow Corning Corporation; 995 Silicone.

Locations of Use: Security Glazing for Glass Type(s).

**Kind FT** (fully tempered) at all locations.

All other glass:

Insulated Safety Glass

## **MISCELLANEOUS GLAZING MATERIALS:**

**Compatibility:** Provide materials with proven record of compatibility with surfaces contacted in installation.

**Cleaners, Primers, and Sealers:** Type recommended by sealant or gasket manufacturer.

**Setting Blocks:** Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.

**Spacers:** Neoprene, EPDM or silicone blocks, or continuous extrusions, as required for compatibility with glazing sealant, of size, shape and hardness recommended by glass and sealant manufacturers for application indicated.

**Edge Blocks:** Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealant, of size and hardness required to limit lateral movement (side-walking) of glass.

## **PART 3 - EXECUTION**

### **EXAMINATION:**

**Require Glazier** to inspect work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required face or edge clearances; and for effective sealing of joinery. Obtain Glazier's written report listing conditions detrimental to performance of glazing work. Do not allow glazing work to proceed until unsatisfactory conditions have been corrected.

### **PREPARATION:**

**Clean glazing channels** and other framing members to receive glass, immediately before glazing. Remove coatings which are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

## **GLAZING, GENERAL:**

**Comply with combined printed recommendations** of glass manufacturers, of manufacturers of sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

**Glazing channel dimensions** as indicated in detail are intended to provide for necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.

**Protect glass from edge damage** during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge which would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass, and impairs performance and appearance.

**Apply primers to joint surfaces** where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

## **GLAZING:**

**Install setting blocks** of proper size in sill rabbet, located one quarter of glass width from each corner, but with edge nearest corner not closer than 6" from corner, unless otherwise required. Set blocks in thin course of sealant which is acceptable for heel bead use.

**Provide spacers inside and out**, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.

**Provide edge blocking** to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer.

**Set units of glass** in each series with uniformity of pattern, draw, bow and similar characteristics.

**Force sealants into glazing channels** to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.

**Tool exposed surfaces** of sealants to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, to eliminate dirt and moisture pockets.

**Where wedge-shaped gaskets** are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.

**Miter cut wedge-shaped gaskets** at corners and install gaskets in manner recommended by gasket manufacturer to prevent pull away at corners; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

**PROTECTION AND CLEANING:**

**Protect exterior glass from breakage** immediately upon installation by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces.

**Protect glass** from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.

**Examine glass surfaces** adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.

**Remove and replace glass** which is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents, and vandalism.

**Wash glass** on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Wash glass by method recommended by glass manufacturer.

**END OF SECTION 08 80 00**

**SECTION 09 29 00 - GYPSUM BOARD****PART 1 - GENERAL****RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**SUMMARY:**

**Extent** of each type of gypsum drywall construction required is indicated on Drawings.

**This Section includes** the following types of gypsum board construction:

Gypsum board screw-attached to wood/metal framing and furring members.

**Wood framing and furring** are specified in the following Division 6 sections: "Rough Carpentry."

**DEFINITIONS:**

**Gypsum Board Construction Terminology:** Refer to ASTM C 11 and GA 505 for definitions of terms for gypsum board construction not otherwise defined in this section or other referenced standards.

**SUBMITTALS:**

Product data from manufacturers for each type of product specified.

**QUALITY ASSURANCE:**

**Fire-Resistance Ratings:** Where indicated, provide materials and construction which are identical to those of assemblies whose fire resistance rating has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.

Provide fire-resistance-rated assemblies identical to those indicated by reference to GA File No's. in GA-600 "Fire Resistance Design Manual" or to design designations in U.L. "Fire Resistance Directory" or in listing of other testing and agencies acceptable to authorities having jurisdiction.

**Single Source Responsibility:** Obtain each type of gypsum board and related joint treatment materials from a single manufacturer.

**DELIVERY, STORAGE, AND HANDLING:**

**Deliver materials** in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.

**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.



**Handle gypsum boards** to prevent damage to edges, ends, and surfaces. Do not bend or otherwise damage metal corner beads and trim.

### **PROJECT CONDITIONS:**

**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.

**Minimum Room Temperatures:** For nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board maintain not less than 50 deg F (10 deg C) for 48 hours prior to application and continuously thereafter until drying is complete.

**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 – PRODUCTS**

### **PERFORMANCE REQUIREMENTS**

**Fire-Resistance-Rated Assemblies:** For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

**STC-Rated Assemblies:** For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

### **MANUFACTURERS:**

**Manufacturer:** Subject to compliance with requirements, provide products of one of the following:

#### **Gypsum Boards and Related Products:**

Georgia-Pacific Corp.  
Gold Bond Building Products Div., National Gypsum Co.  
United States Gypsum Co.  
Domtar  
Pabco

### **GYPSUM BOARD:**

**General:** Provide gypsum board of types indicated in maximum lengths available to minimize end -to-end joints.

**Thickness:** Provide gypsum board in thicknesses indicated, or if not otherwise indicated, inch or 5/8 inch thicknesses to comply with ASTM C 840 for application system and support spacing indicated.

**Gypsum Wallboard:** ASTM C 36, and as follows:

**Type:** Type X

**Edges:** Tapered.

**Thickness:** 5/8 inch

Locations: Restroom, Janitor, and Storage Ceilings directly to framing.

### **TRIM ACCESSORIES:**

**General:** Provide manufacturer's standard trim accessories of types indicated for drywall work, formed of galvanized steel unless otherwise indicated, with either knurled and perforated or expanded flanges for nailing or stapling, and beaded for concealment of flanges in joint compound. Provide corner beads, L-type edge trim beads, U-Type edge trim-beads, special L-kerf type edge trim-beads, and one-piece control joint beads.

**Cornerbead and Edge Trim for Interior Installation:** Comply with ASTM C 840 and the following:

**F Joints:** Fry Reglet Aluminum finish at Judson and McNary.

**Cornerbead** formed from zinc alloy, with flanges knurled and perforated or of fine-mesh expanded metal.

**Steel Edge trim** formed from galvanized steel, types per Fig. 1 of ASTM C 840 as follows:

### **GYPSUM BOARD JOINT TREATMENT MATERIALS:**

**General:** Provide materials complying with ASTM C 475, ASTM C 840, and recommendations of manufacturer of both gypsum board and joint treatment materials for the application indicated.

### **MISCELLANEOUS MATERIALS:**

**General:** Provide auxiliary materials for gypsum drywall construction, which comply with referenced standards and the recommendations of the manufacturer of the gypsum board.

**Fastening Adhesive for Wood:** ASTM C 557.

**Fastening Adhesive for Metal:** Special adhesive recommended for laminating gypsum boards to steel framing.

**Gypsum Board Screws:** ASTM C 1002.

**Concealed Acoustical Sealant:** Nondrying, nonhardening, nonskinning, nonstaining, nonbleeding, gunnable sealant complying with requirement specified in Division-7 section "Joint Sealers."

### **TEXTURE FINISH MATERIALS:**

**Primer:** Of type recommended by manufacturer of texture finish.

**Products:** Subject to compliance with requirements, provide one of the following products:

**Smooth Finish.** No finish required as gypsum board ceiling will be covered with 2 x 6 T & G Decking.

### **PART 3 - EXECUTION**

**EXAMINATION:**

**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. Comply with ASTM C840.

**PREPARATION**

**Ceiling Anchorages:** Coordinate installation of ceiling suspension system with installation of overhead structural systems. Verify that inserts and other structural anchorage provisions have been installed to receive ceiling hangers in a manner that will develop their full strength and at spacing required to support ceiling.

**Furnish concrete inserts and other devices indicated** to other trades for installation well in advance of time needed for coordination with other construction.

**APPLICATION AND FINISHING OF GYPSUM BOARD, GENERAL:**

**Gypsum Board Application and Finishing Standard:** Install and finish gypsum board to comply with ASTM C 840.

**Install sound attenuation blankets** where indicated, prior to gypsum board unless readily installed after board has been installed.

**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.

**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.

**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.

**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.

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

Fit gypsum board around ducts, pipes, and conduits.

**Where sound-rated** drywall construction is indicated, seal construction at perimeters, control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim, and close off sound-flanking paths around or through construction including sealing of partitions above acoustical ceilings.

**Space fasteners** in gypsum boards in accordance with referenced gypsum board application and finishing standard and manufacturer's recommendations.

### **METHODS OF GYPSUM BOARD APPLICATION:**

**Single-Layer Application:** Install gypsum wallboard as follows:

**On ceilings** apply gypsum board prior to wall/partition board application to the greatest extent possible.

**On partitions/walls** apply gypsum board in a manner, which will minimize end joints.

**In "dry" areas** install gypsum backing board or wallboard with tapered edges taped and finished to produce a flat surface.

**Single-Layer Fastening Methods:** Apply gypsum boards to supports as follows:

Fasten with screws.

**In "dry" areas** install gypsum backing board or wallboard with tapered edges taped and finished to produce a flat surface.

### **INSTALLATION OF DRYWALL TRIM ACCESSORIES:**

**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.

**Install radius corner beads** at all external corner shown on details. Provide at all locations in Alternate Bid as scheduled.

**Install metal edge trim** whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound except where "U" bead (semi-finishing type) is indicated.

Install "LC" bead where drywall construction is tightly abutted to other construction and back flange can be attached to framing or supporting substrate.

Install "LK" bead where substrate is kerfed to receive long flange of trim.

Install "L" bead where edge trim can only be installed after gypsum board is installed.

Install U-type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).

### **FINISHING OF DRYWALL:**

**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. **Drywall to be primed only.**

**Prefill open joints** and rounded or beveled edges, if any, using setting-type joint compound.

**Apply joint tape** at joints between gypsum boards, except where trim accessories are indicated.

**Finish interior gypsum wallboard** by applying the following joint compounds in 3 coats (not including prefill of openings in base), and sand between coats and after last coat:

**Partial Finishing:** Omit third coat and sanding on concealed drywall construction, which is indicated for drywall finishing or which requires finishing to achieve fire-resistance rating, sound rating or to act as air or smoke barrier.

**PROTECTION:**

**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.

**END OF SECTION 09 29 00**

**GYPSUM BOARD 09 29 00-6**

**SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES**

**PART 1 - GENERAL**

**RELATED DOCUMENTS:**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

**DESCRIPTION OF WORK:**

**Extent** of resilient base and accessories is shown on drawings and in schedules.

**QUALITY ASSURANCE:**

**Manufacturer:** Provide each type of resilient flooring and accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants, and leveling compounds. Flooring subcontractor is responsible to attend pre-construction meeting and provide tile manufacturers written specifications for concrete slab sealants and curing compounds, and moisture content requirements. Flooring subcontractor will be required to take moisture meter readings in accordance with ASTM F 1869 Standard Test method for measuring vapor emission rate of concrete subfloor using anhydrous calcium chloride and provide written assurance and acceptance of concrete slab floor prior to laying floor tile.

**Critical Radiant Flux (CRF):** Not less than the following rating as per ASTM E 648. 0.45 watts per sq. cm.

**Flame Spread:** Not more than 75 per ASTM E 84.

**Smoke Developed:** Not more than 450 per ASTM E 84.

**Smoke Density:** Not more than 450 per ASTM E 662.

**Installer's Qualifications:** Engage Installer who is certified in writing by resilient flooring manufacturer as qualified for installation of sheet vinyl employing heat welded seams and installing vinyl tile. **In addition, to be eligible to perform work specified herein, Contractor must be acceptable to carpet Manufacturer and have successfully completed 2 similar projects (schools of similar size on a similar schedule).**

**Meet the standards** of the Resilient Floor Covering Institute.

**Coordinate with other trades affecting** or affected by work of this section.

**SUBMITTALS:**

**Product Data:** Submit manufacturer's technical data for each type of resilient flooring and accessory.

**Samples for Verification Purposes:** Submit the following samples of each type, color, and pattern of resilient flooring required, showing full-range of color and pattern variations.

12" long samples of resilient flooring accessories.

**Maintenance Instructions:** Submit 2 copies of manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.

**PROJECT CONDITIONS:**

**Maintain minimum temperature** of 65oF (18oC) in spaces to receive resilient flooring for at least 2 weeks prior to installation, during installation, and for not less than 2 weeks after installation. Store resilient flooring materials in spaces where they will be installed for at least 72 hours before beginning installation. Subsequently, maintain minimum temperature of 55oF (13oC) in areas where work is completed.

**Install resilient flooring and accessories** after other finishing operations, including painting, have been completed. Do not install resilient flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by manufacturer's recommended bond and moisture test. Provide written certification of such compliance prior to installation.

**Workspace Ventilation:** When using offensive odor adhesive provide sufficient ventilation to maintain healthy and pleasant environment for all trades.

**Workspace Illumination:** Do not work under less than 30-foot candles measured 3 ft. above the floor.

## **PART 2 - PRODUCTS**

### **ACCEPTABLE MANUFACTURERS:**

**Manufacturer:** Subject to compliance with requirements, provide products of one of the following:

**Resilient Base B-1:** ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.

#### **Manufacturers of Rubber Wall Base:**

- a. Burke Flooring: [www.burkeflooring.com/#sle](http://www.burkeflooring.com/#sle).
- b. Flexco, Inc: [www.flexcofloors.com](http://www.flexcofloors.com).
- c. Johnsonite, a Tarkett Company: [www.johnsonite.com](http://www.johnsonite.com).
- d. Roppe Corp: [www.roppe.com](http://www.roppe.com).
- e. Substitutions: See Section 01 60 00 - Product Requirements.

**Provide color and patterns** as indicated, or if not otherwise indicated, as selected by Architect from manufacturer's **complete line of colors**.

**Rubber Wall Base:** Provide rubber base complying with FS SS-W-40, Type I, with matching end stops and preformed or molded corner units, and as follows: Match existing at all schools.

1. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E648 or NFPA 253.
2. Height:
  - f. New Projects: 4 inches.
  - g. Remodel with existing base to be replaced: 6 inches.
3. Thickness: 0.125 inch.
4. Finish: Satin.
5. Length: Roll.

### **ACCESSORIES:**

**Adhesives (Cements):** Waterproof, stabilized type as recommended by flooring manufacturer to suit material and substrate conditions.

## **PART 3 - EXECUTION**

### **INSPECTION:**

**Inspection:** Before starting installation work, examine the parts of the building affecting work under this section. If previous work prevents proper execution of work in this Section, have work corrected by trades responsible for the incorrect work. Do not proceed with work under this Section, until all corrections have been made. Beginning of installation means acceptance of existing conditions.

Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.

Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

### **PREPARATION:**

**Require Installer** to inspect subfloor surfaces to determine that they are satisfactory. Prior to starting work, notify General Contractor of any unsatisfactory conditions. Do not start work until conditions are satisfactory.

### **INSTALLATION:**

#### **INSTALLATION OF ACCESSORIES:**

**Apply wall base** to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable, with preformed corner units, or fabricated from base materials with mitered or coped inside corners. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.

### **CLEANING AND PROTECTION:**

**Perform following operations** immediately upon completion of resilient base:

**Sweep or vacuum** floor thoroughly.

**Damp-mop floor** being careful to remove black marks and excessive soil.

**Remove any excess adhesive** or other surface blemishes, using appropriate cleaner recommended by resilient flooring manufacturers. Adhesive that continues to bleed up through joints will not be acceptable and will result in the subcontractor removing and replacing any such areas.

**Protect flooring** against damage during construction period to comply with resilient flooring manufacturer's directions.

**END OF SECTION 09 65 13**



**SECTION 09 91 13**  
**EXTERIOR PAINTING**

**A. GENERAL**

1. Surface preparation.
2. Field application of paint systems indicated as "P" (Paint) on the following substrates:
  - a. Concrete or plaster.
  - b. Concrete masonry units (CMU).
  - c. Fiber cement.
  - d. Gypsum board.
  - e. Wood.
  - f. Steel.
  - g. Galvanized metal.
  - h. Traffic marking paint.
3. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
  - a. Painting of zone and traffic markings (e.g. parking lines and numbers, direction arrows, etc, on concrete or asphalt paving) is Work of other Sections.
  - b. Mechanical and Electrical:
    - 1) On the roof and outdoors, paint equipment that is exposed to weather or to view, including factory-finished materials.
4. Do Not Paint or Finish the Following Items:
  - a. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
  - b. Items indicated to receive other finishes.
  - c. Items indicated to remain unfinished.
  - d. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
  - e. Concealed pipes, ducts, and conduits.

**B. RELATED REQUIREMENTS**

1. Section 09.10 - Interior Painting.
2. Section 09.11 - High-Performance Coatings: Painting of metals with high-performance coatings indicated as "HPC" on Drawings.
3. Section 09.12 - Elastomeric Coatings: Painting of exterior concrete and unit masonry surfaces indicated as "EC" on Drawings.
4. Section 09.13 - Finish Legend: Color selections.

**C. DEFINITIONS**

1. Comply with ASTM D16 for interpretation of terms used in this section.
2. Paint Gloss and Sheen: Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI values:

<u>Gloss Level</u>	<u>Description</u>	<u>Units @ 60 Degrees</u>	<u>Units @ 85 Degrees</u>
Eggshell Finish	10 to 25	10 to 35	
Satin Finish	20 to 35	35 minimum	
Semi-Gloss Finish	35 to 70		

**D. REFERENCE STANDARDS**

1. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
2. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
3. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating.
4. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials.

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5. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.
  6. SSPC-SP 1 - Solvent Cleaning.
  7. SSPC-SP 2 - Hand Tool Cleaning.
  8. SSPC-SP 6 - Commercial Blast Cleaning.
  9. SSPC-SP 13 - Surface Preparation of Concrete.
- E. SUBMITTALS
1. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
  2. Product Data: Provide complete list of products to be used, with the following information for each:
    - a. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
    - b. Manufacturer's installation instructions.
  3. Product List: For each product indicated, include the following:
    - a. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
    - b. Include printed statement of VOC content and chemical components.
  4. Samples for Verification: For each color and material to be applied, provide three 8-inch by 10-inch color drawdowns with texture to simulate actual conditions, and representing color and sheen.
  5. Certification: By manufacturer that paints, and finishes comply with VOC limits specified.
  6. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
  7. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, care, and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
  8. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
    - a. See Section 01 70 00 - Closeout, for additional provisions.
    - b. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
    - c. Label each container with color in addition to the manufacturer's label.
- F. QUALITY ASSURANCE
1. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.
  2. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years of experience.
  3. MPI Standards:
    - a. Preparation and Workmanship: Comply with requirements in MPI (APSM) - "Master Painters Institute Architectural Painting Specification Manual" and paint manufacturer's recommendations for products and paint systems indicated.
  4. Surface Preparation: Obtain written confirmation of the specific surface preparation procedures and primers used for all fabricated steel items from the fabricator(s) to ascertain appropriate and manufacturer compatible finish coat materials to be used before painting any such work.
- G. PREINSTALLATION CONFERENCE
1. Preinstallation Conference: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers. Agenda items will include field conditions, substrate conditions, coordination of shop applied primers with finish coatings, application methods, and field quality control testing and inspection, schedule of painting applications and notifications to Owner of start of painting operations.

- H. Bring copies of reviewed color draw-downs for all required colors.
- I. **MOCK-UP**
  - 1. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.
  - 2. Integrated Exterior Mockups: Paint surfaces included in integrated exterior mockups as indicated on Drawings and as specified in Section 01 40 00 - Quality Requirements.
  - 3. Mock-up may not remain as part of the work.
- J. **DELIVERY, STORAGE, AND HANDLING**
  - 1. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
  - 2. 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.
  - 3. 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.
- K. **FIELD CONDITIONS**
  - 1. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
  - 2. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
  - 3. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
  - 4. Minimum Application Temperatures for Latex Paints: 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
  - 5. Provide lighting level of 80 ft candles measured mid-height at substrate surface.
  - 6. Lead Paint: Lead paint is present in buildings and structures to be painted. A report on the presence of lead paint is included in Document 00 31 00 - Available Project Information. Examine report to become aware of locations where lead paint is present.
    - a. Do not disturb lead paint or items suspected of containing hazardous materials except under procedures specified.
    - b. Perform preparation for painting of substrates known to include lead paint in accordance with all state and local regulations and guidelines.
- L. **PRODUCT MANUFACTURERS**
  - 1. Provide paints and finishes used in any individual system from the same manufacturer, no exceptions.
  - 2. Products: Provide one of the products listed in this section.
  - 3. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in Part 2:
    - a. Coronado Paint (Coronado)
    - b. Kelly-Moore Paints (Kelly).
    - c. Miller Paint Co. (Miller).
    - d. Benjamin Moore & Co. (Moore).
    - e. PPG Paints (PPG).
    - f. Rodda Paint / Cloverdale Paint Co. (Rodda).
    - g. Sherwin-Williams Co. (S-W).
  - 4. Substitutions: Not permitted.
- M. **PAINTS AND FINISHES - GENERAL**
  - 1. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
    - a. Provide paints and finishes 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.
- b. indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- c. Supply each paint material in quantity required to complete entire project's work from a single production run.
- d. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- 2. Volatile Organic Compound (VOC) Content:
  - a. Provide paints and finishes that comply with the most stringent requirements specified in the following:
    - 1) 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
    - 2) Architectural coatings VOC limits of Oregon.
  - b. 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.
- 3. Flammability: Comply with applicable code for surface burning characteristics.
- 4. Colors: As indicated in Section 09.13 - Finish Legend.
  - a. Extend colors to surface edges; colors may change at any edge as directed by Architect.

**N. PAINT SYSTEMS - EXTERIOR**

- 1. Concrete or Plaster: Provide the following finish systems over exterior concrete or plaster surfaces:
  - a. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a primer.
    - 1) Primer Over Existing Painted Surfaces:
      - i. Coronado: Elastite 100% Acrylic Masonry Sealer 48-11.
      - ii. Kelly: 295 Kel-Bond Universal Acrylic Primer.
      - iii. Miller: 470011 Miller Prime All Purpose Acrylic Primer.
      - iv. Moore: Ultra Spec Hi-Build Acrylic Masonry Primer 609.
      - v. PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
      - vi. Rodda: First Coat 501601.
      - vii. S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
    - 2) Primer: Alkali-resistant, exterior, acrylic-latex primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils.
      - i. Coronado: Elastite 100% Acrylic Masonry Sealer 48-11.
      - ii. Kelly: 247 Acry-Shield 100% Acrylic Masonry Primer.
      - iii. Miller: 620011 Kril Primer.
      - iv. Moore: Ultra Spec Hi-Build Acrylic Masonry Primer 609.
      - v. PPG: Perma-Crete Alkali-Resistant Primer 4-603.
      - vi. Rodda: Surfbond II 501801.
      - vii. S-W: Loxon Concrete & Masonry Primer/Sealer LX2W50.
    - 3) First and Second Coats: Semigloss, exterior, acrylic-latex enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.4 mils.
      - i. Coronado: Super Kote 5000 Exterior Semi-Gloss 804.
      - ii. Kelly: 1215 Color-Shield 100% Acrylic Exterior Semi-Gloss Paint.
      - iii. Miller: 5205XX Semi-Gloss Kril.
      - iv. Moore: Ultra Spec EXT 449.
      - v. PPG: 6-900XI Series Speedhide Semi-Gloss Latex.
      - vi. Rodda: Ecologic Semi-Gloss 70623.
      - vii. S-W: A100 Exterior Latex Gloss A8 Series
      - viii. .

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2. Concrete Masonry Units: Provide the following finish systems over exterior concrete masonry units: See Water Repellent Section for Ground Face Units.
  - a. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a block filler. Provide primer in lieu of block filler for existing painted surfaces.
    - 1) Primer Over Existing Painted Surfaces:
      - i. Coronado: Elastite 100% Acrylic Masonry Sealer 48-11.
      - ii. Kelly: 295 Kel-Bond Universal Acrylic Primer.
      - iii. Miller: 470011 Miller Prime All Purpose Acrylic Primer.
      - iv. Moore: Ultra Spec Hi-Build Acrylic Masonry Primer 609.
      - v. PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
      - vi. Rodda: First Coat 501601.
      - vii. S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
    - 2) Block Filler: High-performance, latex block filler applied at spreading rate recommended by the manufacturer to achieve a total dry mill thickness of not less than 4.0 mils.
      - i. Coronado: Super Kote 310210 Production Block Filler 958-11.
      - ii. Kelly: 521 Fill & Prime Acrylic Block Filler.
      - iii. Miller: 481011 Acrylic Block Filler.
      - iv. Moore: Ultra Spec Hi-Build Masonry Block Filler 571.
      - v. PPG: 6-15XI Speedhide Interior/Exterior Masonry Latex Block Filler.
      - vi. Rodda: Sprayable Block Filler 501901.
      - vii. S-W: PrepRite Interior/Exterior Block Filler B25W25.
    - 3) First and Second Coats: Semigloss, exterior, acrylic-latex enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.4 mils.
      - i. Coronado: Super Kote 5000 Exterior Semi-Gloss 804.
      - ii. Kelly: 1215 Color Shield Exterior Acrylic Semi-Gloss Enamel.
      - iii. Miller: 5205XX Semi-Gloss Kril.
      - iv. Moore: Ultra Spec EXT 448.
      - v. PPG: 6-900XI Series Speedhide Exterior Semi-Gloss Latex.
      - vi. Rodda: Ecologic Semi-Gloss 70623.
      - vii. S-W: A-100 Exterior Latex Gloss A8 Series.
3. Fiber Cement Panels: Provide the following finish systems over exterior, fiber cement panels:
  - a. Semi-Gloss Acrylic Finish: 2 finish coats over a primer.
    - 1) Primer Over Existing Painted Surfaces:
      - i. Coronado: Elastite 100% Acrylic Masonry Sealer 48-11.
      - ii. Kelly: 295 Kel-Bond Universal Acrylic Primer.
      - iii. Miller: 470011 Miller Prime All Purpose Acrylic Primer.
      - iv. Moore: Ultra Spec Hi-Build Acrylic Masonry Primer 609.
      - v. PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
      - vi. Rodda: First Coat 501601.
      - vii. S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
    - 2) Primer: Exterior, alkali-resistant, acrylic-latex primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.0 mils.
      - i. Coronado: Ultra Spec Hi-Build Acrylic Masonry Primer 609.
      - ii. Kelly: 247 Acry-Shield 100% Acrylic Masonry Primer.
      - iii. Miller: 620011 Kril Primer.
      - iv. Moore: Ultra Spec Hi-Build Acrylic Masonry Primer 609.
      - v. PPG: Perma-Crete Alkali-Resistant Primer 4-603.
      - vi. Rodda: First Coat Primer 501601.
      - vii. S-W: Loxon Concrete & Masonry Primer/Sealer LX2W50.

- 3) First and Second Coats: Semi-gloss, exterior, acrylic-emulsion paint applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.4 mils.
  - i. Coronado: Super Kote 5000 Exterior Semi-Gloss 32 Line.
  - ii. Kelly: 1250 Acry-Shield 100% Acrylic Exterior Semi-Gloss Paint.
  - iii. Miller: 520-5-XX Semi-Gloss Kril.
  - iv. Moore: Ultra Spec EXT Satin Finish N447.
  - v. PPG: 6-900XI Series Speedhide Exterior Semi-Gloss Latex.
  - vi. Rodda: Unique II 542001.
  - vii. S-W: A-100 Exterior Latex Gloss A8 Series.
4. Exterior Soffit Board: Provide the following finish systems over exterior gypsum soffit board:
  - a. Eggshell Acrylic Finish: 2 finish coats over a primer.
    - 1) Primer Over Existing Painted Surfaces:
      - i. Coronado: Elastite 100% Acrylic Masonry Sealer 48-11.
      - ii. Kelly: 295 Kel-Bond Universal Acrylic Primer.
      - iii. Miller: 470011 Miller Prime All Purpose Acrylic Primer.
      - iv. Moore: Ultra Spec Exterior Latex Primer N558.
      - v. PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
      - vi. Rodda: First Coat 501601.
      - vii. S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
    - 2) Primer: Exterior, alkali-resistant, acrylic-latex primer, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils.
      - i. Coronado: Ultra Spec Exterior Latex Primer N558.
      - ii. Kelly: 250 COLOR SHIELD Exterior 100% Acrylic Primer-Sealer.
      - iii. Miller: 620011 Kril Primer.
      - iv. Moore: Ultra Spec Exterior Latex Primer N558.
      - v. PPG: Perma-Crete Alkali-Resistant Primer 4-603.
      - vi. Rodda: First Coat Primer 501601.
      - vii. S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
    - 3) First and Second Coats: Eggshell or satin, exterior, acrylic-latex paint applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.3 mils.
      - i. Coronado: Super Kote 5000 Exterior Satin 803.
      - ii. Kelly: 1210 Color Shield Exterior 100% Acrylic Low Sheen.
      - iii. Miller: 5204XX Satin Kril.
      - iv. Moore: Ultra Spec EXT Satin Finish N448.
      - v. PPG: 6-2045XI Series Speedhide Exterior Satin Latex.
      - vi. Rodda: Ecologic Pearl 70653.
      - vii. S-W: A-100 Exterior Satin Latex A82 Series.
5. Smooth Wood: Provide the following finish systems over smooth wood siding and other smooth, exterior wood surfaces:
  - a. Eggshell Acrylic Finish: 2 finish coats over a primer.
    - 1) Primer Over Existing Painted Surfaces:
      - i. Coronado: Elastite 100% Acrylic Masonry Sealer 48-11.
      - ii. Kelly: 295 Kel-Bond Universal Acrylic Primer.
      - iii. Miller: 470011 Miller Prime All Purpose Acrylic Primer.
      - iv. Moore: Ultra Spec Exterior Latex Primer N558.
      - v. PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
      - vi. Rodda: First Coat 501601.
      - vii. S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.

- 2) Primer: Exterior, alkyd or latex, wood primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils.
  - i. Coronado: Ultra Spec Exterior Latex Primer N558.
  - ii. Kelly: 255 Acry-Shield 100% Acrylic Exterior Wood Primer.
  - iii. Miller: 470011 Miller Prime All Purpose Acrylic.
  - iv. Moore: Ultra Spec Exterior Latex Primer N558.
  - v. PPG: 17-921 Seal-Grip 100% Acrylic Primer.
  - vi. Rodda: First Coat Primer 501601.
  - vii. S-W: Exterior Latex Wood Primer B42W8041.
- 3) First and Second Coats: Eggshell or satin, exterior, latex paint applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.3 mils.
  - i. Coronado: Ultra Spec Exterior Latex Primer N558.
  - ii. Kelly: 1210 Color Shield Exterior 100% Acrylic Low Sheen.
  - iii. Miller: 5104XX Satin Acrilite.
  - iv. Moore: Ultra Spec EXT Satin Finish N448.
  - v. PPG: 6-2045XI Series Speedhide Exterior Satin.
  - vi. Rodda: Ecologic Pearl 70653.
  - vii. S-W: A-100 Exterior Satin Latex A82 Series.
6. Wood Trim: Provide the following finish systems over exterior wood trim:
  - a. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a primer.
    - 1) Primer Over Existing Painted Surfaces:
      - i. Coronado: Elastite 100% Acrylic Masonry Sealer 48-11.
      - ii. Kelly: 295 Kel-Bond Universal Acrylic Primer.
      - iii. Miller: 470011 Miller Prime All Purpose Acrylic Primer.
      - iv. Moore: Ultra Spec Exterior Latex Primer N558.
      - v. PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
      - vi. Rodda: First Coat 501601.
      - vii. S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
    - 2) Primer: Exterior, acrylic-latex primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils.
      - i. Coronado: Supreme Waterborne Acrylic Bonding Primer 8-11.
      - ii. Kelly: 255 Acry-Shield 100% Acrylic Exterior Wood Primer.
      - iii. Miller: 470011 Miller Prime All Purpose Acrylic.
      - iv. Moore: Ultra Spec Exterior Latex Primer N558.
      - v. PPG: 17-921 Seal-Grip 100% Acrylic Primer.
      - vi. Rodda: First Coat Primer 501601.
      - vii. S-W: Exterior Latex Wood Primer B42W8041.
    - 3) First and Second Coats: Semigloss, waterborne, exterior, acrylic-latex enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.4 mils.
      - i. Coronado: Super Kote 5000 Exterior Semi-Gloss 804.
      - ii. Kelly: 1215 Color Shield Exterior Acrylic Semi-Gloss Enamel.
      - iii. Miller: 5105XX Semi-Gloss Acrilite.
      - iv. Moore: Ultra Spec EXT 449.
      - v. PPG: 6-900XI Series Speedhide Exterior Semi-Gloss Latex.
      - vi. Rodda: Ecologic Semi-Gloss 70623.
      - vii. S-W: A-100 Exterior Latex Gloss A8 Series.
7. Ferrous Metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.
  - a. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a rust-inhibitive primer.
    - 1) Primer Over Existing Painted Surfaces:

- i. Coronado: Corotech Acrylic Metal Primer V110.
  - ii. Kelly: 295 Kel-Bond Universal Acrylic Primer.
  - iii. Miller: 470011 Miller Prime All Purpose Acrylic Primer.
  - iv. Moore: Ultra Spec HP Acrylic Metal Primer HP04.
  - v. G: 17-921 Seal Grip Int./Ext. Universal Primer.
  - vi. Rodda: Ecologic Rustex Primer MPI #107 70323.
  - vii. S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
- 2) Primer: Rust-inhibitive metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.3 mils.
  - i. Coronado: Corotech Universal Metal Primer V110.
  - ii. Kelly: 5725 DTM Acrylic Primer / Finish.
  - iii. Miller: 310210 Acrimetal Primer/Finish.
  - iv. Moore: Ultra Spec HP Acrylic Metal Primer HP04.
  - v. PPG: 90-712 Series Pitt-Tech Int./Ext. DTM Industrial Primer/Finish.
  - vi. Rodda: Ecologic Rustex Primer MPI #107 70323.
  - vii. S-W: Pro Industrial Pro-Cryl Universal Primer B66-1300 Series.
- 3) First and Second Coats: Semigloss, exterior, acrylic-latex enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils.
  - i. Coronado: Corotech Acrylic DTM Enamel Semi-Gloss V331
  - ii. Kelly: 1215 Color Shield Exterior Acrylic Semi-Gloss Enamel.
  - iii. Miller: 3105XX Acrimetal DTM Semi-Gloss.
  - iv. Moore: Ultra Spec EXT Gloss Finish N449.
  - v. PPG: 6-900XI Series Speedhide Exterior Semi-Gloss Latex.
  - vi. Rodda: Ecologic Semi-Gloss 70623.
  - vii. S-W: Pro Industrial DTM Semi-Gloss, B66-1150 Series.
- 8. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated (galvanized) metal surfaces:
  - a. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a galvanized metal primer.
    - 1) Primer Over Existing Painted Surfaces:
      - i. Coronado: Corotech Acrylic Metal Primer V110.
      - ii. Kelly: 295 Kel-Bond Universal Acrylic Primer.
      - iii. Miller: 470011 Miller Prime All Purpose Acrylic Primer.
      - iv. Moore: Ultra Spec HP Acrylic Metal Primer HP04.
      - v. PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
      - vi. Rodda: Ecologic Rustex Primer MPI #107 70323.
      - vii. S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
    - 2) Primer: Galvanized metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
      - i. Coronado: Corotech Acrylic Metal Primer V110
      - ii. Kelly: 5725 DTM Acrylic Primer / Finish.
      - iii. Miller: 310210 Acrimetal Primer/Finish.
      - iv. Moore: Ultra Spec HP Acrylic Metal Primer HP04.
      - v. PPG: 90-712 Series Pitt-Tech Int./Ext. DTM Industrial Primer/Finish.
      - vi. Rodda: Ecologic Rustex Primer MPI #107 70323.
      - vii. S-W: Pro Industrial Pro-Cryl Universal Primer B66-1300 Series.



- 3) First and Second Coats: Semigloss, exterior, acrylic-latex enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils.
  - i. Coronado: Corotech Acrylic DTM Enamel Semi-Gloss V331
  - ii. Kelly: 1215 Color Shield Exterior Acrylic Semi-Gloss Enamel.
  - iii. Miller: 3105XX Acrimetal DTM Semi-Gloss.
  - iv. Moore: Ultra Spec HP DTM Acrylic SG HP29.
  - v. PPG: 6-900XI Series Speedhide Exterior Semi-Gloss Latex.
  - vi. Rodda: Ecologic Semi-Gloss 70623.
  - vii. S-W: Pro Industrial DTM Semi-Gloss, B66-1150 Series.
9. Traffic Marking Paint: Latex, waterborne emulsion, lead, and chromate free, ready mixed, complying with FS TT-P-1952, with drying time of less than 45 minutes.
  - a. Kelly: 1472 Series Waterborne Zone Marking Paint.
  - b. Moore: Insl-x Fast Set Traffic Marking Paint TP-23xx.
  - c. PPG: Zoneline Traffic & Zone Marking Paint 11-53 Series or equal.
  - d. Rodda: Driveline Traffic & Stripping Paint 57341A.
  - e. S-W: Setfast Acrylic Waterborne Traffic Marking Paint White, TM226
- O. ACCESSORY MATERIALS
  1. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
  2. Patching Material: Latex filler.
  3. Fastener Head Cover Material: Latex filler.
- P. EXAMINATION
  1. Do not begin application of paints and finishes until substrates have been properly prepared.
  2. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
  3. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
    - a. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.
  4. Test shop-applied primer for compatibility with subsequent cover materials.
  5. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
    - a. Exterior Plaster and Stucco: 12 percent.
    - b. Fiber Cement Siding: 12 percent.
    - c. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
    - d. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
- Q. PREPARATION
  1. Comply with manufacturer's written instruction and recommendations in MPI (APSM) "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
  2. Provide adequate overspray protection for surrounding buildings, vehicles, landscaping, or other items not scheduled for painting.
    - a. Protect existing signage and logos during painting activities.
  3. Previously Painted Surfaces: Comply with manufacturer's written instructions and recommendations in "Master Painters Institute Maintenance Repainting Manual" applicable to substrates indicated for existing painted surfaces.
    - a. Follow general surface preparations guidelines. Remove loose or failing paint and spot prime bare areas or entire surface with appropriate primer. Sand or provide bonding primer for hard, glossy surfaces as necessary for bond.

4. Clean surfaces thoroughly and correct defects prior to application.
5. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
6. Remove or repair existing paints or finishes that exhibit surface defects.
7. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
  - a. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating or nomenclature plates.
8. Seal surfaces that might cause bleed through or staining of topcoat.
9. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
10. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
  - a. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
11. High pressure water clean all exterior surfaces prior to repainting using pressures indicated below to ensure complete removal of all loose paint, stains, dirt and other foreign matter, with such work to be carried out only by qualified tradesmen experienced in high pressure water cleaning. The use of spray equipment such as water hose cleaning will not be considered satisfactory. Allow sufficient drying time and test all surfaces using an electronic moisture meter before commencing work.

**Substrate****Pressure Range**

Soft stone (sandstone, limestone, softwood)	100 - 600 psi @ 6 inches
Wood siding, stone, clay brick	600 - 1,500 psi @ 6 inches
Firm masonry, stone, brick, concrete	1,500 - 4,000 psi @ 6 to 12 inches

12. Inspect all sealants, joint fillers, and glazing sealants. Remove or repair all damaged, weak and worn materials with equivalent materials approved by Owner. Apply new sealants, joint fillers, and glazing sealants in accordance with manufacturer's recommendations.
13. Concrete:
  - a. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
  - b. Clean concrete according to ASTM D4258. Allow to dry.
  - c. Prepare surface as recommended by topcoat manufacturer and according to SSPC-SP 13.
14. Masonry:
  - a. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
  - b. Prepare surface as recommended by topcoat manufacturer.
15. Fiber Cement Siding: Remove dirt, dust, and other foreign matter with a stiff fiber brush. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
16. Exterior Gypsum Board: Fill minor defects with exterior filler compound. Spot prime defects after repair.
17. Exterior Plaster: Fill hairline cracks, small holes, and imperfections with exterior patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
18. Galvanized Surfaces:
  - a. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
  - b. Prepare surface according to SSPC-SP 2.
19. Ferrous Metal:
  - a. Solvent clean according to SSPC-SP 1.

- b. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
  - c. Level of surface preparation specified is a minimum. If the coating manufacturer requires a higher degree of preparation, comply with the coating manufacturer's recommendations.
  - d. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
20. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted

exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.

**R. APPLICATION**

- 1. Apply paints according to manufacturer's written instructions.
  - a. Use applicators and techniques suited for paint and substrate indicated.
  - b. If spray equipment is utilized, a spray/backroll application is considered one coat of paint.
  - c. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - d. Continue paint finish behind all wall-mounted items.
  - e. Apply block filler to concrete masonry block at a rate to ensure complete coverage with pores filled (pinhole free).
- 2. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- 3. Paint access doors, prime coated hardware, exposed piping, and electrical panels to match adjacent surfaces in color, texture, and sheen, unless otherwise noted or where pre-finished.
  - a. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
- 4. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- 5. Paint Striping:
  - a. Parking bay lines shall be identified with 3-inch wide white painted lines in accordance with approved parking layout, unless otherwise indicated.
  - b. Barrier free accessible parking bays and refuge areas shall be identified with appropriate symbol designation in accordance with the requirements of authorities having jurisdiction.
  - c. Pedestrian walkways shall be identified with 3-inch wide yellow painted lines at 45 degrees to path of travel spaces at 18 inches on center, unless otherwise indicated.
  - d. Fire lanes shall be identified with 3-inch wide red painted lines at 45 degrees to curb lines and red painted curb for entire length of the designated zone, unless otherwise indicated.
- 6. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.
- 7. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- 8. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- 9. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

10. Apply each coat to uniform appearance.
11. Regardless of number of coats specified, apply additional coats until complete hide is achieved.
12. Sand wood and metal surfaces lightly between coats to achieve required finish.
13. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
14. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

**S. FIELD QUALITY CONTROL**

1. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.
2. Painted surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to Architect.
  - a. Brush/roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding, or shadowing by inefficient application methods, skipped or missed areas, or foreign materials in paint coatings.
  - b. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners, reentrant angles, or similar conditions.
  - c. Damage due to touching before paint is sufficiently dry or any other contributory cause.
  - d. Damage due to application on moist surfaces or caused by inadequate protection from the weather.
  - e. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).
3. Painted surfaces shall be considered unacceptable if any of the following are evident:
  - a. Visible defects are evident on vertical or horizontal surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
  - b. Visible defects are evident on ceilings, soffits and other overhead surfaces when viewed at normal viewing angles.
  - c. When the final coat on any surface exhibits a lack of uniformity of color, sheen texture and hiding across full surface area.
  - d. Dry mil thicknesses do not meet manufacturer's recommended thickness or specified thickness.
4. Owner will provide field inspection and testing.
  - a. Painted surfaces will be tested for dry mil thickness for each coat.
  - b. Shop primers and painted surfaces will be tested for adhesion.
  - c. Surfaces will be tested at frequency discussed in the preinstallation conference and as deemed appropriate by Owner.
5. Touch-up and restore painted surfaces damaged by testing.
  - a. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, pay for testing, and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

**T. CLEANING**

1. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
2. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
3. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
4. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

**U. PROTECTION**

1. Protect finishes until completion of project.
2. Touch-up damaged finishes after Substantial Completion.

**V. SCHEDULE - PAINT SYSTEMS**

1. Concrete or Plaster - Semigloss, Acrylic-Enamel Finish.
2. Concrete Masonry Units - Semigloss, Acrylic-Enamel Finish.
3. Fiber Cement Panels - Semi-Gloss Acrylic Finish.

4. Exterior Soffit Board - Eggshell Acrylic Finish.
5. Smooth Wood - Eggshell Acrylic Finish.
6. Wood Trim - Semigloss, Acrylic-Enamel Finish.
7. Ferrous Metal - Semigloss, Acrylic-Enamel Finish.
  - a. Locations of use: Exterior MEP elements.
  - b. Refer to Section 09.11 - High-Performance Coating for ferrous metals not listed to be painted as Work of this Section.
8. Zinc-Coated Metal - Semigloss, Acrylic-Enamel Finish.
  - a. Locations of use: Exterior MEP elements.
  - b. Refer to Section 09.11 - High-Performance Coating for zinc-coated metals not listed to be painted as Work of this Section.
9. Traffic Marking Paint: Pavement markings on concrete and asphalt paving.

**SECTION 09 91 23**  
**INTERIOR PAINTING**

**PART1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- A. Field application of paint systems indicated as "P" (Paint), "EP" (Epoxy), "SP" (Scrubbable), and "ES" (Electrostatic Finish) on the following substrates:
  - 1. Concrete or plaster.
  - 2. Concrete masonry units (CMU).
  - 3. Acoustical panel ceilings.
  - 4. Gypsum board.
  - 5. Wood.
  - 6. Steel.
  - 7. Galvanized metal.
  - 8. Cotton or canvas insulation covering.
- B. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
  - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
  - 2. Elevator pit ladders.
  - 3. Mechanical and Electrical:
    - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      - 1) Protect sprinkler heads.
    - b. In finished areas, paint shop-primed items.
    - c. 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.
    - d. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- C. Do Not Paint or Finish the Following Items:
  - 1. Items factory-finished unless otherwise 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, bar code labels, and operating parts of equipment.
  - 5. Acoustical materials, unless specifically indicated.
  - 6. Concealed pipes, ducts, and conduits.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 50 00 - Metal Fabrications: Shop-primed items.
- B. Section 09 00 01 - Finish Legend: Color selections.

- C. Section 09 96 00 - High-Performance Coatings: Painting of metals with high-performance coatings indicated as "HPC" on Drawings.

**1.03 DEFINITIONS**

- A. Comply with ASTM D16 for interpretation of terms used in this section.
- B. Paint Gloss and Sheen: Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following MPI values:

<u>Gloss Level</u>	<u>Description</u>	<u>Units @60 Degrees</u>	<u>Units @ 85 Degrees</u>
Matte or Flat Finish	0 to 5	10 maximum	
Eggshell Finish	10 to 25	10 to 35	
Satin Finish	20 to 35	35 minimum	
Semi-Gloss Finish	35 to 70		

**1.04 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
- C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating.
- D. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials.
- E. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.
- F. SSPC-SP 1 - Solvent Cleaning.
- G. SSPC-SP 2 - Hand Tool Cleaning.
- H. SSPC-SP 6 - Commercial Blast Cleaning.
- I. SSPC-SP 13 - Surface Preparation of Concrete.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  2. Manufacturer's installation instructions.
- C. Product List: For each product indicated, include the following:
1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
  2. Include printed statement of VOC content and chemical components.
- D. Samples for Verification: For each color and material to be applied, provide three 8-inch by 10-inch color drawdowns with texture to simulate actual conditions, and representing color and sheen.
- E. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- F. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
- G. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
1. At project completion, provide an itemized list complete with manufacturer, paint type and color coding for all colors used for Owner's later use in maintenance.
  2. Include color drawdowns and sample chips for each color and sheen.
- H. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
  2. Extra Paint and Finish Materials: 1 gallon of each color, type, and sheen; from the same

product run, store where directed.

