

BUILDING AMERICA®

GENERAL CONDITIONS AND SPECIFICATIONS

Adopted by the
Union Pacific Engineering Department

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SECTION 00 07 00 - GENERAL CONDITIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. This Section describes Standard Specifications which are broad in scope and apply on most construction projects.

B. Definition of Terms:

1. Whenever in these Specifications the following terms or pronouns in place of them are used, the intent and meaning shall be interpreted as follows:

   a. Railroad: Shall mean Union Pacific Railroad Company and respective affiliates and subsidiary Companies and/or Corporations.

   b. Agreement: The written Agreement and any written supplements or amendments thereto covering the performance of the Work and the furnishing of all superintendence, labor, tools, equipment, material, supplies and all other things required to properly complete the Work.

   c. Contractor: The person or persons, firm, partnership, corporation, or combination thereof, who have entered into the Agreement with the Railroad.

   d. Drawings: The official project plans, profiles, typical cross sections, general cross sections, working drawings and supplemental drawings, or reproductions thereof, approved by the Engineer, which show the location character, dimensions and details of the Work to be performed.

   e. Engineer: The Vice President Engineering of the Railroad or his authorized representative.

   f. Right of Way: Land which the Railroad owns or owns an interest in sufficient to permit performance of the Work.

   g. Specifications: The directions, provisions and requirements contained herein. Any Special Conditions shall override these Specifications.

   h. Project: The total construction of which the Work performed under the Contract Document may be the whole or a part and which may include construction by the Railroad or by separate contractors.

   i. Work: The carrying out of responsibilities and duties imposed by the Agreement, whether completed or partially completed, and includes all labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations.

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PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.01

A. The Contractor shall complete all work in accordance with any and all local, state, and federal codes which have jurisdiction.

B. The Contractor shall perform all work within the confines of existing UPRR right-of-way, proposed right-of-way, construction easements, or public roadway right-of-way. Contractor shall not work within areas beyond existing UPRR right-of-way without prior written approval from the UPRR Engineer. Contractor is responsible for coordinating cost and terms of usage for any staging areas and access with adjacent property owners. Documentation of all agreements with property owners shall be provided to the UPRR Engineer.

C. The Contractor is responsible ensuring sure all applicable State and Local taxes and fees are accounted for in the bid and paid throughout the project

D. Permits obtained by the Railroad for the Project are provided in the All Permits Issued (API) document. The Contractor will be responsible for obtaining all permits listed as the Contractor's responsibility and any and all permits and licenses not specifically provided by UPRR.

E. Site Conditions:

1. All prospective bidders shall visit the site to familiarize themselves with the existing site conditions, access locations, site constraints, existing site drainage, and existing utilities within the project area.

2. The Contractor shall keep fully appraised throughout the performance of the Agreement of existing conditions at the site, including the status and progress of other work, which may affect the performance of this Agreement. The Contractor shall verify all necessary measurements and elevations in the field.

3. The Contractor shall promptly notify the Railroad of:

   a. Any condition at the site which differs from that indicated in the Contract Documents or information furnished by the Railroad, or would be apparent under the mandatory visit to the site to become familiar with existing conditions.

   b. Any previously unknown physical conditions at the site of an unusual nature not revealed by previous investigations and differing from those ordinarily encountered at the site of the Work.

   c. The presence of any hazardous substance or objects of scientific, prehistoric, historical, or archaeological significance not shown on the plans and specifications. If encountered, the Contractor shall also stop all activity in the vicinity of the discovery and exercise necessary care to protect and prevent damage until nature of the findings is determined.

F. Site Supervision:

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1. The Contractor shall maintain on the site at all times during Work at the site a competent resident general superintendent and any necessary assistants, all satisfactory to the Railroad. The resident general superintendent shall represent the Contractor and all directions given to him shall be binding as if given to the Contractor.

G. Material and Equipment by the Contractor:

1. Unless otherwise specified, all materials furnished by the Contractor, for installation as part of the Railroad's facility, shall be new.

2. No material or equipment which is deemed by the Railroad to be experimental will be accepted as complying with the requirements of the Contract Documents. Equipment or material which is provided, but fails to comply with the requirements of said documents, shall be corrected or removed and replaced with complying equipment or material at the Contractor's sole expense provided, however, if the progress of the Work is such as to make such removal impractical, the Railroad shall have the right to accept it and reduce the Agreement price by an amount equivalent to the difference in its value and the value of complying equipment or material. The Railroad may perform such factory or field tests as are deemed necessary to verify that equipment or material meets the performance standards recited in the Contractor's proposal. The Contractor shall be permitted to witness such tests.

3. Should equipment or material fail to meet such standards, the Contractor shall, at his own expense, modify, adjust, repair or replace same, as necessary, to assure compliance therewith and with the other applicable requirements of the Contract Documents.

4. Material Safety Data sheets for all hazardous substances must be submitted to the Railroad prior to bringing hazardous substances onto the property. This is in compliance with 29 CFR 1910.1200, the Federal Hazard Communication Standard. The Contractor shall dispose of hazardous substances in accordance with all Federal, State and local regulations.

H. Patents, Other Intellectual Property Rights and Royalties:

1. If any of the Work or equipment proposed to be furnished by the Contractor is covered by claims or patents of any nature, the Contractor will be required to pay all royalties thereon.

2. The Contractor agrees to indemnify and hold harmless the Railroad from any claim of any third party that any equipment furnished under this Agreement infringes any patent of the United States. If the Railroad notifies the Contractor promptly upon receipt of any claim that the equipment infringes a United States patent and gives the Contractor information, assistance and exclusive authority to settle and defend the claim, the Contractor shall at its own expense and option, either:

a. Settle or defend the claim or any suit or proceeding and pay all damages and costs awarded in it against the Railroad.

b. Procure for the Railroad the right to continue using the equipment.

c. Modify the equipment so it becomes non-infringing.

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d. Replace the equipment or portions thereof so it becomes non-infringing.

3. If, in any suit arising from such claim the continued use of the equipment for the purpose intended is forbidden by any court of competent jurisdiction, the Contractor shall, at its option, take one or more of the actions under 2, 3 and 4 above without affecting the quality, performance or guarantees per the Contract Documents. The foregoing states the entire liability of the Contractor for patent infringement of any equipment.

I. Inspections:

1. The Railroad reserves the right to conduct inspections as it sees fit and hereby requires inspectors shall have the right to inspect all Work as it progresses at the site and shall have access to Contractor's and subcontractor's data relevant to the performance of this Agreement.

2. The Railroad inspectors shall have the right to reject Work which is faulty, or defective, or does not conform to the requirements of the Contract Documents. Inspection shall not relieve the Contractor from any obligations to perform the Work strictly in accordance with the requirements of the Agreement.

J. Occupational Safety and Health:

1. At all times during the performance of the Work, the Contractor shall exercise precaution for the protection of persons and property. The safety provisions of applicable laws, building and construction codes shall be observed. Machinery and equipment and other hazards shall be guarded in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America, to the extent such provisions are not inconsistent with applicable law or regulations.

K. Climatic Conditions:

1. The Contractor shall take all reasonably necessary precautions to protect the Work against adverse climatic conditions.

L. Removal of Debris:

1. All trash, debris, and waste materials shall be removed from the site and disposed of by the Contractor, on a regular basis.

2. If the Contractor does not maintain the cleanliness standards previously mentioned, the Railroad holds the right to perform these duties upon notice to the Contractor and failure by the Contractor with five (5) calendar days to commence corrective action and take other appropriate action. In such case, the costs will be accumulated and subtracted from the Agreement price.

M. Successful Operation:

1. Successful operation is defined as demonstration of meeting performance guarantees by performance testing and completion of all Work including punchlist items, all in accordance with the Contract Documents.

N. Fire Protection:

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1. Only work procedures which minimize fire hazards to the extent practicable shall be used. Combustible debris and waste materials shall be collected and removed from the site each day. Fuels, solvents and other volatile or flammable materials shall be stored in separate areas in well-marked, safe containers. Good housekeeping is essential to fire prevention and shall be practiced by the Contractor throughout the construction period. The Contractor shall follow the requirements from the latest version of the UPRR fire prevention plan.
2. Open burning on Railroad property or related to the project although off Railroad property is strictly forbidden.

O. Contractor Security:

1. The Contractor shall be responsible for all materials and equipment in its custody or placed in construction by it. Security methods shall be employed as required to ensure the protection of all materials, equipment and construction work from theft, vandalism, fire, and all other damage and loss. The Contractor must abide by all of the provisions of the Minimum Contractor Safety Requirements. This includes demobilizing equipment left unattended on the right of way, placing crane booms on the ground when left unattended, and no cell phone use while operating equipment on the right of way.

END OF SECTION

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SECTION 01 11 00 - SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall furnish engineering, design, labor, material, tools, equipment, and construction services necessary to provide total PROJECT SCOPE OF WORK AS HEREIN DESCRIBED.

1.02 OCCUPANCY

A. The Contractor shall allow the Railroad to take possession of and use any completed or partially completed portion of the facility during the progress of the Work as is possible without interfering with the progress of the Contractor. Possession and use of the facility shall not in any way evidence the completion of the Work or signify the Railroad's acceptance of the Work or any part of it.

1.03 NUMBER OF SPECIFIED ITEMS REQUIRED

A. Wherever in these Specifications an article, device or piece of equipment is referred to in the singular number, such reference shall apply to as many such articles as are shown on the Drawings or required to complete the Work.

1.04 FURNISHED BY THE RAILROAD

A. The following Drawings (see Drawings listed in the 'Project Bid Document Index'), furnished by the Railroad, shall be considered as part of and illustrating these Specifications. The Specifications are intended to supplement the Drawings, the two being considered cooperative. They are the property of the Railroad and shall be returned when the Work is completed.

1. The Drawings show the general character of the Work, but the Railroad may furnish large-scale detail Drawings of such portions, as in its judgment may be required, in the preparation of which slight modifications may be made in minor details of design, if necessary. The Contractor shall not execute any work requiring such large-size details until same has been approved and all work must be made in strict accordance with such detail Drawings.

2. Dimensions on Drawings take precedence over measurements by scale, detail Drawings over small-scale Drawings, and full-size details over all other Drawings. The decision of the Railroad shall be final as to the interpretations of Drawings and Specifications.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 01 12 10 - CONTRACTS

PART 1 - GENERAL

1.01 SUMMARY

A. Responsibilities and Duties - Documents, Specifications and Drawings:

1. Contract Documents:

a. The Agreement, applicable Addenda, Exhibits, Schedule of Billable Service Items, Statement of Equipment, Contractor's Statement of Business and Legal Relationships, Drawings and the Specifications (hereinafter the Contract Documents) all set forth numerous responsibilities and duties of the Contractor. The Contractor shall be thoroughly familiar with all of the above Contract Documents in order to fully understand all of his responsibilities and duties.