3. Label each container with color, type, and sheen in addition to the manufacturer's label.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years' experience.
- C. MPI Standards:
  1. Preparation and Workmanship: Comply with requirements in MPI (APSM) - "Master Painters Institute Architectural Painting Specification Manual" and paint manufacturer's recommendations for products and paint systems indicated.
- D. Surface Preparation: Obtain written confirmation of the specific surface preparation procedures and primers used for all fabricated steel items from the fabricator(s) to ascertain appropriate and manufacturer compatible finish coat materials to be used before painting any such work.

#### **1.07 PREINSTALLATION CONFERENCE**

- A. Preinstallation Conference: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers. Agenda items will include field conditions, substrate conditions, coordination of shop applied primers with finish coatings, application methods, and field quality control testing and inspection, schedule of painting applications and notifications to Owner of start of painting operations.
  1. Bring copies of reviewed color draw-downs for all required colors.
  2. Verify with manufacturer's representative paint product compatibility with all cleaning products used on painted surfaces prior to new finish application.

#### **1.08 MOCK-UP**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.
- B. Interior Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified.
    - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
    - b. Other Items: Architect will designate items or areas required.
  2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
  3. Final approval of color selections will be based on benchmark samples.
    - a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.
  4. Include in mock-up all preparation and paint application phases of existing surfaces for review and approval.

#### **1.09 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.

#### **1.10 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. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.
- F. Lead Paint: Lead paint is present in buildings and structures to be painted. A report on the presence of lead paint is included in Document 00 31 00 - Available Project Information. Examine report to become aware of locations where lead paint is present.
  - 1. Do not disturb lead paint or items suspected of containing hazardous materials except under procedures specified

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in Part 2:
  - 1. Kelly-Moore Paints (Kelly).
  - 2. Miller Paint Co. (Miller).
  - 3. Benjamin Moore & Co. (Moore).
  - 4. PPG Paints (PPG).
  - 5. Rodda Paint / Cloverdale Paint Co. (Rodda).
  - 6. Sherwin-Williams Co. (S-W).
- C. Substitutions: Not permitted.

### **2.02 PAINTS AND FINISHES - GENERAL**

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
  - 1. Provide paints and finishes 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. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
  - 3. Supply each paint material in quantity required to complete entire project's work from a single production run.
  - 4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
  - 1. Provide paints and finishes 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.
    - b. Architectural coatings VOC limits of Oregon.
  - 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.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Colors: As indicated in Section 09 00 01 - Finish Legend.
  - 1. Extend colors to surface edges; colors may change at any edge as directed by Architect.
  - 2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

### **2.03 PAINT SYSTEMS - INTERIOR**

- A. Concrete or Plaster: Provide the following paint systems over interior concrete surfaces:
  - 1. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a primer.

## **INTERIOR PAINTING 09 91 23-4**

- a. Primer Over Existing Painted Surfaces:
    - 1) Kelly: 295 Kel-Bond Universal Acrylic Primer.
    - 2) Miller: 470011 Miller Prime All Purpose Acrylic Primer.
    - 3) Moore: Ultra Spec 500 Interior Primer Sealer 534.
    - 4) PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
    - 5) Rodda: First Coat 501601.
    - 6) S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
  - b. Primer: Alkali-resistant, acrylic-latex, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.0 mil.
    - 1) Kelly: 971 AcryPlex Interior PVA Low-Odor Primer/Sealer.
    - 2) Miller: 620011 Kriil Primer.
    - 3) Moore: Ultra Spec Masonry High Build Primer 609.
    - 4) PPG: Perma-Crete Alkali-Resistant Primer 4-603.
    - 5) Rodda: Surfbond II 501801.
    - 6) S-W: Contractors Interior Latex Primer B28WF0162.
  - c. First and Second Coats: Semigloss, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils.
    - 1) Kelly: 1050 KM Professional Acrylic Semi-Gloss Enamel.
    - 2) Miller: 1205XX Premium Semi-Gloss.
    - 3) Moore: Ultra Spec 500 Interior Semi-Gloss Enamel 539 (0 VOC post tint).
    - 4) PPG: 6-500 Speedhide Acrylic Latex Semi-Gloss Enamel.
    - 5) Rodda: Master Painter Ultra Low VOC Semi-Gloss 543601.
    - 6) S-W: ProMar 200 Zero VOC Semi-Gloss, B31-2600 Series.
2. Semi-Gloss, Water-Based Epoxy (EP): 2 finish coats over a primer.
- a. Primer Over Existing Painted Surfaces:
    - 1) Miller: 470011 Miller Prime All Purpose Acrylic Primer.
    - 2) Moore: Ultra Spec Masonry High Build Primer 609.
    - 3) PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
    - 4) Rodda: First Coat 501601.
    - 5) S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
  - b. Primer: Alkali-resistant, acrylic-latex, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.0 mil.
    - 1) Miller: 620011 Kriil Primer.
    - 2) Moore: Ultra Spec Masonry High Build Primer 609.
    - 3) PPG: Perma-Crete Alkali-Resistant Primer 4-603.
    - 4) Rodda: Surfbond II 501801.
    - 5) S-W: Contractors Interior Latex Primer B28WF0162.
  - c. First and Second Coats: Odorless, semigloss, interior water-based epoxy enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 3 mils.
    - 1) Miller: 183510 Water Base Epoxy.
    - 2) Moore: Corotech Pre-Catalyzed Waterborne Epoxy V341.
    - 3) PPG: Pitt-Glaze WB1 Interior Semi-Gloss Pre-Catalyzed Water-Borne Acrylic Epoxy, 16-510, 16-540.
    - 4) Rodda: Rustoleum Sierra Performance S60/S62 WB Epoxy Coating.
    - 5) S-W: Pro Industrial Pre-Catalyzed Waterbased Epoxy K46-1150.
  - d. First and Second Coats: Odorless, semigloss, interior water-based epoxy enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 3 mils.
    - 1) Miller: 183510 Water Base Epoxy.
    - 2) Moore: Corotech Pre-Catalyzed Waterborne Epoxy V341.
    - 3) PPG: Pitt-Glaze WB1 Interior Semi-Gloss Pre-Catalyzed Water-Borne Acrylic Epoxy, 16-510, 16-540.

- 4) Rodda: Rustoleum Sierra Performance S60/S62 WB Epoxy Coating.
  - 5) S-W: Pro Industrial Pre-Catalyzed Waterbased Epoxy K46-1150 Series.
- B. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:
- 1. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a primer.
    - a. Primer Over Existing Painted Surfaces:
      - 1) Kelly: 295 Kel-Bond Universal Acrylic Primer.
      - 2) Miller: 470011 Miller Prime All Purpose Acrylic Primer.
      - 3) Moore: Ultra Spec 500 Interior Primer Sealer 534.
      - 4) PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
      - 5) Rodda: First Coat Primer 501601.
      - 6) S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
    - b. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
      - 1) Kelly: 971 AcryPlex Interior PVA Low-Odor Primer/Sealer.
      - 2) Miller: 230011 Performance Plus Primer Sealer.
      - 3) Moore: Ultra Spec 500 Interior Primer Sealer 534.
      - 4) PPG: 6-2 Speedhide Interior Latex Primer Sealer.
      - 5) Rodda: Master Painter UL VOC Primer 503601.
      - 6) S-W: Contractors Interior Latex Primer B28WF0162.
    - c. First and Second Coats: Semigloss, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils.
      - 1) Kelly: 1050 KM Professional Acrylic Semi-Gloss Enamel.
      - 2) Miller: 1205XX Premium Semi-Gloss.
      - 3) Moore: Ultra Spec 500 Interior Semi-Gloss Enamel 539 (0 VOC post tint).
      - 4) PPG: 6-500 Speedhide Acrylic Latex Semi-Gloss Enamel.
      - 5) Rodda: Master Painter Ultra Low VOC Semi-Gloss 543601.
      - 6) S-W: ProMar 200 Zero VOC Semi-Gloss, B31-2600 Series.
  - 2. Semigloss, Water-Based Epoxy (EP): 2 finish coats over a primer.
    - a. Primer Over Existing Painted Surfaces:
      - 1) Kelly: 295 Kel-Bond Universal Acrylic Primer.
      - 2) Miller: 470011 Miller Prime All Purpose Acrylic Primer.
      - 3) Moore: Ultra Spec 500 Interior Primer Sealer 534.
      - 4) PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
      - 5) Rodda: First Coat Primer 501601.
      - 6) S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
    - b. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils.
      - 1) Kelly: Sierra Performance S30 Griptec Sandable Primer.
      - 2) Miller: 230011 Performance Plus Primer Sealer.
      - 3) Moore: Ultra Spec 500 Interior Primer Sealer 534.
      - 4) PPG: Speedhide Interior Latex Primer Sealer 6-2.
      - 5) Rodda: Master Painter UL VOC Primer 503601.
      - 6) S-W: Contractors Interior Latex Primer B28WF0162.
    - c. First and Second Coats: Odorless, semigloss, interior water-based epoxy enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 3 mils.
      - 1) Kelly: Sierra Performance S-16 Epoxy Acrylic Semi-Gloss.
      - 2) Miller: 183510 Water Base Epoxy.
      - 3) Moore: V341 Corotech Waterborne PreCatalyzed Epoxy Semi-Gloss.
      - 4) PPG: Pitt-Glaze WB1 Interior Semi-Gloss Pre-Catalyzed Water-Borne Acrylic Epoxy 16-510.
      - 5) Rodda: Rustoleum Sierra Performance S60/S62 WB Epoxy Coating.
      - 6) S-W: Pro Industrial Pre-Catalyzed Waterbased Epoxy K46-1150 Series.
  - 3. Satin or Semigloss, Scrubbable Acrylic-Enamel Finish (SP): 2 finish coats over a primer.

- a. Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
    - 1) Moore: Ultra Spec 500 Interior Latex Primer Sealer N534.
    - 2) Rodda: Master Painter UL VOC Primer 503601.
    - 3) S-W: Premium Wall & Wood Primer B28W08111.
  - b. First and Second Coats: Semigloss, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils.
    - 1) Moore: Ultra Spec Scuff-X Waterborne Semi-Gloss 487.
    - 2) Rodda: Ecologic W/B Pearl 70653.
    - 3) S-W: ProClassic Waterborne Interior Acrylic Semi-Gloss Enamel B31-1150 Series.
- C. Woodwork and Hardboard: Provide the following paint finish systems over new, interior wood surfaces:
- 1. Eggshell, Acrylic-Enamel Finish: 2 finish coats over a primer.
    - a. Primer Over Existing Painted Surfaces:
      - 1) Kelly: 295 Kel-Bond Universal Acrylic Primer.
      - 2) Miller: 470011 Miller Prime All Purpose Acrylic Primer.
      - 3) Moore: Sure Seal Latex Primer Sealer 027
      - 4) PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
      - 5) Rodda: First Coat Primer 501601.
      - 6) S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
    - b. Primer: Acrylic-latex-based, interior wood primer, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils.
      - 1) Kelly: 295 Kel-Bond Universal Acrylic Primer.
      - 2) Miller: 270011 Acrylic Enamel Undercoat.
      - 3) Moore: Sure Seal Latex Primer Sealer 027.
      - 4) PPG: 17-951 Seal Grip Interior Primer/Finish.
      - 5) Rodda: Unique II 100% Acrylic Enamel Undercoater 502001.
      - 6) S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
    - c. First and Second Coats: Eggshell or satin, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.8 mils.
      - 1) Kelly: 1686 Dura-Poxy +100% Acrylic Eggshell Enamel.
      - 2) Miller: 3204XX Satin Acrinamel.
      - 3) Moore: Ultra Spec 500 Interior Eggshell Finish 538 (0 VOC post tint).
      - 4) PPG: 6-411 Speedhide Eggshell Latex Enamel.
      - 5) Rodda: Master Painter Ultra Low VOC Satin 523601.
      - 6) S-W: Pro Industrial Acrylic Eg-Shel B66 Series.
  - 2. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a primer or wood undercoater.
    - a. Primer Over Existing Painted Surfaces:
      - 1) Kelly: 295 Kel-Bond Universal Acrylic Primer.
      - 2) Miller: 470011 Miller Prime All Purpose Acrylic Primer.
      - 3) Moore: Sure Seal Latex Primer Sealer 027.
      - 4) PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
      - 5) Rodda: First Coat Primer 501601.
      - 6) S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
    - b. Undercoat: Acrylic-latex-based, interior wood undercoater, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
      - 1) Kelly: 295 Kel-Bond Universal Acrylic Primer.
      - 2) Miller: 270011 Acrylic Enamel Undercoat.
      - 3) Moore: Sure Seal Latex Primer Sealer 027.
      - 4) PPG: 17-951 Seal Grip Interior Primer/Finish.

- 5) Rodda: Unique II 100% Acrylic Enamel Undercoater 502001.
- 6) S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
- c. First and Second Coats: Semigloss, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils.
  - 1) Kelly: 1685 Dura-Poxy +100% Acrylic Semi-Gloss Enamel.
  - 2) Miller: 3205XX Semi-Gloss Acrinamel.
  - 3) Moore: Ultra Spec 500 Interior Semi-Gloss 539 (0 VOC post tint).
  - 4) PPG: 6-500 Speedhide Acrylic Latex Semi-Gloss Enamel.
  - 5) Rodda: Master Painter Ultra Low VOC Semi-Gloss 543601.
  - 6) S-W: Pro Industrial Acrylic Semi-Gloss, B66 Series.
- D. Stained Woodwork: Provide the following stained finishes over new, interior woodwork:
  - 1. Water-Based, Full-Gloss, Polyurethane Varnish Finish: 2 finish coats of a waterborne, clear, full-gloss polyurethane varnish over a sealer coat and an interior wood stain. Wipe filler before applying stain.
    - a. Filler Coat: Paste-wood filler applied at spreading rate recommended by the manufacturer.
      - 1) Kelly: None required.
      - 2) Miller: None required.
      - 3) Moore: None required.
      - 4) PPG: None required.
      - 5) Rodda: None required.
      - 6) S-W: Minwax Stainable Wood Filler (when necessary).
    - b. Stain Coat: Interior wood stain applied at spreading rate recommended by the manufacturer.
      - 1) Kelly: Varathane Wood Stain.
      - 2) Miller: Old Masters Penetrating Stain.
      - 3) Moore: Lenmar Quickstain Waterborne Wiping Stain 1WB. 1300.
      - 4) PPG: Deft S/T Oil Stain - Low VOC DFT400.
      - 5) Rodda: Old Masters Water-Based Wood Stain 761 or Cloverdale WeatherOne Acrylic Semi-Transparent Stain 06680.
      - 6) S-W: Minwax Wood Finish 250 Series.
    - c. Sealer Coat: Clear sanding sealer applied at spreading rate recommended by the manufacturer.
      - 1) Kelly: 2096 Kel-Thane II Waterborne Interior Clear Gloss Finish.
      - 2) Miller: None.
      - 3) Moore: Stays Clear Acrylic Polyurethane 422, Gloss or Lenmar Aquaplastic Waterborne Urethane Gloss 1WB. 14xx.
      - 4) PPG: Deft Water Based Sanding Sealer DFT61.
      - 5) Rodda: Old Masters Int WB Sanding Sealer 75204 or Cloverdale Timberlox WB Varnish Gloss 59324.
      - 6) S-W: None.
    - d. First and Second Finish Coats: Waterborne polyurethane finish applied at spreading rate recommended by the manufacturer.
      - 1) Kelly: 2096 Kel-Thane II Waterborne Interior Clear Gloss Finish.
      - 2) Miller: 710645 Acriclear Gloss.
      - 3) Moore: Stays Clear Acrylic Polyurethane 422, Gloss or Lenmar Aquaplastic Waterborne Urethane Gloss 1WB. 14xx.
      - 4) PPG: Deft Interior Water Based Polyurethane Gloss DFT127.
      - 5) Rodda: Old Masters Water-Based Polyurethane Gloss 754 or Cloverdale Timberlox WB Varnish Gloss 59324.
      - 6) S-W: Minwax Waterbased Oil-Modified Gloss Polyurethane.
  - E. Natural-Finish Woodwork: Provide the following natural finishes over new, interior woodwork:
    - 1. Water-Based, Full-Gloss, Polyurethane Varnish Finish: 2 finish coats of a waterborne, clear, full-gloss polyurethane varnish over a sealer coat. Wipe filler before applying stain.
      - a. Filler Coat: Paste-wood filler applied at spreading rate recommended by the

- manufacturer.
    - 1) Kelly: None required.
    - 2) Miller: None required.
    - 3) Moore: None required.
    - 4) PPG: None required.
    - 5) Rodda: None required.
    - 6) S-W: None required.
  - b. Sealer Coat: Clear sanding sealer applied at spreading rate recommended by the manufacturer.
    - 1) Kelly: 2096 Kel-Thane II Waterborne Interior Clear Gloss Finish.
    - 2) Miller: None.
    - 3) Moore: None recommended.
    - 4) PPG: Deft Water Based Sanding Sealer DFT61
    - 5) Rodda: Old Masters Sanding Sealer or Cloverdale Timberlox WB Varnish Gloss 59324.
    - 6) S-W: None.
  - c. First and Second Finish Coats: Waterborne polyurethane finish applied at spreading rate recommended by the manufacturer.
    - 1) Kelly: 2096 Kel-Thane II Waterborne Interior Clear Gloss Finish.
    - 2) Miller: 710645 Acriclear Gloss.
    - 3) Moore: Stays Clear Acrylic Polyurethane 422, Gloss.
    - 4) PPG: Deft Interior Water Based Polyurethane Gloss DFT127.
    - 5) Rodda: Old Masters Water-Based Polyurethane Gloss 755 or Cloverdale Timberlox WB Varnish Gloss 59324.
    - 6) S-W: Minwax Waterbased Oil-Modified Gloss Polyurethane.
- F. Ferrous Metal: Provide the following finish systems over ferrous metal:
- 1. Semigloss, Acrylic-Enamel Finish: One finish coat over an enamel undercoater and a primer.
    - a. Primer Over Existing Painted Surfaces:
      - 1) Kelly: 295 Kel-Bond Universal Acrylic Primer.
      - 2) Miller: 470011 Miller Prime All Purpose Acrylic Primer.
      - 3) Moore: Ultra Spec 500 Interior Primer Sealer 534.
      - 4) PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
      - 5) Rodda: EcoLogic Rustex Primer 70323.
      - 6) S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
    - b. Primer: Quick-drying, rust-inhibitive, acrylic-based or epoxy-metal primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils.
      - 1) Kelly: 5725 DTM Acrylic Primer / Finish.
      - 2) Miller: 310210 Acrimetal Primer/Finish.
      - 3) Moore: Ultra Spec HP Acrylic Metal Primer HP04.
      - 4) PPG: 4020 Series Pitt-Tech Plus DTM Industrial Primer.
      - 5) Rodda: EcoLogic Rustex Primer 70323.
      - 6) S-W: Pro Industrial Pro-Cryl Universal Primer B66-1300 Series.
    - c. Undercoat: Semigloss, acrylic-latex interior enamel, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.3 mils.
      - 1) Kelly: 5725 DTM Acrylic Primer / Finish.
      - 2) Miller: 310210 Acrimetal DTM Primer/Finish.
      - 3) Moore: Ultra Spec 500 Interior Semi-Gloss Enamel 539 (0 VOC post tint).
      - 4) PPG: 6-500 Speedhide Interior Semi-Gloss Latex Enamel.
      - 5) Rodda: Ecologic Semi-Gloss Enamel 70623.
      - 6) S-W: Pro Industrial Acrylic Semi-Gloss, B66-650 Series.
    - d. Finish Coat: Semigloss, acrylic-latex, interior enamel applied at spreading rate

recommended by the manufacturer to achieve a total dry film thickness of not less than 1.3 mils.

- 1) Kelly: 1685 Dura-Poxy +100% Acrylic Semi-Gloss Enamel.
- 2) Miller: 3105XX Acrimetal DTM Acrylic Semi-Gloss.
- 3) Moore: Ultra Spec 500 Interior Semi-Gloss Enamel 539 (0 VOC post tint).
- 4) PPG: 6-500 Speedhide Acrylic Latex Semi-Gloss Enamel.
- 5) Rodda: Ecologic Semi-Gloss Enamel 70623.
- 6) S-W: Pro Industrial Acrylic Semi-Gloss, B66-650 Series.

**G. Zinc-Coated Metal: Provide the following finish systems over zinc-coated metal:**

1. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a primer.
  - a. Primer Over Existing Painted Surfaces:
    - 1) Kelly: 295 Kel-Bond Universal Acrylic Primer.
    - 2) Miller: 470011 Miller Prime All Purpose Acrylic Primer.
    - 3) Moore: Sure Seal Int/Ext Primer/Sealer 027.
    - 4) PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
    - 5) Rodda: EcoLogic Rustex Primer 70323.
    - 6) S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
  - b. Primer: Galvanized metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils.
    - 1) Kelly: 5725 DTM Acrylic Primer / Finish.
    - 2) Miller: 310210 Acrimetal Primer/Finish.
    - 3) Moore: Ultra Spec HP Acrylic Metal Primer HP04.
    - 4) PPG: 4020 Series Pitt-Tech Plus DTM Industrial Primer.
    - 5) Rodda: EcoLogic Rustex Primer 70323.
    - 6) S-W: Pro Industrial Pro-Cryl Universal Primer B66-1300 Series.
  - c. First and Second Coats: Semigloss, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils.
    - 1) Kelly: 2685 Dura-Poxy +100% Acrylic Semi-Gloss Enamel.
    - 2) Miller: 3105XX Acrimetal DTM Acrylic Semi-Gloss.
    - 3) Moore: Ultra Spec 500 Interior Semi-Gloss Enamel 539 (0 VOC post tint).
    - 4) PPG: 6-500 Speedhide Acrylic Latex Semi-Gloss Enamel.
    - 5) Rodda: Ecologic Semi-Gloss Enamel 70623.
    - 6) S-W: Pro Industrial Acrylic Semi-Gloss, B66-650 Series.
2. Flat Acrylic Dry Fall Finish: 2 finish coats over a primer.
  - a. Primer: Manufacturer's recommended primer.
  - b. Top Coats: 2 coats of acrylic dry fall coating.
    - 1) Kelly: 480 DRY FOG II Flat Latex Maintenance Finish.
    - 2) Miller: Aqua Fall #624.
    - 3) Moore: Dryfall 395.
    - 4) PPG: Speedhide Interior Super Tech WB Acrylic Flat Dry Fog 6-725XI.
    - 5) Rodda: Acrylic Latex Flat Dryfall Coating 513801.
    - 6) S-W: Low VOC Waterborne Dryfall (B42W81).

**H. Concrete Masonry Units: Provide the following finish systems over interior concrete masonry units:**

- a. Semigloss, Acrylic-Enamel Finish: 2 finish coats over a block filler. Provide primer in lieu of block filler for existing painted surfaces.
  - 1) Primer Over Existing Painted Surfaces:
    - Coronado: Elastite 100% Acrylic Masonry Sealer 48-11.
    - Kelly: 295 Kel-Bond Universal Acrylic Primer.
    - Miller: 470011 Miller Prime All Purpose Acrylic Primer.
    - Moore: Ultra Spec Hi-Build Acrylic Masonry Primer

- 609.
  - PPG: 17-921 Seal Grip Int./Ext. Universal Primer.
  - Rodda: First Coat 501601.
  - S-W: PrepRite ProBlock Latex Primer/Sealer B51W620.
- 2) Block Filler: High-performance, latex block filler applied at spreading rate recommended by the manufacturer to achieve a total dry mill thickness of not less than 4.0 mils.
  - Coronado: Super Kote 310210 Production Block Filler 958-11.
  - Kelly: 521 Fill & Prime Acrylic Block Filler.
  - Miller: 481011 Acrylic Block Filler.
  - Moore: Ultra Spec Hi-Build Masonry Block Filler 571.
  - PPG: 6-15XI Speedhide Interior/Exterior Masonry Latex Block Filler.
    - Rodda: Sprayable Block Filler 501901.
    - S-W: PrepRite Interior/Exterior Block Filler B25W25.
- 3) First and Second Coats: Semigloss, exterior, acrylic-latex enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.4 mils.
  - Coronado: Super Kote 5000 Exterior Semi-Gloss 804.
  - Kelly: 1215 Color Shield Exterior Acrylic Semi-Gloss Enamel.
  - Miller: 5205XX Semi-Gloss Kril.
  - Moore: Ultra Spec EXT 448.
  - PPG: 6-900XI Series Speedhide Exterior Semi-Gloss Latex.
  - Rodda: Ecologic Semi-Gloss 70623.
  - S-W: A-100 Exterior Latex Gloss A8 Series.

#### **2.04 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.



- C. Fastener Head Cover Material: Latex filler.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
  - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  - 1. Gypsum Wallboard: 12 percent.
  - 2. Plaster and Stucco: 12 percent.
  - 3. Concrete, and Concrete Masonry Units: 12 percent.
  - 4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

#### **3.02 PREPARATION**

- A. Comply with manufacturer's written instructions and recommendations in MPI (APSM) applicable to substrates indicated.
- B. Previously Painted Surfaces: Comply with manufacturer's written instructions and recommendations in "MPI Maintenance Repainting Manual" applicable to substrates indicated for existing painted surfaces.
  - 1. Follow general surface preparations guidelines. Remove loose or failing paint and spot prime bare areas or entire surface with appropriate primer. Sand or provide bonding primer for hard, glossy surfaces as necessary for bond.
  - 2. Clean and prepare surfaces with manufacturer's recommended products based on previous cleaners used.
- C. Clean surfaces thoroughly and correct defects prior to application.
- D. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- E. Remove or repair existing paints or finishes that exhibit surface defects.
- F. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
  - 1. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating or nomenclature plates.
- G. Seal surfaces that might cause bleed through or staining of topcoat.
- H. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- I. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.
- J. Concrete:
  - 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
  - 2. Clean concrete according to ASTM D4258. Allow to dry.
  - 3. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

- K. Masonry:
  - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
  - 2. Prepare surface as recommended by top coat manufacturer.
- L. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- M. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- N. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- O. Galvanized Surfaces:
  - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
  - 2. Prepare surface according to SSPC-SP 2.
- P. Ferrous Metal:
  - 1. Solvent clean according to SSPC-SP 1.
  - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
  - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
  - 4. Level of surface preparation specified is a minimum. If the coating manufacturer requires a higher degree of preparation, comply with the coating manufacturer's recommendations.
  - 5. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
- Q. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- R. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

### **3.03 APPLICATION**

- A. Apply paints according to manufacturer's written instructions.
  - 1. Use applicators and techniques suited for paint and substrate indicated.
  - 2. If spray equipment is utilized, a spray/backroll application is considered one coat of paint.
  - 3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 4. Continue paint finish behind all wall-mounted items.
  - 5. Apply block filler to concrete masonry block at a rate to ensure complete coverage with pores filled (pinhole free).
  - 6. For surfaces to receive electrostatic coating, apply by electrostatic painting process using Ransberg Corporation No. 2 handgun, unless otherwise recommended by paint manufacturer. Perform coating off-site.
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

- C. Paint access doors, prime coated hardware, exposed piping and electrical panels to match adjacent surfaces in color, texture and sheen, unless otherwise noted or where pre-finished.
  - 1. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
- D. When the color of a door frame changes from side to side, the change shall be made at the edge of the stop, where the transition is not visible when the door is in a closed position.
- E. Back-prime and paint plywood service panels such as electrical, telephone and cable vision panels, as applicable, including edges, to match painted wall it is mounted on or white where mounted on unpainted wall.
- F. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- G. Paint acoustical tile ceiling panels with the panels laid flat on floor or other protected surface. Do not paint panels after installed in grid. Do not lift tile until paint has completely dried.
- H. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- I. Prime surfaces to receive cabinetry and similar items.
  - 1. Provide primer and all finish coats behind wainscots, markerboards, tackboards, and tack surfaces.
- J. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- K. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- L. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- M. Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- N. Sand wood and metal surfaces lightly between coats to achieve required finish.
- O. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- P. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- Q. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.
- B. Painted surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to Architect.
  - 1. Brush/roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, or foreign materials in paint coatings.
  - 2. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners, reentrant angles or similar conditions.
  - 3. Damage due to touching before paint is sufficiently dry or any other contributory cause.
  - 4. Damage due to application on moist surfaces or caused by inadequate protection from the weather.
  - 5. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).
- C. Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces:
  - 1. Visible defects are evident on vertical or horizontal surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.

2. Visible defects are evident on ceilings, soffits and other overhead surfaces when viewed at normal viewing angles.
  3. When the final coat on any surface exhibits a lack of uniformity of color, sheen texture and hiding across full surface area.
  4. Dry mil thicknesses do not meet manufacturer's recommended thickness or specified thickness.
- D. Owner may provide field inspection and testing.
1. Painted surfaces will be tested for dry mil thickness for each coat.
  2. Shop primers and painted surfaces will be tested for adhesion.
  3. Surfaces will be tested at frequency discussed in the preinstallation conference and as deemed appropriate by Owner.
- E. Touch-up and restore painted surfaces damaged by testing.
1. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, pay for testing, and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

**3.05 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

**3.06 PROTECTION**

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

**600. 3.07 SCHEDULE - PAINT SYSTEMS**

- A. Concrete or Plaster - Semigloss, Acrylic-Enamel Finish.
- B. Gypsum Board - Satin or Semigloss, Scrubbable Acrylic-Enamel Finish:
  1. Public areas where indicated.
- C. Woodwork and Hardboard - Eggshell Acrylic-Enamel Finish:
  1. Plywood service panels.
- D. Woodwork and Hardboard - Semigloss, Acrylic-Enamel Finish:
  1. Wood doors indicated to receive opaque finish.
  2. Wood door frames and trim indicated to receive opaque finish.
- E. Stained Woodwork - Water-Based, Full-Gloss, Polyurethane Varnish Finish:
  1. Wood trim indicated to receive stained finish including accent walls, chair rails & wood base..
- F. Natural-Finish Woodwork - Water-Based, Full-Gloss, Polyurethane Varnish Finish:
  1. Wood trim indicated to receive transparent finish.
- G. Ferrous Metal - Semigloss, Acrylic-Enamel Finish:
  1. Steel ladders.

- 2. Countertop supports.
  - 3. Access doors, color to match adjacent wall surfaces.
- H. Refer to Section 09 96 00 - High-Performance Coatings for ferrous metals not listed to be painted as Work of this Section.
- I. Steel Doors and Frames: As specified in Section 09 96 00 - High-Performance Coatings.
- J. Zinc-Coated Metal - Semigloss, Acrylic-Enamel Finish:
  - 1. Access doors, color to match adjacent wall surfaces.
- K. Zinc-Coated Metal - Flat Acrylic Dry Fall Finish:
  - 1. Ceiling areas, exposed ductwork, exposed trusses, exposed metal roof or floor deck, exposed piping (protect fire sprinkler heads from paint).

**END OF SECTION**

**SECTION 09 91 33  
HIGH-PERFORMANCE COATINGS**

- A. GENERAL
  - SECTION INCLUDES
    - 1. High performance coatings (HPC) for the following conditions:
      - a. Exterior Substrates:
        - 1) Galvanized steel.
      - b. Interior Substrates:
        - 1) Steel.
        - 2) Galvanized steel.
    - 2. Surface preparation.
- B. RELATED REQUIREMENTS
  - 1. Section 05 00 - Structural Steel Framing: Shop priming of metal substrates with primers specified in this Section.
  - 2. Section 05 01 - Architecturally Exposed Structural Steel Framing: Shop priming of metal substrates with primers specified in this Section.
  - 3. Section 05 02 - Metal Fabrications: Shop priming of metal substrates with primers specified in this Section.
  - 4. Section 05 03 - Metal Stairs: Shop priming of metal substrates with primers specified in this Section.
  - 5. Section 05 04 - Pipe and Tube Railings: Shop priming of metal substrates with primers specified in this Section.
  - 6. Section 08 01 - Hollow Metal Doors and Frames: Shop priming of metal substrates with primers specified in this Section.
  - 7. Section 09 09 - Exterior Painting.
  - 8. Section 09 10 - Interior Painting: Requirements for mechanical and electrical equipment surfaces.
  - 9. Section 09 13 - Finish Legend: Color selections.
- C. REFERENCE STANDARDS
  - 1. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
  - 2. ASTM D3359 - Standard Test Method for Rating Adhesion by Tape Test.
  - 3. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.
  - 4. SSPC-PA 2 - Procedure For Determining Conformance To Dry Coating Thickness Requirements.
  - 5. SSPC-SP 3 - Power Tool Cleaning.
- D. SUBMITTALS
  - 1. See Section 01 30 00 - Administrative Requirements for submittal procedures.
  - 2. Product Data: Provide complete list of all products to be used, with the following information for each:

- a. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
    - b. Include printed statement of VOC content and chemical components for interior coatings.
  3. Samples for Verification: For each type of coating system and in each color and gloss of finish coat indicated.
    - a. Submit Samples on shop primed and galvanized steel, 8 inches square.
  4. Product List: For each product indicated. Cross-reference products to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules.
  5. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
  6. Maintenance Data: Include cleaning procedures and repair and patching techniques.
    - a. At project completion, provide an itemized list complete with manufacturer, coating type and color coding for all colors used for Owner's later use in maintenance.
  7. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
    - a. See Section 01 70 00 - Closeout, for additional provisions.
    - b. Extra Coating Materials: 1 gallon of each type and color.
    - c. Label each container with manufacturer's name, product number, color number, and room names and numbers where used.
- E. **QUALITY ASSURANCE**
  1. Master Painters Institute (MPI) Standards:
    - a. Preparation and Workmanship: Comply with requirements in MPI (APSM) - "Master Painters Institute Architectural Painting Specification Manual" for products and coating systems indicated.
  2. Surface Preparation: Obtain written confirmation of the specific surface preparation procedures and primers used for all fabricated steel items from the fabricator(s) to ascertain appropriate and manufacturer compatible finish coat materials to be used before painting any such work.
  3. Comply with requirements of SSPC-PA 2 for measurement of coating thickness.
- F. **PREINSTALLATION CONFERENCE**
  1. Preinstallation Conference: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers. Agenda items will include field conditions, substrate conditions, coordination of shop applied primers with finish coatings, application methods, and field quality control testing and inspection.
    - a. Bring copies of reviewed color draw-downs for all required colors.
- G. **MOCK-UP**
  1. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.
  2. Mockups: Apply benchmark samples of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
    - a. Architect will select one surface to represent surfaces and conditions for application of each type of coating and substrate.
    - b. Apply interior benchmark samples after permanent lighting and other environmental services have been activated.
    - c. Final approval of color selections will be based on benchmark samples.

- 1) If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.
  - d. Include in mock-up all preparation and paint application phases of existing surfaces for review and approval.
3. Locate where directed.
4. Mock-up may remain as part of the work.
- H. DELIVERY, STORAGE, AND HANDLING
  1. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
  2. Container Label: Include manufacturer's name, type of coating, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
  3. Coating 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.
- I. FIELD CONDITIONS
  1. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
  2. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the coating product manufacturer.
  3. Do not install materials when temperature is below 55 degrees F or above 90 degrees F.
  4. Maintain this temperature range, 24 hours before, during, and 72 hours after installation of coating.
  5. Provide lighting level of 80 ft candles measured mid-height at substrate surface.
  6. Restrict traffic from area where coating is being applied or is curing.
  7. Lead Paint: Lead paint is present in buildings and structures to be painted. A report on the presence of lead paint is included in Document 00 31 00 - Available Project Information. Examine report to become aware of locations where lead paint is present.
    - a. Do not disturb lead paint or items suspected of containing hazardous materials except under procedures specified.
    - b. Perform preparation for painting of substrates known to include lead paint in accordance with all state and local regulations and guidelines.
- J. PRODUCT MANUFACTURERS
  1. Products: Provide one of the products listed in this section.
  2. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in this section:
    - a. Carboline Company (Carboline)
    - b. Corotech (Corotech)
    - c. Kelly-Moore Paints (Kelly).
    - d. Miller Paint Co. (Miller).
    - e. Benjamin Moore & Co. (Moore).
    - f. PPG Paints (PPG).
    - g. Rodda Paint / Cloverdale Paint Co. (Rodda).
    - h. Sherwin-Williams Co. (S-W).
    - i. Tnemec Company, Inc. (Tnemec).
    - j. Substitutions: Not permitted.



**K. MATERIALS**

1. Coatings - General: Provide complete multi-coat systems formulated and recommended by manufacturer for the applications indicated, in the thicknesses indicated.
  - a. For shop primed items, omit specified primer if shop primer is compatible with finish coats and in good condition as determined by finish coating manufacturer.
2. Material Compatibility: Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
3. Volatile Organic Compound (VOC) Content:
  - a. Provide coatings that comply with the most stringent requirements specified in the following:
    - 1) 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
    - 2) Architectural coatings VOC limits of Oregon.
  - b. 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.
4. Colors: As indicated in Section 09 13 - Finish Legend.

**L. ACCESSORY MATERIALS**

1. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of coated surfaces.

**M. EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE**

1. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated (galvanized) metal surfaces:
  - a. Semi-Gloss, Two-Component, Pigmented Aliphatic Acrylic Polyurethane: One finish coat, over intermediate coat and metal primer with total dry film thickness not less than 6.5 mils, unless noted otherwise.
    - 1) Prime: Manufacturer's recommended metal primer.
      - i. Carboline: Galoseal WB at 0.5 to 1.0 mils DFT.
      - ii. Corotech: Polyamide Epoxy Coating V400 at 2.5 to 3.0 mils.
      - iii. Kelly: K-M 15 Chemical Mastic High Build Epoxy.
      - iv. Miller: PPG 97-145 Series Pitt-Guard D-T-R Polyamide Epoxy
      - v. Moore: Corotech Polyamide Epoxy Coating V400 at 2.5 to 3.0 mils.
      - vi. PPG: 97-145 Series Pitt-Guard D-T-R Polyamide Epoxy.
      - vii. Rodda: Precision Coatings DTM 1300v100 HB Epoxy Primer.
      - viii. S-W: Macropoxy 646-100 Fast Cure Epoxy-620 Series.
      - ix. Tnemec: Series 27 Typoxy WB at 2 to 2.5 mils.
    - 2) Intermediate Coat:
      - i. Carboline: None required.
      - ii. Corotech: Aliphatic Urethane Semi-Gloss V510.
      - iii. Kelly: K-M 15 Chemical Mastic High Build Epoxy.
      - iv. Miller: PPG 95-8800 Series Pitthane High Build Semi-Gloss Urethane.
      - v. Moore: Corotech Aliphatic Urethane Semi-Gloss V510.
      - vi. PPG: 95-8800 Series Pitthane High Build Semi-Gloss Urethane.
      - vii. Rodda: None required.

- viii. S-W: Hi-Solids Polyurethane 100 S/G B65-630 Series.
- ix. Tnemec: None required.
- 3) Finish Coat:
  - i. Carboline: Carbothane 133 MC at 3 to 5 mils.
  - ii. Corotech: Aliphatic Urethane Semi-Gloss V510.
  - iii. Kelly: K-M 375 High Build Gloss Polyurethane Enamel.
  - iv. Miller: PPG 95-8800 Pitthane High Build Semi-Gloss Urethane.
  - v. Moore: Corotech Aliphatic Urethane Semi-Gloss V510.
  - vi. PPG: 95-8800 Pitthane High Build Semi-Gloss Urethane.
  - vii. Rodda: Precision Coatings PC3v100 Acrylic Polyurethane Semi-Gloss.
  - viii. S-W: Hi-Solids Polyurethane 100 S/G B65-630 Series.
  - ix. Tnemec: Series 750 Endura-Shield at 2 to 2.5 mils.

**N. INTERIOR HIGH-PERFORMANCE COATING SCHEDULE**

- 1. Ferrous Metal: Provide the following finish systems over interior ferrous metal. Primer is not required on appropriately shop-primed items.
  - a. Semi-Gloss, Two-Component, VOC Compliant or Waterborne Pigmented Aliphatic Acrylic Polyurethane: One or two finish coats, of two-component, aliphatic acrylic polyurethane coating, over metal primer with total dry film thickness not less than 6.0 mils, unless noted otherwise.
    - 1) Prime:
      - i. Carboline: Rustbond Epoxy.
      - ii. Corotech: Acrylic Metal Primer V110.
      - iii. Miller: PPG Aquapon WB Waterborne Epoxy Primer 98-46.
      - iv. Moore: HP04 Ultra Spec HP Acrylic Metal Primer.
      - v. PPG: PPG Aquapon WB Waterborne Epoxy Primer 98-46.
      - vi. Rodda: Precision Coatings DTM 1300v100 HB Epoxy Primer.
      - vii. S-W: Macropoxy 646-100 Fast Cure Epoxy-620 Series.
      - viii. Tnemec: Series 27 Typoxy WB at 2 mils DFT.
    - 2) Intermediate Coat:
      - i. Carboline: Carboguard 890 VOC.
      - ii. Corotech: Waterborne Urethane V540 <50 g/L.
      - iii. Miller: PPG Amershield VOC.
      - iv. Moore: Corotech Waterborne Aliphatic Acrylic Urethane V540.
      - v. PPG: Amershield VOC.
      - vi. Rodda: Precision Coatings PC3v100 Acrylic Polyurethane Semi-Gloss.
      - vii. S-W: Waterbased Acrolon 100 Polyurethane at 2 - 4 mils DFT.
      - viii. Tnemec: Series 750 Endura Shield.
    - 3) Finish Coat:
      - i. Carboline: Carbothane 133 MC.
      - ii. Corotech: Waterborne Urethane V540 <50 g/L.
      - iii. Miller: PPG Amershield VOC.
      - iv. Moore: Corotech Waterborne Aliphatic Acrylic Urethane V540.
      - v. PPG: Amershield VOC.
      - vi. Rodda: Precision Coatings PC3v100 Acrylic Polyurethane Semi-Gloss.
      - vii. S-W: Waterbased Acrolon 100 Polyurethane B65-720 Series at 2 - 4 mils DFT.
      - viii. Tnemec: Not required.

- 2. Zinc-Coated Metal: Provide the following finish systems over zinc-coated metal:

acrylic polyurethane coating, over metal primer with total dry film thickness not less than 6.0 mils, unless noted otherwise.

- 1) Prime:
  - i. Carboline: Galoseal WB at 0.5 to 1.0 mils DFT.
  - ii. Corotech: Polyamide Epoxy Coating V400 at 2.5 to 3.0 mils.
  - iii. Miller: PPG Aquapon WB Waterborne Epoxy Primer 98-46.
  - iv. Moore: HP04 Ultra Spec HP Acrylic Metal Primer.
  - v. PPG: PPG Aquapon WB Waterborne Epoxy Primer 98-46.
  - vi. Rodda: Precision Coatings DTM 1300v100 HB Epoxy Primer.
  - vii. S-W: Macropoxy 646-100 Fast Cure Epoxy-620 Series.
  - viii. Tnemec: Series 27 Typoxy WB at 2 mils DFT.
- 2) Intermediate Coat:
  - i. Carboline: Carbothane 133 MC3-5 mils DFT.
  - ii. Corotech: Waterborne Urethane V540 <50 g/L.
  - iii. Miller: PPG Amershield VOC.
  - iv. Moore: Corotech Waterborne Aliphatic Acrylic Urethane V540.
  - v. PPG: Amershield VOC.
  - vi. Rodda: Precision Coatings PC3v100 Acrylic Polyurethane Semi-Gloss.
  - vii. S-W: Waterbased Acrolon 100 Polyurethane B65-720 Series at 2 - 4 mils DFT.
  - viii. Tnemec: Series 750 Endura Shield.
- 3) Finish Coat:
  - i. Carboline: Not required.
  - ii. Corotech: Waterborne Urethane V540 <50g/L.
  - iii. Miller: PPG Amershield VOC.
  - iv. Moore: Corotech Waterborne Aliphatic Acrylic Urethane V540.
  - v. PPG: Amershield VOC.
  - vi. Rodda: Precision Coatings PC3v100 Acrylic Polyurethane Semi-Gloss.
  - vii. S-W: Waterbased Acrolon 100 Polyurethane B-65-720 Series at 2 - 4 mils DFT.
  - viii. Tnemec: Not required.

**O. EXAMINATION**

1. Verify existing conditions before starting work.
2. Do not begin application of coatings until substrates have been properly prepared.
3. Verify that substrate surfaces are ready to receive work as instructed by the coating manufacturer. Obtain and follow manufacturer's instructions for examination and testing of substrates.
4. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
5. Test shop-applied primer for compatibility with subsequent cover materials.
6. Proceed with coating application only after unacceptable conditions have been corrected.
  - a. Commencing coating application constitutes Contractor's acceptance of substrates and conditions.

**P. PREPARATION**

1. Comply with manufacturer's written instructions and recommendations in MPI (APSM) applicable to substrates indicated.
2. Remove plates, machined surfaces, and similar items already in place that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.

- a. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.
  3. Clean substrates of substances that could impair bond of coatings, including dirt, oil, grease, and incompatible paints and encapsulants.
    - a. Remove incompatible primers and reprime substrate with compatible primers as required to produce coating systems indicated.
    - b. At interior steel abrade the top layer of primer, unless otherwise required by coating manufacturer.
  4. Steel Substrates: Remove rust and loose mill scale.
    - a. Prepare interior surfaces as recommended by coating system manufacturer and according to SSPC-SP 3 "Power Tool Cleaning."
    - b. Level of surface preparation specified is a minimum. If the coating manufacturer requires a higher degree of preparation, comply with the coating manufacturer's recommendations.
  5. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.
  6. Remove finish hardware, fixture covers, and accessories and store.
  7. Protect adjacent surfaces and materials not receiving coating from spatter and overspray; mask if necessary to provide adequate protection. Repair damage.
- Q. PRIMING
  1. Apply primer to all surfaces, unless specifically not required by coating manufacturer. Apply in accordance with coating manufacturer's instructions.
- R. APPLICATION
  1. Apply coatings in accordance with manufacturer's written instructions, to thicknesses specified and recommendations in "MPI Architectural Painting and Specification Manual". Use applicators and techniques suited to coating and substrate indicated.
  2. Apply in uniform thickness coats, without runs, drips, pinholes, brush marks, or variations in color, texture, or finish. Finish edges, crevices, corners, and other changes in dimension with full coating thickness.
  3. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color and appearance.
  4. When the color of a door frame changes from side to side, the change shall be made at the edge of the stop, where the transition is not visible when the door is in a closed position.
- S. FIELD QUALITY CONTROL
  1. Painted surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to Architect.
    - a. Brush/roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, or foreign materials in paint coatings.
    - b. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners, reentrant angles or similar conditions.
    - c. Damage due to touching before paint is sufficiently dry or any other contributory cause.
    - d. Damage due to application on moist surfaces or caused by inadequate protection from the weather.
    - e. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).
  2. Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces:

- a. Visible defects are evident on vertical or horizontal surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
    - b. Visible defects are evident on ceilings, soffits and other overhead surfaces when viewed at normal viewing angles.
    - c. When the final coat on any surface exhibits a lack of uniformity of color, sheen texture and hiding across full surface area.
    - d. Dry mil thicknesses do not meet manufacturer's recommended thickness or specified thickness.
    - e. Lack of adhesion. Test surfaces indicating lack of adhesion in accordance with ASTM D3359 or as recommended by coating manufacturer.
  3. Owner may provide field inspection and testing.
    - a. Painted surfaces will be tested for dry mil thickness for each coat.
    - b. Shop primers and painted surfaces will be tested for adhesion.
    - c. Surfaces will be tested at frequency discussed in the preinstallation conference and as deemed appropriate by Owner.
  4. Touch-up and restore painted surfaces damaged by testing.
    - a. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.
- T. CLEANING
1. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.
  2. Clean surfaces immediately of overspray, splatter, and excess material.
  3. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
  4. After coating has cured, clean and replace finish hardware, fixtures, and fittings previously removed.
  5. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.
- U. PROTECTION
1. Protect finished work from damage.
- V. EXTERIOR SCHEDULE
1. Steel: Semigloss, Two-Component, Pigmented Aliphatic Acrylic Polyurethane:
    - a. Canopy framing.
    - b. Architecturally exposed structural steel framing.
    - c. Steel bollards.
    - d. Steel handrails and guardrails.
    - e. Hollow metal doors and frames.
- W. INTERIOR SCHEDULE
1. Steel: Semigloss, Two-Component, Pigmented Aliphatic Acrylic Polyurethane:
    - a. Architecturally exposed structural steel framing.
    - b. Door frames for overhead doors.
    - c. Steel handrails and guardrails.
    - d. Hollow metal doors and frames.