2. Access to the Specifications and Drawings:

a. The Contractor shall keep a copy of the Specifications and Drawings at the job site, and shall at all times give the Engineer access thereto.

3. Drawings:

a. The Engineer during the progress of the Work, by means of drawings or written instructions, may clarify the drawings and Specifications or make necessary changes in the Work. Any Work that may reasonably be inferred from the Specifications or Drawings as being required to produce the intended result shall be supplied whether or not it is specifically called for.

4. Drawings Furnished by the Railroad:

a. The drawings furnished by the Railroad shall be considered as part of and illustrating these Specifications. The Specifications are intended to supplement the drawings, the two being considered cooperative.

1.02 INCONSISTENCIES IN SPECIFICATIONS AND CORRECTIONS

A. In the event of conflicting requirements, the most restrictive provision shall apply.

B. The Contractor shall immediately report, and fully describe in writing, to the Engineer any and/or all inconsistencies, discrepancies, and/or ambiguities which the Contractor finds between the Contract Documents. The Engineer will promptly, in writing, correct such inconsistencies, discrepancies, and/or ambiguities in writing. Any such work done by the Contractor after his discovery of these inconsistencies, discrepancies, and/or ambiguities shall be done at the Contractor's risk.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 01 14 10 - IRRIGATION FACILITIES

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall in no way alter or obstruct any irrigation ditches, canals or other facilities without first securing the Engineer's approval.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 01 14 12 - WORKING AND FLAGGING NEAR THE TRACKS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. This Section addresses procedures working near active tracks and flagging requirements.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

3.01 FLAGGER COORDINATION

A. Except as authorized by the Agreement and the Engineer, the Contractor will not work within 25 FT of the centerline of any track in service, and will locate all equipment, devices and materials at a sufficient distance from any track to ensure that no apparatus or part of any piece of equipment, device or material, such as the boom of a crane or a dragline, could under any circumstances reach closer than 25 FT to the centerline of any track. When the Contractor is required to work within 25 FT of the centerline of any track in service, a flagman will be required. The Contractor will shut down or clear equipment within 25 FT of track when trains are approaching, as advised by railroad flagman. The Railroad will bear the cost of such Railroad flagmen required for On Track Safety as defined by the Federal Railroad Adminstration (FRA).

B. Railroad flagmen are for the protection of train movements only. The Contractor is responsible for all equipment movements across public and private road crossings. The Contractor's equipment shall be equipped with two-way radios for better communications with railroad flagmen and the railroad engineer. The Contractor Contractor shall supply the Railroad's Employee-in-Charge (EIC), Contractor(s)-In-Charge (CIC), and the Railroads Construction Project Manager(s) a working radio so that they may contact all equipment operators about the status and location of trains. . All other flagging charges not involving the safety of Railroad operations will be at the Contractor's expense.

C. The Contractor must notify the Engineer at least fourteen (14) days in advance of the date the Contractor wishes to have a railroad flagman.

3.02 CONTRACTOR SAFETY

A. The Contractor shall abide by the rules set forth in the "Minimum Safety Requirements" for UPRR Contractors (separate document).

B. General Contractor and all Subcontractors shall attend all safety meetings. Contractor shall adequately maintain their company "Safety Management Plan" throughout the duration of the project. Contractor will conduct FRA required "On Track Safety Training" for all contractor and subcontractor workers.

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C. Emergency phone numbers shall be posted in a conspicuous place in all field offices or on the project property.

D. Cell phone use is not allowed while operating equipment or walking on UPRR property.

3.03 VEHICLE FOR FLAGGER

A. The Contractor shall provide one (1) 4WD pickup truck or flagging purposes per project location. The vehicles shall be suitable for the type of terrain typically encountered to access the project along the Railroad right-of-way and shall meet the following requirements: four-wheel drive, automatic transmission and five years or newer model year. Vehicles will be insured, fueled, and maintained by the Contractor.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Flagger coordination, contractor safety, and vehicle for flagger will not be measured separately for payment.

4.02 PAYMENT

A. Flagger coordination, contractor safety, and vehicle for flagger shall be incidental.

END OF SECTION

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SECTION 01 18 13 - UTILITY LINES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. This Section addresses procedures working around public and private utilities within the project limits.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.01 UILITIES

A. Public or private utilities requiring relocation on the Railroad's Right-of-Way, in the area of the Work, shall be arranged by the Railroad at no expense to the Contractor, unless required in the Scope of Work and/or the Schedule of Billable Service Items.

B. It is the Contractor's responsibility to locate and protect all utilities within the limits of construction. The Contractor shall verify the location, elevations and flowlines of existing utilities that may be in conflict with the proposed work or that will need to connect to the new work prior to start of construction. This may require the Contractor to pothole existing utilities in advance of the start of work to verify elevations at outlets, crossings, or connection points, location and depth of utilities, size and or material types of existing utilities. This verification work shall include but not be limited to connections to existing gas lines, fiber optic lines, sanitary lines, storm sewers, water mains, electrical and communication lines. Verification of existing site conditions and utility locations is considered incidental. If damaged during grading operations, the Contractor shall repair or replace at no additional cost to the Railroad.

C. If active utility lines are encountered that are not shown on the drawings or otherwise made known to the Contractor, the Contractor shall promptly take necessary steps to assure that service is not interrupted. If service is interrupted, the Contractor shall immediately restore service by repairing the damaged utility.

D. If existing utilities are found to interfere with the permanent facilities being constructed under this section, the Contractor shall immediately notify the Engineer and secure his written instructions.

3.02 FIBER OPTICS

A. Fiber optic cable systems may be buried on Union Pacific Railroad property within the limits of this project. The Contractor shall notify the UPRR CBUD (Call Before You Dig) by following instructions on Union Pacific's website at https://www.up.com/cbud to arrange for a cable locator prior to commencing work.

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END OF SECTION

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SECTION 01 31 10 - PROJECT COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

A. The Work involves construction and operations on the Railroad's Right-of-Way, and the Contractor will be required to coordinate all construction activities directly with the Railroad as well as others not party to the Agreement. As part of coordination with UPRR work gangs, the Contractor can expect to work alternate work periods. This may require working nighttime hours and through holidays and weekends. The Contractor shall account for all related coordination and work periods within their bid. There may be delays associated with UPRR track and signal gang activities; track gangs work consolidated work periods. Contractor delays associated with coordination with UPRR crews and railroad operations shall not constitute a change order. Any questions arising about coordination of work between the Contractor and the Railroad or between the Contractor and others shall be taken up with the Engineer and a method of coordination agreed upon before the work is commenced.

B. The safe operation of the Railroad shall take precedence over all Work, and nothing shall be done or caused by the Contractor which will endanger Railroad employees or operation. The Contractor shall become familiar with and comply with the Railroad's rules and regulations concerning protection of persons and property and shall consult with the Engineer concerning the Railroad's rules and regulations.

C. The Contractor is required to furnish and implement a Safety Management Plan. The Safety Management Plan will include General Contractor employees as well as all Sub-Contractors and their employees. The plan will include the following, at a minimum:

1. Requirements contained in established Contractor Safety Plan
2. Governmental Requirements
3. UPRR Minimum Contractor Safety Requirements
4. UPRR Safety Certification
5. UPRR C.I.C. (Contractor in Charge) Policy
6. UPRR Fire Prevention Plan and Risk Assessment
7. UPRR Back-up Policy
8. eRailsafe training
9. eRailsafe Compliance
10. FRA Roadway Worker training
11. FRA Bridge Worker training
12. Safety Audit Process
13. Adjustment Plan to make modifications to The Safety Management Plan
14. Traffic Control Plan and/or Traffic Management

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15. UPRR Lead In Construction

16. Emergency Response Plan

D. All bidders shall submit a resource loaded, task driven critical path method schedule, work plan, and monthly spending plan along with their bid proposal. The schedule and work plan shall include the following information: type and quantity of equipment, manpower, man hours, hours per day to complete each task. The schedule shall indicate the number of calendar days required for each critical item. In determining the calendar days the Contractor shall consider weather and local conditions which are normal for this area. The successful bidder will be required to make monthly updates of the schedule to be submitted with the invoice for payment requests. Contractor's bid may not be considered if a schedule is not included in the bid.

E. All bidders shall provide a tentative list of sub-contractors and the work to be done by them with their bid. The successful bidder shall submit a final list of sub-contractors and the work to be done by them prior to commencing work.

F. The Contractor shall provide evidence of a current State Contractor's license with the bid. Contractor shall be responsible to assure compliance with the laws of the State with regards to any sub-contractors used.

G. UPRR will furnish electronic copies of plans to the Successful Contractor. Hard copies will be the responsibility of the Contractor.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.01 SUBMITTALS

A. Furnish Safety Management Plan to the Engineer no later than 10 days after the Notice to Proceed (NTP), but prior to mobilization on site. Ideally this plan will be submitted prior to the Pre-Construction meeting and will be discussed at this meeting.

B. Furnish corrections to Safety Management Plan as required by the Engineer no later than 10 days after receipt of request.

C. Provide as discussion item in weekly meeting, or as otherwise approved by the Engineer.

D. The Contractor is responsible for monitoring eRailsafe compliance of all General Contractor and Sub-Contractor employees. The Contractor shall maintain a master list of all employees who are working on the job site, with their eRailsafe badge number and expiration date. Each Contractor employee shall sign-in each day they are on the job site. The attendance roster, with each Contractor employee's eRailsafe status, shall be readily available for the Engineer to view. Union Pacific may perform additional audits of eRailsafe compliance at any time.

E. Safety Audit Process

1. Provide Safety Audit Form.

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2. Provide management for Safety Audit Program, with weekly program audits by contractor management.

3. Provide safety audit results, the daily eRailsafe attendance rosters, and corrective actions in a Weekly Safety Audit Report and provide a comprehensive Monthly Safety Audit Report to the Engineer for approval.

F. If requested adjustments to the Safety Management Plan, including behavior modification process and/or corrective action, are not made, the Contractor may be subject to the deductions as presented in Part 4.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No separate measurement will be made for project coordination.

B. The Safety Management Plan will be measured as follows:

1. The contractor shall submit a completed Weekly Safety Audit Report and a comprehensive Monthly Safety Audit Report to the Engineer.

2. In contracts that do not contain a mobilization bid item, failure to submit a weekly Safety audit report and summarized monthly report over any three weeks may result in removal of contractor from bid lists.

3. Minimum Contractor performed audits should include at least one audit per day for each General Contractor work group and for each Sub-Contractor on-site.

4.02 PAYMENT

A. Project Coordination shall be incidental to applicable service items. No separate payment shall be made.

B. The Safety Management Plan will be incidental to mobilization bid item.

1. 70% of Mobilization paid on first invoice will be contingent upon submittal and approval of Safety Management Plan.

2. Failure to submit Weekly Safety Audit Report and comprehensive Monthly Safety Audit Report with any necessary corrective action plans will result in **5% deduction applied to the remaining 30% of the mobilization pay item for that month's invoice.**

END OF SECTION

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SECTION 01 33 00 - SUBMITTALS AND SUBSTITUTIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Special brands of material or devices mentioned in Specifications, or on Drawings are for the purpose of establishing a standard or criterion of quality and character desired.

1. For products specified by naming several products or manufacturers, select any product and manufacturer named.

2. For products specified by naming one of more products, but indicating the option of selecting equivalent products by stating "or equal" after specified product, Contractor must submit request to the Railroad for substitution for any product not specifically named.

3. For products specified by naming one or more products, but indicating the option of selecting equivalent products by stating "or approved equal" after specified product, Contractor must submit information to Railroad for approval of any product not specifically named.

4. For products specified by naming only one product and manufacturer, there is no option, and no substitution will be allowed. However, a submittal is still required for the record.

5. Where specific make or kind of apparatus is called for and furnished by the Contractor, the furnishing of the apparatus does not relieve the Contractor of liability until he shall make such apparatus or appliance operate so it will successfully perform the function for which it is intended.

6. Include in submittals complete data substantiating compliance of proposed substitution, including product identification, manufacturer's literature, performance and necessary test data.

7. In making request for substitutions, Contractor represents he will coordinate installation of accepted substitution into work, making such changes as may be required for work to be complete in all respects.

B. Design drawings, design information, and other data for all construction work furnished by the Contractor shall be submitted to the Railroad. The Contractor shall submit all design drawings and data sufficiently in advance of construction requirements to allow ample time for checking, resubmitting and rechecking and to avoid any delay in progress of Work.

C. All equipment supplied by Contractor shall be furnished complete with installation instructions, operating and maintenance instruction bulletins, complete parts lists, and wiring diagrams for all panels. It shall be Contractor's responsibility to furnish two (2) complete, bound sets of these instructions, lists, diagrams, etc., to the Railroad.

D. Drawings, instructions and manuals supplied with equipment furnished by others, but installed under the Agreement, shall be carefully preserved and turned over to the Railroad.

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E. The Contractor shall provide three (3) days training to Railroad personnel on the operation and maintenance requirements of equipment installed. The Contractor shall provide a one week notice to the Railroad before training commences. The training dates shall be determined through consultation with the Railroad.

F. All materials to be placed under this Contract will first be approved by the UPRR Engineer. Contractor shall submit to the UPRR Engineer, for review and exception, if any, such work, drawings, shop drawings, laying schedules, test reports, data on material and equipment and material samples, as are required for the proper control of the work. Contractor shall not begin any work covered by a submittal until the submittal is returned to him by the UPRR Engineer. Where exceptions are taken by the UPRR Engineer, the Contractor shall make the necessary revisions and re-submit the information to the UPRR Engineer. Submittals will be required for, but not limited to, the following items: Erosion control plan, subballast, and seeding.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 01 33 04 - OPERATION AND MAINTENANCE MANUALS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Administration of the submittal process for Operation and Maintenance Manuals.
2. Content requirements for Operation and Maintenance Manuals.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. General submittal requirements are specified in Specification Section 01 33 00 - Submittals And Substitutions.

B. Technical Specification Sections identifying required Operation and Maintenance Manual submittals.

1.03 DEFINITIONS

A. Equipment Operation and Maintenance Manuals:

1. Contain the technical information required for proper installation, operation and maintenance of process, electrical and mechanical equipment and systems.

B. Building Materials and Finishes Operation and Maintenance Manuals:

1. Contain the information required for proper installation and maintenance of building materials and finishes.

1.04 SUBMITTALS

A. List of all the Operation and Maintenance Manuals required by the Contract as identified in the Technical Specification Sections.

B. Operation and Maintenance Manuals:

1. Draft and final electronic copies.
2. Final paper copies: One (1).

1.05 SUBMITTAL SCHEDULE

A. List of Required Operation and Maintenance Manuals:

1. Submit list with Specification Section number and title within 90 days after Notice to Proceed.

B. Draft Operation and Maintenance Manuals:

1. Submit approvable draft manuals in electronic format (PDF) within 30 days following approval of the respective Shop Drawing.
    a. Include placeholders or fly sheet pages where information is not final or is missing from the draft manual.

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2. All Draft Operation and Maintenance Manuals shall be received by no later than 50 percent project completion.

C. Final Operation and Maintenance Manuals:

1. Final approval of Operation and Maintenance Manuals in electronic format (PDF) must be obtained 45 days prior to equipment start-up.

2. Provide paper copies and electronic copies on CD-ROMs of approved final Operation and Maintenance Manuals, a minimum of 30 days prior to equipment start-up.

3. Issue addenda to Final Approved Operation and Maintenance Manual to include:

a. Equipment data that requires collection after start-up, for example but not limited to HVAC balancing reports, electrical switchgear, automatic transfer switch and circuit breaker settings.

b. Equipment field testing data.

c. Equipment start-up reports.

1.06 PREPARATION OF SUBMITTALS

A. General:

1. All pages of the Operation and Maintenance Manual submittal shall be legible. Submittals which, in the Engineer's sole opinion, are illegible will be rejected without review.

2. Identify each equipment item in a manner consistent with names and identification numbers used in the Contract Documents, not the manufacturer's catalog numbers.

3. Neatly type any data not furnished in printed form.

4. Operation and Maintenance Manuals are provided for Owner's use, to be reproduced and distributed as training and reference materials within Owner's organization.

a. This requirement is:

1) Applicable to both paper copy and electronic files.

2) Applicable to materials containing copyright notice as well as those with no copyright notice.

5. Notify supplier and/or manufacturer of the intended use of Operations and Maintenance Manuals provided under the Contract.

B. Operation and Maintenance Manual Format and Delivery:

1. Draft electronic submittals:

a. Provide manual in Adobe Acrobat Portable Document Format (PDF), latest version.

b. Create one (1) PDF file for each equipment Operation and Maintenance Manual.

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c. Do not password protect or lock the PDF document.

d. Drawings or other graphics must be converted to PDF file format from the original drawing file format and made part of the PDF document.

e. Scanning of drawings is to be used only where actual file conversion is not possible and drawings must be scanned at a resolution of 300 dpi or greater.

f. Rotate sheets that are normally viewed in landscape mode so that when the PDF file is opened the sheet is in the appropriate position for viewing.

g. Create bookmarks in the bookmarks panel for the Operation and Maintenance Manual cover, the Table of Contents and each major section of the Table of Contents.

h. Using Adobe Acrobat Standard or Adobe Acrobat Professional, set the PDF document properties, initial view as follows:

1) Select File →Properties→Initial View.

2) Select the Navigation tab: Bookmarks Panel and Page.

3) Select the Page layout: Single Page.

4) Select the Magnification: Fit Page.

5) Select Open to page: 1.

6) Set the file to open to the cover page of the manual with bookmarks to the left, and the first bookmark linked to the cover page.

i. Set the PDF file "Fast Web View" option to open the first several pages of the document while the rest of the document continues to load.

1) To do this:

a) Select Edit→Preferences→ Documents→Save Settings.

b) Check the Save As optimizes for Fast Web View box.

j. PDF file naming convention:

1) Use the Specification Section number, the manufacturer's name and the equipment description, separated by underscores.

2) Example: 41 22 20_Travelling_Gantry_Bridge_Cranes.pdf.

3) Do not put spaces in the file name.

2. Final electronic submittals:

a. Submit two (2) copies in PDF file format on two (2) CD-ROM discs (one (1) copy per CD-ROM), each secured in a jewel case.

b. CD-ROM Labeling:

1) Provide the following printed labeling on all CD-ROM discs:

a) Project name.

b) Specification Section.

c) Equipment names and summary of tag(s) covered.

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d) Manufacturer name.

e) Date (month, year).

c. CD-ROM Jewel Case Holder:

1) Insert jewel cases containing labeled CD-ROM discs in three-ring binder holder (C-Line Products, www.c-lineproducts.com stock number CLI-61968 or equivalent) at the front of each final paper copy.

3. Final paper copy submittals:

a. Quantity: Provide two (2) copies.

b. Paper: 8.5 x 11 IN or 11 x 17 IN bright white, 20 pound paper with standard three-hole punching.

c. 3-Ring Binder:

1) Provide D-ring binder with clear vinyl sleeves (i.e. view binder) on front and spine.

2) Insert binder title sheet with the following information under the front and spine sleeves:

a) Project name.

b) Specification Section.

c) Equipment names and summary of tag(s) covered.

d) Manufacturer name.

e) Date (month, year).

3) Provide plastic sheet lifters prior to first page and following last page.

d. Drawings:

1) Provide all drawings at 11 x 17 IN size, triple folded and three-hole punched for insertion into manual.

2) Where reduction is not practical to ensure readability, fold larger drawings separately and place in three-hole punched vinyl envelopes inserted into the binder.

3) Identify vinyl envelopes with drawing numbers.

e. Use plastic coated dividers to tab each section of each manual in accordance with the Table of Contents.

C. Equipment Operation and Maintenance Manual Content:

1. Provide a cover page as the first page of each manual with the following information:

a. Manufacturer(s) Name and Contact Information.

b. Vendor's Name and Contact Information.

c. Date (month, year).

d. Project Owner and Project Name.

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e. Specification Section.

f. Project Equipment Tag Numbers.

g. Model Numbers.

h. Engineer's Name.

i. Contractor's Name.

2. Provide a Table of Contents for each manual.

3. Provide Equipment Record sheets as follows:

a. Printed copies of the Equipment Record (Exhibits B1, B2 and B3), as the first tab following the Table of Contents.

b. Each section of the Equipment Record must be completed in detail; simply referencing the related equipment Operation and Maintenance Manual sections for nameplate, maintenance, spare parts or lubricant information is not acceptable.

c. For equipment involving separate components (for example, a motor and gearbox), a fully completed Equipment Record is required for each component.

d. Submittals that do not include the Equipment Record(s) will be rejected without further content review.

4. Provide the following detailed information, as applicable:

a. Use equipment tag numbers from the Contract Documents to identify equipment and system components.

b. Equipment function, normal and limiting operating characteristics.

c. Instructions for assembly, disassembly, installation, alignment, adjustment, and inspection.

d. Operating instructions for start-up, normal operation, control, shutdown, and emergency conditions.

e. Lubrication and maintenance instructions.

f. Troubleshooting guide.

g. Mark each sheet to clearly identify specific products and component parts and data applicable to the installation for the Project; delete or cross out information that does not specifically apply to the Project.

h. Parts lists:

1) A parts list and identification number of each component part of the equipment.