## **SECTION 10 44 00 IDENTIFYING DEVICES - INTERIOR SIGNS**

### **RELATED DOCUMENTS**

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to this section.

### **SUMMARY**

This section specifies administrative and procedural requirements for handling and processing Contract modifications.

**Related Sections:** The following sections contain requirements that relate to this section:

**Division 1 Section "Unit Prices"** for administrative requirements governing use of unit prices.

**Division 1 Section "Submittals"** for requirements for the Contractor's Construction Schedule.

## **PART 1 - GENERAL**

### **DESCRIPTION**

Room and Door Signs.

Dimensional Letters (Exterior)

### **REFERENCES**

Title III of The Americans with Disabilities Act (ADA)

American National Standards Institute (ANSI)

American Society of Testing and Materials (ASTM)

### **SUBMITTALS**

**Supplier must** be in business for a minimum of 2 years, manufacturing comparable products and able to provide references upon request.

**Submit** the following in accordance with Section 01 30 00 for approval prior to fabrication. Room names may change prior to fabrication, no additional costs will be allowed.

**Product Data:** Manufacturer's complete and current product data for each product required, including complete installation instructions and dimensions.

**Shop Drawings:** Scaled for manufacturing, identify materials, size, sign layout, letter style, letter height, finishes and mounting methods.

**Verification Samples:** Submit one full size sample sign of the type, style and colors specified, including method of attachment. Sample should include methods of raised text and Grade 2 Braille.

**Manufacturer's Instructions:** Printed installation instructions for each sign type.

## **QUALITY ASSURANCE**

**Single Source Responsibility:** Furnish all signs and sign components from a single source.

## **DELIVERY, STORAGE AND HANDLING**

**Package products** to prevent damage during shipment, handling, storage, and installation. Store products in manufacturer's unopened packaging until installation.

**Deliver materials** in manufacturer's original packaging with identification labels attached. Label each sign with a sign location for installation.

**Store signs protected** from exposure to weather conditions or damage by other trades in dry, climate controlled, enclosed facility until installation.

## **WARRANTY**

**Provide manufacturer's warranty** against defect in materials and workmanship. Warranty shall provide materials and labor to replace defective materials. Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted. Removal and reinstallation of is not warranted.

## **PART 2 - PRODUCTS**

### **MANUFACTURERS**

#### **Flat Signs:**

1. Architectural Metal crafters: [www.amcrafters.com](http://www.amcrafters.com).
2. ASI Sign Systems: [www.asisignage.com](http://www.asisignage.com).
3. Best Sign Systems, Inc: [www.bestsigns.com](http://www.bestsigns.com).
4. FastSigns, 3259 NW 29th Avenue, Portland, OR 97210: [www.fastsigns.com](http://www.fastsigns.com).
5. Innerface Sign Systems, Inc: [ww.innerface-signage.com](http://ww.innerface-signage.com).
6. Martin Bros. Inc: [www.martin-bros.com](http://www.martin-bros.com).
7. Mohawk Sign Systems, Inc: [www.mohawksign.com](http://www.mohawksign.com).
8. SignCraft: [signcrafting.com](http://signcrafting.com)

#### **Dimensional Letter Signs:** Manufactured or distributed by one of the following:

1. Architectural Metalcrafters: [www.amcrafters.com](http://www.amcrafters.com).
2. ASI Sign Systems: [www.asisignage.com](http://www.asisignage.com).
3. Best Sign Systems, Inc: [www.bestsigns.com](http://www.bestsigns.com).
4. Gemini Incorporated: [www.geminisigns.com](http://www.geminisigns.com).
5. Innerface Sign Systems, Inc.: [ww.innerface-signage.com](http://ww.innerface-signage.com).
6. Martin Bros. Inc: [www.martin-bros.com](http://www.martin-bros.com).
7. Mohawk Sign Systems, Inc.: [www.mohawksign.com](http://www.mohawksign.com).

**SIGNAGE APPLICATIONS**

**Accessibility Compliance:** Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.

**Room and Door Signs:**

1. Sign Type: Flat signs with photopolymer panel media as specified.
2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
3. Character Height: As indicated.
4. Sign Size: As indicated in Sign Types, unless message requires a smaller size.
5. Provide tactile signs at all panel sign locations.

**Interior Directional and Informational Signs:**

1. Sign Type: Same as room and door signs.

**SIGN TYPES**

**Owner will provide an updated signage schedule prior to shop drawings for exact room names and numbers as these will differ from the construction plans. Contractor shall include all signs within the bid.**

**Flat Signs:** Signage media without frame.

1. Edges: Square.
2. Corners: Square.
3. Comply with requirements indicated for materials, finishes, colors, designs, shapes, sizes, and details of construction.
  - a. Produce smooth, even, level sign panel surfaces, constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally.
  - b. Position text and symbols as detailed.
  - c. Braille color shall match background color.
  - d. Raised Copy: Signs shall be of one-piece construction with raised characters and Grade II Braille. Added-on or engraved characters are not allowed for interior signs. Conform to applicable codes for ADA compliance.
  - e. Tactile characters and symbols, raised 1/32-inch minimum thickness from sign plate face.
  - f. Font: Arial, upper case.
  - g. Colors: As selected by Architect with character color contrasting with background color.
4. Wall Mounting of One-Sided Signs: Tape adhesive.
  - a. At signs mounted on glass, provide a blank panel matching the size and color of the sign on the back side of the glass for a neat and finished appearance from the back side of the sign.

**DIMENSIONAL LETTERS****Flat Cut Metal Lettering:**

1. Material: Aluminum.
2. Finish: Clear anodized.



3. Mounting: Projected mounting on 3/8-inch stainless steel pin standoffs.
4. Font: Arial.
5. Size: As indicated on Drawings.
6. Letter Count and Text: As indicated on Drawings.
7. Letter Thickness: As recommended by manufacturer for size of letters.

## **ACCESSORIES**

Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.

Exposed Screws: Stainless steel.

Tape Adhesive: Double sided VHB tape, permanent adhesive.

## **PART 3 - EXECUTION**

### **EXAMINATION**

**Examine the conditions** under which the work is to be performed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of work. Do not proceed with the installation until unsatisfactory conditions have been corrected.

**Ensure that surfaces** to receive signs specified are properly prepared and clean.

**The wall surface** should be smooth and free of any dirt, dust, or grease.

**All wall treatments**, such as wallpaper or painting should be complete prior to sign installation. All surface finishes should be dry and cured.

### **INSTALLATION**

**Install in accordance** with manufacturer's instructions and accessibility requirements. Install neatly, with horizontal edges level.

**Locate signs and mount at heights** indicated on drawings and in accordance with ADA Standards and ICC A117.1, using mounting methods of types described and complying with manufacturer's written instruction.

1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Interior Wall Signs: Install tactile signs on walls adjacent to latch side of door where applicable.
  - a. Where a tactile sign is provided at double doors with one active leaf, locate the sign on the inactive leaf.
  - b. Where a tactile sign is provided at double doors with two active leaves, locate the sign to the right of the right-hand door.
  - c. Where there is no wall space at the latch side of a single door or at the right side of double doors, locate signs on the nearest adjacent wall.

- d. Locate tactile signs so that a clear floor space of 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45-degree open position.
- e. Locate tactile characters 48 inches minimum above the finish floor, measured from the baseline of the lowest tactile character, and 60 inches maximum above the finish floor, measured from the baseline of the highest tactile character.

**Wall-Mounted Signs:** Comply with sign manufacturer's written instructions except where more stringent requirements apply.

1. Two-Face Tape: Mount signs to smooth, nonporous surfaces. Do not use this method for rough surfaces.
2. Silicone-Adhesive Mounting: Attach signs to irregular or porous surfaces.
3. At glass mounted signs, provide a blank panel on the back side of the glass for a neat and finished appearance from the back side of the sign.

**Dimensional Letters:** Mount characters using standard fastening methods to comply with manufacturer's written instructions for character form, type of mounting, wall construction, and condition of exposure indicated. Provide heavy paper template to establish character spacing and to locate holes for fasteners.

1. **Projected Mounting:** Mount characters at projection distance from wall surface indicated.

**Plaque Sign:** Install with concealed fasteners where directed by Architect.

**Stenciled Signs:** Install stenciled lettering with clean sharp edges. Locate at spacing indicated and where readily visible, clear of visual obstructions above accessible ceilings.

**Protect from damage** until Substantial Completion; repair or replace damaged items.

## **SIGNAGE SCHEDULE**

<b><u>Room No.</u></b>	<b><u>Door No.</u></b>	<b><u>Sign Type</u></b>	<b><u>Sign Text</u></b>
101	9	NT-CR01	Storage
102	10	NT-CR01	Custodial
102	1	NT-RG01	Public ADA Accessible Restroom

Exterior on Wall as per Elevations: 10" high cast aluminum letters mounted to siding with spacers;

## **UNISEX RESTROOMS**

Verify all sign text, symbols, colors, & logos with architect before manufacturing signs.

**END OF SECTION**

**SECTION 10 80 00 - TOILET AND BATH ACCESSORIES**

**PART 1 - GENERAL**

**RELATED DOCUMENTS**

Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**REFERENCES**

ADA Accessibility Standards- Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities.

ASTM A366 – Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.

ASTM A386 – Zinc Coating (Hot Dip) on Assembled Steel Products.

ASTM B456 – Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.

ASTM A167 – Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

ASTM A269 – Seamless and Welded Austenitic Stainless Steel Tubing for General Service.

**SUBMITTALS**

**General:** Submit the following in accordance with Conditions of Contract and Division 1 Specifications Sections 01300.

**Product Data** for each toilet accessory item specified, including details of construction relative to materials, dimensions, gages, profiles, method of mounting, specified options, and finishes.

**Setting Drawings:** Where cutouts are required in other work, provide templates, substrate preparation instructions, and directions for preparing cutouts and for installation of anchorage devices.

**QUALITY ASSURANCE**

**Inserts and Anchorages:** Furnish inserts and anchoring devices that must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.

**Install work in conformance** with ADA Accessibility Standards.

**PROJECT CONDITIONS**

**Coordination:** Coordinate accessory locations, installation, and sequencing with other work to avoid interference and to assure proper installation, operation, adjustment, cleaning, and servicing of toilet accessory items.

**Coordinate the work of this section** with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

## **PART 2 - PRODUCTS**

### **ACCEPTABLE MANUFACTURERS**

**Manufacturers:** Subject to compliance with requirements, provide toilet accessories by one of the following:

Bobrick Washroom Equipment, Inc. "Contura Series"  
Or approved equal from American Specialties. (Prior to bidding)

### **MATERIALS, GENERAL**

**Stainless Steel:** AISI Type 304, with drawn finish, 22-gage (.034-inch) minimum thickness, unless otherwise indicated.

**Stainless Steel Sheet:** ASTM A167, Type 304.

**Sheet Steel:** ASTM A366

**Brass:** Leaded and unleaded, flat products, ASTM B 19; rods, shapes, forgings, and flat products with finished edges, ASTM B 16, Castings, ASTM B-30.

**Galvanized Steel Sheet:** ASTM A 527, G60.

**Mirror Glass:** Nominal 6.0 mm (0.23 inch) thick, conforming to ASTM C 1036, Type I, Class 1, Quality q2, and with silvering, electro-plated copper coating, and protective organic coating.

**Galvanized Steel Mounting Devices:** ASTM A 153, hot-dip galvanized after fabrication.

**Fasteners:** Screws, bolts, and other devices of same material as accessory unit or of galvanized steel where concealed.

**Tubing:** ASTM A269, stainless steel.

**Adhesive:** Contact type, waterproof.

**Expansion Shields:** Fiber, lead or rubber as recommended by manufacturer for component and substrate.

### **FABRICATION**

Weld and grind smooth joints of fabricated components.

Form exposed surfaces from single sheet of stock, free of joints.

Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.

Black paint components where contact is made with building finishes to prevent electrolysis.

Shop assemble components and package complete with anchors and fittings.

Provide steel anchor plates, adapters, and anchor components for installation.

Hot dip galvanized exposed painted ferrous metal and fastening devices.

## **FACTORY FINISHING**

**Galvanizing:** ASTM A386 to 1.25 oz/sq.yd.

**Shop Primed Ferrous Metals:** Pretreat and clean, spray apply one coat primer and bake.

**Chrome/Nickel Plating:** ASTM B456, Type SC-2 satin finish.

**Stainless Steel:** No. 4 satin luster finish.

## **PART 3 - EXECUTION**

### **INSTALLATION**

**Inspection:** Verify that site conditions are ready to receive work and dimensions are as indicated on approved shop drawings. Beginning of installation means acceptance of existing conditions.

**Install** toilet accessory units in accordance with manufacturers' instructions, using fasteners appropriate to substrate and recommended by manufacturer of unit. Install units' plumb and level, firmly anchored in locations and at heights indicated. Comply with all ANSI & ADA handicap requirements.

**Secure mirrors** to walls in concealed, tamperproof manner with special hangers, toggle bolts, or screws. Set units plumb, level, and square at locations indicated, in accordance with manufacturer's instructions for type of substrate involved.

### **ADJUSTING AND CLEANING**

**Adjust** toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.

**Clean** and polish all exposed surfaces in strict accordance with manufacturer's recommendations after removing temporary labels and protective coatings.

## **SCHEDULE**

See drawings for locations and number of items in each room. Required items to ensure health standards and functioning shall be provided regardless of if shown.

A	<b><u>Toilet Room Grab Bar:</u></b>	Bobrick B-6806 Series, Type 304 stainless steel, 1.5" o.d. satin finish grab bars with mounting conditions as required for wall conditions as required for wall construction on which they are mounted.
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**B-6806-36" long**

B	<b><u>Toilet Room Grab Bar:</u></b>	Bobrick B-6806 Series, Type 304 stainless steel, 1.5" o.d. satin finish grab bars with mounting conditions as required for wall conditions as required for wall construction on which they are mounted.
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**B-6806-42" long**

- |   |   |   |
|---|---|---|
| C | <b><u>Toilet Room Grab Bar:</u></b>         | Bobrick B-6806 Series, Type 304 stainless steel, 1.5" o.d. satin finish grab bars with mounting conditions as required for wall conditions as required for wall construction on which they are mounted.                   |
|   |   | <b>B-6806-18" long Vertically mounted</b>   |
| D | <b><u>Toilet Tissue Dispenser:</u></b>      | Surface Mounted Heavy-Duty cast aluminum, satin finish, with High Impact plastic spindles. Holds two rolls.   |
|   |   | <b>B-274</b>  |
| E | <b><u>Paper Towel/Waste Receptacle:</u></b> | Bobrick B-3979 Classic Series with Surface mounted automatic universal roll towel dispenser equipped with intuitive LED light/waste receptacle.   |
|   |   | <b>B-3979</b>   |
| F | <b><u>Soap Dispenser:</u></b>               | Bobrick B-4112 surface mounted.   |
|   |   | B-4112  |
| G | <b><u>Framed Mirror Unit:</u></b>           | Framed mirror conforming to material and construction provisions of Fed. Spec. DD-M-0411 (1), Class2, Style E, Bobrick Model B290 Series, with satin finish stainless steel frames and theft resistant concealed hangers. |
|   |   | <b>B-290 24" W x 36" H</b>  |
| H | <b><u>Seat Cover Dispenser:</u></b>         | Surface mounted satin finish stainless steel, holds 250 single or half fold covers.   |
|   |   | <b>B-4221</b>   |
| I | <b><u>Sanitary Napkin Dispenser:</u></b>    | Satin finish stainless steel, 16 ga., with concealed fasteners. Provide and locate as per plans.  |
|   |   | <b>B-3503 Recessed</b>  |
| J | <b><u>Robe Hooks:</u></b>                   | Satin finish stainless steel, 16 ga., with concealed fasteners. Provide and locate as per plans.  |
|   |   | <b>B-6717</b>   |

**END OF SECTION 10 80 00**

## **SECTION 22 05 00 - PLUMBING MATERIALS AND METHODS**

### **PART 1 - GENERAL**

#### **DESCRIPTION**

The provisions of the General Requirements, Supplementary Requirements, and Division 1 apply to the plumbing work specified in this Division.

The requirements of this Section apply to the plumbing systems specified in these Specifications and in other Division 22 sections.

Provide all items, articles, materials, equipment, operations and/or methods listed, mentioned, shown and/or scheduled on the Drawings and/or in these Specifications, including all labor, supervision, services, permits, fees, and incidentals necessary and required to provide a complete and operable facility with complete systems as shown, specified, and required by applicable codes.

The work shall include, but not be limited to, the following systems:

- Water, sanitary sewer, and storm sewer service complete per serving utility company requirements.
- Service and distribution piping including valves, supports, insulation, etc.
- Complete plumbing systems, including fixtures, trim, equipment, etc.
- Rough-in and final connection of plumbing equipment and fixtures furnished under other Divisions of this Specification.
- Piping to and connection of equipment or fixtures furnished outside of these Specifications and Contract but described on the Drawings.
- Special systems as specified herein.

Advise Subcontractor, suppliers, and vendors involved in the work specified in this Section of the applicable requirements.

#### **QUALITY ASSURANCE**

All work and materials shall conform to all applicable local and state codes and all federal, state and other applicable laws and regulations. All clarifications and modifications which have been cleared with appropriate authorities are listed under the applicable sections. All electrical products shall bear the label of a recognized testing laboratory such as UL or CSA.

Whenever the requirements of the Specifications or Drawings exceed those of the applicable code or standard, the requirements of the Specifications and Drawings shall govern.

Codes and Standards: Comply with the provisions of the following referenced codes, standards and specifications:

- Federal Specifications (FS)
- American National Standards Institute (ANSI)
- National Electrical Manufacturer's Association (NEMA)
- National Fire Protection Association (NFPA)
- Underwriters Laboratories, Inc. (UL)
- Factory Mutual (FM)
- International Building Code (IBC) with State and Local Amendments
- International Mechanical Code (IMC) with State and Local Amendments

Uniform Plumbing Code (UPC) with State and Local Amendments  
American Society for Testing and Materials (ASTM)  
Americans with Disabilities Act (ADA)  
International Fire Code (IFC) with State and Local Amendments  
Energy Policy Act (EPAct)  
Manufacturers Standardization Society (MSS)  
National Sanitation Foundation (NSF)  
American Gas Association (AGA)

Each piece of equipment furnished shall meet all detailed requirements of the Drawings and Specifications and shall be suitable for the installation shown. Equipment not meeting all requirements will not be acceptable, even though specified by name. Where two or more units of the same class of equipment are furnished, use product of the same manufacturer; component parts of the entire system need not be products of same manufacturer. Furnish all materials and equipment, new and free from defect and of size, make, type and quality herein specified or approved by the Architect. All materials shall be installed in a neat and professional manner.

All apparatus shall be built and installed to deliver its full rated capacity at the efficiency for which it was designed.

The Drawings and Specifications are complementary. What is called for by one shall be as though called for by both.

Drawings: Do not scale drawings for roughing-in measurements, nor use as shop drawings. Make field measurements and prepare shop drawings. See Article 3.01 for more requirements. Coordinate work with shop drawings of other specification divisions.

Field Wiring: It is the intent of these specifications that all systems shall be complete and operable. Refer to all drawings and specifications, especially the electrical drawings, to determine voltage, phase, circuit ampacity and number of connections provided. Provide all necessary field wiring and devices from the point of connection indicated on the electrical drawings. All equipment shall be installed in compliance with the Electrical Code and the equipment's UL listing. Bring to the attention of the Architect in writing, all conflicts, incompatibilities, and/or discrepancies prior to bid or as soon as discovered.

### **WORK OF OTHER CONTRACTS**

Work under this contract shall be conducted in a manner to allow for the future installations of such equipment or items listed in other sections of this Specification.

### **WORK OF OTHER DIVISIONS**

Work under this Division shall be conducted in a manner to cooperate with the installation of such equipment or items as specified in other Divisions.

HVAC piping systems, fuel piping systems, fire suppression piping systems, and control devices and control wiring relating to the heating and air conditioning systems are specified under other Divisions of these Specifications except for provisions or items specifically noted on the Drawings or specified herein.

Consult all Drawings and Specifications in this project and become familiar with all equipment to be installed. Coordinate all aspects of the construction with the other trades on the job to ensure that all work and materials required to provide a complete and operational facility are included in the bid.



All sections of Division 22 are interrelated and shall be considered in their entirety when interpreting any material, method, or direction listed in any section of Division 22. Individual sections are not written for specific Subcontractors or suppliers but for the general Contractor.

### **SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES (SUBMITTALS)**

Submit in accordance with Division 1 full technical and descriptive shop drawing data on proposed materials and equipment as detailed in each section.

The Contractor shall verify that all equipment submitted can be delivered and installed within the time constraints of the construction period.

Include the manufacturer, type, style, catalog number, complete specification, certified dimensions, and description of physical appearance for each item and option submitted. Reproduction of catalog data sheets shall be clean and legible to show all details, including gauge of metal used.

Include only information on exact equipment to be installed, not general catalogs of the manufacturer. Where sheets show proposed equipment as well as other equipment, identify proposed equipment with rubber stamp arrow or similar concise method.

Submit with each copy a transmittal letter verifying that all included equipment submittals have been carefully considered for quality, dimensions, function, and have been coordinated with the Drawings and Specifications. Guarantee that proposed materials will meet or exceed the quality and function of those specified.

Include field wiring diagrams and connection diagrams for all control and/or low voltage systems, including floor plans.

Submittal Review: The submittal review process is a means to provide quality control. The action noted to be taken (or where conflicts with the contract documents are not noted) shall not be interpreted by the Contractor as automatic "change orders." Approval of the data for substitution and shop Drawings shall not eliminate the Contractor's responsibility for compliance with Drawings or Specifications, nor shall it eliminate the responsibility for freedom from errors of any sort in the data discovered prior to or after the review process. Deviations, discrepancies, and conflicts between the submittals and the Contract Documents shall be called to the Architect's attention in writing at the time of transmittal of the data.

Submittals shall be in the form of PDF documents. Arrange submittals numerically with specification sections identified in tabs. All required sections shall be submitted at one time. **Partial submittals will be rejected without review.**

### **PRODUCT SUBSTITUTION**

Materials other than those specified may be approved for this project providing a written request is submitted to the Architect prior to bid in accordance with Instructions to Bidders. Requests shall include complete specifications, dimensions, manufacturer and catalog number for each item for which approval is desired. If, in the opinion of the Architect, the material is not complete or if it is not an acceptable substitute, he may reject it. The Architect's evaluation will be based solely on the material submitted.

## **CHANGE ORDERS**

All supplemental cost proposals by the Contractor shall be accompanied by a complete itemized breakdown of labor and materials without exception. At the Architect's request, the Contractor's estimating sheets for the supplemental cost proposals shall be made available to the Architect. Labor must be separated and allocated for each item of work.

## **RECORD DOCUMENTS**

### Project Record (As-Installed) Drawings:

- Maintain a set of record drawings on the job site as directed in Division 1.

- Keep Drawings clean, undamaged, and up to date.

- Record and accurately indicate the following:

  - Depths, sizes, and locations of all buried and concealed piping and all cleanouts, whether concealed or exposed, dimensioned from permanent building features.

  - Locations of all valves with assigned tag numbers.

  - Changes, additions, and revisions due to change orders, obstructions, etc. Eradicate extraneous information.

  - Locations of tracer wire terminal points.

  - Model numbers of installed equipment.

- Make Drawings available when requested by Architect for review.

- Submit as part of the required Project Closeout documents. Final submittal will be in the form of reproducible drawings.

- Quality of entire set of project record drawings to match the quality of the contract documents; quality to be judged by Architect. Computer-aided design drafting (CADD) shall be used to complete project record drawings. Use standards set in contract documents. Note field modifications, all addenda and change order items on project record drawings. If deficiencies are found in either the quality or the accuracy of the drawings, they will be returned unapproved. Additional review of subsequent submissions shall be at the Contractor's expense.

Operating and Maintenance Manuals: Submit Operating and Maintenance Instructions, including manufacturer's service data, wiring diagrams, and parts lists and vendors for all serviceable items of equipment, valve charts, balancing data, final control diagrams showing final set points, duct and piping pressure test reports, equipment startup records, and any additional equipment added by change order. Provide any performance curves, data, and model numbers from submittals. Comply with provisions of Division one where applicable to the mechanical work. Submittal shall be in the form of a PDF file per specification section. Arrange submittals numerically with equipment type or classification identified in tabs. Manufactures O&M manuals shall be provided as a single PDF file that can be hyper-linked by owner for reference. O&M manuals that are a series of PDF files will not be accepted.

## **WARRANTY**

Furnish, prior to application for final payment, three copies of written and signed guarantee effective a period of one year from date of completion and acceptance of entire project; agree to correct, repair and/or replace defective materials and/or equipment or the results of defective workmanship without additional expense to the Owner. Where no response satisfactory to the Owner has occurred within three working days from the written report of a warranty covered defect, the Contractor shall agree to pay for the cost of repair of the reported defect by a Contractor of the Owner's choice.

Where the manufacturer's guarantee exceeds one year, the longer guarantee shall govern and include the Contractor's labor.

Warranty period shall begin once all phases of construction are complete.

## **PART 2 - PRODUCTS**

### **GENERAL**

General: Provide all new materials and equipment, identical to apparatus or equipment in successful operation for a minimum of two years. Provide materials of comparable quality omitted here but necessary to complete the work. Maximum allowable variation from stated capacities, minus 5% to plus 10% as approved in each case.

Compatibility: Provide products which are compatible with other portions of the work and provide products with the proper or correct power and fuel-burning characteristics, and similar adaptations for the project.

Efficiency: Service (Domestic) Water Heating Equipment shall comply with ASHRAE Standard 90.1-2014 and the State Energy code. Where equipment efficiencies are indicated, the use of alternate or substitute manufacturer's equipment with lower efficiencies is not permitted.

Storage and Handling:

Delivery: Deliver to project site with manufacturer's labels intact and legible.

Handling: Avoid damage.

Storage: Inside protected from weather, dirt and construction dust. Where necessary to store outside, elevate well above grade and enclose with durable, waterproof wrapping.

### **ACCESS PANELS**

Manufacturers: Inryco/Milcor, Bilco, Elmdor, Karp, Potter-Roemer or accepted substitute. Inryco/Milcor Style DW, K, or M panels as required by construction.

Construction: Flush style, fire rated in fire rated partitions and ceilings. Provide flush key cylinder locks on all access panels less than 8' above the floor in public spaces. Turn keys over to Owners at project completion. Screwdriver latches on all others. Stainless steel construction when installed in locker room shower ceilings or restroom walls.

### **VALVES**

General: Provide factory fabricated valves of the type, body material, temperature and pressure class, and service indicated. Bronze gate, globe and check valves shall comply with MSS-SP-80. Ball valves shall comply with MSS-SP-110. Iron gate and globe valves shall comply with MSS-SP-70. Iron check valves shall comply with MSS-SP-71. Butterfly valves shall comply with MSS-SP-67. Valve size same as connecting pipe size.

Acceptable Manufacturers: Milwaukee, Crane, Grinnell, Nibco, Hammond, Stockham, Legend, Watts, and Walworth. Grooved end valves Victaulic, Gruvlock, or accepted substitute. NIBCO numbers are given except as noted. Where possible, provide valves from a single manufacturer.

Valve styles: Domestic hot and cold water.

Valves 2" and Smaller:

Ball: Two-piece, bronze body, full port, 600 psi WOG, Fig. T/S-585-70.

Check: Bronze body, swing check, 200 psi WOG, T/S-413B (bronze disc) or T/S-413Y (Teflon disc).

Globe (shutoff): Bronze body, Teflon disc, 200 psi WOG, T/S-211Y.

Globe (throttling): Bronze body, full stainless steel plug disc, 600 psi WOG, T-276AP.

Valves 2" through 12":

Ball: Three-piece, bronze body, full port, 600 psi WOG, T/S-595Y.

Butterfly: Ductile iron body, aluminum bronze disc, 200 psi WOG, Lugged body – LD-2000, Wafer body – WD-2000, Grooved body – GD-4765.

Check (2 ½" and larger): Iron body, bronze trim, Class 125, F-918-B (swing type).

Butterfly Valve Operators: Locking lever for shut-off service; "Memory Stop" for lever handle with 10 position throttling plate for throttling service; gear operator with babbitt sprocket rim for chain-operated valves and gear operators on all 8" or larger valves.

Butterfly Valve Style: Lug-type with cap screws for all valves utilized for equipment isolation for servicing. Lug and grooved style valves shall be capable for use as isolation valves and recommended by manufacturer for dead-end service at full system pressure.

Insulated Valves: Install extended-stem valves in all piping specified as insulated, and arrange in the proper manner to receive insulation.

Mechanical Actuators: Provide mechanical actuators with chain operators where indicated, where valves 4" and larger are mounted more than 7' above the floor, and where manual operation is difficult because of valve size, pressure differential or other operating conditions. Drop chains to 6'-6" above the floor.

Selection of Valve Ends (Pipe Connections): Select and install valves with ends matching the types of pipe/tube connections.

## **HANGERS AND SUPPORTS**

General: Provide factory-fabricated horizontal piping hangers, clamps, hanger rod, inserts, supports, etc., of the indicated MSS type and size. The Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry Practice SP-58 and SP-69 are referenced in this section.

Manufacturers: B-Line, Carpenter & Paterson, Grinnell, Michigan, Superstrut, Tolco, Erico, or accepted substitute. Grinnell figure numbers in parentheses where applicable (or other manufacturers as noted).

Corrosion Protection: Provide materials which are zinc plated or factory painted to prevent corrosion. Prevent electrolysis in the support of copper tubing by the use of hangers and supports which are copper plated, plastic coated, or by other recognized industry methods.

Seismic Requirements: Provide seismic restraints in accordance with OSSC Section 1613. Design restraint systems in accordance with "Seismic Restraint Manual: Guidelines for Mechanical Systems," Second Edition, 1998, SMACNA, or "A Practical Guide to Seismic Restraint" ASHRAE RP-812, 1999.

Horizontal Piping Hangers and Supports:

Adjustable Clevis Hanger: MSS Type 1 (Fig. 260).

Adjustable Band Hanger: MSS Type 7 (Fig. 97), fabricated from steel.

Adjustable Swivel-Band Hanger: MSS Type 10 (Fig. 70).

Clamp: MSS Type 4 (Fig. 212, 216).

Double-Bolt Clamp: MSS Type 3 (Fig. 295A, 295H), including pipe spacers.

Adjustable Saddle-Support: MSS Type 36 (Fig. 258) and MSS Type 37 (Fig. 259), including saddle, pipe and reducer. Fabricate base-support from steel pipe and include cast-iron flange or welded-steel plate.

Channel Support System: Galvanized, 12 gauge channel and bracket support systems, single or double channel as indicated on the Drawings or as required by piping and equipment weights. Grinnell "Power Strut" channel. Acceptable Manufacturers: Super Strut, Globestrut, Bee, Kindorf or Unistrut.

**Vertical Pipe Clamps:**

Two-Bolt Riser Clamp: MSS Type 8 (Fig. 261).

Four-Bolt Riser Clamp: MSS Type 42 include pipe spacers at inner bolt-holes.

**Hanger Attachment:**

Hanger Rod: Rolled threads, zinc plated. Right hand threaded.

Turnbuckles: MSS Type 13 (Fig. 230).

Weldless Eye-Nut: MSS Type 17 (Fig. 290).

Malleable Eye-Socket: MSS Type 16 (Fig. 110R).

Clevises: MSS Type 14 (Fig. 299).

**Building Attachments:**

Concrete Inserts: MSS Type 18 (Fig. 282), steel or Grinnell Power-Strut PS349 continuous channel. Acceptable Manufacturers: Michigan Hanger, Globestrut, Unistrut, Super Strut.

Clamps: MSS Type 19 (Fig. 285, 281), Type 20, 21 (Fig. 225, 226, 131), Type 23 (Fig. 86, 87, 88), Type 25 (Fig. 227), Type 27 through 30 where applicable.

## **IDENTIFICATION MARKERS**

**Pipe Markers:**

Adhesive pipe markers of width, letter size and background color conforming to ANSI A13.1.

Acceptable Manufacturers: Brady B946 with arrow banding tape or similar Seaton, Zeston, MSI.

**Nameplates:**

Engraved nameplates, 1/16" thick, laminated 2-ply plastic, bottom ply white, outer ply black, letters formed by exposing bottom ply.

Size: 2" by 4" nameplates with 1/4" high letters.

**Valve Tags:**

2" diameter, 18-gauge polished brass tags with 3/16" chain hole and 1/4" high stamped, black-filled service designation.

Acceptable Manufacturers: Seaton, Brady, MSI.

## **PENETRATION FIRE STOPPING**

Through-penetration fire stopping system tested and listed by Underwriters Laboratories. 3M, Metacaulk, SpecSeal, or approved.

Select system for proper application based on wall construction, type of penetrating item, wall rating, etc.

## **HEAT TRACING**

**Freeze Protection Heat Cable:**

Self-regulating tracing cable with braided tinned copper under TPR outer jacket and all necessary accessories including controls, bulb-stat with 3' capillary, junction/power connection kit, pipe straps, power termination kit, end seal caps, etc. Chromalox SRF-CR equivalent Raychem, Thermon, Nelson CLT or approved substitute.

## **PART 3 - EXECUTION**

### **LAYOUT AND COORDINATION**

**Site Examination:** Before starting work, carefully examine site and all contract Drawings. Become thoroughly familiar with conditions governing work on this project. Verify all indicated elevations, building measurements, roughing-in dimensions and equipment locations before proceeding with any of the work.

**Utility Locations:** The location of existing utilities, wires, conduits, pipes, ducts, or other service facilities are shown in a general way only on the Drawings and are taken from existing records. Ascertain whether any additional facilities other than those shown on the plans may be present and determine the exact location and elevations of all utilities prior to commencing installation.

**Sleeves, Inserts, Cast-in-Place Work:** Provide sleeves, inserts, anchoring devices, cast-in-place work, etc. which must be set in concrete sequenced at the proper time for the project schedule.

**Coordination:**

The Drawings are based on equipment of a certain manufacturer and may be identified as such. Where alternate manufacturers or approved substitutes are incorporated into the work, any required design changes are the responsibility of the Contractor. Such changes may include changes in utility or system connection sizes, location, or orientation, service clearances, structural support or acoustic considerations.

Prepare accurate AutoCAD shop Drawings showing the actual physical dimensions required for the installation for piping and plumbing devices. Submit Drawings prior to purchase/fabrication/installation of any of the elements involved in the coordination. Provide Drawing files to other trades for coordination.

Cooperate with other trades in furnishing material and information for sleeves, bucks, chases, mountings, backing, foundations and wiring required for installation of mechanical items.

Coordinate all work with other trades and determine in advance where interfacing of the mechanical work and other work are required to be connected together. Provide all materials and equipment to make those connections. Submit shop drawings showing required connections where special conditions exist.

**Discrepancies:** Report immediately any error, conflict or discrepancy in Plans, Specifications and/or existing conditions. Do not proceed with any questionable items of work until clarification of same has been made. Should rearrangement or re-routing of piping be necessary, provide for approval the simplest layout possible for that particular portion of the work.

### **UTILITY COORDINATION**

**Utility Coordination:** Coordinate all aspects of the incoming plumbing utility services indicated with the city engineer, serving utility, and the off-street improvements Contractor. Requirements of the utility company which exceed the provisions made on the Drawings or covered by these Specifications shall take precedence. Provisions made on the Drawings or Specifications in excess of the utility company's requirements shall take precedence. No additional compensation will be allowed the Contractor for connection fees or additional work or equipment not covered in the Drawings or Specifications which are a result of policies of the serving utilities.

### **MECHANICAL EQUIPMENT WIRING**

Provide all mechanical equipment motors, automatic temperature, limit, float and similar control devices required, with wiring complete from power source indicated on Electrical Drawings.

Provide properly rated motor overload and undervoltage protection and all manual or automatic motor operating devices for all mechanical equipment.

Equipment and systems shown on the Drawings and/or specified, are based upon requirements of specific manufacturers which are intended as somewhat typical of several makes which may be approved. Provide all field wiring and/or devices necessary for a complete and operable system including controls for the actual selected equipment/system.

Provide all starters for mechanical motors. Review Electrical Specifications and Drawings to determine which mechanical motor starters will be provided under the Electrical Specification Sections and provide all others.

### **GENERAL INSTALLATION**

Locating and Positioning Equipment: Observe all Codes, Regulations and good common practice in locating and installing mechanical equipment and material so that completed installation presents the least possible hazard. Maintain adequate clearances for repair and service to all equipment and comply with Code requirements.

Arrangement: Arrange piping parallel with primary lines of the building construction, and with a minimum of 7' overhead clearance in all areas where possible. Unless indicated otherwise, conceal all piping. Locate operating and control equipment properly to provide easy access, and arrange entire mechanical work with adequate access for operation and maintenance. Give right-of-way to piping which must slope for drainage. Set all equipment level or as recommended by manufacturer. Under no conditions shall beams, girders, footings or columns be cut for mechanical items. Casting of pipes into concrete is prohibited unless so shown on Drawings.

Drip Pans: Provide drip pans under all domestic hot water heaters and all above ceiling in-line pumps and cooling coils or as noted on drawings. Locate pan immediately below piping and equipment, and extend a minimum of 6" on each side and lengthwise 18" beyond equipment being protected. Fabricate pans 2" deep, of reinforced 20 gauge galvanized sheet metal with watertight seams and rolled or hemmed edges. Provide 3/4" drainage piping, properly discharged to over floor drain or as shown on the Drawings. Comply with Mechanical Code for overflow protection and pipe sizing.

Access Panels: Provide access panels with proper backing reinforcement for all equipment, dielectric unions, valves and items requiring service and installed above ceilings, behind walls, or in furring, complete with correct frame for type of building construction involved. Exact size, number and location of access panels are not necessarily shown on Drawings. Use no panel smaller than 12" by 12" for simple manual access or smaller than 16" x 20" where personnel must pass through.

Adjusting: Adjust and calibrate all automatic mechanical equipment, mixing valves, flush valves, float devices, etc. Adjust flow rates at each piece of equipment or fixture.

Building Vapor Barrier: Wherever the building insulation vapor barrier is penetrated by piping, hangers, conduits, etc., provide clear self-adhesive tape recommended by the insulation manufacturer around the penetrations.

Concrete Work: Coordinate with other work, particularly other concrete work and accessories. Comply with applicable provisions of Section 03310 for mechanical work concrete, including formwork, reinforcement, mix design, materials (use mix designs and materials accepted for Division 3 work where possible), admixtures, accessories, (including waterstops), placing of wet concrete, finishing, curing, protecting, testing, submittals and other requirements of the concrete work.

## **VALVE INSTALLATION**

General: Comply with the following requirements:

Install valves where required for proper operation of piping and isolation of equipment, including valves in branch lines where necessary to isolate sections of piping, and where shown on the Drawings.

Install valves at low points in piping systems that must be drained for service or freeze protection.

Locate valves in accessible spaces (or behind access panels) and so that separate support can be provided when necessary.

Install valves with stems pointed up, in the vertical position where possible, but in no case with stems pointed downward from a horizontal plane.

Insulated Valves: Install extended-stem valves in all piping specified as insulated, and arrange in the proper manner to receive insulation.

Valve Access: Provide access panels to all valves installed behind walls, in furring or otherwise inaccessible.

## **INSTALLATION OF HANGERS AND SUPPORTS**

General: Proceed with the installation of hangers, supports and anchors only after the required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) the proper placement of inserts, anchors and other building structural attachments.

Install hangers, supports, clamps, and attachments to support piping and equipment properly from the building structure. Use no wire or perforated metal to support piping, and no supports from other piping or equipment. For exposed continuous pipe runs, install hangers and supports of the same type and style as installed for adjacent similar piping.

Prevent electrolysis in the support of copper tubing by the use of at least 2 layers of UPC listed 10 mil tape at all bearing surfaces or strut clamp cushion. Copper plated hangers alone are not sufficient.

Support fire sprinkler piping independently of other piping and in accordance with NFPA Pamphlet 13.

Arrange supports to prevent eccentric loading of joists and joist girders. Locate supports at panel points only.

Provisions for Movement:

Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate the action of expansion joints, expansion loops, expansion bends and similar units. Install specified seismic restraints to restrict excessive movement. Install hangers and supports so that equipment and piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

Install hangers and supports to provide the indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded. Comply with the following installation requirements:

Clamps: Attach clamps, including spacers (if any), to piping outside the insulated piping support. Do not exceed pipe stresses allowed by ANSI B31.

Insulated Pipe Supports: Insulated pipe supports shall be supplied and installed on all insulated pipe and tubing.

Load Rating: All insulated pipe supports shall be load rated by the manufacturer based upon testing and analysis in conformance with ASME B31.1, MSS SP-58, MSS SP-69 and MSS SP-89.

Support Type: Manufacturer's recommendations, hanger style and load shall determine support type.

Insulated Piping Supports: Where insulated piping with continuous vapor barrier or where exposed to view in finished areas is specified, install hard maple wood insulation shields (Elcen Fig. 216) or steel pipe covering protection shields (MSS type 39) at each hanger.



**Pipe Support:**

Vertical Spacing: Support at base, at equivalent of every floor height (maximum 10' as required by Code) and just below roof line.

Screwed or Welded Steel or Copper Piping: Maximum hanger spacing shall be as follows:

	<u>Steel</u>	<u>Copper</u>
1-1/4" and smaller	7' span	6' span
1-1/2" pipe	9' span	6' span
2" pipe	10' span	10' span
2-1/2" & larger	12' span	10' span

**Cast Iron Soil Pipe:**

Hubless and Compression Joint: At every other joint except when developed length exceeds 4', then at each joint.

Additional Support: Provide at each horizontal branch and/or at concentrated loads to maintain alignment and prevent sagging.

Install additional hangers or supports at concentrated loads such as pumps, valves, etc. to maintain alignment and prevent sagging.

Support Rod: Hanger support rods sized as follows:

<u>Pipe and Tube Size</u>		<u>Rod Size</u>	
<u>Inches</u>	<u>mm</u>	<u>Inches</u>	<u>mm</u>
1/2" to 4"	12.7 to 101.6	3/8"	9.5
5" to 8"	127.0 to 203.2	1/2"	12.7
10" to 12"	254.0 to 304.8	5/8"	15.9

Provide manufactures approved channel continuously below all horizontal PEX or other plastic pipe where hung from structure.

Adjust hangers and supports to bring piping to proper levels and elevations.

Provide all necessary structural attachments such as anchors, beam clamps, hanger flanges and brackets in accordance with MSS SP-69. Attachments to beams wherever possible. Supports suspended from other piping, equipment, metal decking, etc., are not acceptable.

Horizontal banks of piping may be supported on common steel channel member spaced not more than the shortest allowable span required on the individual pipe. Maintain piping at its relative lateral position using clamps or clips. Allow lines subject to thermal expansion to roll axially or slide. Size channel struts for piping weights.

Installation of drilled-in concrete anchors shall comply with the manufacturer's instructions for working load, depth of embedment, and spacing between anchors and from the edge of the slab. Use only wedge style anchors.

Seismic Restraints: Install restraints where recommended in SMACNA "Seismic Restraint Manual." Show analysis of supporting structure, anchorages, and restraints in accordance with OSSC Chapter 16 and reference ASCE standard. Seismic restraint system components shall be approved by the California Office of Statewide Health Planning and Development (OSHPD). Acceptable Manufacturers: Amber/Booth, Mason Industries, Tolco, or approved. Contractor shall submit calculations and shop Drawings, sealed and signed by a professional engineer, showing seismic restraint design for all equipment, piping and ductwork required to be braced.

**FREEZE PROTECTION ELECTRIC HEAT CABLE INSTALLATION**

Selection:

Select cable watts/foot of pipe based upon maintaining 50 deg. F pipe temperatures with specified insulation thickness, pipe sizes and outside weather conditions of zero degrees F and 20 mph wind.

**Installation:**

Install heat cable under the insulation with the recommended number of wraps per foot of pipe and with all necessary accessories and bulb-stat with 3' capillary. Also protect all fittings and valves. Secure cable to piping with cable ties or fiberglass tape.

**Electrical:**

Connect to nearest available power source indicated on the Electrical Drawings. Verify electrical characteristics required.

**PLUMBING SYSTEM IDENTIFICATION**

Piping System: Indicate each pipe system by its generic name (abbreviated) as shown/scheduled/specified; except vent and drainage piping. Comply with ANSI A13.1 for marker locations, letter sizes, and colors. Include arrows to show direction of flow and "Electric Traced" signs to identify heat cable wrapped piping.

Locate pipe labels in accessible areas as follows:

- Near each valve, meter, gauge, or control device.
- Near equipment such as pumps, heat exchangers, water heaters, etc.
- At piping branch connections.
- At penetrations (each side) of walls, ceilings, and floors.
- At access panels and doors.
- At 25 foot maximum intervals. Provide a minimum of 1 label above each room where lift out ceiling is installed. Reduce intervals in congested areas such as mechanical rooms.

Valve Identification: Tag all valves with brass disc and chain. Prepare valve charts indicating valve number, size, location, concealed or exposed, function, valve manufacture and model number, and normal position. Provide floor plan as part of record Drawings. Use no duplicate numbers in Plumbing and Heating systems. Mount glazed frames containing one set of valve charts in the building mechanical room.

- Include floor plan of each floor level with valve tag numbers indicated at approximate valve locations.
- Provide separate maps for plumbing valves and HVAC valves. Maps are to be 11"x17".
- Label all ceilings directly below or access panels directly in front of plumbing or HVAC valves using engraved, printed labels or hanging tags stating the valve ID as shown on the Valve Map and the Valve Tag Directory.