2) Exploded view or plan and section views of the equipment with a detailed parts callout matching the parts list.

3) A list of recommended spare parts.

4) List of spare parts provided as specified in the associated Specification Section.

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5) A list of any special storage precautions which may be required for all spare parts.

i. General arrangement, cross-section, and assembly drawings.

j. Electrical diagrams, including elementary diagrams, wiring diagrams, connection diagrams, and interconnection diagrams.

k. Test data and performance curves.

l. As-constructed fabrication or layout drawings and wiring diagrams.

m. Copy of the equipment manufacturer's warranty meeting the requirements of the Contract.

n. Copy of any service contracts provided for the specific piece of equipment as part of the Contract.

5. Additional information as required in the associated equipment or system Specification Section.

D. Building Materials and Finishes Operation and Maintenance Manual Content:

1. Building products, applied materials and finishes:

a. Include product data, with catalog number, size, composition and color and texture designations.

b. Provide information for ordering custom manufactured products.

2. Necessary precautions:

a. Include product MSDS for each approved product.

b. Include any precautionary application and storage guidelines.

3. Instructions for care and maintenance:

a. Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods and recommended schedule for cleaning and maintenance.

4. Moisture protection and weather exposed products:

a. Include product data listing, applicable reference standards, chemical composition, and details of installation.

b. Provide recommendations for inspections, maintenance and repair.

5. Additional requirements as specified in individual product specifications.

1.07 TRANSMITTAL OF SUBMITTALS

A. Operation and Maintenance Manuals.

1. Transmit all submittals to the Engineer as specified in the Special Conditions.

2. Transmittal form: Use Operation and Maintenance Manual Transmittal, Exhibit A.

3. Transmittal numbering:

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a. Number each submittal with the Specification Section number followed by a series number beginning with "-01" and increasing sequentially with each additional transmittal, followed by "-OM" (for example: 43 23 14-01-OM).

4. Submit draft and final Operation and Maintenance Manual in electronic format (PDF) to Engineer, until manual is approved.

B. Expedited Return Delivery:

1. Include prepaid express envelope or air bill in submittal transmittal package for any submittals Contractor expects or requires express return mail.

2. Inclusion of prepaid express envelope or air bill does not obligate Engineer to conduct expedited review of submittal.

1.08 ENGINEER'S REVIEW ACTION

A. Draft Electronic (PDF) Submittals:

1. Engineer will review and indicate one of the following review actions:

a. A - ACCEPTABLE

b. B - FURNISH AS NOTED

c. C - REVISE AND RESUBMIT

d. D - REJECTED

2. Submittals marked as Acceptable or Furnish As Noted will be retained; however, the transmittal form will be returned with a request for the final paper and electronic documents to be submitted.

3. Copies of submittals marked as Revise and Resubmit or Rejected will be returned with the transmittal form marked to indicate deficient areas.

4. Resubmit until approved.

B. Final Paper Copy Submittals:

1. Engineer will review and indicate one (1) of the following review actions:

a. A - ACCEPTABLE

b. D - REJECTED

2. Submittals marked as Acceptable will be retained with the transmittal form returned as noted.

3. Submittals marked as Rejected will be returned with the transmittal form marked to indicate deficient areas.

4. Resubmit until approved.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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EXHIBIT A **Operation and Maintenance Manual Transmittal _____-_____ - OM**
(Spec Section) (Series)

Project Name: Date Received:

Project Owner: Checked By:

Contractor: Owner: Log Page:

Address: Address: HDR No.:

Attn: Attn:

1st. Sub. ReSub.

Date Transmitted: Previous Transmittal Date:

No. Copies	Description of Item	Manufacturer	Dwg. or Data No.	Action Taken*

Remarks:

To: From:

.

Date:

* The Action designated above is in accordance with the following legend:
A - Acceptable
B - Furnish as Noted
C - Revise and Resubmit
D - Rejected

Comments:

By Date

Distribution: Contractor File Field Owner Other

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EXHIBIT B1

Equipment Record

Equipment Data and Spare Parts Summary

Project Name				Specification Section:
Equipment Name				Year Installed:
Project Equipment Tag No(s).				
Equipment Manufacturer				Project/ Order No.
Address				Phone
Fax	Web Site		E-mail	
Local Vendor/Service Center				
Address				Phone
Fax	Web Site		E-mail	

MECHANICAL NAMEPLATE DATA

Equip.			Serial No.	
Make			Model No.	
ID No.	Frame No.	HP	RPM	Cap.
Size	TDH	Imp. Sz.	CFM	PSI
Other:				

ELECTRICAL NAMEPLATE DATA

Equip.				Serial No.				
Make				Model No.				
ID No.	Frame No.	HP	V.	Amp.	HZ	PH	RPM	SF
Duty	Code	Ins. Cl.	Type	NEMA	C Amb.	Temp. Rise	Rating	
Other:								

SPARE PARTS PROVIDED PER CONTRACT

Part No.	Part Name	Quantity

RECOMMENDED SPARE PARTS

Part No.	Part Name	Quantity

EXHIBIT B2

Equipment Record

Recommended Maintenance Summary

Equipment Description	Project Equip. Tag No(s).	

RECOMMENDED BREAK-IN MAINTENANCE (FIRST OIL CHANGES, ETC.)	INITIAL COMPLETION * FOLLOWING START-UP							
	D	W	M	Q	S	A	RT	Hours

RECOMMENDED PREVENTIVE MAINTENANCE	PM TASK INTERVAL *							
	D	W	M	Q	S	A	RT	Hours

* D = Daily W = Weekly M = Monthly Q = Quarterly S = Semiannual A = Annual Hours = Run Time I

EXHIBIT B3

Equipment Record

Lubrication Summary

Equipment Description	Project Equip. Tag No(s).

Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					

Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					

Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					

Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					

Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					

Lubricant Point						
Lubricant Type		Manufacturer	Product	AGMA #	SAE #	ISO
	1					
	2					
	3					
	4					
	5					

SECTION 01 33 23 - SHOP DRAWINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Drawings shall clearly indicate proposed items, capacities, characteristics and details in conformance with the Drawings or schedules. Capacities, dimensions and special features required shall be certified by the manufacturer.

B. Shop Drawings shall indicate manufacturer's delivery time for the item after receipt of approval by the Railroad.

C. Shop Drawings for all items requiring same or called for shall be prepared immediately upon award of Agreement and four copies submitted to the Railroad for review. No materials shown thereon shall be ordered until shop Drawings and setting diagrams are reviewed and approved as detailed below. After the review process, Contractor shall then furnish three (3) complete hard copy sets of approved Drawings for the Railroad's use on the job, and one (1) electronic set of approved Drawings in PDF format for the Railroad's Project Closeout CD referenced in Section 07 78 39.

D. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Railroad will review each submittal, mark to indicate action taken, and return promptly.

E. Compliance with specified characteristics is the Contractor's responsibility.

F. Action Stamp: The Railroad will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

1. Final Unrestricted Release: Where submittals are marked "Approved," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.

2. Final-But-Restricted Release: When submittals are marked "Approved as Noted," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

3. Returned for Resubmittal: When submittal is marked "Not Approved, Revise and Resubmit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark. Do not permit submittals marked "Not Approved, Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.

4. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Action Not Required".

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G. The checking and review of shop Drawings by the Railroad will not release the Contractor from any errors thereon. The Contractor is to be responsible for verifying all material and workmanship in shop work or other trades assuming all responsibility for any conflict between the various trades during construction.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 01 35 29 - HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES

PART 1 - GENERAL

1.01 SUMMARY

A. This specification covers the requirements for procedures to be developed and implemented by the Contractor to ensure the protection of personnel employed on the Project, UP employees and the public at sites where demolition or construction is performed that may disturb contaminants, expose persons to physical hazards and contaminants, or cause release of contaminants.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Section 00 07 00 General Conditions

B. Section 01 33 00 Submittal Procedures

1.03 REFERENCED STANDARDS

A. American Petroleum Institute (API)

1. API RP 2219, Safe Operation of Vacuum Trucks Handling Flammable and Combustible Liquids in Petroleum Service, 2016

B. International Safety Equipment Association (ISEA)

1. ANSI/ISEA Z358.1, American National Standard for Emergency Eyewash and Shower Equipment, 2014

C. National Institute for Occupational Safety and Health (NIOSH)

1. NIOSH 85-115, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, 1985

D. U.S. Code of Federal Regulations (CFR)

1. 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response

2. 29 CFR 1926, Safety and Health Regulations for Construction

3. 29 CFR 1926.65, Hazardous Waste Operations and Emergency Response

4. 49 CFR 171, General Information, Regulations, and Definitions

5. 49 CFR 172, Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

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1.04 DEFINITIONS

A. Hazardous Material - A substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated pursuant to the Hazardous Materials Transportation Act, 49 U.S.C. Appendix Section 1801 et seq. The term includes materials designated as hazardous materials under the provisions of 49 CFR 172, Sections .101 and .102 and materials which meet the defining criteria for hazard classes and divisions in 49 CFR 173. EPA designated hazardous wastes are also hazardous materials.

B. Hazardous Waste - A waste which meets criteria established in RCRA or specified by the EPA in 40 CFR 261 or which has been designated as hazardous by a RCRA authorized state program.

1.05 SUBMITTALS

A. Submit as specified in Section 01 33 00.

1. Shop Drawings:

a. Work Zones; and

b. Decontamination Facilities.

2. Product Data:

a. Site Safety and Health Plan (APP/SSHP);

b. Exposure Monitoring/Air Sampling Program;

c. Site Control Log; and

d. Site Safety and Health Officer's (SSHO's) Daily Inspection Logs.

3. Certificates:

a. Certificate of Worker/Visitor Acknowledgement.

b. Certificates of Completion of required training outlined below for all personnel accessing the job site.

4. Closeout Submittals:

a. Safety and Health Phase-Out Report.

1.06 QUALITY ASSURANCE

A. PRECONSTRUCTION SAFETY CONFERENCE

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Conduct a preconstruction safety conference prior to the start of site activities and after submission of SSHP. The objective of the meeting is to discuss health and safety concerns related to the impending work, discuss project health and safety organization and expectations, review and answer comments and concerns regarding the SSHP or other health and safety concerns. Ensure that those individuals responsible for health and safety at the project level are available and attend this meeting.

B. INSPECTIONS

Attach to and submit with the Daily Quality Control reports the SSHO's Daily Inspection Logs. Include with each entry the following: date, work area checked, employees present in work area, personal protective equipment (PPE) and work equipment being used in each area, special SOH issues and notes, and signature of preparer.

C. ONSITE TRAINING

Conduct periodic onsite training by the SSHO at least weekly for personnel assigned to work at the site during the following week. Address SOH procedures, work practices, any changes in the SSHP, activity hazard analyses, work tasks, or schedule; results of previous week's air monitoring, review of safety discrepancies and accidents. Convene a meeting prior to implementation of the change should an operational change affecting onsite field work be made, to explain Safety and Occupational Health (SOH) procedures. Conduct a site-specific training sessions for new personnel, visitors, and suppliers by the SSHO using the training curriculum outlines developed by the Health and Safety Manager. Each employee must sign a training log to acknowledge attendance and understanding of the training.

PART 2 - PRODUCTS

2.01 PERFORMANCE AND DESIGN REQUIREMENTS

A. REGULATORY REQUIREMENTS

Comply with EM 385-1-1, 29 CFR 1926.65, 29 CFR 1910.120, OSHA requirements in 29 CFR 1910 and 29 CFR 1926 with work performed under this contract, and state specific OSHA requirements where applicable. Submit to the UP's Project Manager for resolution matters of interpretation of standards before starting work. The most stringent requirements apply where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary.

B. SITE SAFETY AND HEALTH PLAN (SSHP)

Develop and implement a Site Safety and Health Plan in accordance with 29CFR1910.120(b)(1). Address all occupational safety and health hazards (traditional construction as well as contaminant-related hazards) associated with cleanup operations within the SSHP. The SSHP is a dynamic document, subject to change as project operations/execution change. Modify the SSHP to address changing and previously unidentified health and safety conditions. Ensure that the SSHP is updated accordingly. Submit amendments to the SSHP to UP's Project Manager as the SSHP is updated. For long duration projects resubmit the SSHP to the UP's Project Manager annually for review. The SSHP must contain all updates.

1. ACCEPTANCE AND MODIFICATIONS

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Prior to submittal, the SSHP must be signed and dated by the Contractor's Health and Safety Manager (HSM) and Project Manager or Superintendent. Submit for review 14 days prior to the Preconstruction Safety Conference. Deficiencies in the SSHP will be discussed at the Preconstruction Safety Conference and must be revised to correct the deficiencies and resubmitted for acceptance. Onsite work must not begin until the plan has been accepted. Maintain a copy of the written SSHP onsite. Changes and modifications to the SSHP must be made with the knowledge and concurrence of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer. Bring to the attention of the Contractor's HSM and Project Manager or Superintendent, and the UP's Project Manager any unforeseen hazard that becomes evident during the performance of the work, through the Site Safety and Health Officer (SSHO) for resolution as soon as possible. In the interim, take necessary action to re-establish and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment. Disregard for the provisions of this specification or the accepted SSHP is cause for stopping work until the matter has been rectified.

2. AVAILABILITY

Make available the SSHP in accordance with 29 CFR 1910.120, (b)(1)(v) and 29 CFR 1926.65, (b)(1)(v).

C. STAFF ORGANIZATION, QUALIFICATION AND RESPONSIBILITIES

Provide hazardous waste operations and emergency response organization in accordance 29CFR1910.120(b)(2).

1. HEALTH AND SAFETY MANAGER (HSM)

Health and Safety Manager must be an Industrial Hygienist certified by the American Board of Industrial Hygiene, a safety professional certified by the Board of Certified Safety Professionals, or a health physicist certified by the American Board of Health Physicists.

a. ADDITIONAL QUALIFICATIONS

The HSM must fulfill the responsibilities stated below for all hazardous waste operations. The HSM, dependent upon the contaminant-related hazards on the project, shall be a Certified Industrial Hygienist (CIH), Certified Safety Professional (CSP) or Certified Health Physicist (CHP).

1) The HSM shall have 3 years of experience managing SOH at hazardous waste site cleanup operations.

2) The HSM shall enlist the support of SOH professionals with appropriate education and experience when working on sites with multiple hazards (i.e., chemical, safety, ionizing radiation).

3) Documented experience in supervising professional and technician level personnel.

4) Documented experience in developing worker exposure assessment programs and air monitoring programs and techniques.

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5) Documented experience in managing personal protective equipment (PPE) programs and conducting PPE hazard evaluations for the types of activities and hazards likely to be encountered on the project.

6) Working knowledge of state and Federal occupational safety and health regulations.

7) The HSM shall be responsible for the following actions: (1) Developing, maintaining, and overseeing implementation of the SSHP; (2) Visiting the project as needed to audit the effectiveness of the SSHP; (3) Remaining available for project emergencies; (4) Developing modifications to the SSHP as needed; (5) Evaluating occupational exposure monitoring/air sampling data and adjusting SSHP requirements as necessary; (6) Serving as a QC staff member; and (7) Approving the SSHP by signature.

b. RESPONSIBILITIES AND DUTIES

The following are minimum responsibilities and duties of the HSM.

1) Development, implementation, oversight, and enforcement of the SSHP.

2) Provide onsite consultation as needed to ensure the SSHP is fully implemented.

3) Conduct initial site-specific training.

4) Be available for consultation during the first 3 days of remedial activities and at the startup of each new major phase of work.

5) Visit the site as needed for the duration of activities, to audit the effectiveness of the SSHP.

6) Be available for emergencies.

7) Coordinate any modifications to the SSHP with the Site Superintendent, the SSHO, and the UP Project Manager.

8) Be responsible for evaluating air monitoring data and recommending changes to engineering controls, work practices, and PPE.

9) Provide continued support for upgrading/downgrading of the level of personal protection.

10) Serve as a member of the quality control staff.

11) Review accident reports and results of daily inspections.

12) Sign and date the SSHP prior to submittal.

2. SITE SAFETY AND HEALTH OFFICER (SSHO)

Designate an individual and one alternate as the Site Safety and Health Officer (SSHO). Include the name, qualifications (education and training summary and documentation), and work experience of the Site Safety and Health Officer and alternate in the SSHP.

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a. QUALIFICATIONS

1) A minimum of 1 year experience in implementing SOH programs at CERCLA project sites, at underground storage tank removal projects, or in the chemical or petroleum processing industry where Level B or Level C personal protective equipment was required.

2) Meet 29 CFR 1910.120/29 CFR 1926.65 requirements for 40-hour initial and 8-hour supervisor training and, maintain 8-hour refresher training requirements.

3) Specific training in personal and respiratory protective equipment, confined space entry and in the proper use of air monitoring instruments and air sampling methods including monitoring for ionizing radiation.

4) Documented experience in construction techniques and construction safety procedures.

5) Working knowledge of Federal and state occupational SOH regulations.

b. RESPONSIBILITIES AND DUTIES

The following are minimum responsibilities and duties of the SSHO.

1) Assist and represent the Safety and Health Manager in onsite training and the day to day onsite implementation and enforcement of the accepted SSHP.

2) Be assigned to the site on a full-time basis for the duration of field activities. The SSHO can have collateral duties in addition to SOH related duties. If operations are performed during more than 1 work shift per day, a site Safety and Health Officer must be present for each shift.

3) Have authority to stop work if unacceptable health or safety conditions exist and take necessary action to re-establish and maintain safe working conditions.

4) Have authority to ensure site compliance with specified SOH requirements, Federal, state and OSHA regulations and all aspects of the SSHP including, but not limited to, activity hazard analyses, air monitoring, use of PPE, decontamination, site control, standard operating procedures used to minimize hazards, safe use of engineering controls, the emergency response plan, confined space entry procedures, spill containment program, and preparation of records by performing a daily SOH inspection and documenting results on the Daily Safety Inspection Log in accordance with 29 CFR 1904.

5) In coordination with site management and the Health and Safety Manager, recommend corrective actions for identified deficiencies and oversee the corrective actions.

6) Consult with and coordinate any modifications to the SSHP with the Safety and Health Manager, the Site Superintendent, and the Contracting Officer.

7) Conduct daily safety inspection and document SOH findings into the Daily Safety Inspection Log. Track noted SOH deficiencies to ensure that they are corrected.

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8) Conduct accident investigations and prepare accident reports.

9) Serve as a member of the quality control staff on matters relating to SOH.

3. OCCUPATIONAL PHYSICIAN

Utilize the services of a licensed physician, who is certified in occupational medicine by the American Board of Preventative Medicine, or who, by necessary training and experience is Board eligible. The physician must be familiar with the site's hazards and the scope of this project. Include the medical consultant's name, qualifications, and knowledge of the site's conditions and proposed activities in the APP/SSHP. The physician is responsible for the determination of medical surveillance protocols and for review of examination/test results performed in compliance with 29 CFR 1910.120, (f) and 29 CFR 1926.65, (f) and paragraph MEDICAL SURVEILLANCE PROGRAM.

5. PERSONS CERTIFIED IN FIRST AID AND CPR

At least two persons who are currently certified in first aid and CPR by the American Red Cross or other approved agency must be onsite at all times during site operations. They must be trained in universal precautions and the use of PPE as described in the Bloodborne Pathogens Standard of 29 CFR 1910, Section .1030. These persons may perform other duties but must be immediately available to render first aid when needed.

6. HEALTH AND SAFETY TECHNICIANS

For each work crew in the exclusion zone, one person, designated as a Health and Safety Technician, must perform activities such as air monitoring, decontamination, and safety oversight on behalf of the SSHO. They must have appropriate training equivalent to the SSHO in each specific area for which they have responsibility and report to and be under the supervision of the SSHO.

D. EMERGENCY RESPONSE AND CONTINGENCY MEASURES

Develop and implement an Emergency Response Plan, that meets the requirements of 29 CFR 1910.120 (l) and 29 CFR 1926.65 (l), as a section of the SSHP. In the event of any emergency associated with remedial action, without delay, alert all onsite employees and as necessary offsite emergency responders that there is an emergency situation; take action to remove or otherwise minimize the cause of the emergency; alert the Contracting Officer; and institute measures necessary to prevent repetition of the conditions or actions leading to, or resulting in, the emergency. Train employees that are required to respond to hazardous emergency situations to their level of responsibility according to 29 CFR 1910.120 (q) and 29 CFR 1926.65 (q) requirements. Rehearse the plan regularly as part of the overall training program for site operations. Review the plan periodically and revised as necessary to reflect new or changing site conditions or information. Provide copies of the Emergency Response Portion of the accepted SSHP to the affected local emergency response agencies. The following must be addressed in the plan:

1. PRE-EMERGENCY PLANNING

Coordinate with local emergency response providers during preparation of the Emergency Response Plan. At a minimum, coordinate with local fire, rescue, hazardous materials response teams, police and emergency medical providers to assure all organizations are capable and willing to respond to and provide services for on-site emergencies. Ensure the Emergency Response Plan for the site is compatible and integrated with the local fire, rescue, medical and police security services available from local emergency response planning agencies.