Equipment: Provide engraved plastic-laminate signs at locations of major equipment such as heat exchangers, pumps, etc. Identify equipment in field same as on Drawings. Permanently mount in an appropriate and effective location.

Operation Tags: Where needed for proper and adequate information on operation and maintenance of mechanical systems, provide tags of plasticized card stock, either pre-printed or hand printed to convey the message; example: "DO NOT CLOSE THIS VALVE EXCEPT WHEN THE PUMP IS OFF."

**EQUIPMENT CONNECTIONS**

Provide complete plumbing connections for all items of equipment requiring such connections, including incidental piping, fittings, trim and labor necessary for a finished working installation.

Verify the rough-in and finish requirements for all equipment provided under other Divisions of the work and requiring plumbing connections with equipment supplier and installer prior to rough-in. Minimum branch pipe size for fixtures shall be 1/2".

## **PROTECTION**

Protect all work and materials against loss or damage. Close all pipe openings with caps or plugs. At final completion, thoroughly clean and deliver all work and equipment in an unblemished new condition. Keep all motors and bearings in watertight and dustproof covers during entire course of installation.

Protect floors, walls, framing and sheathing where pipe cutting and threading operations are conducted with plastic sheeting under plywood sheets. Extend plastic sheeting beyond the plywood. Clean-up metal cuttings, oil, etc., daily or as necessary to prevent debris from being tracked beyond the protected area. Damages, as determined by the Architect, due to the pipe cutting/threading operation shall be repaired by the responsible trade.

## **CUTTING AND PATCHING**

General: Comply with the requirements of Division 1 for the cutting and patching of other work to accommodate the installation of mechanical work. Do all necessary cutting and patching of existing building and yard surfaces required for completion of the mechanical work. Patch to match finish and color of adjacent surfaces. Coordinate work in remodel and new areas to avoid cutting of new finished surfaces.

## **PIPE PENETRATION FIRE STOPPING**

Install as recommended by manufacturer and in accordance with the product's UL listing. Below are the minimum installation requirements.

Install specified penetrating item(s) with required annular spacing in proper size wall or floor opening.

Support penetrating item(s) adequately on both sides of construction.

Clean all opening and penetrating item surfaces in penetration area to remove loose debris, dirt, oil, wax, grease, old caulking, etc.

If needed or required for gypsum or concrete block walls, install specified galvanized steel wire mesh or sleeve recessed and centered inside wall around penetrating item(s) so that it is snug against perimeter of opening.

When required, install specified type and depth of backing material in annular space, recessed to required fill depth of fire stopping caulking.

Gun, trowel, and/or pump fire stopping sealant to specified depth in annular space around penetrating item(s). Trowel sealant surfaces flush with wall or floor surfaces to a smooth, defect-free finish. Where required, apply specified size caulking bead around penetrating item(s) at zero annular contact areas and tool smooth.

Drawings show some, not all, of the penetration. Review architectural Drawings for all fire walls.

Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No. 1168.

## **MECHANICAL PAINTING**

Minimum Requirements: All mechanical equipment, piping, insulation, etc., exposed in finished areas, storage rooms and other locations except mechanical equipment rooms will be painted per 09 90 00.

**PLUMBING WORK CLOSEOUT**

General: Refer to the Division 1 sections for general closeout requirements. Calibrate all equipment requiring same. Complete each system as shown or specified herein and place in operation except where only roughing-in or partial systems are called for. Each system shall be tested and left in proper operation free of leaks, obstructions, or contamination.

Record Drawings: Submit record set of Drawings required in Division 1 as previously specified in this Section.

Closeout Equipment/Systems Operations: Sequence operations properly so that work of project will not be damaged or endangered. Coordinate with seasonal requirements. Operate each item of equipment and each system in a test run of appropriate duration with the Architect present, and with the Owner's operating personnel present, to demonstrate sustained, satisfactory performance. Adjust and correct operations as required for proper performance. Clean and lubricate each system, and replace dirty filters, excessively worn parts and similar expendable items of the work.

Operating Instructions: Conduct a walk-through instruction seminar for the Owner's personnel who are to be involved in the continued operation and maintenance of plumbing equipment and systems. Provide written instructions outlining and explaining the identification system, operational diagrams, emergency and alarm provisions, sequencing requirements, seasonal provisions, security, safety, efficiency and similar features of the systems.

Contractor shall submit a complete schedule of all changes to the plumbing fixtures upon substantial completion. The schedule shall include at a minimum:

- All newly installed plumbing fixtures

- All demolished or removed plumbing fixtures.

- All fixtures that have been removed and replaced.

- Schedule shall capture all sinks, drinking fountains, and bottle fillers, hose bibbs, showers, and emergency shower or eyewash fixtures.

**END OF SECTION 22 05 00**

## **SECTION 22 07 00 - PLUMBING INSULATION**

### **PART 1 - GENERAL**

#### **DESCRIPTION**

The requirements of this section apply to the insulation of plumbing systems specified elsewhere in these specifications.

The requirements of Section 22 05 00, Common Plumbing Materials and Methods, also apply to this section.

#### **QUALITY ASSURANCE**

Minimum Insulation Thickness and Thermal Performance: Comply with Chapter 13 provisions of the State of Oregon Structural Specialty Code.

Composite (Insulation, Jacket or Facing and Adhesives) Fire and Smoke Hazard Ratings: Not to exceed a flame spread of 25 or smoke development of 50 and containing less than 0.1% by weight deca-PDE fire retardant.

Component Ratings of Accessories (Adhesives, Mastics, Cements, Tapes, Finishing Cloth for Fittings): Same as "B" requirements above and permanently treated. No water soluble treatments.

#### **SUBMITTALS**

Submit catalog data and performance characteristics for each product specified.

#### **PRODUCT DELIVERY, STORAGE AND HANDLING**

General: In addition to the requirements specified in Section 22 05 00, the following apply:

- Deliver insulation, coverings, cements, adhesives and coatings to the site in factory-fabricated containers with the manufacturer's stamp or label affixed showing fire hazard ratings of the products.
- Store insulation in original wrappings and protect from weather and construction traffic.
- Protect insulation against dirt, water, chemical and mechanical damage. Do not install damaged insulation. Remove such insulation from project site.

### **PART 2 - PRODUCTS**

#### **ACCEPTABLE MANUFACTURERS**

Insulation Manufacturers: Johns Manville, Owens-Corning, Knauf, Certain Teed, Armstrong, Pabco, Imcoa or Nomaco. Johns Manville products are listed unless indicated otherwise.

Adhesive Manufacturers: Foster, 3M, Insul-Coustic, Borden, Kingco or Armstrong.

## **PIPING INSULATION**

Interior and Exterior Piping Systems 32 to 180 Deg. F: Glass fiber preformed pipe insulation with a minimum K-value of 0.23 at 75 deg. F, a minimum density of 3.5 pounds per cubic foot within all-service vapor barrier jacket, vinyl or pre-sized finish and pressure sensitive seal containing less than 0.1% by weight deca-PDE fire retardant.

Exterior Installations: Same as for interior installations except 0.016" aluminum finish jacket.

Pipe Temperatures Minus 30 to 180 Deg. F: Flexible, preformed, pre-slit, self-sealing elastomeric pipe insulation up to 2-1/8" ID, thermal conductivity of 0.27 BTU/hr. sq. ft./in. at 75 deg. F and vapor transmission rating of 0.2 perms/inch. On cold surfaces, apply in thickness necessary to prevent condensation on the surface at 85 deg. F and 70% RH. Armstrong "Armaflex 2000" or, in concealed locations, Imcoa or Nomaco also approved.

## **EQUIPMENT INSULATION**

Equipment Temperatures Below 70 Deg. F: Flexible, closed cell, elastomeric sheet insulation of 5.5 #/cubic feet density and 0.27 thermal conductivity at 75 deg. F. Armstrong "Armaflex."

Equipment Temperatures From 70 to 450 Deg. F: Glass fiber 3 pound density insulation with a 0.23 thermal conductivity at 75 deg. F. Johns Manville "814 Spin-Glas" with "FSK" jacket containing less than 0.1% by weight deca-PDE fire retardant or finished as recommended by manufacturer.

## **INSULATION ACCESSORIES**

Insulation Compounds and Materials: Provide rivets, staples, bands, tapes, adhesives, cements, coatings, sealers, welded studs, etc., as recommended by the manufacturer for the insulation and conditions specified. No staples allowed on cold water piping systems.

Interior Tanks and Equipment Insulation Covering: Finished metal jacket or as recommended by the manufacturer for insulation material specified.

PVC Protective Jacketing and Valve and Pipe Fitting Covers: Johns Manville Zeston 2000, Proto LoSmoke, or Ceel-Co Ceel-Tite 100 Series with precut fitting fiberglass insulation or approved.

Jacket Lap Sealing Adhesives: Foster Drion 85-75 contact cement or approved substitute.

Saddles and Shields: Unless otherwise indicated and except as specified in piping system specification sections, install the following types:

Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.

Protection Shields (MSS Type 40): Of length recommended by manufacturer to prevent crushing insulation.

Thermal-Hanger Shield Inserts: For supporting insulated pipe, 360-degree insert of high-density, 100-psi (690-kPa) minimum compressive strength, water-repellent-treated calcium silicate or cellular-glass pipe insulation, same thickness as adjoining insulation with vapor barrier and encased in 360-degree sheet metal shield.

## **PART 3 - EXECUTION**

### **PIPING INSULATION**

General: Do not insulate underground piping except at joints and fittings on preinsulated piping unless indicated otherwise. At Contractor's option and in accordance with Part 2 of this section, elastomeric insulation may be installed on domestic water piping in thicknesses equivalent to the glass fiber insulation. Installation shall comply with the manufacturer's recommendation with joints and seams completely sealed.

#### Domestic Water Piping:

Insulate with glass fiber pipe covering, 1" thick for cold water piping and for 1" and smaller hot water piping; 1-1/2" for 1-1/4" and larger hot water piping.

Insulate hot water return piping same as cold water piping.

Insulate all water piping exposed to outside weather and freezing temperatures with 1" thickness of glass fiber pipe covering with weather-proof metal jacket. Apply insulation after heat cable is installed. For PEX pipe installations delete requirements for insulation on cold water lines and non-circulated hot water lines. Circulated hot water and hot water recirculation lines to be insulated.

#### Interior Rain Drains and Overflow Drains:

Concealed: Insulate with 1" thick one pound density glass fiber blanket and continuous vapor barrier jacket.

Exposed: Insulate with 3.5 pound density glass fiber insulation with continuous vapor barrier jacket.

PVC overflow drain lines do not need to be insulated.

Drain bodies (overflow or rain drain) to be insulated.

#### Pipe Fittings:

Insulate and finish all fittings including valve bodies, bonnets, unions, flanges and expansion joints with precut fiberglass insulation and preformed PVC covers sealed to adjacent insulation jacket for continuous vapor barrier covering over all fittings.

Provide removable/reusable insulation covers on 4" and larger valves, unions, flanges, pump casings, strainers and similar fittings or equipment requiring periodic service.

Protective Covering: Install continuous protective PVC or metal covering on all piping and fittings in mechanical rooms, accessible tunnels, attic spaces, accessible ceilings, etc., where insulation may be subject to damage. Install with rivets or cement seams and joints.

#### Insulated Piping: Comply with the following.

Attach clamps and spacers to piping.

Piping Operating above Ambient Air Temperature: Clamp may project through insulation.

Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.

Do not exceed pipe stress limits according to ASME B31.9.

Install MSS SP-58, Type 39 or Type 40 protection saddles, if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN100) and larger if pipe is installed on rollers.

Shield Dimensions for Pipe: Not less than the following.

NPS 1/4 to NPS 3-1/2 (DN8 to DN90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.

NPS 4 (DN100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.

NPS 5 and NPS 6 (DN125 and DN150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.

NPS 8 and NPS 14 (DN200 and DN350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.

NPS 16 and NPS 24 (DN400 and DN600): 24 inches (610 mm) long and 0.105 inch (2.67 mm) thick.

Pipes NPS 8 (DN200) and Larger: Include wood inserts.

Insert Material: Length at least as long as protective shield.

Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

Piping Insulation Lap Seams and Butt Joints: Install insulation jacket in accordance with manufacturer's recommendation and without staples on cold water lines. Where jacket joint and lap seams have not adhered, remove affected section of insulation and reinstall or apply lap sealing adhesive in accordance with manufacturer's instructions.

**END OF SECTION 22 07 00**



## **SECTION 22 10 00 - PLUMBING PIPING AND PUMPS**

### **PART 1 - GENERAL**

#### **DESCRIPTION**

Provide pipe, pipe fittings, piping specialties, pumps and related items required for complete piping system.

Related Work: The requirements of Section 22 05 00, Common Plumbing Materials and Methods, also apply to this section.

#### **QUALITY ASSURANCE**

General: ASTM, and ANSI Standards are indicated. In addition, special standards are referenced where neither ASTM nor ANSI Standards are applicable.

Labeling: All piping shall be continuously and legibly labeled on each length as required by codes and standards and including as a minimum, country of origin, manufacturer's identification marking, wall thickness designation, and applicable standards and approvals. Fittings shall be labeled as required by the referenced standard. Tubular fixture traps shall be stamped with manufacturer's mark and material thickness.

Potable Water Valves: Potable water piping materials not limited to faucets, mixing valves, or pressure reducing valves. Valves shall meet NSF Standard 61, Section 9, for drinking water faucets and shall be brass construction. Brass components which contact water within the faucet shall be from brass which contains no more than 3 percent lead by dry weight.

Concealed Plastic Piping: No concealed plastic piping inside the building unless approved by Code or Governing Authorities.

Definitions: Where piping fluid is not indicated in the following paragraphs, provide similar piping materials for similar fluids (i.e., "make-up water" = "domestic water"; "wet stand pipe" = "fire sprinkler pipe"; "drainage piping" = "sanitary/storm sewer piping").

Plumbing System Disinfection shall be performed by an experienced, qualified, chemical treatment agency.

#### **STORAGE AND HANDLING**

Provide factory-applied end caps on each length of pipe and tube. Maintain end caps through shipping, storage and handling as required to prevent pipe-end damage and eliminate dirt and moisture from inside of pipe and tube. Protect flanges and fittings from moisture and dirt by inside storage and enclosure, or by packaging with durable, waterproof wrapping.

#### **SUBMITTALS**

Submit catalog data for each product specified.

## **PART 2 - PRODUCTS**

### **PIPING MATERIALS**

#### Copper Pipe and Tube:

##### Application:

Domestic water.

Priming lines.

Pipe: ASTM B88. Produced by American manufacturer only. Foreign produced piping is not allowed.

Above Ground Domestic Water: Type L hard temper copper with soldered joints for lines 2" or less. Brazed joints for line sizes larger than 2".

Underground Domestic Water and Priming Lines: Type L soft annealed with no joints or type K hard tempered copper with silver soldered joints.

Fittings: Wrought copper solder-joint fittings, ANSI / ASME B16.22.

#### Cast Iron DWV Pipe:

##### Application: 1-1/2" and larger.

Sanitary waste

Plumbing vent

Rain drain

Grease waste

Pipe: Hubless cast iron soil pipe, CISPI 301-05/ASTM A 888-05. Produced by American manufacturer only. Foreign produced piping is not allowed.

Fittings: Hubless cast iron fittings: CISPI 301-05/ASTM A 888-05.

##### Couplings:

Standard Duty: No-hub couplings meeting CISPI 310 and incorporating ASTM C 564 gasket, type 301 SS corrugated shield and type 301 SS clamping bands. Two clamping bands on 1-1/2" thru 4" pipe and four bands on 6" thru 10" pipe.

Heavy Duty: No-hub couplings meeting ASTM C 1540, and FM 1680. ASTM C 564 neoprene gasket, type 304 SS corrugated shield and type 304 SS clamping bands. Four bands on 1-1/2" thru 4" pipe and 6 bands on 5" thru 10" pipe.

Couplings to Dissimilar Pipe in Concealed Locations: Fernco "ProFlex" with stainless steel support collar or approved substitute.

Manufacturers: Cast iron pipe and fittings – AB&I, Charlotte Pipe, Tyler Pipe, or approved. All pipe shall be labeled by the manufacturer.

#### Plastic Pipe – Drain, Waste, Vent (DWV):

##### Application:

Sanitary waste below slab only; unless noted otherwise. Not allowed for grease waste, or oil waste.

Plumbing vent where concealed.

Rain drain below slab only.

Roof overflow drain piping above grade. (Not allowed above grade for rain drain).

##### Pipe:

Poly(vinyl chloride) (ASTM D1784) (PVC) solid core plastic drain, waste and vent pipe (ASTM D2665 and D1785) and fittings (ASTM D2665) (DWV).

Fittings: Provide fittings of the type indicated, matching piping manufacture. Where not otherwise indicated, provide fittings produced and recommended for the service indicated by the piping manufacturer.

#### Plastic Pipe:

##### Application:

Below grade domestic water.

Above grade where concealed domestic water when continuously supported per specification.  
Priming lines if concealed.

Pipe:

Cross-linked polyethylene (PEX) tubing manufactured by PEX-a or Engel Method for Water Service: Tested/listed to ASTM E84, ASTM F876 and F877, and CSA B137.5 listed certified to NSF standards 14 and 61. Rated for 100 PSI at 180° F. UPONOR, AQUAPEX or approved.

Fittings: ASTM F1960 cold expansion fittings. Provide fittings of the type matching piping manufacture and recommended by the piping manufacturer for the service indicated.

## **MISCELLANEOUS PIPING MATERIALS**

Insulating (Dielectric) Fittings: Do not use, see Section 3.3, D.

Soldering and Brazing Materials: Provide soldering materials as determined by the installer to comply with installation requirements.

Tin-Antimony Solder: ASTM B32, Grade 95TA.

Lead-Free Solder: ASTM B32, Grade HB. Harris "Bridgit" approved.

Silver Solder: ASTM B32, Grade 96.5TS.

Flux: Water soluble paste flux.

Brazing filler rod: BCuP rod to suit conditions.

Sleeve Seal: Rubber-link pipe wall and casing closure. Thunderline Link-Seal. For fire rated wall, floor or ceiling penetrations, 3-M "CP-25" caulk, "No. 303" putty and/or "PSS 7904" sealing system.

Strainers: "Y-pattern," iron or bronze body rated for pressures indicated with blow-off connection and 20 mesh stainless steel screen.

Tracer Wire: 14 gauge, single strand, copper wire with blue insulation for water, green for sanitary and storm sewers, and yellow for gas. 3M "DBY" direct bury splice kit required at all splices.

## **PIPING SPECIALTIES**

Cleanouts:

Manufacturer: Jay R. Smith, Zurn, Wade, Watts, Josam, Mifab, or approved substitute.

Types:

Tile Floor Cleanouts: Smith 4053-U with square heavy-duty nickel bronze top, bronze plug, and vandalproof screws. Adjustable top where cast into floor slab.

Carpeted Floor Cleanout: Smith 4023-U-X with round heavy-duty nickel bronze top, bronze plug, carpet clamping device, and vandalproof screws. Adjustable top where cast into floor slab.

Concrete Floor Cleanout: Smith 4023 with round heavy-duty nickel bronze top. Stainless steel shallow cover and vandalproof screws. Adjustable top where cast into floor slab.

Wall Cleanouts: Smith 4472-U, bronze ferrule with raised head bronze plug, stainless steel shallow cover and vandalproof screws.

Outside Area Walks and Drives: Smith 4253-U-G with galvanized cast iron body, top secured with vandalproof screws, and bronze plug. Install in 18" x 18" x 6" deep concrete pad flush with grade.

Drains:

Zurn, Jay R. Smith, Josam, Watts, Wade and Mifab are approved. Numbers scheduled on drawings represent minimum acceptable standard for locations involved. Where CECO is listed previously listed manufactures are approved.

Cast iron construction with acid resistant coating, anchor flange, and other options as indicated by model number.

Install 4 pound sheet lead flashing, extending not less than 10" from and clamped to all drains not completely cast-in-place in a homogeneous material.

Flashing: Minimum 4# sheet lead; to extend horizontally 10" from edge of vent penetrations or rain drain body and vertically 12" minimum up from roof turned over and down into hub of vent or finished with bronze cap providing counterflashing for screwed pipe.

Shock Arrester: Precharged bellows or sealed piston type manufactured to meet PDI WH-201 and ASSE 1010 Standards. Size in accordance with PDI procedures. Jay R. Smith, PPP, Sioux Chief, Wade, Zurn, Watts, Josam, or approved substitute.

**Priming Valves:**

Electrically operated priming station with header sized for number of outlets required. Provide with 120v power supply, timer, and solenoid valve tested per UL. Provide with IAPMO approved atmospheric vacuum breaker. Provide in recessed wall box with access door per Section 22 05 00. P.P.P. Inc., PT Series or approved.

Flow operated valves Jay R. Smith 2699 only. Locate in closets, under counters or in walls behind access panels as specified in Section 220500.

McIntosh Primes: Manufactured for connection to flush valve to be with gasket chrome supply line and wall escutcheon.

Use copper or PEX specified previously for all underground priming lines.

Traps: Except chrome plated fixture traps. Recessed drainage pattern for threaded pipe and same grade as pipe for cast iron and plastic pipe; with cleanout plugs in trap body in all above grade locations.

Pressure Reducing Valve: Single seat type with renewable stainless steel seat and valve. Size and capacity as shown on Drawings. Bronze bodies with screwed connections on valves 2-1/2" and smaller and flanged steel bodies on valves 3" and larger. Install each PRV with strainer on inlet or internal strainer. Leslie, Watts, Cash-Acme, Zurn-Wilkins, or approved substitute.

Backflow Preventer: Where indicated on the Drawings, install a reduced pressure backflow preventer complete with shutoff valves, two separate check valves, differential relief valve, and test cocks. USC Foundation for Cross Connection Control, State Health Officials, and serving utility approved. Bronze bodies on units 2" and smaller, and cast iron bodies with bronze trim on units 2-1/2" and larger.

Backflow Preventer: Where indicated on the Drawings, install a double check backflow preventer complete with shutoff valves, two separate check valves, and test cocks. USC Foundation for Cross Connection Control, State Health Officials, and serving utility approved. Bronze bodies on units 2" and smaller, and cast iron bodies with bronze trim on units 2-1/2" and larger.

Domestic Water Balancing Valve: Lead free brass or bronze body or 300 Series stainless steel body with stainless steel trim Victaulic TA Series 76X or approved substitute.

**BACKFILL MATERIALS**

Subbase Materials: A graded mixture of gravel, sand, crushed stone or crushed slag.

Finely-Graded Subbase Material: Well graded sand, gravel, crushed stone or crushed slag, with 100% passing a 3/8" sieve.

Backfill Material: Soil material suitable for compacting to the required densities, and complying with AASHTO designation M145, Group A-1, A-2-4, A-2-5, or A-3.

Stabilization Fabric: Nonwoven stabilization and drainage fabric. Mirafi 140S or 140M.

## **PART 3 - EXECUTION**

### **UTILITY SERVICE**

Plumbing Utility Connections: Complete installation. Contact local serving utilities to determine conditions involved and make or arrange to have connection made at proper time and pay all costs involved.

Sanitary and Storm Sewers: Connect sanitary and storm sewers as shown on the Drawings and as required by the serving utility. Verify depth, size and location prior to installation of the new sewer systems.

Water Service: Connect to water system.

### **PIPE INSTALLATION**

General: Install pipe, tube and fittings in accordance with recognized industry practices and plumbing code standards. Install each run accurately aligned with a minimum of joints and couplings, but with adequate and accessible unions and flanges for disassembly, maintenance and/or replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings.

Piping Runs: Route piping close to and parallel with walls, overhead construction, columns and other structural and permanent-enclosure elements of the building. Install piping plumb and level except where pitched for drainage. If not otherwise indicated, run piping in the shortest route which does not obstruct usable space or block access for servicing the building or equipment and avoid diagonal runs. Wherever possible in finished and occupied spaces, conceal piping from view. Do not encase horizontal runs in solid (concrete or CMU) partitions.

Ensure all copper piping is protected from contact with non-copper and plated supports. Provide strut cushion below clamp or 2 layers of UPC listed 10 mil tape.

Tracer Wire: Install tracer wire as close to underground non-metallic water, sanitary and storm sewers and gas pipe in the trench as possible. Tracer wire shall be accessible at grade via all services, valve and meter boxes, curb cocks, cleanouts at the building, manholes (inside the cover near the top), etc. Locate all points on the record as-installed drawings. Splice into utility tracer system where available. Comply with code requirements.

### **PIPING JOINTS**

General: Provide joints of the type indicated in each piping system, and where piping and joint as manufactured form a system, utilize only that manufacturer's material.

Cast Iron "No-Hub": All joints in accordance with the Cast Iron Soil Pipe Institute (CISPI) Designation No. 310-97 "Installation Procedures for Hubless Cast Iron Soil Pipe and Fittings For Sanitary and Storm Drain, Waste and Vent Piping Applications." Horizontal runs of 5" and greater shall be braced as indicated in Figure 4 for "rodding" restraints. Application of couplings as follows:

Standard Duty Couplings: All vent piping and all drainage and waste piping above grade.

Heavy Duty Couplings: All underground waste installations and any storm drain installations 2 stories or more in height.

**Solder Copper Tube and Fitting Joints:** In accordance ANSI B 828 with recognized industry practice. Cut tube ends squarely. Copper tubing shall be cut with a wheeled tubing cutter or approved copper tubing cutting tool. The tubing shall be cut square to permit proper joining with the fittings. Remove scale, slag, dirt and debris from inside and outside of tubing and fittings before assembly. The tubing end shall be wiped clean and dry. The burrs on the tubing shall be reamed with a deburring or reaming tool. Apply solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in a manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens. "T-Drill" field formed tees may be utilized where the main is at least two pipe sizes larger than the branch.

**Insulating (Dielectric) Fittings:** Where the "joining of ferrous and non-ferrous piping", use brass valve or brass nipple with length/nominal diameter ratio of 8 or greater rather than dielectric fitting.

**Changes in Direction:** Use fittings for all changes in direction. Run lines parallel with building surfaces.

**Line Grades:**

Drainage Lines: Run at maximum possible grade and in no case less than 1/4" per foot within building.

Vents: Pitch for drainage 1/4" per 10'.

Water: Pitch to low points and install hose bib drains. 3' minimum depth of ground cover for all lines outside building unless otherwise noted.

**Unions and Flanges:** At all equipment to permit dismantling and elsewhere as consistent with good installation practice.

**Expansion:** Provide loops, swing joints, anchors, runouts and spring pieces to prevent damage to piping or equipment.

## **CLEANOUTS**

Where required by code, at each change of sewer direction 45 degrees or greater and more than 10' long, at end of each branch or main and spaced not greater than 100' apart, as required by code and/or as shown on Drawings.

## **MISCELLANEOUS PIPING EQUIPMENT**

**Floor, Wall and Ceiling Plates:** Chrome plated pressed steel or brass screw locked split plates on all pipe penetrations in finished spaces.

**Strainers:** Install in a manner to permit access for cleaning and screen removal and with blow-off valve.

**Sleeves:** At all penetrations of concrete or masonry construction. PVC, 24 gauge galvanized steel or Schedule 40 galvanized steel pipe. Use steel pipe sleeves through beams, footings, girders or columns and for all penetrations of walls or floors below grade. Where floor finish is ceramic tile, terrazzo, or similar material extend standard steel pipe sleeves 1-1/2" above finished floor. Fabricate sleeves 1" diameter larger than pipe or insulation. PVC and sheet metal sleeves at non-structural penetrations only.

**Sleeve Caulking:** Caulk below grade pipe with rubber link seal. Grout above grade pipe with cement mortar or approved waterproof mastic. All caulking or grouting shall extend full depth of sleeve. Utilize rubber sealing links in lieu of caulking. Install UL sealing caulk, putty and/or system at all penetrations of fire rated walls, floors and ceiling.

**Shock Arrestors:** Install at end of mains, in a battery of three or more flush valve-operated fixtures water header, ahead of quick closing and solenoid operated valves. Size per PDI recommendations where size is not indicated. Provide access panels.

Trap Priming: Traps serving floor drains, floor sinks, catch basins, and similar fixtures shall be primed in accordance with Code requirements.

See Section 23 05 00 for Pump Starters.

## **EXCAVATING**

General: Do not excavate for mechanical work until the work is ready to proceed without delay, to minimize the total time lapse from excavation to completion of backfilling. Comply with all applicable Federal and state safety regulations and local erosion control requirements.

Width: Excavate for piping with 6" to 9" clearance on both sides of pipe, except where otherwise shown or required for proper installation of pipe joints, fittings, valves and other work. Excavate for other work to provide minimum practical but adequate working clearances.

Depth for Direct Support: For work to be supported directly on undisturbed soil, do not excavate beyond indicated depths, and hand-excavate the bottom cut to accurate elevations. Support the following work on undisturbed soil at the bottom of the excavations:

- Piping of 5" and less pipe/tube size.
- Cast-in-place concrete.

## **BASE PREPARATION**

Subbase Installation: Where indicated, install subbase material to receive mechanical work, and compact by tamping to form a firm base for the work. For 4" and larger piping, horizontal cylindrical tanks and similar work, shape the subbase to fit the bottom 90 degrees of the cylinder, for uniform continuous support. Provide finely-graded subbase material for wrapped, coated and plastic pipe and tank. Shape subbases and bottoms of excavation with recesses to receive pipe bells, flanged connections, valves and similar enlargements in the piping systems and set bottom of trench at proper pitch and correct elevations with subbase material.

Previous Excavations: Where piping crosses over an area more than 5' wide which has been previously excavated to a greater depth than required for the piping installation, provide suitable subsidence-proof support for the piping. Comply with the details shown, or where not otherwise shown, provide the following support system:

- Excavate to undisturbed soil, in a width equal to the pipe diameter plus 2'. Install 8" courses of subbase material, each compacted to 95% of maximum density, as required to fill excavation and support piping.

## **BACKFILLING**

Do not backfill until installed mechanical work has been tested and accepted wherever testing is indicated. Install drainage fill where indicated, and tamp to a uniform firm density. Backfill with finely-graded subbase material to 6" above wrapped, coated and plastic piping and tanks, and to center line of other tanks (where recommended by tank manufacturer, use "pea gravel" backfill). Condition backfill material by either drying or adding water uniformly, to whatever extent may be necessary to facilitate compaction to the required densities. Do not backfill with frozen materials.

## **CLEANING**

General: Clean all dirt and construction dust and debris from all mechanical piping systems and leave in a new condition. Touch up paint where necessary.

### Disinfection of Domestic Water Piping System:

Prior to starting work, verify system is complete and clean.

Open all drains and fixtures valves in the building starting with the valve nearest the water service line and permit the water to run clear for 10 minutes to eliminate grease, cuttings, flux, and foreign matter.

Inject disinfectant at beginning of water system to be disinfected. Introduce free chlorine in liquid form, throughout system to obtain concentration required by local Public Health Department regulations or 50 to 80 mg/L residual.

Bleed water from all potable water outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

Maintain disinfectant in system for 24 hours.

If final disinfectant residual tests less than 25 mg/L, repeat treatment.

Flush disinfectant from system until residual is equal to that of incoming water or 1.0 mg/L.

Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C601. If any sample fails the analysis, repeat the procedure.

Include a copy of the bacteriological analysis in the Operating and Maintenance manuals.

If allowed by local jurisdiction, testing is acceptable in lieu of treatment.

### Sanitary and Storm Drainage System:

Remove construction debris from cleanouts, drains, strainers, baskets, traps, etc., and leave same accessible and operable. Place plugs in the end of uncompleted piping at the end of the day or whenever work stops.

Before final acceptance of completed sewer system, flush and clean the entire system with water. Trap and remove solid material obtained from flushing and cleaning from the new system. Do not allow debris to enter the existing sewer system.

## **TEST**

### General:

Minimum duration of two hours or longer, as directed for all tests. Furnish report of test observation signed by qualified inspector. Make all tests before applying insulation, backfilling, or otherwise concealing piping or connecting fixtures or equipment. Where part of the system must be tested to avoid concealment before the entire system is complete, test that portion separately, same as for entire system.

Provide all necessary temporary equipment for testing, including pump and gauges. Remove control devices before testing and do not use piping system valves to isolate sections where test pressure exceeds valve pressure rating. Fill each section with water and pressurize for the indicated pressure and time.

Observe each test section for leakage at end of test period. Test fails if leakage is observed or if pressure drop exceeds 5% of test pressure.

### Repair:

Repair piping system sections which fail the required piping test by disassembly and re-installation, using new materials to the extent required to overcome leakage. Do not use chemical stop-leak compounds, solder, mastics, or other temporary repair methods.

Drain test water from piping systems after testing and repair work has been completed.

Sewer: Furnish all facilities and personnel for conducting the test. Test in accordance with the requirements of the State Plumbing Inspector and local authorities.



Plumbing Waste and Vent Piping: Hydrostatic test by filling to highest point, but not less than 10' water column on major horizontal portion.

Water Piping: Hydrostatic pressure of 100 psig without loss for four hours.

Tanks and Equipment: Hydrostatic pressure to 1.5 times operating pressure but do not exceed maximum rated pressure.

### **SUPERVISION AND START-UP**

Adjust flush valves, pressure reducing valves, water heater thermostats, and similar equipment.

**END OF SECTION 22 10 00**

**SECTION 22 40 00 - PLUMBING FIXTURES**

**PART 1 - GENERAL**

**DESCRIPTION**

The requirements of this section apply to the plumbing fixtures and trim.

Provide fixtures as shown on the Drawings and specified herein. Provide all required fixture trim and accessories for a complete, finished installation.

Related Work: The requirements of Section 22 05 00, Common Plumbing Materials and Methods, also apply to this section.

**QUALITY ASSURANCE**

Code: Comply with requirements of the Oregon State Plumbing Specialty Code.

Fixture color: White unless indicated otherwise.

Potable Water Valves: Potable water valves not limited to faucets, mixing valves, or pressure reducing valves. Valves shall meet NSF Standard 61, Section 9, for drinking water faucets and shall be brass construction. Brass components which contact water within the faucet shall be from brass which contains no more than 3 percent lead by dry weight.

**PART 2 - PRODUCTS**

**PIPING**

Piping, fittings, and related items as specified in related Sections 22 10 00.

**INTERIOR PLUMBING MATERIALS**

Dishwasher and Cooking Equipment Pressure Reducing Valve: For installation with dishwasher booster heater and other kitchen equipment, all brass lead free certified, single seat type for dead end service, with renewable stainless steel seat and valve. Designed for service on hot water to reduce pressure from 50 psi to 20 psi. Watts, Cash-Acme, Zurn-Wilkins, or approved substitute.

Single Fixture Tempering Valve: Lead Free Certified, Thermostatic mixing valve. ASSE 1070 listed. Cast copper silicon alloy construction with stainless steel disc and springs, copper thermostat. Watts LFMMV, Acorn ST7069 approved.

## **PLUMBING FIXTURES AND TRIM**

**Stops:** Furnish stop valves for all fixtures. Loose key style, in wall, angle or straight through pattern to fit installation. Stops to be lead free certified all brass with full turn brass stem and replaceable washer, no plastic. Compression nuts to be high copper content brass. Finish to be copper nickel chrome plate. Product to carry manufacturer's name. Risers to be chrome plated copper. Provide chrome plated shallow escutcheons. McGuire, Chicago, Brasskraft, Keeney, Zurn, or approved substitute.

**Fixture Traps:** Exposed fixture tailpieces, traps, and wastes shall be chrome plated 17 gauge seamless brass tube with cast brass nuts and deep or box style escutcheons as required to conceal rough piping. Products to be stamped with manufacturer's name and material gauge. McGuire, Keeney, Zurn, or approved.

Provide compliant fixture piping protector kit on all exposed accessible fixture traps and water supplies. White anti-microbial molded PVC. IPS Truebro "Lav Guard 2", McGuire "ProWrap", Plumberex "Pro-extreme", or approved substitute.

**1.6 Gallon per Flush Water Closet, Flush Valve, Vitreous China:** Elongated water closet bowl shall be designed for 1.6 gallon siphon jet flushing action.

Install each listed water closet with the following:

**Flush Valve:** Quiet acting, exposed chrome plated brass with ADA metal oscillating non-hold-open handle, screwdriver check/control stop with vandal resistant cap, cast wall flange, synthetic rubber diaphragm, and vacuum breaker, as recommended by closet manufacturer. Valve shall be dual flush operation for full flush at 30% less flow. Sloan only.

**Seat:** Solid white heavy weight molded plastic seat, with molded in bumpers; open front less cover for elongated bowl with check and self-sustaining hinge. Hinge and hardware to be 300 Series stainless steel. Church 295-SSC, Beneke 523-SS/CH-B, or Bemis 1955 SS/C, Zurn Z5956SS-EL-STS.

**Wall Mount:** Top Spud without bed pan lugs. Kohler K-4325 Series. Mount WC-2 at elevation per Architect for ADA application. Provide with neoprene gasket at connection from fixture to carrier inlet.

**Floor Mount:** Top Spud without bed pan lugs. Kohler K-25076 Series.

**Lavatory, Vitreous China:**

**Faucet:** Chrome plated brass body with single lever handle for the handicapped, vandal resistant 0.5 gpm aerator, temperature limit stop, with grid strainer waste. Faucet shall be ASME A112.1070 listed. Chicago 420-T45E2805ABCP series or equal Delta Commercial or American Standard.

**Wall Hung, 20" x 18" Size:** Provide with concealed arm hangers and wall backing plate (Jay R. Smith, Josam, Wade, Watts, or Zurn). American Standard 0355.012 or Kohler K-2005.

Set LV-1 at standard height. Set LV-2 at ADA height and provide trap protector per specifications.

**Drains:** Zurn, Jay R. Smith, Wade and Mifab. Numbers scheduled on Drawings represent minimum acceptable standard for locations involved.

**Hose Bibbs:**

**Outside "HB-1":** Non-freeze type with vacuum breaker, bronze wall casing and wall clamp. Jay R. Smith 5509QT Series, Zurn Z-1310-6, Wade W-8620, Woodford 67 Series, or Watts HY420.

**Inside "HB-2":** Cast aluminum / stainless steel wall box with wall flange, hold open cast door, vacuum breaker, stop, single temperature Acorn 8104, Woodford, Watts, Wade, Zurn or approved.

**Drinking Fountain:**

**Outside "DF-1":** Wall mount, freeze resistant, stainless steel non-filtered fountain with vandal resistant bubbler and mechanical front button activation. Install for ADA compliance. Elkay EDFP214FPK.

## **PART 3 - EXECUTION**

### **PIPING**

Install in accordance with Section 22 10 00.

### **FIXTURE INSTALLATION AND CONNECTION**

All exposed fixture hardware and piping shall be plated with polished chrome unless otherwise directed in these specifications. Where chair carriers or special carrier design are not indicated, provide 3/16" thick by 6" wide steel to waste or vent piping and to available building construction.

All fixtures in contact with finished walls and floors shall be caulked with waterproof, white, non-hardening sealant which will not crack, shrink or change color with age.

All fixtures and component parts shall conform to governing codes.

All fixtures shall be securely mounted level and plumb or as recommended by the manufacturer. Mount fixtures intended to be accessible to the handicapped at the dimensions required by code.

### **STARTUP**

Adjust flush valves, pressure reducing valves, mixing valves, water heater thermostats, and similar equipment.

Remove construction protection, tags and labels and thoroughly clean all plumbing equipment and trim. Scour all fixtures just prior to building acceptance.

**END OF SECTION 22 40 00**

## **SECTION 23 05 00 - HVAC MATERIALS AND METHODS**

### **PART 1 - GENERAL**

#### **DESCRIPTION**

The provisions of the General Requirements, Supplementary Requirements, and Division 1 apply to the HVAC work specified in this Division.

The requirements of this Section apply to the HVAC systems specified in these Specifications and in other Division 23 sections.

Provide all items, articles, materials, equipment, operations and/or methods listed, mentioned, shown and/or scheduled on the Drawings and/or in these Specifications, including all labor, supervision, services, permits, fees, and incidentals necessary and required to provide a complete and operable facility with complete systems as shown, specified, and required by applicable codes.

The work shall include, but not be limited to, the following systems:

- Fuel supply system.
- Central heating and cooling equipment.
- Complete piping systems including insulation, valves, supports, etc.
- Air handling equipment including packaged equipment and exhaust fans.
- Air distribution systems including ductwork, terminal units, dampers, insulation, and air inlets and outlets.
- HVAC control system.
- Assist Commissioning Agent as required by Commissioning specification.

Advise subcontractor, suppliers, and vendors involved in the work specified in this Section of the applicable requirements.

#### **QUALITY ASSURANCE**

All work and materials shall conform to all applicable local and state codes and all federal, state and other applicable laws and regulations. All clarifications and modifications which have been cleared with appropriate authorities are listed under the applicable sections. All electrical products shall bear the label of a recognized testing laboratory such as UL or CSA.

Whenever the requirements of the Specifications or Drawings exceed those of the applicable code or standard, the requirements of the Specifications and Drawings shall govern.

Codes and Standards: Comply with the provisions of the following referenced codes, standards and specifications:

- Federal Specifications (FS)
- American National Standards Institute (ANSI)
- National Electrical Manufacturer's Association (NEMA)
- National Fire Protection Association (NFPA)
- Underwriters Laboratories, Inc. (UL)
- Factory Mutual (FM)
- International Building Code (IBC) with State and Local Amendments
- International Mechanical Code (IMC) with State and Local Amendments

Uniform Plumbing Code (UPC) with State and Local Amendments  
American Society for Testing and Materials (ASTM)  
Americans with Disabilities Act (ADA)  
International Fire Code (IFC) with State and Local Amendments  
Energy Policy Act (EPAct)  
Manufacturers Standardization Society (MSS)  
American Gas Association (AGA)

Each piece of equipment furnished shall meet all detailed requirements of the Drawings and Specifications and shall be suitable for the installation shown. Equipment not meeting all requirements will not be acceptable, even though specified by name. Where two or more units of the same class of equipment are furnished, use product of the same manufacturer; component parts of the entire system need not be products of same manufacturer. Furnish all materials and equipment, new and free from defect and of size, make, type and quality herein specified or approved by the Architect. All materials shall be installed in a neat and professional manner.

All apparatus shall be built and installed to deliver its full rated capacity at the efficiency for which it was designed.

The Drawings and Specifications are complementary. What is called for by one shall be as though called for by both.

Drawings: Do not scale drawings for roughing-in measurements, nor use as shop drawings. Make field measurements and prepare shop drawings. Coordinate work with shop drawings of other specification divisions. See Article 3.1 for more information and requirements.

Field Wiring: It is the intent of these specifications that all systems shall be complete and operable. Refer to all drawings and specifications, especially the electrical drawings, to determine voltage, phase, circuit ampacity and number of connections provided. Provide all necessary field wiring and devices from the point of connection indicated on the electrical drawings. All equipment shall be installed in compliance with the Electrical Code and the equipment's UL listing. Bring to the attention of the Architect in writing, all conflicts, incompatibilities, and/or discrepancies prior to bid or as soon as discovered.

### **WORK OF OTHER CONTRACTS**

Work under this contract shall be conducted in a manner to allow for the future installations of such equipment or items listed in other sections of this Specification.

### **WORK OF OTHER DIVISIONS**

Work under this Division shall be conducted in a manner to cooperate with the installation of such equipment or items as specified in other Divisions.

Plumbing piping systems and fixtures and fire suppression piping systems are specified under other Divisions of these Specifications except for provisions or items specifically noted on the Drawings or specified herein.

Consult all Drawings and Specifications in this project and become familiar with all equipment to be installed. Coordinate all aspects of the construction with the other trades on the job to ensure that all work and materials required to provide a complete and operational facility are included in the bid.

All sections of Division 23 are interrelated and shall be considered in their entirety when interpreting any material, method, or direction listed in any section of Division 23. Individual sections are not written for specific subcontractors or suppliers but for the general contractor.

### **SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES (SUBMITTALS)**

Submit in accordance with Division 1 full technical and descriptive shop drawing data on proposed materials and equipment as detailed in each section.

The Contractor shall verify that all equipment submitted can be delivered and installed within the time constraints of the construction period.

Include the manufacturer, type, style, catalog number, complete specification, certified dimensions, and description of physical appearance for each item and option submitted. Reproduction of catalog data sheets shall be clean and legible to show all details, including gauge of metal used.

Include only information on exact equipment to be installed, not general catalogs of the manufacturer. Where sheets show proposed equipment as well as other equipment, identify proposed equipment with rubber stamp arrow or similar concise method.

Submit with each copy a transmittal letter verifying that all included equipment submittals have been carefully considered for quality, dimensions, function, and have been coordinated with the Drawings and Specifications. Guarantee that proposed materials will meet or exceed the quality and function of those specified.

Include field wiring diagrams and connection diagrams for all control and/or low voltage systems, including floor plans.

Submittal Review: The submittal review process is a means to provide quality control. The action noted to be taken (or where conflicts with the contract documents are not noted) shall not be interpreted by the Contractor as automatic "change orders." Approval of the data for substitution and shop Drawings shall not eliminate the contractor's responsibility for compliance with Drawings or Specifications, nor shall it eliminate the responsibility for freedom from errors of any sort in the data discovered prior to or after the review process. Deviations, discrepancies, and conflicts between the submittals and the Contract Documents shall be called to the Architect's attention in writing at the time of transmittal of the data.

Submittals shall be in the form of PDF documents. Arrange submittals numerically with specification sections identified in tabs. All required sections shall be submitted at one time. **Partial submittals will be rejected without review.**

For adhesives and sealants used on the interior of the building (inside the waterproofing system), include printed statement of volatile organic compound (VOC) content.

### **PRODUCT SUBSTITUTION**

Materials other than those specified may be approved for this project providing a written request is submitted to the Architect prior to bid in accordance with Instructions to Bidders. Requests shall include complete specifications, dimensions, manufacturer and catalog number for each item for which approval is desired. If, in the opinion of the Architect, the material is not complete or if it is not an acceptable substitute, he may reject it. The Architect's evaluation will be based solely on the material submitted.

## **CHANGE ORDERS**

All supplemental cost proposals by the Contractor shall be accompanied by a complete itemized breakdown of labor and materials without exception. At the Architect's request, the contractor's estimating sheets for the supplemental cost proposals shall be made available to the Architect. Labor must be separated and allocated for each item of work.

## **RECORD DOCUMENTS**

### Project Record (As-Installed) Drawings:

- Maintain a set of record drawings on the job site as directed in Division 1.

- Keep Drawings clean, undamaged, and up to date.

- Record and accurately indicate the following:

  - Depths, sizes, and locations of all buried and concealed piping dimensioned from permanent building features.

  - Locations of all valves with assigned tag numbers.

  - Locations of all fire dampers and other airflow control devices.

  - Changes, additions, and revisions due to change orders, obstructions, etc. Eradicate extraneous information.

  - Model numbers of installed equipment.

- Make Drawings available when requested by Architect for review.

- Submit as part of the required Project Closeout documents. Final submittal will be in the form of reproducible drawings.

- Quality of entire set of project record drawings to match the quality of the contract documents; quality to be judged by Architect. Computer-aided design drafting (CADD) shall be used to complete project record drawings. Use standards set in contract documents. Note field modifications, all addenda, and change order items on project record drawings. If deficiencies are found in either the quality or the accuracy of the drawings, they will be returned unapproved. Additional review of subsequent submissions shall be at the contractor's expense.

Operating and Maintenance Manuals: Submit Operating and Maintenance Instructions, including manufacturer's service data, wiring diagrams, and parts lists and vendors for all serviceable items of equipment, valve charts, balancing data, final control diagrams showing final set points, duct and piping pressure test reports, equipment startup records, and any additional equipment added by change order. Provide any performance curves, data, and model numbers from submittals. Comply with provisions of Division one where applicable to the mechanical work. Submittal shall be in the form of a PDF file per specification section. Arrange submittals numerically with equipment type or classification identified in tabs. Manufactures O&M manuals shall be provided as a single PDF file that can be hyper-linked by Owner for reference. O&M manuals that are a series of PDF files will not be accepted.

## **WARRANTY**

Furnish, prior to application for final payment, three copies of written and signed guarantee effective a period of one year from date of completion and acceptance of entire project; agree to correct, repair and/or replace defective materials and/or equipment or the results of defective workmanship without additional expense to the Owner. Where no response satisfactory to the Owner has occurred within three working days from the written report of a warranty covered defect, the Contractor shall agree to pay for the cost of repair of the reported defect by a Contractor of the Owner's choice.

Where the manufacturer's guarantee exceeds one year, the longer guarantee shall govern and include the Contractor's labor.



## **PART 2 - PRODUCTS**

### **GENERAL**

General: Provide all new materials and equipment, identical to apparatus or equipment in successful operation for a minimum of two years. Provide materials of comparable quality omitted here but necessary to complete the work. Maximum allowable variation from stated capacities, minus 5% to plus 10% as approved in each case.

Compatibility: Provide products which are compatible with other portions of the work and provide products with the proper or correct power and fuel-burning characteristics, and similar adaptations for the project.

Efficiency: Heating and cooling equipment shall comply with ASHRAE Standard 90.1-2016 and the State Energy Code. Where equipment efficiencies are indicated, the use of alternate or substitute manufacturer's equipment with lower efficiencies is not permitted.

Storage and Handling:

Delivery: Deliver to project site with manufacturer's labels intact and legible.

Handling: Avoid damage.

Storage: Inside protected from weather, dirt and construction dust. Where necessary to store outside, elevate well above grade and enclose with durable, waterproof wrapping.

### **STARTERS AND SWITCHES**

Manufacturers: Cerus Industrial Model numbers are listed. General Electric, ABB, Allen Bradley, Schneider Electric, Eaton, are approved if equal. Provide starters by same manufacturer throughout project.

General: Provide each motor with starter or switch as approved and recommended by manufacturer of motor or equipment of which motor is a part. All starters shall include integral disconnect.

System Description

Single Phase Starter: Starters for 115VAC single phase motors less than 1 HP shall be capable of both manual and automatic operation. Refer to Section D for single phase starter requirements.

Magnetic Starters: Starters for 3-phase motors shall be magnetic starters. Refer to Section E for magnetic starter requirements.

Enclosed Full Voltage Non-Reversing (FVNR) Single Phase Starter

Single Phase Motor Starter Control: The single phase motor starter shall consist of a manually operated quick-make toggle mechanism lockable in the "Off" position which shall also function as the motor disconnect. Additionally, the starter shall provide thermal overload protection, run status pilot light and fault pilot light. The starter must include the capability to operate in both manual and automatic control modes. In automatic mode, the starter shall have the capability to integrate with a building automation system by providing terminals for run input, run status output and fault output. All control terminals shall be integrated in the starter. At a minimum, each single phase starter shall include an interposing run relay and current sensing status output relay. Single phase motor starter shall be in a surface mount enclosure.

Approved manufacturer: Cerus Industrial, model BAS-1P or approved equal.

Quality Assurance

Manufacturer shall provide a five year warranty on the complete starter assembly.

The starter assembly shall be UL listed under UL 508A.

## **ACCESS PANELS**

Manufacturers: Inryco/Milcor, Bilco, Elmdor, Karp, Potter-Roemer or accepted substitute. Inryco/Milcor Style DW, K, or M panels as required by construction.

Construction: Flush style, fire rated in fire rated partitions and ceilings. Provide flush key cylinder locks on all access panels less than 8' above the floor in public spaces. Turn keys over to Owner at project completion. Screwdriver latches on all others.

## **VALVES**

General: Provide factory fabricated valves of the type, body material, temperature and pressure class, and service indicated. Bronze gate, globe and check valves shall comply with MSS-SP-80. Ball valves shall comply with MSS-SP-110. Iron gate and globe valves shall comply with MSS-SP-70. Iron check valves shall comply with MSS-SP-71. Butterfly valves shall comply with MSS-SP-67. Valve size same as connecting pipe size.

Acceptable Manufacturers: Milwaukee, Crane, Grinnell, Nibco, Hammond, Stockham, Legend, Watts, and Walworth. Grooved end valves Victaulic, Gruvlock, or accepted substitute. NIBCO numbers are given except as noted. Where possible, provide valves from a single manufacturer.

Valve Styles: See individual Division 23 sections for valve styles.

Butterfly Valve Operators: Locking lever for shut-off service; "Memory Stop" for lever handle with 10-position throttling plate for throttling service; gear operator with babbitt sprocket rim for chain-operated valves and gear operators on all 8" or larger valves.

Butterfly Valve Style: Lug-type with cap screws for all valves utilized for equipment isolation for servicing. Lug and grooved style valves shall be capable for use as isolation valves and recommended by manufacturer for dead-end service at full system pressure.

Insulated Valves: Install extended-stem valves in all piping specified as insulated, and arrange in the proper manner to receive insulation.

Mechanical Actuators: Provide mechanical actuators with chain operators where indicated, where valves 4" and larger are mounted more than 7' above the floor, and where manual operation is difficult because of valve size, pressure differential or other operating conditions. Drop chains to 6'-6" above the floor.

Selection of Valve Ends (Pipe Connections): Select and install valves with ends matching the types of pipe/tube connections.

## **HANGERS AND SUPPORTS**

General: Provide factory-fabricated horizontal piping hangers, clamps, hanger rod, inserts, supports, etc., of the indicated MSS type and size. The Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry Practice SP-58 and SP-69 are referenced in this section.

Manufacturers: B-Line, Carpenter & Paterson, Grinnell, Michigan, Superstrut, Tolco, Erico, or accepted substitute. Grinnell figure numbers in parentheses where applicable (or other manufacturers as noted).

Corrosion Protection: Provide materials which are zinc plated or factory painted to prevent corrosion. Prevent electrolysis in the support of copper tubing by the use of hangers and supports which are copper plated, plastic coated, or by other recognized industry methods.

Seismic Requirements: Provide seismic restraints in accordance with OSSC Section 1613. Design restraint systems in accordance with "Seismic Restraint Manual: Guidelines for Mechanical Systems," Second Edition, 1998, SMACNA, or "A Practical Guide to Seismic Restraint" ASHRAE RP-812, 1999.

**Horizontal Piping Hangers and Supports:**

Adjustable Clevis Hanger: MSS Type 1 (Fig. 260).  
Adjustable Band Hanger: MSS Type 7 (Fig. 97), fabricated from steel.  
Adjustable Swivel-Band Hanger: MSS Type 10 (Fig. 70).  
Clamp: MSS Type 4 (Fig. 212, 216).  
Double-Bolt Clamp: MSS Type 3 (Fig. 295A, 295H), including pipe spacers.  
Adjustable Saddle-Support: MSS Type 36 (Fig. 258) and MSS Type 37 (Fig. 259), including saddle, pipe and reducer. Fabricate base-support from steel pipe and include cast-iron flange or welded-steel plate.  
Channel Support System: Galvanized, 12 gauge channel and bracket support systems, single or double channel as indicated on the Drawings or as required by piping and equipment weights. Grinnell "Power Strut" channel. Acceptable Manufacturers: Super Strut, Globestrut, Bee, Kindorf or Unistrut.

**Vertical Pipe Clamps:**

Two-Bolt Riser Clamp: MSS Type 8 (Fig. 261).  
Four-Bolt Riser Clamp: MSS Type 42 include pipe spacers at inner bolt-holes.

**Hanger Attachment:**

Hanger Rod: Rolled threads, zinc plated. Right hand threaded.  
Turnbuckles: MSS Type 13 (Fig. 230).  
Weldless Eye-Nut: MSS Type 17 (Fig. 290).  
Malleable Eye-Socket: MSS Type 16 (Fig. 110R).  
Clevises: MSS Type 14 (Fig. 299).

**Building Attachments:**

Concrete Inserts: MSS Type 18 (Fig. 282), steel or Grinnell Power-Strut PS349 continuous channel.  
Acceptable Manufacturers: Michigan Hanger, Globestrut, Unistrut, Super Strut.  
Clamps: MSS Type 19 (Fig. 285, 281), Type 20, 21 (Fig. 225, 226, 131), Type 23 (Fig. 86, 87, 88), Type 25 (Fig. 227), Type 27 through 30 where applicable.

**IDENTIFICATION MARKERS**

**Pipe Markers:**

Adhesive pipe markers of width, letter size and background color conforming to ANSI A13.1.  
Acceptable Manufacturers: Brady B946 with arrow banding tape or similar Seaton, Zeston, MSI.

**Duct Markers:**

Adhesive duct markers 2¼"x14" with black text indicating contents on white background with directional flow arrow.  
Acceptable Manufacturers: Brady B946 or similar Seaton, Zeston, MSI.

**Nameplates:**

Engraved nameplates, 1/16" thick, laminated 2-ply plastic, bottom ply white, outer ply black, letters formed by exposing bottom ply.  
Size: 2" by 4" nameplates with 1/4" high letters.

Valve Tags:

2" diameter, 18-gauge polished brass tags with 3/16" chain hole and 1/4" high stamped, black-filled service designation.

Acceptable Manufacturers: Seaton, Brady, MSI.

Valve Identification: Tag all valves with brass disc and chain. Prepare valve charts indicating valve number, size, location, concealed or exposed, function, valve manufacture and model number, and normal position. Provide floor plan as part of record Drawings. Use no duplicate numbers in Plumbing and Heating systems. Mount glazed frames containing one set of valve charts in the building mechanical room.

Include floor plan of each floor level with valve tag numbers indicated at approximate valve locations.

Provide separate maps for plumbing valves and HVAC valves. Maps are to be 11"x17".

Label all ceilings directly below or access panels directly in front of plumbing or HVAC valves using engraved, printed labels or hanging tags stating the valve ID as shown on the Valve Map and the Valve Tag Directory.

## **PENETRATION FIRE STOPPING**

Through-penetration fire stopping system tested and listed by Underwriters Laboratories. 3M, Metacaulk, SpecSeal, or approved.

Select system for proper application based on wall construction, type of penetrating item, wall rating, etc.

Sealants and Primers – General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No. 1168.

## **PART 3 - EXECUTION**

### **LAYOUT AND COORDINATION**

Site Examination: Before starting work, carefully examine site and all contract Drawings. Become thoroughly familiar with conditions governing work on this project. Verify all indicated elevations, building measurements, roughing-in dimensions and equipment locations before proceeding with any of the work.

Utility Locations: The location of existing utilities, wires, conduits, pipes, ducts, or other service facilities are shown in a general way only on the Drawings and are taken from existing records. Ascertain whether any additional facilities other than those shown on the plans may be present and determine the exact location and elevations of all utilities prior to commencing installation.

Sleeves, Inserts, Cast-in-Place Work: Provide sleeves, inserts, anchoring devices, cast-in-place work, etc. which must be set in concrete sequenced at the proper time for the project schedule.

Coordination:

The drawings are based on equipment of a certain manufacturer and may be identified as such.

Where alternate manufacturers or approved substitutes are incorporated into the work, any required design changes are the responsibility of the contractor. Such changes may include changes in utility or system connection sizes, location, or orientation, service clearances, structural support or acoustic considerations.

Prepare accurate AutoCAD shop drawings showing the actual physical dimensions required for the installation for duct work, piping and mechanical devices. Submit drawings prior to purchase/fabrication/installation of any of the elements involved in the coordination. Provide drawing files to other trades for coordination.

Cooperate with other trades in furnishing material and information for sleeves, bucks, chases, mountings, backing, foundations and wiring required for installation of mechanical items.

Coordinate all work with other trades and determine in advance where interfacing of the mechanical work and other work are required to be connected together. Provide all materials and equipment to make those connections. Submit shop drawings showing required connections where special conditions exist.

Discrepancies: Report immediately any error, conflict or discrepancy in Plans, Specifications and/or existing conditions. Do not proceed with any questionable items of work until clarification of same has been made. Should rearrangement or re-routing of piping be necessary, provide for approval the simplest layout possible for that particular portion of the work.

### **UTILITY COORDINATION**

Utility Coordination: Coordinate all aspects of the incoming utility services indicated with the city Engineer, serving utility, and the off-street improvements contractor. Requirements of the utility company which exceed the provisions made on the Drawings or covered by these Specifications shall take precedence. Provisions made on the Drawings or Specifications in excess of the utility company's requirements shall take precedence. No additional compensation will be allowed the contractor for connection fees or additional work or equipment not covered in the Drawings or Specifications which are a result of policies of the serving utilities.

### **MECHANICAL EQUIPMENT WIRING**

Provide all mechanical equipment motors, automatic temperature, limit, float and similar control devices required, with wiring complete from power source indicated on Electrical Drawings.

Provide properly rated motor overload and undervoltage protection and all manual or automatic motor operating devices for all mechanical equipment.

Equipment and systems shown on the Drawings and/or specified, are based upon requirements of specific manufacturers which are intended as somewhat typical of several makes which may be approved. Provide all field wiring and/or devices necessary for a complete and operable system including controls for the actual selected equipment/system.

Provide all starters for mechanical motors. Review Electrical Specifications and Drawings to determine starter sizes. Adjust fusing/time delay on all starters once installed.

### **GENERAL INSTALLATION**

Locating and Positioning Equipment: Observe all Codes, Regulations and good common practice in locating and installing mechanical equipment and material so that completed installation presents the least possible hazard. Maintain adequate clearances for repair and service to all equipment and comply with Code requirements.

**Arrangement:** Arrange piping parallel with primary lines of the building construction, and with a minimum of 7' overhead clearance in all areas where possible. Unless indicated otherwise, conceal all piping. Locate operating and control equipment properly to provide easy access, and arrange entire mechanical work with adequate access for operation and maintenance. Give right-of-way to piping which must slope for drainage. Set all equipment level or as recommended by manufacturer. Under no conditions shall beams, girders, footings or columns be cut for mechanical items. Casting of pipes into concrete is prohibited unless so shown on Drawings.

**Drip Pans:** Provide drip pans under all above ceiling in-line pumps and cooling coils. Locate pan immediately below piping and equipment, and extend a minimum of 6" on each side and lengthwise 18" beyond equipment being protected. Fabricate pans 2" deep, of reinforced 20 gauge galvanized sheet metal with watertight seams and rolled or hemmed edges. Provide 3/4" drainage piping, properly discharged to over floor drain or as shown on the Drawings. Comply with Mechanical Code for overflow protection and pipe sizing.

**Access Panels:** Provide access panels with proper backing reinforcement for all equipment, dielectric unions, valves and items requiring service and installed above ceilings, behind walls, or in furring, complete with correct frame for type of building construction involved. Exact size, number and location of access panels are not necessarily shown on Drawings. Use no panel smaller than 12" by 12" for simple manual access or smaller than 16" x 20" where personnel must pass through.

**Adjusting:** Adjust and calibrate all automatic mechanical equipment, temperature controls, float devices, etc. Adjust flow rates at each piece of equipment or fixture.

**Building Vapor Barrier:** Wherever the building insulation vapor barrier is penetrated by piping, hangers, conduits, etc., provide clear self-adhesive tape recommended by the insulation manufacturer around the penetrations.

**Housekeeping Pads:** Construct minimum 6" thick with chamfered edges using 3000 psi concrete. Provide #4 reinforcing bars 8" on center in each direction and within 4" of each edge, centered in pad thickness. Provide 1/2" dowel with 3" embedment into floor slab for each 2 square feet of pad area. Dowels and equipment anchor bolts shall be spaced a minimum of 6" from pad edges.

## **VALVE INSTALLATION**

**General:** Comply with the following requirements:

Install valves where required for proper operation of piping and isolation of equipment, including valves in branch lines where necessary to isolate sections of piping, and where shown on the drawings.

Install valves at low points in piping systems that must be drained for service or freeze protection.

Locate valves in accessible spaces (or behind access panels) and so that separate support can be provided when necessary.

Install valves with stems pointed up, in the vertical position where possible, but in no case with stems pointed downward from a horizontal plane.

**Insulated Valves:** Install extended-stem valves in all piping specified as insulated, and arrange in the proper manner to receive insulation.

**Valve Access:** Provide access panels to all valves installed behind walls, in furring or otherwise inaccessible.

## **INSTALLATION OF HANGERS AND SUPPORTS**

General: Proceed with the installation of hangers, supports and anchors only after the required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) the proper placement of inserts, anchors and other building structural attachments.

Install hangers, supports, clamps, and attachments to support piping and equipment properly from the building structure. Use no wire or perforated metal to support piping, and no supports from other piping or equipment. For exposed continuous pipe runs, install hangers and supports of the same type and style as installed for adjacent similar piping.

Prevent electrolysis in the support of copper tubing use of at least 2 layers of UPC listed 10 mil tape at all bearing surfaces or strut clamp cushion. Copper plated hangers alone are not sufficient.

Arrange supports to prevent eccentric loading of joists and joist girders. Locate supports at panel points only.

### Provisions for Movement:

Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate the action of expansion joints, expansion loops, expansion bends and similar units. Install specified seismic restraints to restrict excessive movement. Install hangers and supports so that equipment and piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

Install hangers and supports to provide the indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded. Comply with the following installation requirements:

Clamps: Attach clamps, including spacers (if any), to piping outside the insulated piping support. Do not exceed pipe stresses allowed by ANSI B31.

Insulated Pipe Supports: Insulated pipe supports shall be supplied and installed on all insulated pipe and tubing.

Load Rating: All insulated pipe supports shall be load rated by the manufacturer based upon testing and analysis in conformance with ASME B31.1, MSS SP-58, MSS SP-69 and MSS SP-89.

Support Type: Manufacturer's recommendations, hanger style and load shall determine support type.

Insulated Piping Supports: Where insulated piping with continuous vapor barrier or where exposed to view in finished areas is specified, install hard maple wood insulation shields (Elcen Fig. 216) or steel pipe covering protection shields (MSS type 39) at each hanger.

### Pipe Support:

Vertical Spacing: Support at base, at equivalent of every floor height (maximum 10' as required by Code) and just below roof line.

Screwed or Welded Steel or Copper Piping: Maximum hanger spacing shall be as follows:

	<u>Steel</u>	<u>Copper</u>
1-1/4" and smaller	7' span	6' span
1-1/2" pipe	9' span	6' span
2" pipe	10' span	10' span
2-1/2" & larger	12' span	10' span

Install additional hangers or supports at concentrated loads such as pumps, valves, etc. to maintain alignment and prevent sagging.

Support Rod: Hanger support rods sized as follows:

<u>Pipe and Tube Size</u>		<u>Rod Size</u>	
<u>Inches</u>	<u>mm</u>	<u>Inches</u>	<u>mm</u>
1/2" to 4"	12.7 to 101.6	3/8"	9.5

5" to 8"	127.0 to 203.2	1/2"	12.7
10" to 12"	254.0 to 304.8	5/8"	15.9

Provide manufactures approved channel continuously below all horizontal PEX or other plastic pipe where hung from structure.

Adjust hangers and supports to bring piping to proper levels and elevations.

Provide all necessary structural attachments such as anchors, beam clamps, hanger flanges and brackets in accordance with MSS SP-69. Attachments to beams wherever possible. Supports suspended from other piping, equipment, metal decking, etc., are not acceptable.

Horizontal banks of piping may be supported on common steel channel member spaced not more than the shortest allowable span required on the individual pipe. Maintain piping at its relative lateral position using clamps or clips. Allow lines subject to thermal expansion to roll axially or slide. Size channel struts for piping weights.

Installation of drilled-in concrete anchors shall comply with the manufacturer's instructions for working load, depth of embedment, and spacing between anchors and from the edge of the slab. Use only wedge-style anchors.

Seismic Restraints: Install restraints where recommended in SMACNA "Seismic Restraint Manual" and as required by code. Show analysis of supporting structure, anchorages, and restraints in accordance with OSSC Section 16 and reference ASCE standard. Seismic restraint system components shall be approved by the California Office of Statewide Health Planning and Development (OSHPD). Acceptable Manufacturers: Amber/Booth, Mason Industries, Tolco, or approved. Contractor shall submit calculations and shop drawings, sealed and signed by a professional Engineer, showing seismic restraint design for all equipment, piping and ductwork required to be braced. **Seismic importance factor for new additions is 1.5. For remodeled areas seismic importance factor is 1.0.**

Ensure all copper piping is protected from contact with non-copper supports. Provide strut cushion below clamp or 2 layers of UPC listed 10 mil tape.

## **HVAC SYSTEM IDENTIFICATION**

Piping System: Indicate each pipe system by its generic name (abbreviated) as shown/scheduled/specified. Comply with ANSI A13.1 for marker locations, letter sizes, and colors. Include arrows to show direction of flow and "Electric Traced" signs to identify heat cable wrapped piping. Locate pipe labels in accessible areas as follows:

- Near each valve, meter, gauge, or control device.
- Near equipment such as pumps, heat exchangers, water heaters, etc.
- At piping branch connections.
- At penetrations (each side) of walls, ceilings, and floors.
- At access panels and doors.
- At 25 foot maximum intervals. Provide a minimum of one label above each room where lift-out ceiling is installed. Reduce intervals in congested areas such as mechanical rooms.

Equipment: Provide engraved plastic-laminate signs at locations of major equipment such as heat exchangers, pumps, etc. Identify equipment in field same as on Drawings. Permanently mount in an appropriate and effective location.



Operation Tags: Where needed for proper and adequate information on operation and maintenance of mechanical systems, provide tags of plasticized card stock, either pre-printed or hand printed to convey the message; example: "DO NOT CLOSE THIS VALVE EXCEPT WHEN THE PUMP IS OFF."

### **EQUIPMENT CONNECTIONS**

Provide complete connections for all items of equipment requiring such connections, including incidental piping, fittings, trim and labor necessary for a finished working installation.

Verify the rough-in and finish requirements for all equipment provided under other Divisions of the work and requiring HVAC piping or duct connections with equipment supplier and installer prior to rough-in.

### **PROTECTION**

Protect all work and materials against loss or damage. Close all pipe openings with caps or plugs. At final completion, thoroughly clean and deliver all work and equipment in an unblemished new condition. Keep all motors and bearings in watertight and dustproof covers during entire course of installation.

Protect floors, walls, framing and sheathing where pipe cutting and threading operations are conducted with plastic sheeting under plywood sheets. Extend plastic sheeting beyond the plywood. Clean-up metal cuttings, oil, etc., daily or as necessary to prevent debris from being tracked beyond the protected area. Damages, as determined by the Architect, due to the pipe cutting/threading operation shall be repaired by the responsible trade.

### **CUTTING AND PATCHING**

General: Comply with the requirements of Division 1 for the cutting and patching of other work to accommodate the installation of mechanical work. Do all necessary cutting and patching of existing building and yard surfaces required for completion of the mechanical work. Patch to match finish and color of adjacent surfaces. Coordinate work in remodel and new areas to avoid cutting of new finished surfaces.

### **PIPE PENETRATION FIRE STOPPING**

Install as recommended by manufacturer and in accordance with the product's UL listing. Below are the minimum installation requirements.

Install specified penetrating item(s) with required annular spacing in proper size wall or floor opening.

Support penetrating item(s) adequately on both sides of construction.

Clean all opening and penetrating item surfaces in penetration area to remove loose debris, dirt, oil, wax, grease, old caulking, etc.

If needed or required for gypsum or concrete block walls, install specified galvanized steel wire mesh or sleeve recessed and centered inside wall around penetrating item(s) so that it is snug against perimeter of opening.

When required, install specified type and depth of backing material in annular space, recessed to required fill depth of fire stopping caulking.

Gun, trowel, and/or pump fire stopping sealant to specified depth in annular space around penetrating item(s). Trowel sealant surfaces flush with wall or floor surfaces to a smooth, defect-free finish. Where required, apply specified size caulking bead around penetrating item(s) at zero annular contact areas and tool smooth.

Drawings show some, not all, of the penetration. Review architectural drawings for all fire walls.

Sealants and Primers – General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No. 1168.

### **MECHANICAL PAINTING**

Minimum Requirements: Comply with minimum requirements of Division 9, Painting. All mechanical equipment, piping, insulation, etc., exposed in finished areas, storage rooms and other locations except mechanical equipment rooms will be painted under Section 09 90 00.

### **HVAC WORK CLOSEOUT**

General: Refer to the Division 1 sections for general closeout requirements. Calibrate all equipment requiring same. Complete each system as shown or specified herein and place in operation except where only roughing-in or partial systems are called for. Each system shall be tested and left in proper operation free of leaks, obstructions, or contamination.

Record Drawings: Submit record set of Drawings required in Division 1 as previously specified in this Section.

Closeout Equipment/Systems Operations: Sequence operations properly so that work of project will not be damaged or endangered. Coordinate with seasonal requirements. Operate each item of equipment and each system in a test run of appropriate duration with the Architect present, and with the Owner's operating personnel present, to demonstrate sustained, satisfactory performance. Adjust and correct operations as required for proper performance. Clean and lubricate each system and replace dirty filters, excessively worn parts and similar expendable items of the work.

Operating Instructions: Conduct a walk-through instruction seminar for the Owner's personnel who are to be involved in the continued operation and maintenance of the HVAC equipment and systems. Provide written instructions outlining and explaining the identification system, operational diagrams, emergency and alarm provisions, sequencing requirements, seasonal provisions, security, safety, efficiency and similar features of the systems.

**END OF SECTION 23 05 00**

**SECTION 23 05 48 - MECHANICAL SOUND AND VIBRATION CONTROL**

**PART 1 - GENERAL**

**DESCRIPTION**

The requirements of this section apply to the vibration isolation for mechanical equipment specified elsewhere.

**QUALITY ASSURANCE**

Isolator Engineering: Selected and furnished by the equipment manufacturer. Select isolators for 98% efficiency unless indicated otherwise on the Drawings.

Manufacturer: Provide field installed isolation required from a single manufacturer where possible.

**SUBMITTALS**

Provide product data sheets on all vibration isolators and seismic restraints.

Provide itemized list showing the items of equipment or piping to be isolated, isolator type and model number selected, isolator loading and deflection, and reference to specified Drawings showing frame and construction.

Provide manufacturer's Drawings showing equipment frame construction for each item including dimensions, structural member sizes and support locations.

**PART 2 - PRODUCTS**

**ACCEPTABLE MANUFACTURERS**

Manufacturers: Amber/Booth, Mason Industries, Vibration Mountings and Controls, Kinetics Noise Control.

Manufacturer Model Numbers: Amber/Booth figure numbers are listed unless indicated otherwise.

**VIBRATION ISOLATORS**

Types of Isolators:

Hanger with Spring and Rubber Stop: Combination neoprene element and spring hangers – Hangers shall consist of a steel frame containing a neoprene isolation element at the top and a coil steel spring seated in a neoprene cup on the bottom. Both the element and the cup shall be molded with a neoprene bushing that passes through the steel frame. The neoprene element shall be capable of an average deflection of 0.35". The steel springs shall be capable of a minimum static deflection of 0.75" with a minimum additional travel to solid of 1/2". Spring diameters and hanger box lower hole size shall be large enough to permit the hanger rod to swing through a 30 degree arc before contacting the box and short circuiting the spring. Hangers shall be factory precompressed 60% of the total deflection determined by the assigned load per hanger. Hangers shall be manufactured with provision for bolting or attaching to ceiling flat iron straps, rods or steel runners. Hangers shall be of a fail-safe design.

Amber / Booth BSRA.

Neoprene Pads: Neoprene pads shall be of waffle or ribbed design, 1/4" – 3/8" thick. They shall be installed as a single layer or in multiple layers with 16 gauge steel shims cemented between so that the combination of stiffness and total neoprene thickness achieves the static deflection listed in the vibration isolation schedule in conjunction with a distributed load area that will maintain 10-50 psi. If the equipment support location does not completely cover the pads or does not consist of flat steel footing, an additional full coverage, load distribution plate of minimum 3/8 steel shall be placed between the pad and attached to the equipment support. There shall be no rigid structure between top and bottom of mount. Amber / Booth Type NR Ampad.

Neoprene Mounts: Neoprene mounts shall be one piece, neoprene molded assemblies with a minimum loaded static deflection of 0.25". The mount shall incorporate both rubber-in-shear and compression load characteristics. All metal surfaces shall be neoprene covered. The mount shall have friction pads both top and bottom. Bolt holes shall also be provided for both surfaces. The top bolt hole shall be threaded. There shall be no rigid structure between top and bottom supports. Amber / Booth Type RV.

Noise and Vibration Barrier Hanger: For ductwork and piping where indicated. Target Enterprises Inc. "ARH-1" or accepted substitute.

Seismic and Start-Up Restraints: Select all isolators to withstand seismic loads equivalent two times the isolator load rating applied from any direction. Mason Industries type Z-1011 on all isolated equipment not utilizing isolators with integral restraints.

Flexible Pipe Connectors - Type SS: All stainless steel hose and braid with carbon steel connections. Male thread ends on flexible connectors 2" and smaller, and flanged connections on 1-1/2" and larger connectors.

Ductwork Flexible Connections:

Typical connections shall be made of 30 ounce woven glass fiber, coated with neoprene, sewn together at the edges and joints.

The flexible connections shall be approximately 6" long and held in place with 1" wide bands of 12 gauge galvanized steel bolted to duct and to outlets and inlets of the units and fans with 1/8" stove bolts, 5" o.c.

It is the intent that these flexible connections shall withstand the operating air pressure, shall not permit air leakage and shall not transmit vibration.

## **PART 3 - EXECUTION**

### **INSTALLATION**

General: Install vibration isolators and flexible connectors as specified herein, as shown on the Drawings and as recommended by manufacturer.

Ductwork Flexible Connections: Install flexible duct connections on all externally spring isolated air handling units including roof mounted units down through roof curbs (and/or to unit side duct connections). Fan connections, both at inlet and discharge, shall be made with flexible materials so as to prevent the transfer of vibration from fans to ductwork connected thereto.

**Flexible Pipe Connections:**

Provide flexible connections on all piping to spring isolated equipment, where indicated on Drawings and for all coils mounted in spring isolated air handling units or plenums. Coils in rigid units and plenums do not require flexible connectors. Provide a flexible connection in both the supply and return connections to the coil as near the coil as possible.

Install connectors in a straight line as recommended by the manufacturer without offsets or twists and support pipe without any load on flexible connectors. Minimum live length shall be as follows:

<u>Pipe Size</u>	<u>Minimum Live Length</u>
1" through 1-1/2"	8"
2" through 2-1/2"	10"
3" through 4"	12"
Over 4"	18"

Anchorage: Anchor all isolators to the floor, wall or ceiling structure and anchor points reinforced where necessary. Anchor bolts, cap screws, etc., shall not be continuous through the isolator such that vibrations are transmitted to the structure.

Adjustment: Adjustable during and after installation, to ensure sufficient clearance between vibration isolation element and rigid restraining device. Do not install isolators until they have been loaded and adjusted to achieve the specified static deflection and clearances.

Housekeeping Pads: Construct minimum 3" thick with chamfered edges using 3000 psi concrete. Provide #4 reinforcing bars 8" on center in each direction and within 4" of each edge, centered in pad thickness. Provide 1/2" dowel with 3" embedment into floor slab for each 2 square feet of pad area. Dowels and equipment anchor bolts shall be spaced a minimum of 6" from pad edges.

**EQUIPMENT RESTRAINTS**

All equipment shall be anchored to resist displacement including sliding, swinging, and overturning due to seismic forces. Friction due to equipment weight shall not be considered as anchorage.

Contractor shall submit shop Drawings showing seismic restraint design for all equipment weighing 400 lbs. or more. Design shall show analysis of supporting structure, anchorages, and restraints in accordance with OSSC Section 16.

**END OF SECTION 23 05 48**

**SECTION 23 05 90 - TESTING, ADJUSTING AND BALANCING**

**PART 1 - GENERAL**

**DESCRIPTION**

Work Included: After completion of the work of installation, test and regulate all components of the new heating, air conditioning and ventilating systems to verify air volumes and heating-cooling flow rates indicated on the Drawings.

Balancing Organization:

Balancing of the Heating and Air Conditioning Systems: Performed by a firm providing this service established in the State of Oregon.

Balancing Organization: Approval by Architect. Air Balancing Specialties, Neudorfer Engineers, Northwest Engineering Services, or approved.

Provide all necessary personnel, equipment, and services.

Balancer shall perform work as a Contractor to the General Contractor directly, not through the Mechanical Contractor.

**QUALITY ASSURANCE**

Balancing of the Heating and Air Conditioning Systems: Agency shall be a current member of NEBB or AABC specializing in the adjusting and balancing of systems specified with a minimum of 10 years documented experience.

Testing, adjusting, and balancing shall be performed under direct field supervision of a Certified NEBB Supervisor or a Certified AABC Supervisor.

See Commissioning Specification for additional requirements.

**SUBMITTALS**

See Section in Division 1, Administrative Requirements, for submittal procedures.

Submit name of adjusting and balancing agency for approval within 30 days after award of Contract.

Field Reports: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

Submit under provisions of Section 23 05 00.

Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required.

Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.

Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.

Include detailed procedures, agenda, sample report forms, and copy of AABC National Project Performance Guaranty or other certifying agency prior to commencing system balance.

**TESTING, ADJUSTING AND BALANCING 23 05 00-1**

Test Reports: Indicate data on AABC MN-1 forms, forms prepared following ASHRAE 111, NEBB forms, or forms containing information indicated in Schedules.

Include the following on the title page of each report:

- Name of testing, adjusting, and balancing agency.
- Address of testing, adjusting, and balancing agency.
- Telephone number of testing, adjusting, and balancing agency.
- Project name.
- Project location.
- Project Architect and Owner.
- Project Engineer.
- Project Contractor.
- Project altitude.
- Report date.

Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

Provide a list of equipment, air supply, return and exhaust, heating water, and chilled water systems not in compliance with tolerances subsequently specified.

## **PART 2 - PRODUCTS**

**-- NOT USED --**

## **PART 3 - EXECUTION**

### **EXAMINATION**

Verify that systems are complete and operable before commencing work. Ensure the following conditions:

- Systems are started and operating in a safe and normal condition.
- Temperature control systems are installed complete and operable.
- Proper thermal overload protection is in place for electrical equipment.
- Final filters are clean and in place. If required, install temporary media in addition to final filters.
- Duct systems are clean of debris.
- Fans are rotating correctly.
- Fire and volume dampers are in place and open.
- Air coil fins are cleaned and combed.
- Access doors are closed and duct end caps are in place.
- Air outlets are installed and connected.
- Duct system leakage is minimized.
- Hydronic systems are flushed, filled, and vented.
- Pumps are rotating correctly.
- Proper strainer baskets are clean and in place.
- Service and balance valves are open.

Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance.

Beginning of work means acceptance of existing conditions.

**INSTALLATION TOLERANCES**

Air Handling Systems: Adjust to within plus 10 percent or minus 5 percent of design for supply systems and +/- 10 percent of design for return and exhaust systems.

Air Outlets and Inlets: Adjust total to within plus 10 percent or minus 5 percent of design to space. Adjust outlets and inlets in space to within +/- 10 percent of design.

Hydronic Systems: Adjust to within +/- 10 percent of design.

**ADJUSTING**

Ensure recorded data represents actual measured or observed conditions.

Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

**AIR SYSTEM PROCEDURE**

Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities.

Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

Measure air quantities at air inlets and outlets.

Adjust noise distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

Use volume control devices to regulate air quantities only to the extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.

Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.

Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.



Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.

Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.02" (12.5 Pa) positive static pressure near the building entries.

For variable air volume system powered units, set volume controller to air flow setting indicated. Confirm connections are properly made and confirm proper operating for automatic variable air volume temperature control. Adjust drives to maximum airflow for highest static condition (maximum amps of motor). Allow VFD to regulate airflow per specification.

Space pressure Control, Return Fan Speed Endpoints: For variable air volume system with terminal unit zoning, attain return fan speed control endpoints based on the following values for the given operating mode. Coordinate with the HVAC control contractor for system setup and provide values when determined.

<b>Return Fan Speed Endpoint Values</b>				
<b>Mode</b>	<b>Supply Fan Speed Hi/Lo Reset Limits</b>	<b>Desired Space Pressure (InH2O)</b>	<b>Economizer Position</b>	<b>Return Fan Speed</b>
Full Heating (All terminal units are operating at heating flow setpoints)	TBD – Noted during the full heating condition	<b>Ideal - 0.02</b> Acceptable Test Range: 0.01 – 0.03	Min-Min (25% of the minimum ventilation requirement)	Minimum Return Fan Speed-TBD
Full Cooling (All terminal units are operating at cooling flow setpoints)	TBD – Noted during the full cooling condition	<b>Ideal - 0.02</b> Acceptable Test Range: 0.01 – 0.03	Min-Max (100% of the minimum ventilation requirement)	Maximum Return Fan Speed-TBD

CO2 controller set points – minimum CO2 setpoint (ppm), maximum CO2 setpoint (ppm)(setting for min OSA at full occupancy).

Outside air intake damper settings at minimum CO2 and maximum CO2 setpoint.

## **WATER SYSTEM PROCEDURE**

Adjust water systems to provide required or design quantities. This includes domestic HVAC systems.

Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gauges to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.

Adjust systems to provide specified pressure drops and flows through heat transfer elements prior to thermal testing. Perform balancing by measurement of temperature differential in conjunction with air balancing.

Effect system balance with automatic control valves fully open to heat transfer elements.

Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.

Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.

Where automatic flow control valves are installed (Dynamic devices, not circuit setters) record listed flow rate of device based on field verification. Testing is not required.

Balancing Contractor shall be trained on balancing procedures by certified representative of differential pressure control valves.

## **SCHEDULES**

Equipment Requiring Testing, Adjusting, and Balancing:

- Plumbing pumps
- HVAC pumps
- Forced air furnaces
- Air cooled water chillers
- Packaged rooftop heating/cooling units
- Air coils
- Air handling units
- Fans
- Air filters
- Air terminal units
- Air inlets and outlets

Report:

Summary Comments:

- Design versus final performance
- Notable characteristics of system
- Description of systems operation sequence
- Summary of outdoor and exhaust flows to indicate amount of building pressurization
- Nomenclature used throughout report
- Test conditions

Instrument List:

- Instrument
- Manufacturer
- Model number
- Serial number
- Range
- Calibration date

Electric Motors:

- Manufacturer
- Model/frame
- HP/BHP
- Phase, voltage, amperage; nameplate, actual, no load
- RPM
- Service factor
- Starter size, rating, heater elements
- Sheave make/size/model

V-Belt Drives:

- Identification/location
- Required driven RPM

Driven sheave, diameter, and RPM  
Belt, size, and quantity  
Motor sheave diameter and RPM  
Center to center distance, maximum, minimum, and tested

**Pumps:**

Identification/number  
Manufacturer  
Size/model  
Impeller  
Service  
Design flow rate, pressure drop, BHP  
Actual flow rate, pressure drop, BHP  
Discharge pressure  
Suction pressure  
Total operating head pressure  
Shut off, discharge, and suction pressure  
Shut off, total head pressure

**Refrigerant Cooling Coils:**

Identification/number  
Location  
Service  
Manufacturer  
Air flow, design and actual  
Entering air DB temperature, design and tested  
Entering air WB temperature, design and tested  
Leaving air DB temperature, design and tested  
Leaving air WB temperature, design and tested  
Air pressure drop, design and tested  
Saturated suction temperature, design and tested

**Heating & Chilled Water Coils:**

Identification/number  
Location  
Service  
Manufacturer  
Air flow, design and tested  
Water flow, design and tested  
Water pressure drop, design and tested  
Entering water temperature, design and tested  
Leaving water temperature, design and tested  
Entering air temperature, design and tested  
Leaving air temperature, design and tested  
Air pressure drop, design and tested

**Air Moving Equipment:**

Location  
Manufacturer  
Model number  
Serial number  
Arrangement/Class/Discharge  
Air flow, specified and tested  
Return air flow, specified and tested

- Outside air flow, specified and tested
- Total static pressure (total external), specified and tested
- Inlet pressure
- Discharge pressure
- Sheave make/size/bore
- Number of Belts/Make/Size
- Fan RPM

**Return Air/Outside Air:**

- Identification/location
- Supply air flow, design and tested
- Return air flow, design and tested
- Outside air flow, design and tested
- Return air temperature
- Outside air temperature
- Mixed air temperature, design and tested

**Exhaust Fans:**

- Location
- Manufacturer
- Model number
- Serial number
- Air flow, specified and tested
- Total static pressure (total external), specified and tested
- Inlet pressure
- Discharge pressure
- Sheave Make/Size/Bore
- Number of Belts/Make/Size
- Fan RPM

**Duct Traverses:**

- System zone/branch
- Duct size
- Area
- Design velocity
- Design air flow
- Test velocity
- Test air flow
- Duct static pressure
- Air temperature
- Air correction factor

**Terminal Unit Data:**

- Manufacturer
- Type, constant, variable, single, dual duct
- Identification/number
- Location
- Model number
- Size
- Minimum static pressure
- Minimum air flow, design and tested
- Maximum air flow, design and tested
- Inlet static pressure, design and tested

**Air Distribution Tests:**

- Air terminal number
- Room number/location
- Terminal type
- Terminal size
- Area factor
- Design velocity
- Design air flow
- Test (final) velocity
- Test (final) air flow
- Percent of design air flow

**DETAILED REQUIREMENTS****Adjusting and Balancing:**

Adjust and balance all portions of the mechanical systems to produce indicated results within limits of minus 5 or plus 10 percent or as subsequently directed by the Architect.

Balancing data may be spot checked with instruments similar to that used by the balancing firm.

If, in the judgment of the Architect, the discrepancies warrant additional adjustment, readjust and rebalance the systems at no additional project cost.

Duct Pressure Test: To be conducted and/or witnessed by balancer.

**END OF SECTION 23 05 90**

## **SECTION 23 07 00 - HVAC INSULATION**

### **PART 1 - GENERAL**

#### **DESCRIPTION**

The requirements of this section apply to the insulation of mechanical equipment specified elsewhere in these specifications.

Related Work: The requirements of Section 23 05 00, Common HVAC Materials and Methods, also apply to this section.

#### **QUALITY ASSURANCE**

Insulation Thickness and Thermal Performance: Comply with provisions of the State of Oregon Energy Code.

Composite (Insulation, Jacket or Facing and Adhesives) Fire and Smoke Hazard Ratings: Not to exceed a flame spread of 25 or smoke development of 50 and containing less than 0.1% by weight deca-PDE fire retardant.

Component Ratings of Accessories (Adhesives, Mastics, Cements, Tapes, Finishing Cloth for Fittings): Same as "B" requirements above and permanently treated. No water soluble treatments.

#### **PRODUCT DELIVERY, STORAGE AND HANDLING**

General: In addition to the requirements specified in Section 23 05 00, the following apply:

- Deliver insulation, coverings, cements, adhesives and coatings to the site in factory-fabricated containers with the manufacturer's stamp or label affixed showing fire hazard ratings of the products.
- Store insulation in original wrappings and protect from weather and construction traffic.
- Protect insulation against dirt, water, chemical and mechanical damage. Do not install damaged insulation. Remove such insulation from project site.

#### **SUBMITTALS**

Submit catalog data and performance characteristics for each product specified.

### **PART 2 - PRODUCTS**

#### **ACCEPTABLE MANUFACTURERS**

Insulating Manufacturers: Johns Manville, Knauf, Armstrong, Owens-Corning, Pittsburgh Corning, Pabco, Imcoa or Certain Teed. Johns Manville products are listed unless indicated otherwise.

Adhesive Manufacturers: Foster, 3M, Insul-Coustic, Borden, Kingco or Armstrong.

## **PIPING INSULATION**

Interior and Exterior Piping Systems 50 to 850 Deg. F: Glass fiber preformed pipe insulation with a minimum K-value of 0.23 at 75 Deg. F, a minimum density of 3.5 pounds per cubic foot within all-service vapor barrier jacket, vinyl or pre-sized finish and pressure sensitive seal containing less than 0.1% by weight deca-PDE fire retardant.

Exterior Installations: Same as for interior installations except 0.016" aluminum finish jacket

Pipe Temperatures Minus 30 to 180 Deg. F: Flexible, preformed, pre-slit, self-sealing elastomeric pipe insulation up to 2-1/8" ID, thermal conductivity of 0.27 BTU/hr. sq. ft./in. at 75 deg. F and vapor transmission rating of 0.2 perms/inch. Apply in thickness necessary to prevent condensation on the surface at 85 deg. F and 70% RH. Armstrong "Armaflex 2000" or, in concealed locations, Imcoa or Nomaco also approved.

Interior Piping Systems 32 to 50 Deg. F: Glass fiber preformed pipe insulation with a minimum K-value of 0.23 at 75 deg. F, a minimum density of 3.5 pounds per cubic foot. Polymer vapor barrier jacket containing less than 0.1% by weight deca-PDE fire retardant and with pressure sensitive seal and wicking system to remove condensation from pipe surface. Owens Corning "VaporWick."

## **DUCT INSULATION**

Interior Above Grade Ductwork: Glass fiber formaldehyde-free blanket with "FSK" facing, k value = 0.31 at 75 deg. F, 0.2 perms, and UL 25/50 surface burning rating. Johns Manville "Microlite."

Below Grade Ductwork: Insulate with Flexible, preformed, pre-slit, self-sealing elastomeric pipe insulation

## **EQUIPMENT INSULATION**

Equipment Temperatures Below 70 Deg. F: Flexible, closed cell, elastomeric sheet insulation of 5.5 #/cubic feet density and 0.27 thermal conductivity at 75 deg. F. Armstrong "Armaflex."

Equipment Temperatures From 70 to 450 Deg. F: Glass fiber 3 pound density insulation with a 0.23 thermal conductivity at 75 deg. F. Johns Manville "814 Spin-Glas" with "FSK" jacket containing less than 0.1% by weight deca-PDE fire retardant or finished as recommended by manufacturer.

## **INSULATION ACCESSORIES**

Insulation Compounds and Materials: Provide rivets, staples, bands, adhesives, cements, coatings, sealers, welded studs, etc., as recommended by the manufacturers for the insulation and conditions specified except staples not permitted on chilled water lines.

Interior Tanks and Equipment Insulation Covering: Finished metal jacket or as recommended by the manufacturer for insulation material specified.