2. PLAN ELEMENTS

The following elements must be addressed in the plan:

a. Personnel roles, lines of authority, communications for emergencies.

b. Emergency recognition and prevention.

c. Site topography, layout, and prevailing weather conditions.

d. Criteria and procedures for site evacuation (emergency alerting procedures, employee alarm system, emergency PPE and equipment, safe distances, places of refuge, evacuation routes, site security and control).

e. Route maps to nearest pre-notified medical facility. Site-support vehicles must be equipped with maps. At the beginning of project operations, drivers of the support vehicles must become familiar with the emergency route and the travel time required.

f. Specific procedures for decontamination and medical treatment of injured personnel.

g. Emergency alerting and response procedures including posted instructions and a list of names and telephone numbers of emergency contacts (physician, nearby medical facility, fire and police departments, ambulance service, Federal, state, and local environmental agencies; as well as Safety and Health Manager, the Site Superintendent, the Contracting Officer and their alternates).

h. Criteria for initiating community alert program, contacts, and responsibilities.

i. Procedures for reporting incidents to appropriate government agencies. In the event that an incident such as an explosion or fire, or a spill or release of toxic materials occurs during the course of the project, the appropriate government agencies must be immediately notified. In addition, verbally notify the Contracting Officer and the local district safety office immediately and submit a written notification within 24 hours. Include within the report the following items:

1) Name, organization, telephone number, and location of the Contractor.

2) Name and title of the person(s) reporting.

3) Date and time of the incident.

4) Location of the incident, i.e., site location, facility name.

5) Brief summary of the incident giving pertinent details including type of operation ongoing at the time of the incident.

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6) Cause of the incident, if known.

7) Casualties (fatalities, disabling injuries).

8) Details of any existing chemical hazard or contamination.

9) Estimated property damage, if applicable.

10) Nature of damage, effect on contract schedule.

11) Action taken to ensure safety and security.

12) Other damage or injuries sustained, public or private.

j. Procedures for critique of emergency responses and follow-up.

E. PERSONAL PROTECTIVE EQUIPMENT

1. SITE SPECIFIC PPE PROGRAM

Provide onsite personnel exposed to contaminants with appropriate personal protective equipment. Components of levels of protection (B, C, D and modifications) must be relevant to site-specific conditions, including heat and cold stress potential and safety hazards. Use only respirators approved by NIOSH. Keep protective equipment and clothing clean and well maintained. Include site-specific procedures to determine PPE program effectiveness and for onsite fit-testing of respirators, cleaning, maintenance, inspection, cartridge change out, and storage of PPE within the PPE section of the SSHP.

2. LEVELS OF PROTECTION

The SSHO must establish and evaluate as the work progresses the levels of protection for each work activity. Also establish action levels for upgrade or downgrade in levels of PPE. Describe in the SSHP the protocols and the communication network for changing the level of protection. Address air monitoring results, potential for exposure, changes in site conditions, work phases, job tasks, weather, temperature extremes, and individual medical considerations within the PPE evaluation protocol.

3. INITIAL PPE COMPONENTS

The following items constitute initial minimum protective clothing and equipment ensembles.

Level D	OSHA 1910.120 General description and discussion of the levels of protection and protective gear : https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.120AppB
Modified Level D	
Level C	
Level B	

F. EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

Maintain, as a minimum, the following items onsite and available for immediate use:

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1. First aid equipment and supplies approved by the consulting physician.

2. Emergency eyewashes and showers that comply with ANSI/ISEA Z358.1.

3. Emergency-use respirators. For escape purposes, supply a sufficient number of 5- to 15-minute emergency escape masks. For rescue purposes, Supply a sufficient number of positive pressure self-contained breathing apparatus (SCBA). Dedicate these for emergency use only and maintained onsite in the Contamination Reduction Zone.

4. Provide fire extinguishers of sufficient size and type at site facilities and in all vehicles and at any other site locations where flammable or combustible materials present a fire risk.

PART 3 - EXECUTION

3.01 PREPARATION

A. SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

1. PROJECT/SITE CONDITONS

Refer to the following reports and information for the site description and contamination characterization. They are available from the UP Project Manager.

a. CERCLA Documents

b. RCRA Documents

c. UST Documents

d. UP Soil Management Plan Technical Memorandum

3.02 APPLICATION

A. TASK SPECIFIC HAZARDS, INITIAL PPE, HAZWOPER MEDICAL SURVEILLANCE AND TRAINING APPLICABILITY

Task specific occupational hazards, task specific HAZWOPER medical surveillance and training applicability and task specific initial PPE requirements for the project are listed on the Task Hazard and Control Sheets at the end of this section. Reevaluate occupational safety and health hazards as the work progresses and to adjust the PPE and onsite operations, if necessary, so that the work is performed safely and in compliance with occupational safety and health regulations.

B. TRAINING

In conjunction with 29 CFR 1910.120, meet the training program requirements for workers performing cleanup operations and who will be exposed to contaminants.

1. HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE (HAZWOPER) TRAINING

All Personnel performing duties with potential for exposure to onsite contaminants must meet and maintain the following 29 CFR 1910.120/29 CFR 1926.65 (e) training requirements:

a. 40 hours of off-site HAZWOPER instruction.

b. 3 days actual on-the-job field experience under the direct supervision of a trained, experienced supervisor.

c. 8 hours refresher training annually.

d. Onsite supervisors must have an additional 8 hours management and supervisor training specified in 29 CFR 1910.120/29 CFR 1926.65 (e) (4).

2. PRE-ENTRY BRIEFING

Prior to commencement of onsite field activities, all site employees, including those assigned only to the Support Zone, must attend a site-specific SOH training session. This session will be conducted by the Health and Safety Manager and the Site Safety and Health Officer to ensure that all personnel are familiar with requirements and responsibilities for maintaining a safe and healthful work environment. Thoroughly discuss procedures and contents of the accepted SSHP. Each employee must sign a training log to acknowledge attendance and understanding of the training. Notify the UP Project Manager at least 2 weeks prior to the initial site-specific training session so UP personnel involved in the project may attend.

3. PERIODIC SESSIONS

Conduct periodic onsite training by the SSHO at least weekly for personnel assigned to work at the site during the following week. Address SOH procedures, work practices, any changes in the SSHP, activity hazard analyses, work tasks, or schedule; results of previous week's air monitoring, review of safety discrepancies and accidents. Convene a meeting prior to implementation of the change should an operational change affecting onsite field work be made, to explain SOH procedures. Conduct a site-specific training session for new personnel, visitors, and suppliers by the SSHO using the training curriculum outlines developed by the Health and Safety Manager. Each employee must sign a training log to acknowledge attendance and understanding of the training.

C. MEDICAL SURVEILLANCE PROGRAM

Meet all requirements of 29 CFR 1910.120/29 CFR 1926.65 medical surveillance program for workers performing cleanup operations and who will be exposed to contaminants. Ensure the Occupational Physician or the physician's designee performs the physical examinations and reviews examination results. Participation in the medical surveillance program is without cost to the employee, without loss of pay and at a reasonable time and place.

D. EXPOSURE MONITORING/AIR SAMPLING PROGRAM

Prepare and implement by the Health and Safety Manager an exposure monitoring/air sampling program to identify and quantify SOH hazards and airborne levels of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment for affected site personnel. Include action levels for upgrading/downgrading PPE in the program. Submit personnel exposure monitoring/sampling results. Monitoring details should be included in the monitoring/air sampling plan and approved by the Safety and Health Manager. Volatile organic compounds (VOCs) should be continuously monitored using a hand-held device such as a photo ionization detector (PID) or equivalent. If VOCs are not present, service provider may provide justification for not monitoring in the sampling and monitoring plan.

HEAT STRESS MONITORING AND MANAGEMENT

Document in the SSHP and implement the procedures and practices in 29 CFR 1910.120 to monitor and manage heat stress.

E. SPILL AND DISCHARGE CONTROL

F. Develop and implement written spill and discharge containment/control procedures. Address shock sensitive wastes, laboratory waste packs, material handling equipment, as well as drum and container handling, opening, sampling, shipping and transport. Describe prevention measures, such as building berms or dikes; spill control measures and material to be used (e.g. booms, vermiculite); location of the spill control material; personal protective equipment required to cleanup spills; disposal of contaminated material; and who is responsible to report the spill. Storage of contaminated material or hazardous materials must be appropriately bermed, diked and contained to prevent any spillage of material on uncontaminated soil. If the spill or discharge is reportable, or human health or the environment are threatened, immediately notify Response Management Communication Center (RMCC) 1-888-877-7267, and the UP Project Manager as soon as possible. Provide control as required by Section 01 57 19 TEMPORARY ENVIRONMENT CONTROLS.

G. MATERIALS TRANSFER SAFETY

Remove liquids and residues from the tanks using explosion-proof or air-driven pumps. In accordance with 29 CFR 1910.120, electrically bond the tank and ground pump motors and suction hoses to prevent electrostatic ignition hazards. Use of a hand pump will be permitted to remove the last of the liquid from the bottom of the tanks. If a vacuum truck is used for removal of liquids or residues, the area of operation for the vacuum truck must be vapor free. locate the truck upwind from the tank and outside the path of probable vapor travel. Discharge the vacuum pump exhaust gases through a hose of adequate size and length downwind of the truck and tank area. Vacuum truck operating and safety practices must conform to API RP 2219. Collect tank residues in drums, tanks, or tank trucks labeled according to 49 CFR 171 and 49 CFR 172 and disposed of as specified. Disconnect and drain fittings and lines of their contents after the materials have been transferred and the tanks have been exposed. Do not spill contents into the environment during cutting or disconnecting of tank fittings. Transfer materials drained into DOT-approved drums for storage and transportation. Use only non-sparking or non-heat producing tools to disconnect and drain or to cut through tank fittings. Electrical equipment (e.g., pumps, portable hand tools) used for tank preparation must be explosion-proof. Following cutting or disconnecting of the fittings, plug openings leading to the tanks.

H. SITE CONTROL MEASURES

Coordinate site control measures with Section 01 57 19 TEMPORARY ENVIRONMENT CONTROLS.

1. WORK ZONES

Initial anticipated work zone boundaries (exclusion zone, contamination reduction zone, support zone, all access points and decontamination areas) are to be clearly delineated on the site drawings. Base delineation of work zone boundaries on the contamination characterization data and the hazard/risk analysis to be performed as described in 29 CFR 1910.120. As work progresses and field conditions are monitored, work zone boundaries may be modified (and site drawings modified) with approval of the Contracting Officer. Clearly identify work zones and mark in the field (using fences, tape, or signs). Submit and post a site map, showing work zone boundaries and locations of decontamination facilities in the onsite office. Work zones must consist of the following:

a. EXCLUSION ZONE

The exclusion zone is the area where hazardous contamination is either known or expected to occur and the greatest potential for exposure exists. Control entry into this area and exit may only be made through the Contamination Reduction Zone (CRZ).

b. CONTAMINATION REDUCTION ZONE

The CRZ is the transition area between the Exclusion Zone and the Support Zone. The personnel and equipment decontamination areas must be separate and unique areas located in the CRZ.

c. SUPPORT ZONE (SZ)

The Support Zone is defined as areas of the site, other than exclusion zones and contamination reduction zones, where workers do not have the potential to be exposed to hazardous substances or dangerous conditions resulting from HTRW operations. Secure the Support Zone against active or passive contamination. Site offices, parking areas, and other support facilities must be located in the Support Zone.

2. SITE CONTROL LOG

A log of personnel visiting, entering, or working on the site must be maintained. Include the following: date, name, agency or company, time entering and exiting site, time entering and exiting the exclusion zone (if applicable). Before visitors are allowed to enter the Contamination Reduction Zone or Exclusion Zone, they must show proof of current training, medical surveillance and respirator fit testing (if respirators are required for the tasks to be performed) and fill out a Certificate of Worker or Visitor Acknowledgment. Record this visitor information, including date, in the log.

3. COMMUNICATION

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Provide and install an employee alarm system that has adequate means of on and off site communication in accordance with 29 CFR 1910 Section .165. The means of communication must be able to be perceived above ambient noise or light levels by employees in the affected portions of the workplace. The signals must be distinctive and recognizable as messages to evacuate or to perform critical operations.

4. SITE SECURITY

Provide the site security signage per the drawings. Print signs in bold large letters on contrasting backgrounds. Signs must be visible from all points where entry might occur and at such distances from the restricted area that employees may read the signs and take necessary protective steps before entering.

5. PERSONAL HYGIENE AND DECONTAMINATION

Personnel entering the Exclusion or Contamination Reduction Zones or otherwise exposed to hazardous chemical vapors, gases, liquids, or contaminated solids must decontaminate themselves and their equipment prior to exiting the contamination reduction zone (CRZ) and entering the support zone. Consult Chapter 10.0 of NIOSH 85-115 when preparing decontamination procedures. Submit a detailed discussion of personal hygiene and decontamination facilities and procedures to be followed by site workers as part of the APP/SSHP. Train employees in the procedures and enforce the procedures throughout site operations.

a. DECONTAMINATION FACILITIES

Submit drawings showing the layout of the personnel and equipment decontamination areas and facilities.

b. PERSONAL DECONTAMINATION

Initially set up a decontamination line in the CRZ. Employees must exit the exclusion zone through the CRZ and implement the decontamination procedures and techniques as outlined, as needed in the project Special Conditions, including as applicable: Scrub and rinse water proof outer garments, remove all outer garments, hand and face wash, shower. Showers, if needed, must comply with 29 CFR 1910, Section.141, Washing Facilities. It is the Site Health and Safety Manager's responsibility to recommend techniques to improve personnel decontamination procedures, if necessary.

c. EQUIPMENT DECONTAMINATION

Decontaminate the vehicles and equipment used in the EZ in the CRZ prior to leaving the EZ.

1) FACILITIES FOR EQUIPMENT AND PERSONNEL

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Provide a vehicle/equipment decontamination station within the CRZ for decontaminating vehicles and equipment leaving the EZ. Construct a decontamination station pad, which meets the site decontamination needs for all vehicles and larger equipment decontamination. Construct the pad to capture decontamination water, including overspray, and allow for collection and removal of the decontamination water using sumps, dikes and ditches as required. Provide a high pressure, low volume, water wash area for equipment and vehicles. Provide a steam cleaning system for use after the mud or site material has been cleaned from the equipment. Perform dry decontamination using a broom to remove dry/loose spilled materials on accessible surfaces if allowed. Provide a designated "clean area" in the CRZ for performing equipment maintenance. Use this area when personnel are required by normal practices to come in contact with the ground, i.e., crawling under a vehicle to change engine oil. Equipment within the EZ or CRZ must be decontaminated before maintenance is performed.

2) PROCEDURES

Procedures for equipment decontamination must be developed and utilized to prevent the spread of contamination into the SZ and offsite areas. These procedures must address disposal of contaminated products and spent materials used on the site, including, as a minimum, containers, fluids, and oils. Assume any item taken into the EZ to be contaminated and perform an inspection and decontaminate. Vehicles, equipment, and materials must be cleaned and decontaminated prior to leaving the site. Handle construction material in such a way as to minimize the potential for contaminants being spread or carried offsite. Prior to exiting the site, vehicles and equipment must be monitored to ensure the adequacy of decontamination.

3.03 FIELD QUALITY CONTROL

A. RECORDKEEPING

1. SAFETY AND HEALTH PHASE-OUT REPORT

Submit a Safety and Health Phase-Out Report in conjunction with the project close out report, prior to final acceptance of the work. Include the following minimum information:

a. Summary of the overall performance of SOH (e.g., accidents or incidents including near misses, unusual events, lessons learned).

b. Final decontamination documentation including procedures and techniques used to decontaminate equipment, vehicles, and onsite facilities.

c. Summary of exposure monitoring and air sampling accomplished during the project.

d. Signatures of Health and Safety Manager and SSHO.

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Task Hazard and Control Requirements Sheet	
Task	
Initial Anticipated Hazards	
Initial PPE	
Initial Controls	
Initial Exposure Monitoring	
Yes	HAZWOPER Medical Surveillance Required
Yes	HAZWOPER Training Required

END OF SECTION

SECTION 01 40 00 - PROJECT SCHEDULING

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor's planning, scheduling and execution of the work shall be disclosed to Union Pacific by submission of the Preliminary, Baseline and Contract Schedule information and data specified in this section. The Work under this Contract shall be planned, scheduled, executed, reported and accomplished using Critical Path Method (CPM) scheduling.

B. No contract work shall begin without a Baseline CPM schedule approved by the Engineer.

C. CPM schedule must be updated, submitted and approved by Railroad monthly.

1.02 COST LOADING

A. Baseline Schedule shall be cost loaded. Activity level cost loading shall be based on Union Pacific bid items and/or items outlined in the contract documents. One or more resources shall be assigned to each activity representing the value of the work identified by the activity.

1.03 PRECONSTRUCTION SCHEDULE

A. The Contractor shall have for review, prior to the pre-construction meeting, a cost loaded CPM schedule. At this meeting the Engineer will review the requirements of this section with the Contractor for any revisions to that provided.

1.04 SUBMITTAL OF A CPM SCHEDULE

A. Baseline Schedule Submittals:

1. A baseline schedule must be approved by the Engineer prior to the commencement of work.

B. Contract Schedule Update Submittals.

1. Schedule updates shall be submitted for approval each calendar month with a narrative describing any changes.

C. Three Week Detail Schedule:

1. A three week look ahead schedule is required on a weekly basis to be provided to the Engineer.

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1.05 SCHEDULE REVIEWS

A. The Engineer's review will be for conformance with the Contract Time and those sequences of Work indicated in or required by the Contract Documents, to record Early and Late Dates for Milestones, to identify the Contractor's use of Float, to compare as-built data, and for conformance with the requirements of this Section and other information given in the Contract Documents which may have a bearing on the Contract Schedule. The Engineer's review may extend to the accuracy of other matters dealt with by the Contract Schedule, including, but not limited to, whether work is omitted, activity durations are reasonable, the level of labor, materials and equipment, sequences of construction, or whether the sequences and timing for work remaining are practicable, the correctness of all which shall remain the sole responsibility of the Contractor.

1.06 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. All costs for complying with this section shall be considered incidental to the project. No separate payment will be made.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

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SECTION 01 43 26 – LABORATORY AND FIELD TESTING SERVICES

PART 1 - GENERAL

1.01 SUMMARY

A. All quality control and quality assurance testing and inspecting to ensure the completed Work meets the Project Plans and Specifications shall be provided by the Contractor.

B. Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to:

   a. Section 00 00 00 General Conditions

   b. Section 01 00 00 General Requirements

2. Requirements for testing may be described in various Sections of these Specifications.

3. Where no testing requirements are described, but the Railroad decides testing is needed, the Railroad may require testing to be performed under pertinent standards for testing.

C. Work Included:

1. The Contractor will select a qualified independent testing laboratory.

2. Testing engineer or scientist: The Contractor will select a licensed independent engineer or scientist by the state in which the Work is performed to observe performance of the Work in connection with excavating, trenching, filling, backfilling and grading, placing of asphalt and placing of concrete and to perform soils, compaction, asphalt and concrete tests.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Section 03 12 00 – Non-reinforced Concrete

B. Section 03 13 00 – Reinforced Concrete

C. Section 03 20 00 - Concrete Reinforcement

D. Section 03 30 00 – Cast-in-Place Concrete

E. Section 31 23 26 – Compaction Control and Testing

F. Section 32 12 16 – Hot Mix Asphalt Paving

G. Section 32 13 00 – Rigid Paving

H. Section 34 11 27 - Subballast

1.03 REFERENCED STANDARDS

A. American Society for Testing and Materials (ASTM) E329

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1.04 QUALITY ASSURANCE

A. The testing laboratory will be qualified to the Railroad's approval in accordance with ASTM E329.

B. Testing will be in accordance with all pertinent codes and regulations, and with pertinent standards of the American Society for Testing and Materials.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Specifications Sections.

B. Promptly process and distribute required copies of test reports and related instructions to assure necessary retesting and replacement of failed materials with the least possible delay in progress of the Work.

C. The Contractor will furnish to the Railroad's Engineer the original copies of test reports. In cases of test failure, the Engineer will be notified in the most expedient manner possible and written reports will follow. If the Engineer cannot be located immediately the Contractor will be notified of the failure and the failure shall be rectified.

1.06 SERVICES INCLUDED.

A. The Contractor will provide all inspection and testing services including, but not necessarily limited to:

1. Observing performance of work in connection with excavating and embankment, trenching, backfilling, grading and installation of asphalt and concrete.

B. Code Compliance Testing:

1. Inspections and tests required by codes or ordinances or by a plan approval authority, and which are made by a legally constituted authority, shall be the responsibility of, and be paid for by the Contractor, unless otherwise provided in the Contract Documents.

C. Contractor's Testing:

1. Inspecting and testing performed exclusively for the convenience of the Contractor shall be the Contractor's sole responsibility.

D. Cooperation with Testing Laboratory:

1. Representatives of the testing laboratory shall have access to the Work at all times and at all locations where the Work is in progress. The Contractor shall provide facilities for such access to enable the laboratory to perform its functions properly.