PVC Protective Jacketing and Valve and Pipe Fitting Covers: Johns Manville Zeston 2000, Proto LoSmoke, or Ceel-Co Ceel-Tite 100 Series with precut fitting fiberglass insulation or approved.

Jacket Lap Sealing Adhesives: Foster Drion 85-75 contact cement or approved substitute.

Saddles and Shields: Unless otherwise indicated and except as specified in piping system specification sections, install the following types:

Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.

Protection Shields (MSS Type 40): Of length recommended by manufacturer to prevent crushing insulation.

Thermal-Hanger Shield Inserts: For supporting insulated pipe, 360-degree insert of high-density, 100-psi (690-kPa) minimum compressive strength, water-repellent-treated calcium silicate or cellular-glass pipe insulation, same thickness as adjoining insulation with vapor barrier and encased in 360-degree sheet metal shield.

## **PART 3 - EXECUTION**

### **PIPING INSULATION**

General: Do not insulate underground piping except at joints and fittings on preinsulated piping unless indicated otherwise.

Heating Water Piping: Insulate with glass fiber or elastomeric pipe covering:

Size	Thickness
1/2" to 1-1/2"	1-1/2"
2" to 3"	2"
4" and larger	2-1/2"

Chilled Water Piping: Above grade insulate with glass fiber pipe covering:

Size	Thickness
1/2" to 1 1/4"	1/2"
1 1/2" and larger	1"

Refrigerant Piping Insulation: Insulate suction piping with minimum 1/2" thick foamed plastic or of thickness necessary to prevent condensation at 85 deg. F and 70% RH. Where possible, slip insulation over the piping as it is installed. Seal all joint and seams.

Pipe Fittings:

Insulate and finish all fittings including valve bodies, bonnets, unions, flanges and expansion joints with precut fiberglass insulation and preformed PVC covers sealed to adjacent insulation jacket for continuous vapor barrier covering over all fittings.

Provide removable/reusable insulation covers on 4" and larger valves, unions, flanges, pump casings, strainers and similar fittings or equipment requiring periodic service.

Protective Covering: Install continuous protective PVC or metal covering on all piping and fittings in mechanical rooms below 8' AFF, and where insulation may be subject to damage. Install with rivets or cement seams and joints. Piping in tunnels need not be covered with PVC jacketing.

Insulated Piping: Comply with the following.

Attach clamps and spacers to piping.

Piping Operating above Ambient Air Temperature: Clamp may project through insulation.

Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.

Do not exceed pipe stress limits according to ASME B31.9.

Install MSS SP-58, Type 39 or Type 40 protection saddles, if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.



Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN100) and larger if pipe is installed on rollers.

Shield Dimensions for Pipe: Not less than the following.

NPS 1/4 to NPS 3-1/2 (DN8 to DN90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.

NPS 4 (DN100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.

NPS 5 and NPS 6 (DN125 and DN150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.

NPS 8 and NPS 14 (DN200 and DN350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.

NPS 16 and NPS 24 (DN400 and DN600): 24 inches (610 mm) long and 0.105 inch (2.67 mm) thick.

Pipes NPS 8 (DN200) and Larger: Include wood inserts.

Insert Material: Length at least as long as protective shield.

Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

Piping Insulation Lap Seams and Butt Joints: Install insulation jacket in accordance with manufacturer's recommendation. Where jacket joint and lap seams have not adhered, remove affected section of insulation and reinstall or apply lap sealing adhesive in accordance with manufacturer's instructions.

## **DUCTWORK INSULATION**

Ductwork: Insulate the following:

All supply ductwork.

All supply and return ductwork in systems routed in unconditioned spaces or exposed to the outside conditions.

All outside air intake ducts.

All ductwork required to be insulated by code.

All relief ducts.

Insulation Thickness: Select board and blanket insulation of thickness required to provide the following installed R-value.

All heating or cooling system supply and return ducts located on the exterior of the insulated building envelope and all outside air intake ducts.

R-8

All heating and cooling system supply ducts located inside of building envelope or in unconditioned spaces, R-5.

All heating and cooling system return ducts located in vented spaces, R-8.

Fittings: Wire and duct adhesive as required. To prevent sagging on all rectangular or square ducts over 24" wide, install Gramweld or equal welding pins on the bottom. Maximum spacing 18" on center in both directions.

Installation: Applied with butt joints, all seams sealed with vapor seal mastic or taped with 2" wide vapor-proof, pressure-sensitive tape. Seal all penetrations with vapor barrier adhesive.

Internally Lined Ductwork: Where internally lined ductwork is indicated on the Drawings and/or specified, no exterior insulation is required. Select duct lining to provide the required R-value. Carefully lap the ends of the exterior insulation a minimum of 6" past the interior insulation unless otherwise shown. Seal the end of vapor barrier jacket to the duct with mastic where the vapor barrier is required. Duct lining is specified in Section 23 30 00.

## **EQUIPMENT ROOM ITEMS**

Materials:

For equipment and piping systems operating and below 150 deg. F., Insulate with material with same thickness as largest connecting pipe. Encase / close seems per specification for pipe joints.

### **EXPANSION JOINTS**

Insulation: Insulate expansion joints on heating and/or cooling piping to match thickness of adjacent piping. Build up piping insulation adjacent to the expansion joints sufficiently to allow internal clearance within the insulation for the diameter of the expansion joint. Fasten one end of the expansion joint insulation securely and provide aluminum or sheet metal on the built-up insulation at the other end to permit movement of the insulation without damage.

Finish: Finish as specified for adjacent piping with fireproof covering.

**END OF SECTION 23 07 00**

## **SECTION 23 30 00 -AIR DISTRIBUTION**

### **PART 1 - GENERAL**

#### **DESCRIPTION**

Provide Air Distribution Materials as specified herein and as shown on the Drawings.

Material characteristics and size shall be as indicated on the Drawings.

Related Work: The requirements of Section 23 05 00, Common HVAC Materials and Methods, also apply to this section.

#### **QUALITY ASSURANCE**

Air Distribution Equipment Rating: In accordance with AMCA certified rating procedures and bearing the AMCA label.

See Commissioning specification for additional requirements.

#### **SUBMITTALS**

Submit catalog data, construction details and performance characteristics for all manufactured materials.

Submit operating and maintenance data.

For adhesives and sealants used on the interior of the building (inside the waterproofing system), include printed statement of volatile organic compound (VOC) content.

### **PART 2 - PRODUCTS**

#### **SHEET METAL**

Quality Assurance: Galvanized steel sheet metal except where otherwise indicated. Metal gauges, joints and reinforcement in accordance with Mechanical Code, ASHRAE and SMACNA standards. Ductwork shall be fabricated to the following pressure classifications:

Return and exhaust ducts: 2" negative.

Supply ducts from fan discharge to VAV box inlet: 4" positive. VAV box discharge to diffuser: 1" positive. For single zone systems construct to 2" positive.

Acoustical Duct Lining: Line ducts with 1" thick lining (unless noted otherwise) for installation inside the building insulation envelope, and 1-1/2" for installation outside the building insulation envelope. Density shall be 3 lb / ft<sup>3</sup> minimum. Owens Corning, QuietR, or equal Schueller, or Certain Teed. Meeting NFPA 90A and B requirements for maximum flame spread and smoke developed. Duct liner adhesive shall conform to ASTM C916. Mechanically attach lining to sheet metal duct with fasteners conforming to SMACNA Standard MF-1-1971, Schuller Grip Nails or Gramweld welding pins. Apply fire-retardant type adhesive similar to Schuller No. 44 adhesive, Benjamin Foster 81-99, Insul-Coustic 22 or 3M equivalent on all leading edges, joints and seams.

**Duct Sound Control Wrap:**

Mass-loaded Vinyl Sheet: Each loaded vinyl sheet shall weigh 0.4 – 0.5 lb/square foot, be 0.025 – 0.040 inches thick, and have smooth finish surface.

Manufacturers: Kinetics Noise Control model KNM-50B, Soundcoat Sound fab, EAR Composite Specialties model EAR WB-5, Claremont Sales Coustifab.

**Duct Sealing Tapes:** Provide one of the following UL listed ductwork sealing tape systems.

Two-part sealing system with woven fiber, mineral gypsum impregnated tape and non-flammable adhesive. Hardcast "DT" tape and "FTA-20" adhesive, United "Uni-Cast" system, or accepted substitute.

For joints and seams exposed to the weather in lieu of soldering, United "Uni-Cast" system or approved.

Sealing systems with VOC content are not allowed.

Sealants and Primers – General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No. 1168.

Optional Duct Joints for Sheet Metal Ducts: "Ductmate System" by Ductmate Industries, Inc., Ward Duct Connectors, Inc., Mez Industries, or acceptable substitute. Spiramir self-sealing round duct connector system meeting Class 3 leakage standards with EPDM o-ring seal.

Exposed to View Spiral Seam Duct and Fittings: Round and flat oval spiral seam duct shall be manufactured of galvanized steel sheet metal with spiral lock seam. Matching fittings shall be manufactured of galvanized steel with continuous welded seams. Gauge shall be per SMACNA Duct Construction Standard third addition table for appropriate pressure, and reinforcement or at least 26 gauge.

Concealed Round Duct: Round and flat oval spiral seam duct shall be manufactured of galvanized sheet metal with spiral lock seam. Construction, gauges, and reinforcement in accordance with SMACNA standards. Fittings shall be manufactured of galvanized steel with spot welded or riveted and sealed seams or continuously welded seams. Snap lock longitudinal seam duct shall fully comply with SMACNA standards for duct gauge and seam type for appropriate pressure class. Adjustable elbows are prohibited.

Flexible Ductwork-Low Pressure: Insulated low pressure flexible duct, factory fabricated assembly consisting of a zinc-coated spring steel helix seamless inner liner, wrapped with a nominal 1" thick insulation for installation inside the building insulation envelope, and 1-1/2" for installation outside the building insulation envelope, 1 pound/cubic foot density fiberglass insulation. The assembly shall be sheathed in a vapor barrier jacket, factory vapor resistance sealed at both ends of each section. The composite assembly, including insulation and vapor barrier, shall meet the Class 1 requirements of NFPA Bulletin No. 90-A and be labeled by Underwriters Laboratories, Inc., with a flame spread rating of 25 or less and a smoke developed rating of 50 or under. The duct shall have factory sealed double air seal (interior and exterior) to assure an airtight installation. Genflex, ATCO, Wiremold, Thermaflex, Glassflex, Clevepak, Schuller, or accepted substitute.

Dryer Exhaust Duct: Min. 22 gauge 304 stainless steel tube construction with laser welded seams and rolled ends. Designed with smooth interior, clamp together construction. Norfab or equal.

## **ACCESSORIES**

Manual Volume Dampers: Construct of material two gauges heavier than duct in which installed; single plate up to 12" wide; multiple over 12" wide. Hem both edges 1/2" and flange sides 1/2". Use Young, Duro-Dyne, MAT, or accepted substitute damper accessories. Young numbers are shown.

No. 605 bearing set with No. 403 regulator for dampers up to 24" long.

For dampers over 24" long use No. 660 3/8" rod, No. 656 end bearing and No. 403 regulator.

Where damper regulators are not readily accessible, use No. 660 or No. 661 rod extensions and No. 301 and No. 315 concealed damper regulators or MAT cable operated dampers as required.

Location of all volume dampers is not necessarily shown on Drawings; minimum required is one in each supply, return or exhaust main, and one in each branch.

Constant Airflow Regulator: Air pressure actuated regulator capable of maintaining constant airflow within +/-10%, within 0.12 to 1.2 in. w.g. differential pressure. Rated for air temperatures between -25°F to 140°F. Airflow adjustment dial, double lip gasket for rigid round duct installation. UL 2043. Aldes CAR3-L or approved.

Exterior Wall Louvers: Prefabricated extruded aluminum stormproof blades with frame to suit building construction. 1/2", 16 gauge aluminum wire mesh on back side of all intake louvers and insect screen on exhaust/relief louvers. 4" deep, 37½ degree fixed drainable type blade, AMCA 500 tested for 800 fpm without water penetration, and maximum of 0.07" wg intake pressure loss and 0.09" wg exhaust pressure loss. Louver color selected by Architect, color is custom color. Ruskin ELF375D as basic pattern on blade and frame, Greenheck, Cesco, Pottorff, or approved.

Standard Gravity Exhaust Intake Heads:

Aluminum cap with backdraft dampers on relief only, curb connection, flashing, 1/2" mesh galvanized bird screen and hinged access. Greenheck, Carnes, Cook or accepted substitute.  
Install with automatic relief / outside air intake damper in curb as indicated on the Drawings.

Louvered Gravity Exhaust Head / Outside Air Intake Housing: Extruded aluminum (0.0081) louvered tiered style with curb connection, flashing, 1/2" mesh bird screen. Cap color as selected by Architect. Provide with storm proof blades with aluminum construction and Kynar finish. Color as selected by Architect from standard color palette. See drawings for required performance and custom height/number of louver tiers. Greenheck WIH/WRH as basis of design. Equal Ruskin, Cook, or Carnes approved.

Locking Connection Straps: 1/2" wide positive locking steel straps or nylon self-locking straps. Panduit or accepted substitute.

Connection Fittings: Connections to non-metallic ducts manufactured sheet metal "spin-in" fittings. Genflex, Wiremold, Thermaflex, Glassflex, Clevepak, Schuller, or accepted substitute.

Access Doors In Sheet Metal Work:

Hollow core double construction of same or heavier gauge material as duct in which installed. Use no door smaller than 12" by 12" for simple manual access or smaller than 18" by 24" where personnel must pass through infrequently. Use 24" by 60" minimum for filters and more frequent maintenance. Use Ventlok or accepted substitute hinges and latches on all doors.

100 Series hinges and latches on low pressure system doors up to 18" maximum dimension.

200 Series on larger low pressure system doors and 333 Series on high pressure systems.

Construct doors up to 18" maximum dimension with 1" overlap, furr and gasket with 3/4" by 1/8" sponge rubber. Fit larger doors against 1-1/2" by 1/8" or angle frame and gasket with 3/4" by 1/8" sponge rubber or felt.

Anti-Backdraft Dampers: Connected, gasket-edged aluminum blades set in 14 gauge or heavier steel frame; brass, nylon or Teflon bearings; equip with spring helper with tension adjustment feature or with adjustable counterweight and adjust to open when not more than 0.10" wg pressure is applied. Ruskin CBS-4, Greenheck, Pacific Air Products, Air Balance, Controlair or accepted substitute.

Opposed Blade Volume Damper: Install opposed blade volume damper in each zone supply duct on discharge of multi-zone units and where indicated on Drawings. Young No. 817 or accepted substitute.

Flexible Connections: Neoprene impregnated fiberglass connection. Ventglass, Duro-Dyne, or accepted substitute.

Control Dampers: Construct of aluminum frame and blades with continuous full length axle shafts and/or operating "jackshafts" as required to provide coordinate tracking of all blades. Interlocking multi-blade type, except where either dimension is less than 10", a single blade may be used. Opposed blade type on all modulating dampers and parallel blades on all two position dampers. Provide with metal jamb seal and neoprene blade seals. Damper assembly rated for maximum air leakage of 4 CFM per square foot at 1" wg pressure or less and with interconnecting blade linkages in the side channels of the frame.

## **GRILLES, REGISTERS AND DIFFUSERS**

Description: Provide grilles, registers and diffusers as shown on the Drawings.

Finishes:

Steel: Flat white enamel prime coat, factory applied on ceiling diffusers. Others are to have a baked enamel finish, color as selected by Architect.

Aluminum: Anodized clear finish unless indicated otherwise.

Manufacturers: Carnes, Krueger, Titus, Price, and Tuttle & Bailey are accepted substitutes where only Titus model numbers are listed. Where other manufacturer's products are listed and/or "accepted substitute" is indicated, only the products or an accepted substitute for that item shall be provided.

Ceiling Return and/or Exhaust Register: Perforated snap-in or concealed hinged face plate. Use in spaces containing ceiling diffusers and/or T-bar ceilings. Provide with damper except where dampered plenums are indicated. Match manufacturer of supply. Provide with ceiling radiation fire damper and diffuser fire rated blanket at all units noted in drawings.

Sidewall Supply Grille or Register: Double deflection grille with face bars parallel to long dimension on ceiling type and horizontal on wall type; bars to be individually adjustable, spaced on 0.66" to 0.75" centers; key operated opposed blade volume damper. Titus 300RL.

Sidewall or Ceiling Return or Exhaust Register: Face bars parallel to long dimension on ceiling type and horizontal on wall type; bars set at 35 degrees to 45 degrees, spaced on 0.66" to 0.75" centers; key operated opposed blade volume damper. Titus 350RL Series.

Perforated Face Diffusers: Perforated snap-in or concealed hinged face plate with internal deflection blades at diffuser neck in steel or extruded aluminum frame and margin to suit the ceiling construction. Panel size shall be 12" x 12". Titus PCS.

Steel Door Transfer Grilles and Sidewall Transfer grilles: All welded construction with 20 gauge, fixed inverted V-blades with a deflection angle of 77 so as to provide a sight proof design. Titus T-700 Series. Provide door frame for both sides for door applications. For wall applications provide wall sleeve and grille on both sides of the wall.

Plaster Frames: Provide plaster frames for all diffusers, grilles or registers installed in plaster walls or ceiling. Where register face is aluminum, the plaster frame shall be aluminum. Frame to match manufacturer of register or be of compatible size of listed manufacturer. Titus TRM/TRM-S.

## **PART 3 - EXECUTION**

### **EQUIPMENT INSTALLATION**

Air Handling Equipment Installation and Arrangement: Install and arrange as shown on Drawings. Comply with the manufacturer's recommendations for installation, connection, and start-up.

Equipment Access Panels: Locate free of all obstructions such as ceiling bars, electrical conduit, lights, ductwork, etc.

Filters: Install specified filters or accepted substitute temporary construction filters in supply units and systems prior to start-up or use for drying and/or temporary heat. Replace prior to acceptance of project.

### **INSTALLATION OF GRILLES, REGISTERS AND DIFFUSERS**

Size and air handling characteristics shall be as shown on the Drawings.

Locate, arrange, and install grilles, registers and diffusers as shown on the Drawings. Locate registers in tee-bar ceilings with diffusers centered on the tile unless indicated otherwise.

### **DUCTWORK INSTALLATION**

Support: Install ductwork with 1" wide strap cradle hangers not more than 8' on centers or as required by code. Support terminal units independent of adjacent ductwork. Attach to available building construction according to good practices for materials involved. Manufactured hanger system acceptable in lieu of fabricated hangers at Contractor's option. Ductmate "Clutcher" system or approved. Support flexduct where shown to be used for lengths beyond 4' per above requirements. Comply with SMACNA Duct Construction Standard Figure 3-9 and 3-10.

Fan and Air Handling Unit Flexible Connections: Install neoprene impregnated fiberglass connections in ductwork at all rotating equipment. Ventglass, Duro-Dyne or accepted substitute.

Elbows and Fittings: Construct elbows with throat radius equal to duct width in plane of turn or make them square and provide double wall, air foil turning vanes.

Fittings: Make transitions and take-offs as shown on Drawings. Provide volume dampers and splitter dampers as indicated on Drawings and as specified. Saddle tees are not allowed.

Acoustical Duct Lining:

Acoustically line all fan unit intake and discharge plenums, all ductwork indicated as lined on the Drawings, all sheet metal ductwork specified per Section 23 07 00 as insulated, where exposed to view or subject to damage in areas such as mechanical rooms, and, at the Contractor's option, all insulated ductwork specified in Section 23 07 00 except outside air intake ducts. The duct size noted on the Drawings is the clear opening of the duct with insulation. Insulation shall not reduce duct size listed.

All duct designated to receive duct liner shall be completely covered with a fire-resistant, fiber-bonding coating, or covering (composite, polymer, vinyl or neoprene) that reduces airflow resistance and controls fiber release. The duct lining shall be adhered to the sheet metal with 100% coverage of a fire retardant adhesive. The coated surface of the duct liner shall face the airstream. When width of duct exceeds 12" and also when height exceeds 24", use corrosion resistant mechanical fasteners 12" on center maximum lateral spacing and 18" on center maximum longitudinal spacing. Start fastening within 3" of upstream transverse edge of the liner and within 3" of the longitudinal joint. Mechanical fasteners shall be either impact-driven or weld-secured and shall not pierce the duct walls. Fasteners and washers of the specified type and length shall be used assuring no greater than 10% compression of the liner thickness. Installation shall be made so that no fastener pins protrude into the airstream. No gaps or loose edges shall occur in the insulation. Top pieces shall be supported by the side pieces. Provide insulated build out frames for attaching dampers at running vanes where required. All transverse and longitudinal abutting edges of duct lining shall be sealed and lapped 3" with a heavy coat of approved adhesive, in accordance with the manufacturer's recommendations. All upstream transverse edges shall be installed with sheet metal nosings. All raw exposed edges of lining shall be 'buttered' with approved adhesive.

Manual Volume Dampers: Location of all volume dampers are not necessarily shown on the Drawings. Provide a minimum of one volume damper in each supply, return or exhaust branch. Do not install dampers closer than 3 duct diameters to the diffuser.

Constant Airflow Regulators: Install only where indicated on drawings. Branch served by CAR may omit manual volume damper. Set airflow prior to installation. CAR's are directional and must be installed in the correct orientation for supply or return/exhaust.

Duct Insulation: Specified in Section 23 07 00.

Sleeves: Provide galvanized sheet metal plaster ring around ductwork penetrating exposed finished walls. Sleeve and flash all duct penetrations through exterior walls in an air tight and weatherproof manner.

Plenums: Construct sheet metal plenums and partitions of not lighter than 18 gauge galvanized steel and reinforce with 1-1/2" by 1/2" by 1/8" angles as required to prevent drumming or breathing.

Access: Install necessary access opening and covers for cleaning, wiring or servicing motors, filters, fans, both entering and leaving air sides of coils, fire and/or smoke dampers and to other equipment located within or blocked by sheet metal work.

Sealing: Caulk, seal, grout and/or tape ductwork and plenums to make airtight at seams, joints, edges, corners and at penetrations. Solder all seams, joints, etc., on all ductwork exposed to the weather. Install specified tape in accordance with manufacturer's requirements using degreaser on surfaces to be taped and wiped to eliminate moisture.

### **FIELD QUALITY CONTROL**

Disassemble, reassemble, and seal segments of systems as required to accommodate leakage testing and as required for compliance with test requirements.

Conduct test, in presence of Architect, at static pressures equal to maximum design pressure of system or section being tested. If pressure classifications are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.



Determine leakage from entire system or section of system by relating leakage to surface area of test section.

Maximum Allowable Leakage: Comply with requirements for Leakage Classification 3 for round and flat-oval ducts, Leakage Classification 12 for rectangular ducts in pressure classifications greater than 2-inch wg (both positive and negative pressures).

Remake leaking joints and retest until leakage is less than maximum allowable.

Leakage Test: Perform tests according to SMACNA's "HVAC Air Duct Leakage Test Manual."

### **NEW DUCTWORK CLEANING**

Store all ductwork materials on pallets or above grade, protected from weather, dirt/mud and other construction dust.

Remove all accumulated dust, dirt, etc. from each duct section as it is being installed.

Prior to installation of diffusers, grilles and registers, install temporary system filters and cover all diffuser, grille and register openings with temporary 25% efficiency filter materials and start the fan systems. Operate fans a minimum of 8 hours. Remove all temporary filters at the end of that period.

Clean all diffusers, grilles and registers just prior to project final completion.

Cover all ductwork terminations during construction to prevent accumulation of dust and debris.

**END OF SECTION 23 30 00**

**SECTION 23 40 00 - HVAC AIR CLEANING DEVICES**

**PART 1 - GENERAL**

**DESCRIPTION**

Provide Air Cleaning Devices as specified herein and as shown on the Drawings.

Materials characteristics and size shall be as indicated on the Drawings.

Related Work: The requirements of Section 23 05 00, Common HVAC Materials and Methods, also apply to this section.

**QUALITY ASSURANCE**

Air Equipment Rating: In accordance with ASHRAE 52.2-2007.

**SUBMITTALS**

Submit catalog data, construction details and performance characteristics for all manufactured materials.

Submit operating and maintenance data.

**PART 2 - PRODUCTS**

**AIR FILTERS**

Roll filter media to be Tri-Dim Tri-Dek 15/40 3-ply MERV 8 media or better.

**PART 3 - EXECUTION**

Install specified filters or accepted substitute temporary construction filters in supply units and systems prior to start-up or use for drying and/or temporary heat. Provide 1 additional set of filters and replace those installed during Balancing and Commissioning process.

**END OF SECTION 23 40 00**

## **SECTION 23 80 00 - TERMINAL HVAC EQUIPMENT**

### **PART 1 - GENERAL**

#### **DESCRIPTION**

Provide Heating, Cooling, and Ventilating Equipment as specified herein and shown on the Drawings.

Equipment capacity and size shall be as indicated on the Drawings.

Related Work: The requirements of Section 23 05 00, Common HVAC Materials and Methods, also apply to this section.

#### **QUALITY ASSURANCE**

Air Handling Equipment: Rated in accordance with AMCA certified rating procedures and AMCA labeled.

Air Conditioning and Refrigeration Equipment Rating: Rated in accordance with ARI certified rating procedures and ARI labeled.

See Commissioning specification for additional requirements.

#### **SUBMITTALS**

Submit catalog data, construction details and performance characteristics for each HVAC unit.

Submit operating and maintenance data.

### **PART 2 - PRODUCTS**

#### **DEDICATED OUTSIDE AIR SYSTEMS (LESS THAN 1000 CFM)**

##### Product Specification

Energy Recovery Ventilator (ERV) shall be a packaged unit and shall transfer both sensible and latent energy using static plate core technology.

##### Quality Assurance

The energy recovery cores used in these products shall be third party Certified by AHRI under its Standard 1060 for Energy Recovery Ventilators. AHRI published certifications shall confirm manufacturer's published performance for airflow, static pressure, temperature and total effectiveness, purge air (OACF) and exhaust air leakage (EATR). Products that are not currently AHRI certified will not be accepted. OACF shall be no more than 1.02 and EATR shall be at 0% against balanced airflow. Manufacturer shall be able to provide evidence of independent testing of the core by Underwriters Laboratory (UL), verifying a maximum flame spread index (FSI) of 25 and a maximum smoke developed index (SDI) of 50 thereby meeting NFPA90A and NFPA 90B requirements for materials in a compartment handling air intended for circulation through a duct system. The method of test shall be UL Standard 723.

Unit shall be Listed under UL/ETL 1812 Standard for Ducted Air to Air Heat Exchangers and comply with CSA Standard 22.2.

The ERV core shall be warranted to be free of manufacturing defects and to retain its functional characteristics, under circumstances of normal use, for a period of ten (10) years from the date of purchase. The balance-of-unit shall be warranted to be free of manufacturing defects and to retain its functional characteristics, under circumstances of normal use, for a period of two (2) years from the date of installation.

**Energy Transfer:** The ERV shall be capable of transferring both sensible and latent energy between airstreams. Latent energy transfer shall be accomplished by direct water vapor transfer from one airstream to the other, without exposing transfer media in succeeding cycles directly to the exhaust air and then to the fresh air.

**Passive Frost Control:** The ERV core shall perform without condensing or frosting under normal operating conditions.

**Positive Airstream Separation:** Water vapor transfer shall be through molecular transport by hydroscopic resin and shall not be accomplished by "porous plate" mechanisms. Exhaust and fresh airstreams shall travel at all times in separate passages, and airstreams shall not mix. No metal separators or metal core material shall be acceptable.

**Laminar Flow:** Airflow through the ERV core shall be laminar over the products entire operating airflow range, avoiding deposition of particulates on the interior of the energy exchange plate material.

#### **Construction**

The energy recovery component shall be of fixed-plate cross-flow construction, with no moving parts. No condensate drain pans or drains shall be allowed and unit shall be capable of operating both winter and summer conditions without generating condensate.

The unit case shall be constructed of G90 galvanized, 20-gauge steel, with lapped corners and zinc-plated screw fasteners.

Access doors shall provide easy access to blowers, ERV cores, and filters. Doors shall have an airtight compression seal using closed cell foam gaskets. Pressure taps, with captive plugs, shall be provided allowing cross-core pressure measurement allowing for accurate airflow measurement.

Case walls and doors shall be insulated with 1 inch, 4 pound density, foil-scrim faced, high-density fiberglass board insulation, providing a cleanable surface and eliminating the possibility of exposing the fresh air to glass fibers, and with minimum R-value of 4.3 (hr· ft· °F/BTU).

See Section 23 40 00 for Filter Frames and Media. Provide filters at inlet to both sides of energy recovery Media.

Flanders or equal Farr.

Unit shall have single-point power connection and a single-point 24 VAC contactor control connection.

Blower motors shall be EC type.

The unit electrical box shall include a factory installed, non-fused disconnect switch and a 24 VAC, Class II transformer/relay package.

Renew Aire, American Aldes, or approved.

#### **ELECTRIC HEATERS**

Wall mounted electric fan forced heaters:

UL listed recessed heater with primary and secondary thermal safeties with secondary manual reset, nichrome heating element, recessed wall can, two stage centrifugal blower, and powder coat metal grille. Provide with remote 2-pole [programmable electronic] thermostat. Cadet C series, Qmark, Markel, King, Marley or approved.

## **PART 3 - EXECUTION**

### **INSTALLATION**

Install and arrange equipment as shown on the Drawings and as recommended by the equipment manufacturer.

Piping: Refer to applicable sections for piping, ductwork, insulation, painting, etc.

Manufacturer's Field Service: Engage a factory authorized service representative to inspect field assembled components and equipment installation, to include electrical and piping connections. Report results to A/E in writing. Inspection must include a complete startup checklist to include (as a minimum) the following:  
Completed Start-Up Checklists as found in manufacturer's IOM.

Engage a factory authorized service representative to perform startup service. Clean entire unit, comb coil fins as necessary and clean filters. Measure and record electrical values for voltage and amperage. Refer to Division 23 "Testing, Adjusting and Balancing" and comply with provisions therein.

Engage a factory authorized service representative to train Owner's maintenance personnel to adjust, operate and maintain the unit. Refer to Division 01 Section Closeout Procedures and Demonstration and Training.

### **AIR HANDLING INSTALLATION**

Installation and Arrangement: Air handling equipment shall be installed and arranged as shown on the Drawings. Comply with the manufacturer's recommendations for installation connection and start-up.

Lubrication: All moving and rotating parts shall be lubricated in accordance with the manufacturer's recommendations prior to start-up.

Filters: Specified filters or approved temporary construction filters shall be installed in supply units prior to start-up or used for drying and/or temporary heat.

### **CONTROLS**

Wiring: All wiring shall be in accordance with the National Electrical Code and local electrical codes.

**END OF SECTION 23 80 00**

## **SECTION 26 00 00 - GENERAL ELECTRICAL REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Section Includes
  - 1. General electrical requirements.

#### **1.2 PERMITS, FEES AND SERVICE CHARGES**

- A. The CONTRACTOR shall obtain all electrical permits required to complete the work and pay all associated fees.
- B. The CONTRACTOR shall coordinate and provide for the installation and operation of franchise utility service (including any telephone and/or leased lines specified) as required during construction, startup, testing, and operation of the work until substantial completion.

#### **1.3 CONTRACTOR'S RESPONSIBILITY FOR FIELD VERIFICATION OF EXISTING CONDITIONS**

- A. The CONTRACTOR shall be responsible for performing field verification of the existing conditions prior to bidding. The nature of this work inherently requires field observation to understand the existing conditions and scope of work.
- B. Failure to observe the existing conditions or ignorance of existing conditions shall be the responsibility of the CONTRACTOR alone. Additional services shall not be authorized due to the CONTRACTOR'S lack of understanding of the existing conditions.

#### **1.4 CONTRACTOR'S RESPONSIBILITY FOR SHUTDOWNS AND MAINTAINING EXISTING SYSTEMS**

- A. Shutdowns of any Division 26, 27, 28 system shall be coordinated with the OWNER prior to performing the shutdown. The CONTRACTOR shall provide the OWNER with a written schedule identifying the system, duration, and impact on the OWNER's facility.
- B. Existing Division 26, 27, and 28 systems not impacted by the work in this project shall be protected and maintained during construction. Any system not identified on the Drawings or within these Specifications shall be brought immediately to the attention of the ENGINEER and OWNER.
  - 1. The CONTRACTOR shall be responsible for bearing the cost of repairing or restoring all electrical systems that are disrupted or damaged during construction. The systems shall be repaired and restored to their original condition.

#### **1.5 INTENT OF DRAWINGS AND SPECIFICATIONS**

- A. Riser and other diagrams are schematic and are intended to show the approximate location of equipment, and the general alignment of conduits and piping, and shall not be used for obtaining quantities. Dimensions given on the plans shall take precedence over scaled dimensions and all dimensions whether in figures or scaled, shall be verified in the field.
- B. The electrical drawings do not show complete details of the site conditions. The CONTRACTOR shall check actual conditions.

- C. The exact location of apparatus, fixtures, equipment, conduit and piping shall be ascertained by the CONTRACTOR in the field, and the work shall be laid out accordingly. Should the CONTRACTOR fail to ascertain such locations or coordinate with work performed by other trades, the work shall be changed at no additional cost to the OWNER when so ordered by the ENGINEER. The ENGINEER reserves the right to make minor changes in the location of conduit, piping and equipment up to the time of installation without additional cost to OWNER.
- D. CONTRACTOR shall provide all labor, materials, equipment, machinery, and tools necessary to provide all electrical equipment specified and shown on the Drawings. All items not specified in detail or shown on the Drawings but necessary for complete installation shall be provided by the CONTRACTOR.

### **1.6 SUBSTITUTION REQUESTS FOR MECHANICAL, HVAC, PROCESS, OR OTHER EQUIPMENT IMPACTING THE ELECTRICAL DESIGN**

- A. The CONTRACTOR shall be responsible for including the cost impact to the electrical systems for substitution requests and/or value engineering for mechanical, HVAC, process, or other equipment made by other trades. The costs to the overall substitution request or value engineering solution must be included in the total number provided to the OWNER. The CONTRACTOR is responsible for coordinating the substitution requests or value engineering proposals made by other trades.
- B. Any substitution request and/or value engineering solution which impacts the electrical design but does not include the costs shall be unacceptable.
- C. Failure of other subcontractors to include the electrical cost impact shall not be the basis for a change order. The CONTRACTOR shall be responsible for coordinating the total costs of all substitution requests and/or value engineering solutions prior to presenting them to the ENGINEER or OWNER. When these requests are received by the ENGINEER or OWNER to review and approve, the ENGINEER and OWNER shall assume the cost impact to electrical has been included.

### **1.7 CONTRACTOR'S RESPONSIBILITY FOR SHUTDOWNS AND MAINTAINING EXISTING SYSTEMS**

- A. Shutdowns of any Division 26, 27, 28 system shall be coordinated with the OWNER prior to performing the shutdown. The CONTRACTOR shall provide the OWNER with a written schedule identifying the system, duration, and impact on the OWNER's facility.
- B. Existing Division 26, 27, and 28 systems not impacted by the work in this project shall be protected and maintained during construction. Any system not identified on the Drawings or within these Specifications shall be brought immediately to the attention of the ENGINEER and OWNER.
  - 1. The CONTRACTOR shall be responsible for bearing the cost of repairing or restoring all electrical systems that are disrupted or damaged during construction. The systems shall be repaired and restored to their original condition

### **1.8 SUBMITTALS**

- A. Contractor shall submit all the product data in Division 26 at the same time. Piecemeal submittals will be rejected as incomplete.
  - 1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
  - 2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 260519.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same

- sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
  4. Submittals which are incomplete, incorrect, inaccurate, and/or do not conform to these Specifications shall not be acceptable. The CONTRACTOR shall be back-charged for the time and material required by the ENGINEER to review submittals if the number of submittal reviews exceeds three (3) reviews per product.
- B. Submittals shall be in accordance with the requirements of these Contract Documents and shall include the following:
1. Submittals shall include information and literature as required for all equipment and materials provided under this and related sections.
  2. Shop Drawings: Shop drawings shall include the following along with any special requirements listed in the individual Specification Sections:
    - a. Installation instructions and drawings
    - b. Wiring schematics with termination point identification
    - c. Motor information
    - d. Materials of construction
    - e. Manufacturer's name and model
    - f. Manufacturer's catalog data
    - g. Supplementary structural framing for electrical equipment including design loads, member size and location. When supplementary framing is indicated, verify that dimensions are suitable for the equipment furnished. Provide additional strength when equipment furnished is heavier than that specified.
  3. Manufacturers' Literature: Literature indicating the compliance of the products with the Specifications shall be included with all submittals. This shall include catalogs and other descriptive bulletins. Relevant portions of the literature shall be clearly identified by highlighting or underlining.
  4. Test Logs: The CONTRACTOR shall submit test logs as outlined below and as specified in subsequent electrical sections and drawings.
    - a. A log of the complete results of tests for shorts and grounds for each circuit. All circuits and tests shall be clearly identified.
    - b. A log of complete results of insulation resistance measurements of each circuit. All circuits and tests shall be clearly identified.
  5. Operation and maintenance information for all equipment furnished and/or installed.
  6. Programming instructions for any controllers or other programmable equipment. Copies of the any required software, including registration cards, shall be provided with the O&M manuals.
- C. Deferred Submittals
1. Submittals for seismic bracing/anchoring and wind loads shall be a deferred submittals. Engineering of the seismic bracing and anchoring system shall be provided by a licensed Engineer in the State of Oregon. Submittals shall include calculations and drawings, including connection types/materials/sizes, load, maximum load, dimensions, etc.
- D. The CONTRACTOR shall indicate on the submittals all variances from the Specifications.
- E. Record Drawings. After the completion of construction, the CONTRACTOR shall provide one set of "as-built" drawings to the ENGINEER as specified herein showing the location of buried conduits and all changes or deviations from the original drawings.
- F. Final inspection certificates shall be submitted prior to final payment.



### **1.9 COORDINATION OF WORK**

- A. The CONTRACTOR shall plan his work in coordination with the other trades and with the power and telephone utility authorities.
- B. The CONTRACTOR shall field verify all dimensions of equipment to be installed or provided by others so that correct clearances and connections may be made between the work installed by the CONTRACTOR and equipment installed or provided by others.
- C. The CONTRACTOR shall arrange all conduit runs so that they do not interfere with piping, structural members, etc.
- D. All working measurements shall be taken from the sites, checked with those shown on the drawings, and if they conflict, reported to the ENGINEER at once, and before proceeding with the work. Should the CONTRACTOR fail to comply with this procedure, he shall alter his work at his own expense as directed by the ENGINEER.
- E. No additional payments will be allowed where obstructions in the work of other trades, or work under this contract requires offsets to conduit runs.
- F. The CONTRACTOR is responsible for all alterations in the work to accommodate equipment differing in dimensions or other characteristics from that shown or specified.
- G. The CONTRACTOR shall provide all temporary power necessary for existing site equipment and for all construction needs.

### **1.10 SUPERVISION**

- A. The CONTRACTOR shall maintain adequate supervision of the work and shall have a responsible person in charge at the site during all times that work under this contract is in progress, or when necessary for coordination with other work.

### **1.11 CODES**

- A. Work shall conform to the National Electrical Code (NEC), and State Codes and other applicable codes, even though not specifically mentioned for each item. These shall be regarded as the minimum standard of quality for materials and workmanship.

### **1.12 CONTRACTOR'S RECORD DRAWINGS & AS-BUILTS**

- A. The CONTRACTOR shall maintain a neatly marked set of record drawings showing the locations of all buried conduits and other utilities encountered or installed during construction. The final locations of panels, field mounted instruments and panels, terminal boxes, junction boxes, receptacles, light switches and other materials included in the work shall be shown, as well as conduit routing between them to the extent it differs from the design drawings. Record drawings shall be kept current with the work as it progresses and shall be subject to inspection by the OWNER's Representative at any time. Failure to keep field record drawings current may result in the issuance of a stop work order or delay in the processing of pay requests until the record drawings are made current.
- B. The CONTRACTOR shall provide one complete set of as-built electrical schematics for all panels and equipment provided, including PLC I/O schematics as applicable, panel elementary diagrams, interconnecting wiring diagrams, wire numbers, termination strip locations and numbers. These shall be in the same format and style as those in the Contract Documents and submittal requirements.

- C. All information shown on the CONTRACTOR's field record drawings and as-built schematics shall be subject to verification by the OWNER's Representative. If significant errors or deviations are noted by the OWNER's Representative, new as-builts shall be completed at the CONTRACTOR's expense.

## **PART 2 - PRODUCTS**

### **2.1 PORTABLE OR DETACHABLE PARTS**

- A. The CONTRACTOR shall retain in his possession and shall be responsible for all portable and detachable parts or portions of installations such as fuses, key locks, adapters, blocking chips and inserts until completion of his work.
- B. These parts shall be delivered to the ENGINEER and an itemized receipt obtained. This receipt, together with 2 copies of the final inspection certificate, shall be attached to the CONTRACTOR's request for final payment.
- C. All equipment shall be demonstrated to operate in accordance with the requirements of this specification and the manufacturer's recommendations.

### **2.2 NEW PRODUCTS**

- A. All products shall be new without defects and covered by Manufacturer's warranty. Products shall be re-used only where indicated on the Drawings.
- B. All products shall be listed, labeled, and certified by a testing agency approved by the state of Oregon.
- C. All equipment of the same type and capacity shall be by the same manufacturer.

## **PART 3 - EXECUTION**

### **3.1 IDENTIFICATION**

- A. All identification labeling shall be in compliance with Section 260553 Electrical and Control Identification.

### **3.2 WORKMANSHIP & COORDINATION**

- A. All work shall be performed by personnel skilled in the particular trade in a workmanlike manner. Workmanship shall conform to the standards of the NEC and the National Electrical Installation Standards (NEIS).
- B. The ENGINEER shall be the sole judge as to whether or not the finished work is satisfactory; and if in his judgment any material or equipment has not been properly installed or finished, the CONTRACTOR shall replace the material or equipment whenever required, and reinstall it in a manner entirely satisfactory to the ENGINEER without any increase in cost to the OWNER.
- C. The CONTRACTOR shall coordinate and verify the installation of all equipment furnished by him to other trades, or equipment provided and installed by other trades that is connected to the electrical or control systems. Work shall include the furnishing of all labor, materials, and equipment required for the installation of a complete and operable system as hereinafter specified and as indicated on the drawings. The Contract Documents are complementary and what is called for by any one shall be as binding as if called for by all. Unless otherwise specifically stipulated, the term "furnished and installed complete" shall be considered a part of this section.

- D. Controls and systems shall be complete with transformers, switches, relays, contactors, control valves, control devices, instrument piping, fittings, valves, control wiring, thermometers, pressure gauges, thermostats, damper operators, miscellaneous control cabinets to fill the intent of the Specifications and shall provide control for the various units and systems. All control valves and motorized dampers shall be provided with position indicators.
- E. Unless otherwise specified or shown on the drawings, switches or relays shall be installed in, or adjacent to the motor starter or other electrical device to which they are to be connected. Control and interlock wiring shall be included as necessary from breakers specified herein or shown on the drawings.
- F. Each control schematic intended to control a series of motor operated louvers, fans, and thermostats shall contain a switch for maintenance to meet the NEC requirements regarding disconnect switches for motors. This switch shall be local if any unit controlled is out of sight of the switch. This switch shall disconnect all power to all motor operated devices within the circuit.

### **3.3 TEMPORARY HEATING, LIGHTING AND POWER**

- A. The CONTRACTOR shall provide all heat, lighting and power required to construct and protect the work until the work is placed in service by the OWNER for beneficial use of the OWNER. Temporary heaters shall be provided as required to keep the work area and all new electrical components dry.
- B. The source for temporary power shall be from the electric utility or OWNER approved CONTRACTOR supplied auxiliary power units. The installation for electric power shall meet the requirements of local authorities and of OSHA.
- C. The CONTRACTOR shall obtain all permits and pay all costs for connecting temporary power service at no expense to the OWNER.

### **3.4 SUPPORT BACKING**

- A. Provide any necessary backing required to properly support all fixtures and equipment installed under this contract.

### **3.5 CUTTING, PATCHING AND FRAMING**

- A. The CONTRACTOR shall determine in advance the locations and sizes of all sleeves, chases, and openings necessary for the proper installation of his work.
- B. Whenever practical, inserts or sleeves shall be installed prior to covering work. Cutting and patching shall be held to a minimum. All required holes in concrete construction shall be made with a core drill and patched with non-metallic non-shrink grout.
- C. Cutting, fitting repairing and finishing of carpentry work, metal work, or concrete work, and the like, which may be required for this work shall be done by craftsmen skilled in their respective trades. When cutting is required, it shall be done in such a manner as not to weaken walls, partitions, or floors; and holes required to be cut in floors must be drilled without breaking out around the holes.

### **3.6 ACCESS PANELS**

- A. The CONTRACTOR shall provide all access panels in hard ceilings to allow NEC-required access to junction boxes, pull boxes, and light fixtures. The CONTRACTOR shall submit to the ENGINEER for approval floor plans (1/8" = 1'-0" scale minimum) which clearly indicate proposed access panel locations.

### **3.7 COMMISSIONING**

- A. Commissioning of the facility shall be completed prior to substantial completion.
- B. CONTRACTOR shall provide for realistic durations in the progress schedule for the commissioning activities.
- C. Provide the labor, medium, chemicals, tools, equipment, instruments and services required for, and incidental to, completing commissioning.
- D. Demonstrate satisfactory operation within the facility of the equipment and systems in actual operation as a functional unit.
- E. Conduct commissioning for a period of fourteen (14) continuous days without significant interruption.
- F. The commissioning verification period shall restart with the correction of each significant interruption.
- G. Correct defects in material and workmanship immediately following their discovery.
- H. Provide for maintenance until substantial completion. This includes the required maintenance activities during the commissioning verification period.
- I. Perform maintenance pursuant to the operation and maintenance data requirements for the new facility during and following the commissioning verification period and prior to issuance of a certificate of substantial completion.
- J. As of the date of substantial completion, OWNER's staff shall be responsible for operation and maintenance of the new facilities. This excludes any issues identified as warranty matters.

### **3.8 TESTS**

- A. The CONTRACTOR shall furnish all labor, material, instruments and tools to make all connections for testing of the electrical and instrumentation installation. All equipment shall be demonstrated as operating properly prior to the acceptance of the work. All protective devices shall be operative during testing of equipment. The tests shall be made under the supervision of the ENGINEER. All deficiencies or unsatisfactory conditions as determined by the ENGINEER or inspecting authorities shall be corrected by the CONTRACTOR in a satisfactory manner at his own expense.
- B. After visual inspection of joints and connections and the application of tape and other insulating materials, all sections of the entire wiring system shall be thoroughly tested for shorts and grounds. A log of results for each circuit shall be kept by the CONTRACTOR and presented to the ENGINEER.
- C. A phase rotation check shall be made to demonstrate that all power receptacles, service feeders, main power feeders and auxiliary power generators have the same A - B - C phase rotation and ground relationships.
- D. Equipment shall be tested by operating all electric motors, relays, controls, switches, heaters, etc., sufficiently to demonstrate proper installation and electrical connections. Control and emergency conditions shall be artificially simulated where necessary for complete system or subsystem.

### **3.9 CLEANING AND TOUCH-UP PAINT**

- A. Upon completion of work, all electrical equipment shall be cleaned.

1. Vacuum all dirt, metal shavings, and foreign materials from all enclosures. The use of compressed air shall not be acceptable.
  2. All stains, dirt, and fingerprints shall be removed from switchboards, motor control centers, panelboards, light fixtures, enclosures, and all other electrical equipment covers.
- B. Provide touch-up paint on equipment that has been scraped, scratched, or chipped during construction. Paint color shall match color of equipment.

**END OF SECTION 26 00 00**

## **SECTION 26 01 08 - ELECTRICAL TESTING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes
1. Electrical and control testing forms and requirements.

#### **1.2 REFERENCES**

- A. National Fire Protection Association (NFPA):
1. 70, National Electrical Code (NEC).

#### **1.3 SEQUENCING**

- A. ENGINEER shall issue written acceptance of the following certifications submitted by the CONTRACTOR before utility power is supplied to conductors, cables, or equipment.
1. Megger Test
- B. CONTRACTOR shall verify to ENGINEER that every function of the electrical, measurement, and control systems are operating properly.

### **PART 2 - PRODUCTS – NOT USED**

### **PART 3 - EXECUTION**

#### **3.1 FIELD QUALITY CONTROL**

- A. Site Tests, Inspection
1. CONTRACTOR shall be responsible to become familiar with the test and certification requirements of the Contract Documents for this project. It is the intent of these requirements that the Work will be systematically checked to verify that the functions required or implied, work properly to ensure safety for the personnel, environment, and equipment associated with the Work.
  2. CONTRACTOR shall complete the certification forms that are supplemental to this section and submit the forms to ENGINEER for approval.
  3. All site test and inspection certificates and schedules shall be contained in a 3-ring binder(s).
    - a. Size 8½ inches by 11 inches.
    - b. Paper: 20-pound minimum, white for typed pages.
    - c. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
    - d. Provide each manual with title page to include "Process Electrical Testing", typed table of contents with consecutive page numbers. Where more than one binder is used, consecutively title each with a volume number. The first binder shall be labeled Volume 1 and consecutively numbered as required to include all test documentation.
    - e. Tab sections for each required section of testing and acceptance certification.
  4. CONTRACTOR shall notify ENGINEER seven days in advance of scheduled testing and facilitate the witnessing of those tests by ENGINEER.
  5. CONTRACTOR shall provide ENGINEER with current as-built documentation for electrical and measurement and control commissioning with submittal of test certification.
    - a. Systems operating at or above 200-volts to ground or more shall be included in the Megger Test Certification. Minimum duration for each test shall be one minute, at 1000 VDC, and minimum acceptable results shall be 50 mega ohms.

- b. Conductors and cables shall be included in the Continuity Test Certification. No continuity to ground is the only acceptable result of the test.
- c. Conductors, cables, or equipment failing to meet the minimum requirements shall be replaced with new. Repair will not be acceptable.
- d. Each individual instrument shall have an Instrument Calibration Certificate. The calibration shall operate within the tolerances specified by the manufacturer of the instrument and the Contract Documents.
- e. Installed motors shall have a written Motor Insulation Certificate for all the motors listed in the Drawings for the Work. Motors failing test shall be tagged and locked out from operation.

### **3.2 SUPPLEMENTS**

- A. Schedule 260108 - A; Megger Test Certificate.

**END OF SECTION 26 01 08**

SUPPLEMENT 26 01 08 - A  
MEGGER TEST CERTIFICATE

				Project Number:					
Test Equipment Manufacturer:		Model Number:		Project Name:					
Test Equipment Last Calibration Date:		Serial Number:		Accepted By:					
Testing Personnel:		Calibration Certificate		Date:					
Test Voltage:		Test Date:		Drawing Reference:					
				Title:					
				Tag:					
Title	Tag Identification	A-Ø/ B-Ø	A- Ø / C- Ø	A- Ø / Ground	B- Ø / Ground	C- Ø / Ground	A- Ø / Neutral	B- Ø / Neutral	C- Ø / Neutral



SUPPLEMENT 26 01 08 - A  
MEGGER TEST CERTIFICATE

Test Equipment Manufacturer: <i>APC</i>		Model Number: <i>GH-1</i>		Project Number: <i>12345</i>					
Test Equipment Last Calibration Date: <i>8/13/02</i>		Serial Number: <i>346321</i>		Project Name: <i>Water Diversion</i>					
Testing Personnel: <i>John Doe</i>		Calibration Certificate: <i>Yes</i>		Accepted By: <i>S.E. Davis</i>					
Test Voltage: <i>1000 Volts</i>		Test Date: <i>12/17/02</i>		Date: <i>01/01/2003</i>					
				Drawing Reference: <i>E-006</i>					
				Title: <i>Power Distribution Diagram</i>					
				Tag: <i>016</i>					
Title	Tag Identification	A-Ø/ B-Ø	A- Ø / C- Ø	A- Ø / Ground	B- Ø / Ground	C- Ø / Ground	A- Ø / Neutral	B- Ø / Neutral	C- Ø / Neutral
<i>Main Feeder</i>	<i>016-C03</i>	∞	∞	∞	∞	∞	∞	∞	∞
<i>PNL-07</i>	<i>016-C07</i>	∞	∞	∞	∞	∞	∞	∞	∞
<i>PNL-12</i>	<i>016-C12</i>	∞	∞	∞	∞	∞	∞	∞	∞

END OF SUPPLEMENT 26 01 08 – A

## **SECTION 26 01 10 - OPERATION AND MAINTENANCE DATA**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
1. Definitions.
  2. General requirements.
  3. Submittal procedures.
  4. Content requirements for manuals.
  5. Supplements.

#### **1.2 DEFINITIONS**

- A. Maintenance Operation.
1. Routine operation required to ensure satisfactory performance and longevity of the equipment.  
Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands and other routine adjustments.

#### **1.3 GENERAL REQUIREMENTS**

- A. Provide operation and maintenance data for items listed in Supplement 260110 – A, "Schedule of Equipment Requiring Operation and Maintenance Data".
- B. In addition to the composite of manuals for individual equipment items or systems, provide a consolidated summary of required routine scheduled maintenance and scheduled preventative and predictive maintenance for the project, with reference to where detailed information may be found. Include safety information and emergency plans and procedures. The summary shall be in a separate binder from the other equipment and system binders.
- C. Comply with the following format relating to the Operation and Maintenance Manual:
1. All binders shall be "D" ring type with one-touch ring locking mechanism.
  2. Overlay material shall be crystal clear poly.
  3. Binders shall be black poly.
  4. Binders shall be nominally sized for 75 percent fill per volume with a maximum binder depth of four (4) inches and a minimum depth of one (1) inch.
  5. Submit example binder cover sheet for approval by ENGINEER.
  6. Submit example spine insert for approval by ENGINEER.
  7. Paper: twenty (20) pound minimum, white for typed pages, 8.5 x 11 inches.
  8. Text: Manufacturer's printed data, or neatly typewritten. Facsimiles transmitted via fax machine shall be unacceptable.
  9. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
  10. Provide fly-leaf for each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment. Provide with heavy section dividers with numbered plastic index tabs.
  11. Provide each manual with a title page, typed table of contents with consecutive page numbers. Plan contents of entire set, identified by volume number, in each binder.
  12. Material shall be suitable for reproduction with quality equal to the original. Photocopying of material will be acceptable except for material containing photographs.
  13. Table of contents shall be neatly typewritten, arranged in a systematic order, containing as a minimum the following data:
    - a. CONTRACTOR, name of responsible principle, address and telephone number.

- b. List of each product required to be included and indexed to content of each volume.
  - c. List of each product, name, address and telephone number of subcontractor, supplier, installer and maintenance contractor as appropriate.
  - d. Provide local source and phone number of supply for parts and replacement.
  - e. Identify each product by product name, model number and other identifying numbers or symbols as set forth in the Contract Documents.
14. Product data:
- a. Include only those sheets that are pertinent to the specific product provided.
  - b. Clearly annotate each sheet to identify specific product or part installed, data applicable to the installation and delete references to inapplicable information.
15. Drawings: supplement product data with drawings as necessary to clearly illustrate the following:
- a. Relationship of component parts of equipment and systems.
  - b. Control and flow diagrams.
  - c. Coordinate drawings with project record documents to assure correct illustration of completed installations.
  - d. CONTRACTOR shall not use project record documents as maintenance manual drawings.
  - e. Provide reinforced punched binder tabs.
  - f. Reduced 11 x 17 inch drawings shall be folded to 8.5 x 11 inch format.
  - g. Where reduction to 11 x 17 inch is impractical, fold and place the 8.5 x 11 inch envelopes that are bound in the binder.
  - h. Identify specification Section and product on drawings and envelopes.

## **1.4 SUBMITTAL PROCEDURE**

- A. Compile the required data, arrange as specified herein and insert data in the number of volumes necessary. The volumes shall be submitted as a complete set. Partial or incomplete manuals shall be rejected by the ENGINEER.
- B. Preliminary Manuals:
- 1. Submit three copies to ENGINEER for review and approval well before the starting and adjusting activities commence.
  - 2. If accepted:
    - a. One copy will be returned to the CONTRACTOR.
    - b. One copy will be forwarded to the OWNER.
    - c. One copy will be retained in the ENGINEER's file.
  - 3. If rejected:
    - a. Two copies will be returned to the CONTRACTOR with ENGINEER's comments for revision.
    - b. One copy will be retained in the ENGINEER's file.
    - c. CONTRACTOR shall be required to resubmit three revised preliminary manuals for ENGINEER's review.
- C. Final Manuals:
- 1. Submit two copies to ENGINEER for review and approval before final completion.
  - 2. If accepted:
    - a. CONTRACTOR will be so notified.
    - b. CONTRACTOR shall provide a complete set of the final manual on CD-ROM. Data written specifically for the manual will be presented in MS Word format. Manufacturer data (per-printed data) will be presented in Adobe PDF format.
  - 3. If rejected:
    - a. At the ENGINEER's discretion either all but one copy of the manuals will be returned to the CONTRACTOR for revisions or all copies will be retained by the ENGINEER and the necessary revision data will be requested from the CONTRACTOR.

## **1.5 CONTENT REQUIREMENTS FOR MANUALS**

A. The Operation and Maintenance Manuals shall normally consist of no less than four volumes outline below.

B. Volume 1 – Facility Overview.

1. All sheets in volume 1 shall have sheet protectors.
2. All materials in volume 1 shall be copied onto a CD and provided to the ENGINEER.
3. Include instructions and procedures for handling, storage, maintenance during storage, assembly, erection, installation, adjusting, testing, operating, shut down in emergency, troubleshooting, maintenance, interface with other equipment and as may otherwise be required.
4. Organize in a consistent format under separate heading for each different procedure.
5. Provide a logical sequence of instructions for each procedure.
6. Provide an information sheet for the OWNER's personnel which include the proper procedures in the event of a failure and instances that might affect the validity of warranties or bonds.
7. Content for each unit (or common units) and system:
  - a. Description of unit and component parts including controls, accessories and appurtenances. Detail their function, normal operating characteristics and limiting conditions. Provide performance curves, engineering data, nameplates data and test forms. Provide a complete commercial number and nomenclature for replaceable parts.
8. Operating Procedures:
  - a. Start-up and break-in routine and normal operating instructions.
  - b. Test procedures and results of factory tests where required.
  - c. Regulation, control, stopping and emergency instructions.
  - d. Description of operation sequence by control manufacturer.
  - e. Shutdown instructions for both short and extended durations.
  - f. Summer and winter operating instructions as applicable.
9. Maintenance and Overhaul Procedures:
  - a. Routine operations
  - b. Guide to troubleshooting.
  - c. Disassembly, removal, repair, reinstallation and reassembly.
10. Installation Instructions including alignment, adjusting, calibrating and checking.
11. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list and diagrams required for maintenance.
12. Parts list by generic title and manufacturer's part number.
13. Name, location and telephone number of nearest supplier and spare parts warehouse.
14. Where applicable identify installed spares and other provisions for future work (e.g. reserved panel space, unused components, wiring and terminals).
15. Manufacturer's printed operating and maintenance instructions.
16. Charts of valve tag numbers along with the location and function of each valve.
17. Manufacturer's certifications including calibration data sheets and specified calibration procedures or methods for installed equipment.
18. Warranty forms and information for all installed equipment provided by the CONTRACTOR.
19. Circuit directories for all panels including electrical, control and communication.
20. List of adjustable electrical relay settings, control and alarm settings.

C. Volume 2 – Equipment Manuals.

1. Table of contents shall have a sheet protector
2. Table of contents and index sheets shall be of colored card stock.
3. Manuals for individual equipment shall not be divided between separate binders.
4. List function, normal operation, characteristics and limiting conditions.
5. Complete commercial part number and nomenclature of replaceable parts.
6. Maintenance procedures including routine operations, guide to troubleshooting and adjustments.
7. Manufacturer's printed operation and maintenance instructions.
8. List of manufacturer's spare parts and recommended quantities to be maintained in storage.

9. Contents for Maintenance Summary Manual:
  - a. Compile individual maintenance summaries for each applicable equipment item, respective unit or system and for components or subunits.
  - b. Format shall include use of the Supplement 260110 – B “Maintenance Summary” provided. Each Maintenance Summary may take as many pages as required. Supplement shall be typewritten and shall include detailed lubrication instructions and diagrams showing points to be greased or oiled, recommended type, grade and temperature range of lubricants and frequency of lubrication.
  - c. Include a list and quantity of manufacturer’s recommended consumable and spare parts that should be stored on site.
- D. Volume 3 – Drawings
  1. As-built drawings associated with the project shall be provided. This includes, but is not limited to, manufacturers supplied drawings. All drawings shall be provided on 11 x 17 inch sheets folded to 8.5 x 11 inch size and bound in this volume. A complete and detailed index shall be provided that includes a list of all drawings in the volume and the drawings shall be tabbed in a fashion that provides clear and concise identification.

## **PART 2 - PRODUCTS – NOT USED**

## **PART 3 - EXECUTION**

### **3.1 SUPPLEMENTS**

- A. Supplement 260110 – A, “Schedule of Equipment Requiring Operation and Maintenance Data”.
- B. Supplement 260110 – B, “Maintenance Summary Form”.

**END OF SECTION 26 01 10**

**SUPPLEMENT 26 01 10 – A**

**SCHEDULE OF EQUIPMENT REQUIRING OPERATION AND MAINTENANCE DATA**

Item No.	Section	Manual (M) Data Sheet (D)	Description
1.	260923	D	Lighting Control Devices
2.	265100	D	Interior Luminaires

**END OF SUPPLEMENT**

**SUPPLEMENT 26 01 10 – B**

**MAINTENANCE SUMMARY FORM**

ProjectName \_\_\_\_\_  
ProjectNumber \_\_\_\_\_  
Equipment \_\_\_\_\_  
Equipment ID Number \_\_\_\_\_  
Manufacturer \_\_\_\_\_  
Nameplate Data \_\_\_\_\_  
Manufacture's Local Supplier Name \_\_\_\_\_  
Phone \_\_\_\_\_  
Address \_\_\_\_\_

**Maintenance Requirements**

Maintenance Requirements	Frequency Required	Lubricant if Required

**END OF SUPPLEMENT**

## **SECTION 26 05 02 - MINOR ELECTRICAL DEMOLITION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes.
1. Removal of existing electrical equipment, wiring and conduit in areas to be remodeled. Removal of designated construction, dismantling, cutting and alterations for completion of the Work.
  2. Disposal of materials.
  3. Storage of removed materials.
  4. Identification of utilities.
  5. Salvaged items.
  6. Protection of items to remain as identified in the schedules at the end of this Section.
  7. Relocate existing equipment.
  8. Removal of temporary electrical equipment prior to completion of the Work.

#### **1.2 SUBMITTALS**

- A. Contractor shall submit all the product data in Division 26 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
  2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 260519.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
  3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data.
1. Pursuant to Section 013300 Submittal Procedures.
  2. Manufacturer's data including materials of construction, methods of installation and related information for each item specified.
- C. Shop Drawings.
1. Provide shop drawings indicating the location and construction of temporary work. Describe demolition procedures related to items listed in the schedules at the end of this Section.

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Refer to the Contract Documents for general closeout submittal requirements.
- B. Project Record Drawings shall be provided that record actual locations of capped conduits and equipment abandoned in place.

#### **1.4 SEQUENCING**

- A. Sequencing of the Work shall be as noted in the Contract Documents.



### **1.5 SCHEDULING**

- A. Refer to the Contract Documents.
- B. Coordinate the schedule of noisy, malodorous and dusty work with the ENGINEER.

### **1.6 COORDINATION**

- A. Refer to Contract Documents.
- B. Conduct demolition to minimize interference with adjacent or occupied areas.
- C. Coordinate demolition work with other trades.
- D. Coordinate and sequence demolition so as not to cause shutdown or interruption of operation of surrounding areas.
- E. Arrange timing of shutdowns with the OWNER. Do not shutdown any utility service without prior written approval. Keep shutdown periods to a minimum.
- F. Identify salvage items in cooperation with the OWNER.

## **PART 2 - PRODUCTS – NOT USED**

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verify wiring and equipment scheduled for demolition serve only abandoned process and facilities.
- B. Verify termination points for demolished services.

### **3.2 DEMOLITION**

- A. Items scheduled for demolition shall be legally disposed of by the CONTRACTOR.
- B. Remove exposed abandoned conduit.
- C. Disconnect electrical systems in walls, floors and ceilings scheduled for removal.
- D. Reconnect equipment being disturbed by renovation work and required for continued service.
- E. Disconnect or shut off service to areas where electrical work is to be removed. Remove electrical fixtures, equipment, switches, receptacles, conduit, and conductors which are not part of the completed project.
- F. Install temporary wiring and connections necessary to maintain existing systems in service during construction.
- G. Remove, relocate and extend existing installations to accommodate new construction.
- H. Repair adjacent construction and finishes to original condition that are damaged during demolition and extension work.

- I. Remove abandoned grounding and bonding components, fasteners, supports and electrical identification components. Cut embedded support elements flush with wall, floors and ceilings.
- J. Provide watertight knockout seals in panels, enclosures, gutters, or junction boxes where conduit is removed.
- K. Clean and repair existing equipment scheduled to be reinstalled.
- L. Protect and retain power to existing active equipment remaining.
- M. Cap abandoned empty conduit at both ends.

### **3.3 WALL, FLOOR AND CEILING PENETRATIONS**

- A. Seal concrete penetrations originally occupied by removed conduit with suitable grout material. Paint to match existing concrete.
- B. Repair holes in plaster or drywall assemblies. Provide all sheet rock, drywall, joint compound, sanding, etc. to repair the assembly to original condition. Paint to match existing assembly.

### **3.4 FIRESTOPPING**

- A. Where existing firestopping sealants, pillows, or other material are removed to facilitate the installation of new cabling, the firestopping shall be restored to a Code-compliant installation. All fire rated penetrations shall be fully sealed upon completion of work, regardless of the state of the existing installation.

### **3.5 SALVAGE ITEMS**

- A. Remove and protect items scheduled to be salvaged. Coordinate with OWNER where you are to locate these items.

### **3.6 REUSEABLE ELECTRICAL EQUIPMENT**

- A. Unless specifically identified for reuse, no used electrical equipment, conduit, conductors, components of any sort scheduled for demolition, disposal or salvage shall be installed for reuse on the project.
- B. Electrical equipment identified specifically as being reused on the project shall be cleaned and protected until such time as it is reinstalled.

### **3.7 SCHEDULES**

- A. Salvage the following equipment to the OWNER at a location they identify. Coordinate the delivery of the salvaged items to the location identified by the OWNER at a time they have pre-approved.
  - 1. None.
- B. Dispose of the following equipment and its associated components.
  - 1. All electrical systems identified as demolition.
- C. Reuse the following items.
  - 1. All electrical devices identified as Remove (RR) & Reinstall (RD) as shown on drawings.

**END OF SECTION 26 05 02**

**SECTION 26 05 19 - LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes.
1. The section includes the requirements for conductors and cables used to conduct potentials of 600 volts and less.
  2. All conductors and cables shall be installed in conduit or approved raceways regardless of which Division the conductors or cables are specified.

**1.2 REFERENCES**

- A. The following is a list of Standards which may be referenced in the Section.
1. American Society for Testing and Materials (ASTM).
    - a. B8, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard or Soft.
  2. National Electrical Contractors Association, Inc. (NECA): National Electrical Installation Standards (NEIS).
  3. National Electrical Manufacturers Association (NEMA).
    - a. WC 3, Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
    - b. WC 5, Thermoplastic Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
    - c. WC 7, Cross Linked-Thermosetting Polyethylene Wire and Cable for the Transmission and Distribution of Electrical Energy.
    - d. WC 55, Instrumentation Cables and Thermocouple Wire.
  4. National Fire Protection Association (NFPA). 70, National Electrical Code (NEC).
  5. Underwriters Laboratories, Inc. (UL).
    - a. 13, Standard for Power-Limited Circuit Cables.
    - b. 44, Standard for Safety Rubber-Insulated Wires and Cables.
    - c. 62, Standard for Safety Flexible Cord and Fixture Wire.
    - d. 510, Standard for Safety Insulating Tape.
    - e. 854, Standard for Safety Service-Entrance Cables.
    - f. 910, Standard for Safety Test Method for Fire and Smoke Characteristics of Electrical and Optical Fiber Cables Used in Air Handling Spaces.
    - g. 1277, Standard for Safety Electrical Power and Control Tray Cables.
    - h. 1581, Standard for Safety References for Electrical Wires, Cables and Flexible Cords.

**1.3 SUBMITTALS**

- A. Contractor shall submit all the product data in Division 26 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
  2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 260519.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.

3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data.
1. Pursuant to Section 013300 Submittal Procedures.
  2. Manufacturer's data including materials of construction, weight, and related information for each item specified in PART 2 PRODUCTS.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. **Single Conductors (260519.C01).**
1. Conductors shall be rated for 600 volts and conform to applicable requirements of NEMA.
  2. Conductors shall be stranded copper.
  3. Insulation type shall be THWN-2.
  4. Conductors shall be sized per the Drawings and the NEC, whichever is greater.
  5. Rome Cable Corporation, Southwire Company, Okonite Company, or approved equal.
- B. **MC (Metal Clad) Cables (260519.C25)**
1. Shall be rated 600 volts and conform to applicable requirements of NEMA.
  2. Conductors shall be solid copper.
  3. Insulation type shall be THHN/THWN.
  4. Armor material shall be aluminum.
  5. Southwire, or approved equal.

### **2.2 ACCESSORIES**

- A. **Colored Tape (260519.T01).**
1. Colored tape shall be used to identify individual conductors larger than # 6 AWG.
  2. 3M colored tape, or approved equal.
- B. **Cable Ties (260519.T05).**
1. Cable ties shall be nylon, adjustable, self-locking, and properly sized for the bundle and force implied.
  2. Thomas and Betts, Panduit, or approved equal.
- C. **Pulling Compound (260519.P01).**
1. Pulling compound shall be non-corrosive, noncombustible, nonflammable waxed based lubricant listed for this use.
  2. Ideal Company, Polywater, Inc., or approved equal.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. General.
1. All identification labeling shall be in compliance with Section 260553 Electrical and Control Identification.
  2. Conductor and cable installations shall meet or exceed the NECA National Electrical Installation Standards.

3. CONTRACTOR shall not exceed the manufacturer's recommendations for maximum pulling tensions or minimum bending radii for respective conductors or cables.
4. Pulling compound is recommended for all conductor or cable installations and shall be used on all installations requiring a mechanical pulling device.
5. CONTRACTOR shall not exceed the manufacturer's recommended pulling tensions on all conductor or cable installations requiring the use of a mechanical pulling device. Should the pulling tensions be exceeded, and the conductor or cable becomes damaged, the conductor or cable shall be removed from the raceway and discarded. It shall not be reused under any circumstance on the project. The CONTRACTOR shall be responsible to make the alterations necessary before attempting to re-pull new conductors or cables.
6. Immediately after pulling in conductors or cables, the pulling compound shall be completely removed from the conductors or cables, from boxes, enclosures, floors, walls, etc.
7. Conductor and cable installations shall be continuous without splices or intermediate terminations unless specifically identified on the Drawings or prior written approval from the ENGINEER.
8. Where conductors or cables are routed in boxes enclosures or cable tray they shall be neatly bundled with cable ties at intervals not to exceed 12 inches on center. The tension for the cable ties shall be set with a tool specifically manufactured for that purpose and of the same manufacturer as the cable tie. Side cutters, linemen pliers and similar tools shall not be used to cut the tail end of the cable tie. The CONTRACTOR shall only use the tool specifically manufactured for this purpose and of the same manufacturer as the cable tie.
9. Conductors and cables shall not be installed until the raceway, boxes, enclosures, conduit bushings, etc. have all been installed. Where conductors or cables have been installed prior to meeting this requirement, the ENGINEER shall at their discretion elect to have the conductors or cables removed, disposed of and replaced with new product.
10. Should the outer jacket of any conductor or cable be damaged in any way, they shall be removed, disposed of and replaced with new product.
11. An equipment grounding conductor shall be installed in all raceways. Size shall be as identified on the Drawings or the NEC, whichever is greater, but in no case shall it be less than # 16 AWG for under 50 volts and no less than # 14 for 50 volts or above.

**END OF SECTION 26 05 19**

## **SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes.
1. The section includes requirements for grounding electrodes, equipment grounding and electrical bonding.

#### **1.2 SUBMITTALS**

- A. Contractor shall submit all the product data in Division 26 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
  2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 260526.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
  3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data
1. Pursuant to Section 013300 Submittal Procedures.
  2. Manufacturer's data including materials of construction, methods of installation and related information for each item specified in PART 2 PRODUCTS.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. **Compression Connectors (260526.C20).**
1. Compression connections shall be provided as shown on the drawings and as required for bonding end-use equipment.
  2. Compression connections shall be compress-deforming type, extruded copper material.
  3. Compression connections shall be tin electroplated for corrosion resistance.
  4. Compression connections shall be ring-type connectors. Forked connectors shall not be used on grounding conductors.
  5. Provide Burndy products, or approved equal.
- B. **Mechanical Connectors (260526.C21).**
1. Mechanical connectors shall be provided as shown on the drawings and as required for bonding to pipes.
  2. Mechanical connectors shall be UL 467 Listed, copper material.
  3. Mechanical connectors shall be sized to match the pipe being bonded.
  4. Mechanical connector clamps shall permit parallel or 90° cable connection.
  5. Mechanical connectors installed below-grade shall include silicon bronze hardware.
  6. Provide Burndy GAR3902 series for above-ground installations, or approved equal.
  7. Provide Burndy GAR-BU series for below-grade installations, or approved equal.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

#### **A. General.**

1. All identification labeling shall be in compliance with Section 260553 Electrical and Control Identification.
2. Bond separately derived systems, including generators, to the grounding electrode system.
3. Maintain equipment ground continuity throughout the facility by means of a grounding conductor routed in all raceways.
4. Provide grounding conductors pursuant to Section 260519. Conductors shall be copper and shall be sized per the Drawings or the NEC, whichever is greater.
5. Provide ground bushings for all conduits that do not terminate in a hub type fitting and install at the source of power with a bonding conductor fastened to the ground bushing.
6. Provide ground bar kits as shown on the Drawings and where two (2) or more grounding conductors are terminated in a box or enclosure.
7. Install ground rods at the locations and in the number shown on the Drawings or per the NEC, whichever is greater.
8. Bond the grounding electrode system to all metallic water and wastewater piping.

#### **B. Grounding Conductors.**

1. Brush grounding conductors clean of debris before connections are made.
2. Strip insulated conductor insulation in a neat, workman like manner where insulated conductors are used.
3. Fasten all conductors securely.

#### **C. Connections.**

1. Install connectors according to the manufacturer's directions, using the proper dies, tools, etc. designed specifically for this purpose.
2. Provide compression connector type connections to ground rods, re-bar, building steel, end use equipment and bolt to the equipment using washers and split lock washers for secure fastening. Bolts shall be grade 5 for grounding connections and shall be tightened to the manufacturer's recommend torque.

**END OF SECTION 26 05 26**

## **SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

A. Section Includes:

1. This section includes requirements pertaining to electrical equipment anchoring and electrical equipment hanging and support.

#### **1.2 SUBMITTALS**

A. Contractor shall submit all the product data in Division 26 at the same time. Piecemeal submittals will be rejected as incomplete.

1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 260529.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

B. Product Data.

1. Pursuant to Section 013300 Submittal Procedures.
2. Manufacturer's data including materials of construction, equipment weight and related information for each item specified in PART 2 PRODUCTS.
3. Seismic calculations and drawings.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

A. **Hot Dipped Galvanized Hardware (260529.H11).**

1. Bolts shall be hot dipped galvanized steel and sized for the load served and have a hex head unless specifically specified otherwise elsewhere.
2. Nuts shall be hot dipped galvanized steel hex nut.
3. Washers shall be hot dipped galvanized steel, USS pattern flat washers.
4. Split lock washers shall be hot dipped galvanized steel.
5. Threaded rods and couplings shall be hot dipped galvanized steel.
6. Eye-bolts, u-bolts, bent-bolts and similar connecting hardware shall be hot dipped galvanized steel.

B. **Hot Dipped Galvanized Anchors (260529.A11).**

1. Wedge or stud anchors installed in concrete or masonry shall be hot dipped galvanized steel and sized for the load served.
2. Toggle type fasteners shall only be used in hollow sheetrock wall. The wing part of the fastener may be mild steel, but the bolt shall be hot dipped galvanized steel.

C. **Hot Dipped Galvanized Beam Clamps (260529.B11).**



1. Beam clamps shall be hot dipped galvanized steel and sized for the load served.

**D. Hot Dipped Galvanized Strut Channel (260529.S11).**

1. Strut channel shall be hot dipped galvanized after fabrication and shall be a minimum of 12 gauge.
2. Strut channel shall have factory pre-drilled holes.

**2.2 SEISMIC BRACING**

**A. Seismic Anchoring and Bracing Products (260529.S90).**

1. Provide seismic bracing for the vertical and lateral restraint of all conduits, conduit racks, raceways, cable trays, required by the International Building Code and Oregon Structural Specialty Code.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

**A. General.**

1. Hardware shall be set to a torque as recommended by the manufacturer.
2. Washers and split lock washers shall be installed on all bolts, threaded rods and anchors.
3. Lead or plastic type anchors are prohibited from use on the project.
4. When threaded rods are installed in drop-in type anchors, a washer, split lock washer and a jamb nut shall be installed at the anchor to ensure stability.
5. When channel (strut) is installed as a hanger or support from threaded rod, washers, split lock washers and jamb nuts shall be installed on both sides of the strut to lock it in place.
6. Cut ends of channel, strut, threaded rods or other cut fittings shall be filed smooth before installation.
7. Cut ends of hot dipped galvanized channel and strut shall be coated with three coats of cold galvanizing compound after the channel has been filed to prohibit rust.
8. Concrete anchors shall be installed as per the manufacturer's directions and set using the manufacturer's supplied tool.
9. Threaded rod shall not extend more than one (1) inch beyond the channel, strut or other material it is supporting.
10. Hangers and supports shall be installed level and plumb.
11. Hangers and supports shall be installed per the National Electrical Code, Building Code and Structural Code and shall be designed to safely support the load. The ENGINEER may request the CONTRACTOR provide a copy of their design calculations for the seismic requirements and the load served.

**B. Seismic Anchoring and Bracing**

1. The design of the seismic anchoring and bracing system shall be by a licensed Structural Engineer in the State of Oregon. The CONTRACTOR shall arrange and pay for the services of the licensed Engineer.
2. Wet stamped and signed calculations and drawing of the seismic anchoring and bracing system shall be submitted to the Architect and Engineer for review and approval.

**END OF SECTION 26 05 29**

## **SECTION 26 05 33 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes
1. The Section includes the requirements pertaining to conduits and fittings used to contain electrical conductors and cables.
  2. All conductors and cables shall be installed in conduit or approved raceways regardless of which Division the conductors or cables are specified.

#### **1.2 REFERENCES**

- A. The following is a list of standards which may be referenced in this Section.
1. American National Standards Institute (ANSI).
    - a. C80.1, Rigid Steel Conduit-Zinc Coated.
  2. American Society for Testing Materials (ASTM).
    - a. A123 E1, Standard Specification for Zinc-Coated (Galvanized) Coatings on Iron and Steel Products.
  3. National Electrical Contractors Association (NECA).
    - a. National Electrical Installation Standards (NEIS).
  4. National Electrical Manufacturers Association (NEMA).
    - a. TC 3, PVC Fittings for use with Rigid PVC Conduit and Tubing.
    - b. TC 6, PVC and ABS plastic Utilities Duct for Underground Installation.
  5. Nation Fire Protection Association (NFPA).
    - a. 70, National Electrical Code (NEC).
  6. Underwriters Laboratories, Inc. (UL).
    - a. 6, Standard for Safety Rigid Metal Conduit.
    - b. 514B, Standards for Safety Fittings for Conduit and Outlet Boxes.
    - c. 651, Standard for Safety Schedule 40 and 80 PVC Conduit.
    - d. 651A, Standard for Safety Type EB and Rigid PVC Conduit and HDPE Conduit.
    - e. 1660, Standard for Safety Liquid-Tight Flexible Nonmetallic Conduit.
    - f. 360, Standard for Safety Liquid-Tight Flexible Metallic Conduit.
    - g. 797, Standard for Safety Electrical Metallic Conduit.

#### **1.3 SUBMITTALS**

- A. Contractor shall submit all the product data in Division 26 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
  2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 260533.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
  3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data.

1. Pursuant to Section 013300 Submittal Procedures.
2. Manufacturer's data including materials of construction, equipment weight and related information for each item specified in PART 2 PRODUCTS.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

#### **A. Liquid-Tight Flexible Metal Conduit (LFMC) (260533.C25).**

1. Shall be constructed of a flexible steel core with a sunlight resistant thermoplastic outer jacket.
2. Provide galvanized conduit fittings.
3. No couplings shall be installed.
4. Sealing rings shall be installed where conduit terminates at an enclosure.
5. Conduit shall be Anaconda, Electrifix, T & B, or approved equal.

#### **B. EMT Conduit (260533.C50).**

1. EMT conduit may be used in all indoor and outdoor locations. In outdoor locations the fittings shall be watertight compression fittings. Set screw fittings shall be acceptable in indoor locations.
2. Exposed surface mounted EMT conduit shall be powder coated. Finish shall be white.
3. Conduit connectors shall have insulated throats, plastic bushings or ground bushing installed.

#### **C. Galvanized Sheet Metal Boxes (260533.B15).**

1. Shall comply with NEMA specifications for sheet metal boxes.
2. All boxes shall be deep. No shallow boxes shall be permitted.
3. Provide mud rings or industrial covers for the devices installed and a depth to match the sheetrock where applicable.

### **2.2 ACCESSORIES**

#### **A. Firestopping (260533.F90).**

1. Shall be as specified in Division 07 Specifications.
2. Shall be Listed for the conduit, raceway or box being installed.
3. Install per the Manufacturer's instructions.

#### **B. Bushing Plug (260533.P90).**

1. Provide OZ Gedney type PPC bushing plug, or approved equal.

### **2.3 INSTALLATION**

#### **A. General Requirements**

1. Install conduit runs in accordance with the schematic representation shown on the Drawings.
2. Minimum conduit size shall be .75 inch unless specifically called out otherwise on the drawings.
3. Galvanized Rigid Conduit (GRC) shall be used for all conduits subject to damage up to a height of eight (8) feet above finished floor or finished grade.
4. Where raceways are indicated, but the routing is not identified, the routing shall be the CONTRACTOR'S choice and in accordance with the rest of the Contract Documents and the National Electrical Code (NEC).
5. Raceways shall be electrically and mechanically complete before the conductors are installed.
6. Routing of conduits may be adjusted to avoid obstructions. Coordinate with other trades prior to installation of raceways. Lack of such coordination shall not be justification for extra compensation and removal and reinstallation to resolve conflicts shall be at the CONTRACTOR's expense.
7. Conduit joints shall be wrench tight, thoroughly grounded, secure and free of obstructions.

8. Conduits shall be reamed.
  9. Exposed conduits shall be installed parallel or perpendicular to the structural members and surfaces and shall be level and or plumb.
  10. When two or more conduits are routed in the same general direction their routing shall be parallel with symmetrical bends.
  11. Conduits shall be bent with equipment specifically designed for this purpose and for the specific size and type of conduit.
  12. Conduits that are creased or crushed shall be replaced.
  13. Install conduits such that they do not interfere with the proper and safe operation of equipment and do not block or otherwise interfere with the ingress and egress and installation of removable hatches and covers.
  14. Install expansion joints as needed across expansion joints in the structure and at other locations where necessary to compensate for thermal or mechanical expansion or contraction.
  15. Conduits shall be routed at least six (6) inches from high temperature piping, ducts and flues.
  16. Final connections to dry type transformers, motors, instruments and other equipment requiring a flexible connection shall be made with LFMC conduit. Lengths shall not exceed three (3) feet.
  17. All conduits shall be capped throughout construction to prevent entrance of dirt, trash, water, etc.
  18. All power conduits routed to or from an adjustable frequency drive or a variable frequency drive shall be metallic conduit. Conduits installed underground shall meet the requirements listed below under part B; underground and concrete encased conduit installation.
  19. Spare conduits shall be provided with a coupling and threaded male plug that matches the makeup of the conduit for the area they are installed in. The conduit shall terminate at an enclosure when one is called out and exists as part of the Work. Where the spare conduit is stubbed up in a concrete slab for future equipment, it shall be installed flush with the finished floor. Where spare conduits are routed to other areas such as outside a building envelope, in an attic, to a vault, etc., the conduit shall have a female conduit cap installed.
- B. Electrical Metallic Raceway (EMT) Installation
1. Electrical Metallic raceways (EMT) shall be used throughout this project as follows:
    - a. EMT shall serve as the "homerun" between the panelboard and the first device for receptacle and lighting branch circuits routed above grade. The use of MC type cable shall be permitted to "spider" out of the first device box to the wiring devices within the respective branch circuit. No individual MC run shall exceed 75 feet.
- C. Underground Conduit Installation.
1. Underground conduits shall be PVC except as specifically noted differently elsewhere.
  2. Conduits routed under a concrete slab shall be routed under the vapor barrier. The conduits shall be routed deep enough so the radius of the conduit stubbed up through the slab is completely below grade. The vapor barrier shall be sealed at every point a conduit penetrates the barrier as per the requirements specified for the vapor barrier.
  3. All power conduits routed to or from an adjustable frequency drive or a variable frequency drive shall be metallic conduit.
  4. Underground conduits shall be routed as shown on the Drawings.
  5. Power conduits shall be separated from all other conduits by a minimum of 12 inches and when required to cross other conduits it shall be done at a 90 degree angles.
  6. Conduits routed in structural concrete shall be routed in such a manner as to not interfere with the structural integrity of the concrete. The ENGINEER shall approve CONTRACTOR's proposed conduit routing before installation. It is the CONTRACTOR's responsibility to coordinate conduit routing with the ENGINEER well before it is scheduled to be installed. Conduits shall be stubbed up directly under the enclosure or device their will serve. The CONTRACTOR is responsible to coordinate with the other trades prior to installation of raceways. Lack of coordination shall not be justification for extra compensation and removal and re-installation of conduits to resolve conflicts shall be done at the CONTRACTOR's expense.
  7. Rigid metallic conduit installed in or extended through concrete shall be wrapped with 10 mil PVC corrosion protection tape with a minimum 50 % overlap. The conduit shall be wrapped

beginning a minimum of six inches before entering concrete and be wrapped continuously to a point six inches beyond exiting the concrete.

8. Underground conduit shall have a minimum of 24 inches of cover unless specifically called out differently on the Drawings.
9. Identification tape shall be centered and laid neatly above all underground conduits that extend beyond the envelope of a building or structure. The tape shall be 12 inches below finished grade.

**D. Boxes**

1. Install boxes and enclosures in accordance with the schematic representation as indicated on the Drawings.
2. Space back to back boxes at least 24" apart in sound rated walls.
3. Install vaults and in-ground box tops (lids) such that they are ½ inch above finished grade to prevent water ingress.
4. Boxes and enclosures shall be mounted level and plumb.
5. Boxes and enclosures shall not be altered, holes drilled, etc. in any way that may compromise the NEMA rating of the enclosure or box.
6. Boxes and enclosures shall be bonded the equipment grounding conductor.
7. Provide a divider whenever a box contains conductors of different potentials that the code requires separation.
8. Surface mounted enclosures and boxes shall be spaced off the surface at least 1/4 inch in damp or wet locations.
9. Enclosures shall be provided whenever a junction or pull box larger than 4 inches square is required.
10. Sheet metal boxes are permitted only in locations where EMT conduit is approved.
11. Enclosures shall be labeled with a nameplate as specified in Section 26 05 53 – Identification for Electrical Systems. The nameplate shall match the callout on the Drawings. If no callout exists, the CONTRACTOR is responsible to meet with the ENGINEER and develop a list of pull box, junction box and termination box nomenclature and their as-built Drawings shall reflect these callouts.

**END OF SECTION 26 05 33**

## **SECTION 26 05 53 - ELECTRICAL AND CONTROL IDENTIFICATION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes
1. Requirements for identification of electrical, safety, measurement, data, fire alarm, security, monitoring, control and related components and equipment.

#### **1.2 SUBMITTALS**

- A. Contractor shall submit all the product data in Division 26 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
  2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 260553.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
  3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data
1. Pursuant to Section 013300 – Submittal Procedures.
  2. The initial submittal shall contain all the products, samples and data base specified. An initial submittal that does not contain all the specified data shall be returned as incomplete.
- C. Samples
1. Provide a sample of each type and size of nameplate, label, tag and means of attachment specified for approval by the OWNER.
- D. Quality Assurance / Quality Control Submittals
1. The CONTRACTOR shall be responsible for submitting a data base of all identification nameplates, labels, panel schedules and tags required for the Work. The data base shall be developed in the most current edition of Microsoft Excel for the OWNER's future use.
- E. Closeout Submittals
1. Pursuant to Section 017800 – Closeout Submittals.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. **Circuit Breaker Panel Schedules (260553.S21).**
1. Shall be created in Microsoft Excel software. One copy of each schedule shall be included in the closeout submittals.
  2. Shall be printed on 60 - 70 lb white card stock.
  3. Provide sample panel schedule for approve.

**B. Device & Faceplate Identification Labels (260553.F01).**

1. Shall be BLACK letters on CLEAR background.
2. 3/8" high block lettering.
3. Adhesive label.
4. Brother P-Touch or approved equal.

**C. Conductor and Cable Identification Sleeves (260553.T31).**

1. The identification sleeves shall be properly sized for the cable or conductor.
2. Shall be adhesive style.
3. Sleeves shall be white with black machine generated characters.
4. Provide Brady wire and cable sleeves, or approved equal.

**D. Flexible Identification Tape (260553.T56).**

1. Shall be white, red, yellow, clear or as otherwise specified tape with black characters.
2. Standard tape size shall be 0.5 inch high unless specified otherwise and shall have extra strength adhesive rated for indoor and outdoor use.
3. Provide products manufactured by Brother, or approved equal.

**E. Plastic Nameplates (260553.P05).**

1. Shall have a black background with white engraved letters. Nameplates for emergency functions shall be red background with white engraved letters. The nameplates shall have self-adhesive rated for the environment which they are installed. The font type shall be consistent on all nameplates.
2. Provide products supplied by E.R. Perry Signs & Engraving, or approved equal.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

**A. Circuit Breaker Panel Schedules**

1. CONTRACTOR shall request panel schedules in Microsoft Excel software and printing instructions from ENGINEER. CONTRACTOR shall update the panel schedules to reflect as-built conditions. Print schedules on 60 - 70 lb white card stock with black ink.
2. Schedules shall be neatly trimmed with 1/8" white space borders.
3. The finished schedules shall be laminated and neatly trimmed with 1/8" of laminate border.
4. A sample layout shall be submitted to OWNER for approval prior to installation.
5. Panel schedules shall be provided for all existing panels with updated load circuiting.

**B. Conductor and Cable Identification Sleeves**

1. Provide adhesive, machine generated, white labels with black characters for all cables and conductors. Explanation is provided below on how various systems shall be identified. In many cases the information necessary to develop the unique identification labels will be provided on the Contract Drawings. The verbiage required for the identification shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available or clear based on the information provided on the Contract Drawings.
2. The labels shall be installed between 6 to 8 inches from the end. Conductors shall be labeled at all splices and points of termination.
3. Power conductors and cables, including the neutral and the ground conductors shall all be identified individually. The identification label will be developed as follows: The first set of characters will be the equipment code identifying the source of power "NH1A" followed by the circuit number "12". For example, the label would read "NH1A-12".

**C. Device and Faceplate Identification Labels**

1. Devices, faceplates, small electrical boxes 4 inches or less located indoors and similar equipment shall be identified utilizing flexible identification tape. Typically, the CONTRACTOR shall provide machine generated, white labels with black characters except as specified otherwise. Explanation is provided below on how various systems shall be identified. In many cases the information necessary to develop the unique identification labels will be provide on the Contract Drawings. The verbiage required for the identification shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available or clear based on the information provided on the Contract Drawings.
2. Power receptacles faceplates (cover plates) shall state the panel and circuit number. A typical label might read "NH2A-15".
3. Light switches faceplate shall state the panel and circuit number(s). A typical label might read "NL2E-15,17".
4. Interior emergency light fixtures shall have a unique 0.5 inch adhesive dot applied to facilitate tracking routine maintenance required for emergency lighting. The dots shall be red when they have an integral battery back-up.
5. Low Voltage Face plates will be labeled with the label on the right side of the jack if there are two or less jacks and on the left and right sides for more than two jacks. Contractor shall coordinate with Districts Technology department on labeling format for all low voltage face plates.
6. Paging devices will be labeled with the **Device Name** per district naming standards.
7. Fire alarm notification devices will be labeled with the NAC power supply source, circuit, and a unique device ID number. Fire alarm SLC devices will be labeled with the device's unique SLC loop and unique device ID number.

**D. Conductor Color Coding**

1. Conductors shall be colored as specified in the table below. The technical specification requirements for the conductors are specified elsewhere.

System	Conductor	Color
All Systems	Equipment Grounding	Green
IT / Data	Data Cable Sheath (outer cover)	Reference Division 27
24 Volt DC	Positive	Blue
	Negative	White w/Blue Stripe
	Discrete Input Line (hot leg) Side	Blue
	Discrete Input Switch Leg	Blue w/White Stripe
	Discrete Output Line (hot leg) Side	Blue
	Discrete Output Switch Leg	Blue w/Orange Stripe
24 Volt AC	Hot Leg	Red
	Neutral	White
	Discrete Input Line (hot leg) Side	Red
	Discrete Input Switch Leg	Red w/Blue Stripe
120 Volt AC Control	Hot Leg	Red
	Neutral	White
	Discrete Input Line (hot leg) Side	Red
	Discrete Input Switch Leg	Red w/White Stripe
	Discrete Output Line (hot leg) Side	Red
	Discrete Output Switch Leg	Red w/Orange Stripe
120/240 Volt Single Phase	Hot Leg # 1	Black
	Hot Leg # 2	Red
	Neutral	White
120/208 Volt Three Phase	Phase A	Black
	Phase B	Red
	Phase C	Blue



System	Conductor	Color
	Neutral	White
120, 208, 277 Volt	Switch Legs	Pink
480 Volt Three Phase	Phase A	Brown
Wye or Delta Corner Tap	Phase B	Orange
	Phase C	Yellow
	Neutral	Gray
120/240 Delta Three Phase	Phase A	Brown
	Phase B	Orange
	Phase C	Yellow
	Neutral	Gray

**E. Plastic Nameplates**

1. Provide plastic nameplates for panelboards, motor control centers, motor starters, disconnects, variable frequency drives, control panels and similar equipment. The verbiage on the nameplate shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available on the Contract Drawings.
2. In addition to the nameplate identifying the equipment, a second nameplate shall be provided that identifies the source of power for the equipment i.e. "Fed From PNL208-1".
3. Typically the nameplates shall be centered and installed near the top of the equipment.
4. Nameplates shall be black with white characters unless specified otherwise.
5. Nameplates on emergency panels shall be red with white characters.

**END OF SECTION 26 05 53**

## **SECTION 26 05 83 - WIRING CONNECTIONS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

A. Section Includes.

1. This Section includes requirements for conductor termination methods.

#### **1.2 SUBMITTALS**

A. Contractor shall submit all the product data in Division 26 at the same time. Piecemeal submittals will be rejected as incomplete.

1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 260583.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

B. Product Data.

1. Pursuant to Section 013300 - Submittal Procedures.
2. Manufacturer's data including materials of construction, applications and related information for each item specified in PART 2 PRODUCTS.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

A. **Small Compression Connectors (260583.C01).**

1. Insulated fork, ring or splicing (butt) connectors shall be provided for # 10 AWG or smaller conductors that splice together or terminate with a screw other than in a terminal block.
2. Connectors shall be properly sized for the conductor and for the stud used.
3. Burndy, Panduit, Thomas and Betts, or approved equal.

B. **Electrical Spring Connectors (Wire Nuts) (260583.W01).**

1. Provide properly sized spring connectors for the size and number of conductors spliced.
2. Ideal, 3M, Thomas and Betts, or approved equal.

C. **Insulated Mechanical Multi-Tap Connectors (260583.M01).**

1. Provide properly sized, insulated, mechanical, multi-tapped connectors for splices.
2. Burndy, Panduit, Thomas and Betts, or approved equal.

#### **2.2 ACCESSORIES**

A. **Electrical Tape (260583.T40).**

1. General electrical tape shall be premium grade, all weather vinyl electrical insulating tape.
2. 3M – Scotch 33+, or approved equal.

**B. Thin Wall Heat Shrink Tubing (260583.T01).**

1. Thin walled heat shrink tubing shall be flame retardant and made of cross-linked polyolefin.
2. The tubing shall have a minimum operating temperature of – 55 to + 135 degrees Celsius.
3. Burndy, Panduit, or approved equal.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

**A. General**

1. All identification labeling shall be in compliance with Section 260553 Electrical and Control Identification.
2. Care shall be taken when terminating conductors to avoid kinking, cutting or puncturing the jacket or allowing contamination by grease, oil or water.
3. Care shall be taken when terminating conductors to properly support the conductors and to avoid undue pressure on the connector or utilization equipment.
4. Conductors shall be terminated by use of lugs, pressure type connectors wire nuts or terminal blocks. Wrapping conductors around a screw type terminal is not acceptable.
5. Compression connectors shall be installed using the tool and die provided by the same manufacturer as the connectors and as per their directions.
6. Compressions on connectors used for # 8 AWG conductors and larger shall have a minimum of two (2) circumferential crimps.
7. Indenter type crimps on compression connectors shall not be used on conductors larger than # 10 AWG.
8. Connectors shall be installed as per the manufacturer's directions.
9. Insulated wire ferrules shall be provided for conductors terminated on terminal blocks utilizing a crimping tool provided by the ferrule manufacture specifically for this purpose.
10. Where wire ducts in enclosures exist, conductors shall be grouped together and routed in the wire ducts and shall be fanned out to the terminals.
11. Wire nuts shall be used on conductors # 10 AWG or less and only for splicing conductors at light fixtures, at receptacles and motors. No other splicing of conductors with wire nuts are permitted unless specifically identified on the Drawings.
12. All spare conductors shall be identified individually, neatly coiled and fastened with cable ties. The coil shall be labeled to describe its origin. Spare conductors shall be left long enough to be neatly routed and terminate anywhere within the enclosure.
13. Conductors installed outdoors which are not terminated the same day, shall have heavy wall heat shrinkable end caps installed the same day they are pulled in. The end caps shall remain in place until the day they are terminated.
14. Heavy wall heat shrink tubing shall be installed over splices or over the barrel of connectors installed outdoors.
15. Thin wall heat shrink tubing shall be installed over splices or over the barrel of connectors installed indoors.
16. As connections are set with a torque wrench, a black felt marker shall be used to mark across the bolt, nut or screw indicating the torque has been set.
17. Insulated Mechanical Multi-Tap Connectors shall be utilized for splices located at in-ground lighting and power boxes. It may also be used for motor terminations.

**END OF SECTION 26 05 83**

## **SECTION 26 27 26 - WIRING DEVICES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes.
1. This Section includes the requirements for wiring devices such as receptacles, toggle switches and devices plates.

#### **1.2 REFERENCES**

- A. The following is a list of Standards which may be references in the Section.
1. National Electrical Contractors Association (NECA): National Electrical Installation Standards (NEIS).
  2. National Electrical Manufacturers Association (NEMA).
    - a. WD1 – General Requirements for Wiring Devices.
    - b. WD6 – Wiring Device Dimensional Requirements.
  3. National Fire Protection Association (NFPA): 70.
  4. Underwriters Laboratories, Inc. (UL): 1070.

#### **1.3 SUBMITTALS**

- A. Contractor shall submit all the product data in Division 26 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
  2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 262726.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
  3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data.
1. Pursuant to Section 013300 Submittal Procedures.
  2. Manufacturer's data including materials of construction, equipment weight, and related information for each item specified in PART 2 PRODUCTS.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. **Ground Fault Circuit Interrupter Receptacles (262726.R10).**
1. Shall be heavy duty hospital grade, tamper-resistant, weather-resistant two-pole, three wire grounding type with screw type terminals suitable for number 10 American Wire Gauge (AWG).
  2. Shall be NEMA 5-20R, rated for 20 amperes, 125-volt configuration.
  3. Provide duplex or single receptacles as shown on the Drawings.
  4. Finish shall be White unless fed from an emergency circuit and in which case the receptacle shall be red in color.

5. Provide Hubbell GFR8300S or approved equal. Red receptacles shall be sample model number except for color designation.

**B. Device Plates (262726.P05).**

1. Shall be stainless steel.
2. Shall be the same manufacturer as the devices.

**C. Motor Rated Toggle Switches (262726.M01).**

1. Shall be extra heavy-duty AC Manual Motor Controllers series with grounding screw, 30 or 60 amperes, 600-volt rated.
2. Single throw, double pole, three pole toggle switches shall be used as a local disconnect for HVAC equipment.
3. Shall be black in color.
4. Provide Hubbell, or approved equal

**PART 3 - EXECUTION****3.1 INSTALLATION****A. General.**

1. All identification labeling shall be in compliance with Section 260553 Electrical and Control Identification.
2. Devices shall be bonded to their enclosure and the equipment grounding conductor with a separate grounding conductor attached to the device which will allow the device to be detached from the enclosure without disconnecting the equipment grounding conductor from the enclosure.
3. The use of the mounting yoke as the only method for bonding is unacceptable.
4. Devices that are not installed at the end of the line (circuit) shall be pig-tailed out and the pig-tails shall be connected to the line and load conductors.
5. After the pigtailed conductors are terminated on the device and before it is installed in the enclosure the exposed energized parts shall be wrapped with electrical insulating tape with a minimum of three wraps.
6. As the device is installed in the enclosure, care shall be taken to neatly fold the conductors inside the enclosure so as to not kink, bind or otherwise damage the sheath of the conductors.
7. Terminations on all devices shall be via pressure or compression type connectors. Wrapping conductors around a termination screw and tightening is unacceptable.
8. Mounting heights for receptacles shall be 18 inches to center from finished floor unless called out otherwise on the Drawings or specified at different height to meet minimum code requirements. Where countertops are present, receptacles shall be mounted horizontally and mounted 4 inches to center above the back-splash. The CONTRACTOR is responsible to coordinate with the approved casework submittals. Failure to do so will require the CONTRACTOR to relocate devices at their expense.
9. Mounting height for switches shall be 42 inches to center above finished grade unless called out otherwise on the Drawings or specified at different height to meet minimum code requirements. Where countertops are present, switches shall be mounted 5 inches to center above the back-splash. The CONTRACTOR is responsible to coordinate with the approved casework submittals. Failure to do so will require the CONTRACTOR to relocate devices at their expense.
10. Coordination is the responsibility of the CONTRACTOR. If a conflict exists for the mounting location of devices, the CONTRACTOR shall bring it to the ENGINEER's attention during the rough-in phase and the ENGINEER shall provide direction. Failure to coordinate conflicts during the rough-in phase will result in relocation of devices at the CONTRACTOR's expense.
11. All receptacles fed from emergency panels shall be red in color.
12. Devices shall be installed level and plumb. Devices shall be brought out plumb with the wall surface via UL listed spacers approved for this purpose if necessary.

13. Devices shall be tested for voltage, polarity, ground integrity and in the case of GFCI receptacles, that they operate as intended.
14. The position of devices, as shown on the Drawings, are general locations only unless dimensioned. The CONTRACTOR is responsible to coordinate with various trades to ensure no conflict exists.

**END OF SECTION 26 27 26**

## **SECTION 26 28 23 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes the following enclosed low voltage components rated at 600 VAC or less:
1. Heavy duty single throw, fused, safety switch.

#### **1.2 REFERENCES**

- A. National Fire and Protection Association (NFPA)
1. 70 - National Electrical Code (NEC)
- B. National Electrical Manufacturers Association (NEMA).
1. B 3-2001 - Molded Case Circuit Breakers and Their Application.
  2. AB 4-2001 - Guidelines for Inspection and Preventive Maintenance of Molded Case Circuit Breakers Used in Commercial and Industrial Applications.
  3. KS 1-2001 - Enclosed and Miscellaneous distribution Equipment Switches (600 Volts Maximum).

#### **1.3 SUBMITTALS**

- A. Contractor shall submit all the product data in Division 26 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
  2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 262823.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
  3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data
1. Pursuant to Section 013300 - Submittals.
  2. Manufacturer's data including materials of construction, equipment weight, and related information for each item specified in PART 2 PRODUCTS.
- C. Shop Drawings
1. Back panel and enclosure layouts including interior and exterior front and side exterior view details showing maximum overall dimensions.
  2. For enclosure weighing 150 pounds and over, provide physical properties, handling and mounting data including total weight, lifting instructions, height, and floor space required. Mounting requirements for seismic zone 4.
  3. All drawings shall list the equipment number.
  4. Component designations shall match those shown on the Drawings.
- D. Quality Assurance/Control Submittals
1. Manufacturer's Instructions
    - a. List special requirements or restrictions of the motor/load combination.

- b. Submit copy of the manufacturer's operating and maintenance manuals and, installation instructions.

## **1.4 QUALITY ASSURANCE**

- A. Regulatory Requirements
  - 1. Products shall be UL listed.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Storage and Protection
  - 1. Products shall be stored and installed in a dry environment maintained at 65 degrees F or above.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURED UNITS**

- A. **Heavy Duty Non-Fused Safety Switch (262823.S21).**
  - 1. Heavy Duty Non-Fused Safety switches shall be provided as shown on the Drawings
  - 2. Heavy Duty Non-Fused Safety switches shall be rated for the load served and shall switch all the phase conductors.
  - 3. Heavy Duty Non-Fused Safety switches shall include separate, unswitched, neutral and ground buses where applicable.
  - 4. Heavy Duty Non-Fused Safety switch enclosures shall be painted steel, NEMA 3R, outdoor, surface mount for outdoor installations and NEMA 12 surface mount for indoor installations
  - 5. Heavy Duty Non-Fused Safety switch ground bus shall be large enough to accommodate terminations for all grounding conductors.
  - 6. Provide Eaton, or approved equal.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. All identification labeling shall be in compliance with Section 260553 Electrical and Control Identification.
- B. Install switches and circuit breakers as indicated on the Drawings.
- C. Install equipment level and plumb.
- D. Provide nameplates as indicated on the Drawings.

### **3.2 ADJUSTING**

- A. Adjustable features such as the trip setting for a circuit breaker shall be adjusted pursuant to the manufacturer's instructions.

**END OF SECTION 26 28 23**



## **SECTION 26 51 00 - INTERIOR LIGHTING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes.
1. This Section includes the requirements for the interior illumination fixtures and controls.

#### **1.2 SUBMITTALS**

- A. Contractor shall submit all the product data in Division 26 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
  2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 265100.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
  3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data.
1. Pursuant to Section 013300 Submittal Procedures.
  2. Manufacturer's data including materials of construction, fixture dimensions, options provided and related information for each item specified in PART 2 PRODUCTS.

#### **1.3 QUALITY ASSURANCE**

- A. Regulatory Requirements.
1. All products shall be UL listed for the environment they are installed in.

### **PART 2 - PRODUCTS**

#### **2.1 FIXTURES**

- A. Reference the Luminaire Schedule for all Interior Luminaires.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. General.
1. All identification labeling shall be in compliance with Section 260553 Electrical and Control Identification.
  2. CONTRACTOR shall provide all mounting hardware required to mount luminaires in lay-in or gypsum board ceilings. Verify ceiling types with the ARCHITECT. Luminaires of a given type may be used in more than one type of ceiling.

3. Luminaires shall be supported by #12 AWG hanger wire connected to the luminaire and the building structure.
4. Positively attach all luminaires to the suspended ceiling system. Attachment devices shall have capacity of 100% of the luminaire weight acting in any direction.
5. Verify luminaire locations with the ARCHITECT'S reflected ceiling plan.
6. Adjustable luminaire heads shall be aimed as directed by the ENGINEER.
7. All luminaires shall be cleaned of all dirt, dust, and finger prints prior to close-out.

**END OF SECTION 26 51 00**

**SECTION 28 00 00 - GENERAL ELECTRONIC SAFETY AND SECURITY REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Section Includes
  - 1. General safety and security requirements.

**1.2 REFERENCES**

- 1. The following is a list of Standards that may be referenced in the Section.
- 2. Building Industries Consulting Services International (BICSI).
- 3. Electronics Industries Alliance (EIA).
- 4. International Building Code (IBC).
- 5. Institute of Electrical and Electronics Engineers (IEEE).
- 6. National Fire Protection Association (NFPA).

**1.3 PERMITS, FEES AND SERVICE CHARGES**

- A. The CONTRACTOR shall obtain all electrical permits required to complete the work and pay all associated fees.
- B. The CONTRACTOR shall coordinate and provide for the installation and operation of franchise utility service (including any telephone and/or leased lines specified) as required during construction, startup, testing, and operation of the work until substantial completion.

**1.4 INTENT OF DRAWINGS AND SPECIFICATIONS**

- A. Riser and other diagrams are schematic and are intended to show the approximate location of equipment, and the general alignment of conduits and piping, and shall not be used for obtaining quantities. Dimensions given on the plans shall take precedence over scaled dimensions and all dimensions whether in figures or scaled, shall be verified in the field.
- B. Not all components for the Division 28 systems are shown on the DRAWINGS. The CONTRACTOR shall be responsible for providing a complete system, regardless of whether or not components are shown on the DRAWINGS.
- C. The electrical drawings do not show complete details of the site conditions. The CONTRACTOR shall check actual conditions.
- D. The exact location of apparatus, fixtures, equipment, conduit and piping shall be ascertained by the CONTRACTOR in the field, and the work shall be laid out accordingly. Should the CONTRACTOR fail to ascertain such locations or coordinate with work performed by other trades, the work shall be changed at no additional cost to the OWNER when so ordered by the ENGINEER. The ENGINEER reserves the right to make minor changes in the location of conduit, piping and equipment up to the time of installation without additional cost to OWNER.
- E. CONTRACTOR shall provide all labor, materials, equipment, machinery, and tools necessary to provide all electrical equipment specified and shown on the Drawings. All items not specified in detail or shown on the Drawings but necessary for complete installation shall be provided by the CONTRACTOR.

## **1.5 SUBMITTALS**

- A. Contractor shall submit all the product data in Division 28 at the same time. Piecemeal submittals will be rejected as incomplete.
  - 1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
  - 2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 280000.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
  - 3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Deferred Submittals
  - 1. Submittals for seismic bracing and anchoring shall be a deferred submittal. Engineering of the seismic bracing and anchoring system shall be provided by a licensed Engineer in the State of Oregon. Submittals shall include calculations and drawings, including connection types/materials/sizes, load, maximum load, dimensions, etc.
- C. The CONTRACTOR shall indicate on the submittals all variances from the Specifications.
- D. Record Drawings. After the completion of construction, the CONTRACTOR shall provide one set of "as-built" drawings to the ENGINEER as specified herein showing the location of buried conduits and all changes or deviations from the original drawings.
- E. Final inspection certificates shall be submitted prior to final payment.

## **1.6 COORDINATION OF WORK**

- A. The CONTRACTOR shall plan his work in coordination with the other trades and with the OWNER.
- B. The CONTRACTOR shall field verify all dimensions of equipment to be installed or provided by others so that correct clearances and connections may be made between the work installed by the CONTRACTOR and equipment installed or provided by others.
- C. The CONTRACTOR shall arrange all conduit runs so that they do not interfere with piping, structural members, etc.
- D. All working measurements shall be taken from the sites, checked with those shown on the drawings, and if they conflict, reported to the ENGINEER at once, and before proceeding with the work. Should the CONTRACTOR fail to comply with this procedure, he shall alter his work at his own expense as directed by the ENGINEER.
- E. No additional payments will be allowed where obstructions in the work of other trades, or work under this contract requires offsets to conduit runs.
- F. The CONTRACTOR is responsible for all alterations in the work to accommodate equipment differing in dimensions or other characteristics from that shown or specified.

- G. The CONTRACTOR shall provide all temporary power necessary for existing site equipment and for all construction needs.

### **1.7 DEMOLITION**

- A. Contractor shall be responsible for removing all devices, cabling, raceways, and boxes completely as shown on the drawings.
- B. No non-functioning devices shall remain in the project upon completion.
- C. Devices that are discovered to be made inadvertently non-functional because of demolition work shall be brought to the attention of the owner and engineer immediately.

### **1.8 SUPERVISION**

- A. The CONTRACTOR shall maintain adequate supervision of the work and shall have a responsible person in charge at the site during all times that work under this contract is in progress, or when necessary for coordination with other work.

### **1.9 CODES**

- A. Work shall conform to the National Electrical Code (NEC), and State Codes and other applicable codes, even though not specifically mentioned for each item. These shall be regarded as the minimum standard of quality for materials and workmanship.

### **1.10 CONTRACTOR'S RECORD DRAWINGS & AS-BUILTS**

- A. The CONTRACTOR shall maintain a neatly marked set of record drawings showing the locations of all buried conduits and other utilities encountered or installed during construction. The final locations of equipment racks, panels, field mounted instruments and panels, terminal boxes, junction boxes, cable trays, wiring devices and other materials included in the work shall be shown, as well as conduit routing between them to the extent it differs from the design drawings. Record drawings shall be kept current with the work as it progresses and shall be subject to inspection by the OWNER's Representative at any time. Failure to keep field record drawings current may result in the issuance of a stop work order or delay in the processing of pay requests until the record drawings are made current.
- B. The CONTRACTOR shall provide one complete set of as-built electrical schematics for all patch panels and equipment provided, including horizontal cabling schematics as applicable, panel elementary diagrams, interconnecting wiring diagrams, wire numbers, termination strip locations and numbers. These shall be in the same format and style as those in the Contract Documents and submittal requirements.
- C. All information shown on the CONTRACTOR's field record drawings and as-built schematics shall be subject to verification by the OWNER's Representative. If significant errors or deviations are noted by the OWNER's Representative, new as-builts shall be completed at the CONTRACTOR's expense.

## **PART 2 - PRODUCTS**

### **2.1 PORTABLE OR DETACHABLE PARTS**

- A. The CONTRACTOR shall retain in his possession and shall be responsible for all portable and detachable parts or portions of installations such as fuses, key locks, adapters, blocking chips and inserts until completion of his work.

- B. These parts shall be delivered to the ENGINEER and an itemized receipt obtained. This receipt, together with 2 copies of the final inspection certificate, shall be attached to the CONTRACTOR's request for final payment.
- C. All equipment shall be demonstrated to operate in accordance with the requirements of this specification and the manufacturer's recommendations.

## **2.2 NEW PRODUCTS**

- A. All products shall be new without defects and covered by Manufacturer's warranty. Products shall be re-used only where indicated on the Drawings.
- B. All products shall be listed, labeled, and certified by a testing agency approved by the state of Oregon.
- C. All equipment of the same type and capacity shall be by the same manufacturer.

## **PART 3 - EXECUTION**

### **3.1 IDENTIFICATION**

- A. All identification labeling shall be in compliance with Section 260553 Electrical and Control Identification.

### **3.2 WORKMANSHIP & COORDINATION**

- A. All work shall be performed by personnel skilled in the particular trade in a workmanlike manner. Workmanship shall conform to the standards of the NEC and the National Electrical Installation Standards (NEIS).
- B. The ENGINEER shall be the sole judge as to whether or not the finished work is satisfactory; and if in his judgment any material or equipment has not been properly installed or finished, the CONTRACTOR shall replace the material or equipment whenever required, and reinstall it in a manner entirely satisfactory to the ENGINEER without any increase in cost to the OWNER.
- C. The CONTRACTOR shall coordinate and verify the installation of all equipment furnished by him to other trades, or equipment provided and installed by other trades that is connected to the electrical or control systems. Work shall include the furnishing of all labor, materials, and equipment required for the installation of a complete and operable system as hereinafter specified and as indicated on the drawings. The Contract Documents are complementary and what is called for by anyone shall be as binding as if called for by all. Unless otherwise specifically stipulated, the term "furnished and installed complete" shall be considered a part of this section.

### **3.3 TEMPORARY HEATING, LIGHTING AND POWER**

- A. The CONTRACTOR shall provide all heat, lighting and power required to construct and protect the work until the work is placed in service by the OWNER for beneficial use of the OWNER. Temporary heaters shall be provided as required to keep the work area and all new electrical components dry.
- B. The source for temporary power shall be from the electric utility or OWNER approved CONTRACTOR supplied auxiliary power units. The installation for electric power shall meet the requirements of local authorities and of OSHA.
- C. The CONTRACTOR shall obtain all permits and pay all costs for connecting temporary power service at no expense to the OWNER.

### **3.4 SUPPORT BACKING**

- A. Provide any necessary backing required to properly support all fixtures and equipment installed under this contract.

### **3.5 CUTTING, PATCHING AND FRAMING**

- A. The CONTRACTOR shall determine in advance the locations and sizes of all sleeves, chases, and openings necessary for the proper installation of his work.
- B. Whenever practical, inserts or sleeves shall be installed prior to covering work. Cutting and patching shall be held to a minimum. All required holes in concrete construction shall be made with a core drill and patched with non-metallic non-shrink grout.
- C. Cutting, fitting repairing and finishing of carpentry work, metal work, or concrete work, and the like, which may be required for this work shall be done by craftsmen skilled in their respective trades. When cutting is required, it shall be done in such a manner as not to weaken walls, partitions, or floors; and holes required to be cut in floors must be drilled without breaking out around the holes.
- D. Penetrations through fire and smoke rated partitions shall be sealed in accordance with Section 078400 Firestopping.

### **3.6 ACCESS PANELS**

- A. The CONTRACTOR shall provide all access panels in hard ceilings to allow NEC-required access to junction boxes and pull boxes. The CONTRACTOR shall submit to the ENGINEER for approval floor plans (1/8" = 1'-0" scale minimum) which clearly indicate proposed access panel locations.

### **3.7 CLEANING AND TOUCH-UP PAINT**

- A. Upon completion of work, all electrical equipment shall be cleaned.
  - 1. Vacuum all dirt, metal shavings, and foreign materials from all enclosures. The use of compressed air shall not be acceptable.
  - 2. All stains, dirt, and fingerprints shall be removed from enclosures, and all other electrical and communications equipment covers.
- B. Provide touch-up paint on equipment that has been scraped, scratched, or chipped during construction. Paint color shall match color of equipment.

**END OF SECTION 28 00 00**

## **SECTION 28 05 29 - HANGERS & SUPPORTS FOR SAFETY & SECURITY SYSTEMS**

### **PART 1 – GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
1. This section includes requirements pertaining to electrical equipment anchoring and electrical equipment hanging and support.

#### **1.2 SUBMITTALS**

- A. Contractor shall submit all the product data in Division 28 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
  2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 280529.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
  3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data.
1. Pursuant to Section 013300 Submittal Procedures.
  2. Manufacturer's data including materials of construction, equipment weight and related information for each item specified in PART 2 PRODUCTS.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. **Wide Base J-Hooks (280529.J01).**
1. Shall be 1-5/16" diameter loop, pre-galvanized steel.
  2. Provide all accessories required to independently support the J-hooks from the structure. The CONTRACTOR shall provide the required supports based on the location of the J-hook installation.
  3. Provide multiple J-hook "trees" to allow a stacked installation of multiple cabling systems. Do not mix separate cabling systems (IT, CATV, fire alarm, building automation, security) within the same J-hook.
  4. Shall be Erico Caddy Cat HP, or approved equal.
- B. **Galvanized Hardware (280529.H11).**
1. Bolts shall be hot dipped galvanized steel and sized for the load served and have a hex head unless specifically specified otherwise elsewhere.
  2. Nuts shall be hot dipped galvanized steel hex nut.
  3. Washers shall be hot dipped galvanized steel, USS pattern flat washers.
  4. Split lock washers shall be hot dipped galvanized steel.
  5. Threaded rods and couplings shall be hot dipped galvanized steel.



6. Eye-bolts, u-bolts, bent-bolts and similar connecting hardware shall be hot dipped galvanized steel.
- C. **Galvanized Anchors (280529.A11).**
  1. Wedge or stud anchors installed in concrete or masonry shall be hot dipped galvanized steel and sized for the load served.
  2. Toggle type fasteners shall only be used in hollow sheetrock wall. The wing part of the fastener may be mild steel, but the bolt shall be hot dipped galvanized steel.
- D. **Galvanized Beam Clamps (280529.B11).**
  1. Beam clamps shall be hot dipped galvanized steel and sized for the load served.
- E. **Galvanized Strut Channel (280529.S11).**
  1. Galvanized strut channel shall be hot dipped galvanized after fabrication and shall be a minimum of 12 gauge.
  2. Galvanized strut channel shall have factory pre-drilled holes.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. General.
  1. J-hooks shall be utilized for horizontal cabling between cable tray and wall conduit.
  2. J-hook spacing shall not exceed 60".
  3. Cable sag between j-hooks shall not exceed 12".
  4. Bundle cables using velcro straps. The use of plastic cable ties to bundle cable at J-hooks is prohibited.
  5. J-hooks shall be independently supported by the building structure. J-hooks shall not be secured to ceiling hanger wires.
  6. J-hooks shall be installed a minimum of 12" from all power branch circuit conduit and wiring and luminaires.
  7. J-hooks shall be installed a minimum of 3" above removable ceiling tiles.
  8. J-hooks shall be installed with a minimum of 18" clear space on the working side.
  9. Where specific pathways are not shown on the Drawings, the design of the j-hook system shall be CONTRACTOR's choice.
  10. CONTRACTOR shall provide j-hook trees where multiple low voltage systems (IT, nurse call, CATV, fire alarm, security, building automation) serve the same space. The number of j-hooks on the tree shall be sufficient to permit all of the different systems to be installed on a separate j-hook. Where less than six cables of different systems serve the same area, combining cables within the same bundle and j-hook shall be acceptable.
  11. CONTRACTOR shall be responsible for coordination the installation of j-hooks and horizontal cabling with other trades.
  12. Hardware shall be set to a torque as recommended by the manufacturer.
  13. Washers and split lock washers shall be installed on all bolts, threaded rods and anchors.
  14. Lead or plastic type anchors are prohibited from use on the project.
  15. When threaded rods are installed in drop-in type anchors, a washer, split lock washer and a jamb nut shall be installed at the anchor to ensure stability.
  16. When channel (strut) is installed as a hanger or support from threaded rod, washers, split lock washers and jamb nuts shall be installed on both sides of the strut to lock it in place.
  17. Cut ends of channel, strut, threaded rods or other cut fittings shall be filed smooth before installation.
  18. Cut ends of hot dipped galvanized channel and strut shall be coated with three coats of cold galvanizing compound after the channel has been filed to prohibit rust.
  19. Concrete anchors shall be installed as per the manufacturer's directions and set using the manufacturer's supplied tool.

20. Threaded rod shall not extend more than one (1) inch beyond the channel, strut or other material it is supporting.
21. Hangers and supports shall be installed level and plumb.
22. Hangers and supports shall be installed per the National Electrical Code, Building Code and Structural Code and shall be designed to safely support the load. The ENGINEER may request the CONTRACTOR provide a copy of their design calculations for the seismic requirements and the load served.

**END OF SECTION 28 05 29**

**SECTION 28 05 33 - CONDUITS & BOXES FOR SAFETY & SECURITY SYSTEMS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
1. This section includes requirements pertaining to pathways for communications systems.

**1.2 SUBMITTALS**

- A. Contractor shall submit all the product data in Division 28 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
  2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 280533.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
  3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data.
1. Pursuant to Section 013300 Submittal Procedures.
  2. Manufacturer's data including materials of construction, equipment weight and related information for each item specified in PART 2 PRODUCTS.
  3. Seismic calculations and drawings.

**PART 2 - PRODUCTS**

**2.1 ROUGH-IN REQUIREMENTS**

- A. The following table summarizes the Division 28 rough-in requirements for this project, unless shown differently on the Drawings:

DIVISION 28 ROUGH-IN REQUIREMENTS			
Device	Box	Conduit	Notes
Fire Alarm Device Wall	Galvanized Sheet Metal Box (280533.B01)	.75 Inch	Install conduit from box to accessible ceiling or nearest cable tray
Fire Alarm Device Surface	Galvanized Sheet Metal Box (280533.B01)	.75 Inch	Install conduit from box to ceiling.

## **2.2 MATERIALS**

### **A. EMT Conduit (280533.C01).**

1. Reference Specification Section 260533 for requirements for EMT conduit.
2. Provide bushings at all conduit terminations.
3. Reference the Division 28 Rough-In Requirements in Part 2.1 of this Specification
4. Provide bushings at all conduit terminations.
5. Exposed surface mounted EMT conduit shall be powder coated. Finish shall be white.
6. Division 28 devices in exposed areas shall be installed using surface mounted raceway as specified within this Section and within Section 260533 Raceways and Boxes for Electrical Systems.

### **B. Galvanized Sheet Metal Boxes (280533.B01).**

1. Reference Specification Section 260533 for requirements for boxes.
2. Sheet metal boxes for the following Division 28 wiring devices shall be 4-11/16" x 4-11/16" x 2-1/8".
3. Boxes for fire alarm shall be red.

### **C. Sleeves (280533.S01).**

1. Provide conduit sleeves through floors as shown on the Drawings.
2. Provide conduit bushing on each end.

## **2.3 FIRESTOPPING**

- A. Firestopping products shall be provided in all fire and smoke rated partition penetrations per Specification Section 078400 Firestopping.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

#### **A. General.**

1. Galvanized sheet metal boxes shall be used for all surface mount applications.
2. No section of conduit shall exceed two 90-degree bends.
3. Sections of conduit shall not exceed 100 feet without a pull point.
4. Condulets shall not be used for bends unless approved by the ENGINEER. Utilize field or factory bends only.
5. Where specific pathways are not shown on the Drawings, the design of the pathway shall be CONTRACTOR's choice.
6. CONTRACTOR shall be responsible for coordination the installation of conduits and boxes with other trades.
7. Conduits shall be reamed.
8. Metallic threads shall all be coated with conduit thread lubricant before assembly. Failure to install the lubricant will result in removal of all conduit and reassembly with the conduit lubricant.
9. Exposed conduits shall be installed parallel or perpendicular to the structural members and surfaces and shall be level and or plumb.
10. When two or more conduits are routed in the same general direction their routing shall be parallel with symmetrical bends.
11. Conduits shall be bent with equipment specifically designed for this purpose and for the specific size and type of conduit.
12. Conduits that are creased or crushed shall be replaced.
13. Install conduits such that they do not interfere with the proper and safe operation of equipment and do not block or otherwise interfere with the ingress and egress and installation of removable hatches and covers.

14. Install expansion joints as needed across expansion joints in the structure and at other locations where necessary to compensate for thermal or mechanical expansion or contraction.
15. Conduits shall be routed at least six (6) inches from high temperature piping, ducts and flues
16. Conduits over 10 feet in length shall be provided with a pull string.
17. Raceways shall be electrically and mechanically complete before the conductors are installed.
18. Routing of conduits may be adjusted to avoid obstructions. Coordinate with other trades prior to installation of raceways. Lack of such coordination shall not be justification for extra compensation and removal and reinstallation to resolve conflicts shall be at the CONTRACTOR's expense.

**B. Conduits for Exposed Wiring**

1. No Division 28 wiring shall be exposed. In all areas where wiring is exposed, conduit shall be provided as described in Part 2.1 Rough-In Requirements of this Specification.
2. Conduit sleeves shall be provided across inaccessible ceilings to allow cables to be pulled across these areas both during construction and in the future.
3. Conduit sleeves shall be for through-wall or through-floor penetrations to allow cables to be pulled across these areas both during construction and in the future.
4. Major conduit sleeves have been shown on the Drawings. However, the CONTRACTOR shall be responsible for providing all sleeves required for a complete installation. The final quantity and location of all sleeves shall be provided by the CONTRACTOR, whether or not they have been shown on the DRAWINGS. Coordination of sleeve requirements with the Division 27 installer shall be the responsibility of the CONTRACTOR.
  - a. Any penetration 7/8" or smaller shall not require conduit sleeves, but shall be fire stopped, grout filled, and / or filled with drywall.
5. If conduit sleeves are not shown on the Drawings, they shall be provided by the CONTRACTOR. When sleeves are not shown on the Drawings but are required, the CONTRACTOR shall provide appropriately sized sleeves. The sleeves shall meet the following Codes and standards:
  - a. NEC / OESC.
  - b. TIA / EIA standards.
  - c. 25% spare capacity minimum.
6. Fire Rated Sleeves
  - a. Fire Rated Sleeves – Small shall be used for all applications with 24 cables or less.
  - b. Fire Rated Sleeves – Large shall be used for all applications with 120 cables or less.
  - c. If any sleeve has been filled to 60% of capacity, a new sleeve shall be provided.
7. Conduit Terminations at Cable Tray
  - a. Conduit that terminates at a cable tray shall be provided with a bushing and shall be bonded and secured to the cable tray using a Manufacturer approved clamp or clip. Bond conduit to the cable tray using #6 AWG minimum.

**END OF SECTION 28 05 33**

## **SECTION 28 30 00 - FIRE DETECTION AND ALARM**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes.
1. The section includes requirements for fire alarm detection and alarm.

#### **1.2 REFERENCES**

- A. The following is a list of standards which may be referenced in this Section.
1. National Fire Protection Association (NFPA)
    - a. NFPA 13 – Sprinkler Systems.
    - b. NFPA 70 – National Electrical Code.
    - c. NFPA 72 – National Fire Alarm Signaling Code
    - d. NFPA 101 – Life Safety Code
  2. International Fire Code – 2009 Version:
  3. Underwriters Laboratories (UL):
    - a. UL 268 - Smoke Detectors for Fire Alarm Signaling Systems
    - b. UL 497 B – Protectors for Data Communications and Fire Alarm Circuits
    - c. UL 864 - Control Units and Accessories for Fire Alarm Systems
    - d. UL 1424 – Cables for Power-Limited Fire Alarm Circuit
    - e. UL 1971 - Signaling Devices for the Hearing Impaired

#### **1.3 SUBMITTALS**

- A. Contractor shall submit all the product data in Division 28 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be submitted in PDF format. Each PDF shall only contain products from a single specification section, products in a different specification section shall be in a separate PDF.
  2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 283000.C01) typewritten in the upper right-hand corner of the submittal. The submittals within each PDF shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
  3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data
1. Pursuant to Section 013300 Submittal Procedures.
  2. Manufacturer's data including materials of construction, methods of installation and related information for each item specified in PART 2 PRODUCTS.

#### **1.4 PERMITTING AND SUBMITTALS TO THE AUTHORITY HAVING JURISDICTION (AHJ)**

- A. The CONTRACTOR is responsible to provide drawings to the local jurisdiction having authority for approval and permitting. The drawings shall include at a minimum the voltage drop calculations and battery calculations. The CONTRACTOR shall be responsible for all fees required for plan review

and permitting. The ENGINEER will provide a copy of the Contract Drawings related to the Fire Alarm System for the CONTRACTOR'S use

- B. A copy of the Product Data and Quality Assurance/Control Submittals shall be provided to the AHJ. In addition, a copy of the Contract Documents shall be included. The Contractor shall make clarifications or revisions as directed by the AHJ. All comments received from the AHJ shall be submitted immediately to the Engineer for review.

### **1.5 CONTRACTOR DESIGN REQUIREMENTS**

- A. The CONTRACTOR shall be responsible for providing final design of the fire alarm system. The contract documents show the general nature of the fire alarm system. The CONTRACTOR shall provide all fire alarm devices required for a complete system in accordance with NFPA 72 and to the satisfaction of the AHJ. Design shall include the following:
1. Quantity and location of all initiation devices.
  2. Quantity and location of all notification devices.
  3. Speaker wattage sizing and selection.
  4. Signaling line circuit (SLC) and initiating device circuit (IDC) design, including voltage drop calculations.
  5. Battery sizing and selection.
  6. Leave 20% of fire system addresses and NACs available for future expansion.
    - a. Zone building logically, i.e. East, West, Floor, Wing, Portables, Annex, etc. No more than 22,500 square feet per detector zone as per NFPA 72.
    - b. Sprinkler flow alarms and tamper supervisory signals - Separate annunciation for each.
- B. Provide SLC expander modules with the new FACP to support all of the existing and new initiation devices.
- C. Shop Drawings and As-Built:
1. Shop Drawings to include:
    - a. Point to point connections.
    - b. Wiring and pathways.
    - c. Riser locations.
    - d. Address each device (device label info).
    - e. Detail location of each device.
    - f. Detail pull point J-boxes.
    - g. Power supply. Panel location and breaker number.
    - h. Signal expanders and DC power supplies, including panel name or address.
    - i. Annunciators.
    - j. Battery calculations for all panels.
    - k. Voltage and current calculations for all panels and NACs.
    - l. Must include mezzanine, mechanical, and roof type areas.
    - m. Consult Fire Marshall prior to final bid document. Verify locations and number of devices.
      - i) Submit shop drawings.
      - ii) Submit battery and voltage calculations.
  2. As-Built Drawings to Include:
    - a. Point to point connections.
    - b. Wiring and pathways.
    - c. Riser locations.
    - d. Address each device (device label info).
    - e. Detail location of each device.
    - f. Detail pull point J-boxes.
    - g. Power supply. Panel location and breaker number.
    - h. Signal expanders and DC power supplies, including panel name or address.

- i. Annunciators.
- j. Battery calculations for all panels.
- k. Must include mezzanine, mechanical, and roof type areas.
- l. Voltage and Current calculations for all panels and NACs.
- m. Submittal of As Built drawings is required prior to issuance of substantial completion.

## **1.6 WARRANTY**

- A. All components, parts and assemblies supplied by the manufacturers and installed by the CONTRACTOR shall be warranted against defects in material and workmanship for a period of at least 36 months (parts and labor), commencing upon the date of acceptance by the OWNER. A qualified factory-trained service representative shall provide warranty service.
- B. The warranty shall be in the OWNER's name.

## **1.7 EXISTING FIRE ALARM SYSTEM**

- A. The existing Fire Alarm system shall be extended in the renovated spaces as shown on the drawings.
- B. The existing FACP is a Siemens Cerberus Pyrotronics.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. **Horn Strobe (283000.H01).**
  - 1. Shall be UL 1971 listed.
  - 2. Wall or ceiling mount style.
  - 3. Suitable for indoor and outdoor installations.
  - 4. Strobes shall match specifications for visual strobes.
  - 5. Color shall be red.
- B. **Visual Strobe (283000.V01).**
  - 1. Visual notification appliances shall be UL 1971 Listed.
  - 2. Notification appliances shall be wall or ceiling mount style.
  - 3. Suitable for indoor and outdoor installations.
  - 4. Notification appliances shall produce a minimum flash rate of 60 flashes per minute over the UL regulated voltage range of 16 to 33 VDC and shall incorporate a Xenon flashtube. Notification appliances shall have four (4) field selectable candela settings of 15, 30, 75 and 110 candela.
  - 5. Notification appliances shall be rated for 24 VDC.
  - 6. Notification appliance color shall be red.
- C. **Smoke Detectors (283000.S01).**
  - 1. Smoke detectors shall be photoelectric type.
  - 2. Smoke detectors shall be addressable.
  - 3. Smoke detectors shall be two-wire style.
  - 4. Shall be constantly monitored for changes in sensitivity due to dirt, humidity, dirt, and temperature.
  - 5. Shall provide advance notice to the FACP when requiring maintenance.
  - 6. Color shall be white.
- D. **Notification Appliance Circuit Conductors (283000.N10).**
  - 1. Notification Appliance Circuit (NAC) Conductors shall be copper, un-twisted, unshielded. Conductor color shall be red (+) and black (-).



2. NAC Conductor material shall be stranded copper.
3. NAC Conductors shall be plenum rated.
4. NAC Conductor size shall be 14/2 AWG.
5. NAC Conductor insulation shall be PVC.
6. NAC Conductor jacket cover shall be PVC. Jacket color shall be red and black.
7. NAC Conductors shall be Southwire FPLP and FPLR, or approved equal.

**E. Speaker Notification Appliance Circuit Conductors (283000.N02).**

1. Speaker Notification Appliance Circuit (NAC) Conductors shall be copper, twisted, shielded. Conductor color shall be red (+) and black (-).
2. Conductor material shall be stranded copper.
3. Conductors shall be plenum rated.
4. Conductor size shall be determined by the CONTRACTOR.
5. Conductor insulation shall be PVC.
6. Shield shall be 100% aluminum polyester foil.
7. Conductor jacket cover shall be PVC. Jacket color shall be red and black.
8. Conductors shall be Southwire FPLP and FPLR, or approved equal

**F. Signaling Line Circuit Conductors (283000.S02).**

1. Signaling Line Circuit (SLC) Conductors shall be copper, twisted unshielded pair. Conductor color shall be red (+) and black (-).
2. SLC conductors between buildings shall be twisted shielded pair, rated for outdoor use.
3. SLC Conductor material shall be stranded copper.
4. Shall be rated for outdoor use where outdoor installations are shown on the DRAWINGS.
5. SLC Conductors shall be plenum rated.
6. SLC Conductor size shall be 16/2 AWG.
7. SLC Conductor insulation shall be PVC.
8. SLC Conductor jacket cover shall be PVC. Jacket color shall be red and black.
9. SLC Conductors shall be Southwire FPLP and FPLR, or approved equal.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

**A. General.**

1. All identification labeling shall be in compliance with Section 260553 Electrical and Control Identification.
2. The CONTRACTOR shall coordinate the installation of the 120 VAC power with the Fire Alarm installer. Care shall be taken to ensure that the 120 VAC branch circuit conduit is installed according to the Manufacturer's requirements and the NEC. The 120 VAC branch circuit conductors shall be installed within the FACP such that Code required separation is maintained between Class 1 conductors and the power limited conductors. Installing Class 1 conductors across power limited conductors or over the batteries shall not be acceptable.
3. All devices which contain end of line resistors shall be marked with a label on the device cover. The label shall read: "EOLR".
4. Fire alarm circuit conductors shall not be twisted when spliced with a wire nut.
5. All Fire Alarm System junction boxes shall be red.
6. Fire Alarm System wire and cable shall be arranged in a neat manner and securely supported in cable groups.
7. Fire Alarm System Wiring shall be protected from sharp edges and corners.
8. Coordination is the responsibility of the CONTRACTOR. If a conflict exists for the mounting location of devices, the CONTRACTOR shall bring it to the ENGINEER's attention during the rough-in phase and the ENGINEER shall provide direction. Failure to coordinate conflicts during the rough-in phase will result in relocation of devices at the CONTRACTOR's expense.

9. Devices shall be installed level and plumb. Devices shall be brought out plumb with the wall surface via UL listed spacers approved for this purpose if necessary.
10. The position of devices, as shown on the Drawings, are general locations only unless dimensioned. The CONTRACTOR is responsible to coordinate with various trades to ensure no conflict exists.
11. All strobes shall be synchronized.
12. All testing and demonstration shall be performed to the satisfaction of the AHJ and the Fire Marshal.

**B. Cable Installation**

1. Neatly group cables together that terminate on the same fire alarm hardware. Utilize Velcro cable ties.
2. Cable runs shall not obstruct walkways or service access to mechanical and electrical equipment. All cabling shall be self-supported and attached to the structure as required by Code. Cables shall follow a common path where possible. Sweep 90-degree bend radii shall be installed.
3. Cables shall be installed parallel and perpendicular to the structural elements of the building. Line of sight "spider webs" shall not be permitted.
4. Cables installed above accessible ceilings shall not block access to access panels, mechanical equipment, piping valves, electrical equipment, or other equipment requiring access for maintenance and service.
5. Cables shall not be supported by any temporary building structure, including conduit, duct work, water pipes, hydronic piping, storm water piping, T-bar ceiling tiles, and/or support wires.
6. Cables above accessible ceilings shall be supported every 4-6 feet.
7. All cables in exposed areas shall be installed in a surface raceway.
8. All cables within walls or soffits shall be installed in metallic conduit.

**C. Testing**

1. All fire alarm circuits shall be tested for open circuits and ground faults.
2. All smoke detectors shall be tested using a listed smoke detector tester product.
3. Alarm conditions shall be simulated, and the operation of all notification devices shall be verified.
4. Alarm conditions which require interfacing with other systems within the building, such as the Building Automation System and Lighting Control System shall be simulated. The CONTRACTOR shall verify the correct operation of these systems after receiving an Alarm signal from the FACP.

**END OF SECTION 28 30 00**