E. Taking Specimens:

1. All specimens and samples for testing, unless otherwise provided in the Contract Documents, shall be taken by the testing personnel. All sampling equipment and personnel will be provided by the testing laboratory. All deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

1.07 SCHEDULES FOR TESTING

A. Establishing Schedule:

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1. Testing shall be performed in accordance of the schedule as noted in Sections 03 12 00, 03 13 00, 03 20 00, 03 30 00, 31 23 26, 32 12 16, and 34 11 27.
2. Provide all required time within the construction schedule.

B. Revising Schedule:

1. When changes of construction schedule are necessary during construction, coordination of all such changes with the testing laboratory is required.

C. Adherence to Schedule:

1. When the testing laboratory is ready to test according to the established schedule, but is prevented from testing or taking specimens due to incompleteness of the Work, all extra charges for testing attributable to the delay shall be back charged to the Contractor and shall not be borne by the Railroad.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION -

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No separate measurement will be made for laboratory and field testing services.

4.02 PAYMENT

A. : Laboratory and field testing services shall be incidental applicable service items. No separate payment shall be made.

END OF SECTION

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SECTION 01 45 00 - QUALITY ASSURANCE AND CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Quality assurance and control.
2. Regulatory requirements.
3. Tolerances.
4. Mock-ups.
5. Manufacturer's field services.

1.02 QUALITY ASSURANCE AND CONTROL

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

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturer's instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as a minimum quality for Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified and experienced to produce required or specified quality.

F. Verify that field measurements are as indicated on approved shop drawings or as instructed by manufacturer of product.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

H. Materials shall be compatible with one another and with other materials with which they may come in contact.

1.03 SUPERVISION AND CONSTRUCTION PROCEDURES

A. Contractor shall supervise and direct Work, using Contractor’s best skill and attention.

B. Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of Work under the Contract, unless Contract Documents give other specific instructions concerning these matters.

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C. Whether or not Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall review, substantiate, and comply with current industry execution standards and manufacturer's current execution instructions and evaluate jobsite safety thereof and shall be fully and solely responsible for jobsite safety of such means, methods, techniques, sequences or procedures.

1. If Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to Railroad Engineer and shall not proceed with that portion of Work without further written instructions from Engineer.

2. If Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by Contractor, the Railroad shall be solely responsible for any loss or damage arising solely from those Railroad-required means, methods, techniques, sequences or procedures.

D. Contractor shall be responsible to Railroad for acts and omissions of Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of Work for, or on behalf of Contractor or any of its Subcontractors.

E. Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

F. Contractor is solely responsible for coordination of scope of Work for its own forces, and of Subcontractors and suppliers, and to complete all Work, whether performed by the Contractor or a Subcontractor.

G. Contractor shall employ Licensed Surveyor to locate and stake out Work and establish necessary reference and benchmarks.

1. Work from established benchmarks and reference points, layout and correctly establish all lines, levels, grades, and locations of all parts of their own Work and be responsible for their accuracy and proper correlation with Work and established data.

1.04 REGULATORY REQUIREMENTS

A. Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of Work.

B. If Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction, including, but not limited to, any penalties, fines or other damages realized.

C. When Contract Documents require Contractor, Subcontractor, Vendor or other supplier to provide selection or design of parts of Work, such selection or design shall meet requirements of Municipal, State or other governmental authorities having jurisdiction.

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1.05 TOLERANCES

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

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

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

1.06 MANUFACTURER'S FIELD SERVICES AND REPORTS

A. When field services are specified, have material or product suppliers, or manufacturers, provide technically competent staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and supervise installation where specified, as applicable and to initiate instructions when necessary.

B. Report observations, and site decisions or instructions given to applicators or installers which are supplemental or contrary to manufacturer's written instructions.

C. Submit report in duplicate within 30 days of observation.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual Specification Sections.

D. Verify that utility services are available, of correct characteristics, and in correct locations.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

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SECTION 01 50 00 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section describes construction facilities and temporary controls required for the Work.

1. Provide construction facilities and temporary controls and utilities for as long as needed for the Work. The Contractor shall ensure the timely removal of temporary controls and utilities as required. This includes, but is not necessarily limited to the facilities, controls and utilities covered in this Section.

B. Related Work:

1. Documents affecting work of this Section include, but are not limited to:

a. Section 00 00 00 – General Conditions

b. Section 01 00 00 – General Requirements

2. Except equipment furnished by the subcontractors shall comply with requirements of pertinent safety regulations, such equipment normally furnished by the individual trades in execution of their own portions of the Work are not part of this Section.

C. Requirements:

1. Provide construction facilities and temporary controls needed for the Work including, but not necessarily limited to:

a. Temporary utilities such as heat, water, electricity, and telephone.

b. Field office for the Contractor's personnel.

c. Sanitary facilities.

d. Enclosure such as tarpaulins, barricades, and canopies.

e. Temporary fencing of the construction site.

f. Project sign.

1.02 DELIVERY, STORAGE, AND HANDLING

A. Maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

1.03 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the Work.

B. Remove such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Engineer.

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PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No separate measurement will be made for construction facilities and temporary controls.

4.02 PAYMENT

A. Construction facilities and temporary controls shall be incidental applicable service items. No separate payment shall be made.

END OF SECTION

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SECTION 01 51 13 - ELECTRICITY

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall provide and/or obtain all electric power necessary to accomplish the Work. Temporary electric lines will be furnished, installed, connected and maintained by the Contractor in a manner satisfactory to the Engineer and shall be removed by the Contractor prior to completion of the Work.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No separate measurement will be made for providing electricity.

4.02 PAYMENT

A. Electricity shall be incidental applicable service items. No separate payment shall be made.

END OF SECTION

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SECTION 01 51 36 - WATER

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. This Section addresses providing water needed for construction and water for consumption.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.01 WATER SUPPLY

A. The Contractor shall provide an adequate supply of uncontaminated water as required for domestic consumption. Water quality shall meet state regulations. The Contractor shall provide an adequate supply of water as required for excavation, embankment pre-wetting, moisture control, and dust control and shall install and maintain necessary supply connections and piping for such water supply, but only at such locations and in such manner as may be approved by the Engineer. The Contractor shall not use water from rivers, streams, canals, or wells unless prior written agreements have been obtained from adjacent landowners, water users (appropriators), or appropriate water authorities (local, state, or federal). Use of water is subject to state water laws and water rights. Impacts to riparian and wetland vegetation along drainages due to water use shall be minimized, as required by federal and state laws. Contractor must supply water and furnish a water resource plan, with the delivery method outlined. The Contractor shall submit a list of anticipated water sources with the bid. The water source must be approved by the Railroad prior to usage.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No separate measurement will be made for providing water.

4.02 PAYMENT

A. Water shall be incidental to applicable service items. No separate payment shall be made.

END OF SECTION

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SECTION 01 52 13 - OFFICE SPACE FOR CONTRACTOR AND ENGINEER

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall provide and pay for the Following:

1. Field Offices and Sheds:

a. Contractor's Facilities:

1) Provide a field office building and sheds adequate in size and accommodation for Contractor's offices, supply and storage.

2) Within the Contractor's facilities, provide enclosed space adequate for holding project meetings. Furnish with table, chairs, etc.

b. Engineer's Facilities:

1) Provide a field office building adequate in size and accommodation for the Engineer and staff.

2) Provide desks and chairs for the Engineer and staff.

3) Provide a printer capable of printing 11 x 17 papers.

4) Provide access to the internet.

5) Provide access to office supplies.

2. Heating and Air Conditioning:

a. Provide and maintain heating and air conditioning as necessary for the proper execution of the operations needed on the job.

3. Sanitary Facilities:

a. Provide temporary sanitary facilities in the quantity required for use by all personnel.

b. The facility shall be maintained in a sanitary condition at all times.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 01 52 19 - SANITARY FACILITIES

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall provide and maintain in a neat, sanitary condition such accommodations for the use of his employees and the Engineer's employees, as may be necessary to comply with the requirements of Federal, State and Local Boards of Health regulations, or of other authorities having jurisdiction.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No separate measurement will be made for sanitary facilities.

4.02 PAYMENT

A. Sanitary facilities shall be incidental applicable service items. No separate payment shall be made.

4.03

END OF SECTION

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SECTION 01 55 13 - ACCESS ROADS AND CROSSINGS

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall ensure all roads, whether pavement or gravel, used during construction are maintained and left in pre-construction condition when project is complete. The contractor is responsible for all bonds required by local or state agencies to ensure public roads are maintained or repaired. Any temporary barricades or traffic control, if not included as a bid item, are the responsibility of the contractor and shall be incidental.

B. Temporary Access Roads and Parking Areas: The location of access roads and parking areas which the Contractor needs to construct on the Railroad's Right-of-Way or property, which the Railroad has easement or interest in, shall be approved by the Engineer before such roads or parking areas are built. All access roads and parking areas constructed by the Contractor which the Engineer deems unsuitable for future Railroad use shall be removed upon completion of the Work and at the Contractor's expense, and shall be stabilized with gravel or put back to pre-existing conditions where required.

C. Agreements: Any agreements made between the Contractor and private landowners shall be furnished to the Engineer.

1.02 CONSTRUCTION TRAFFIC CONTROL

A. General:

1. When work is being performed on or near a public or private roadway, the Contractor shall use temporary traffic control measures to warn and guide the traveling public. The temporary traffic control measures and devices shall be provided and placed in accordance with the Manual on Uniform Traffic Control Devices and the respective State, County or City traffic control requirements, whichever is more stringent.

2. Traffic control devices, and installations shall be checked by the Contractor daily. Broken, damaged, or displaced devices shall be replaced immediately.

3. The Contractor shall, at the preconstruction conference, provide the Engineer with the names and telephone numbers of personnel who will be available on a 24-hour-per-day, 7-days-per-week basis. These people shall be responsible for repair, correction, replacement, and maintenance of the traffic control devices. The Contractor shall also conspicuously post at the site a contact number for the Contractor's staff person responsible for maintaining traffic control measures and devices, and for public safety agencies.

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4. It shall be the responsibility of the Contractor to furnish flagger(s) to direct traffic when construction activity occurs on or adjacent to a surface being used by the traveling public. The flagger(s) shall be properly attired with vest and head gear. They shall be provided properly installed advance warning signs, and they shall be otherwise equipped in accordance with the requirements of the plans and specifications. Flaggers shall position themselves appropriately and according to accepted flagging procedures.
5. All traffic control materials and devices shall meet the respective State Department of Transportation's Approved Products List.
6. Off-road travel by project-related vehicles and construction equipment will be prohibited outside of the UPRR Right-of-Way and dedicated roadways, unless prior written approval/permits from private or public property owners are obtained by the contractor.
7. The Contractor shall furnish and place lockable gates at all temporary access crossings. The gates must be locked when left unattended. The Contractor shall be responsible for the security of the gate at all times. A railroad approved flagger, provided by the Contractor, will be positioned at the temporary access crossing to flag construction vehicles and/or equipment across the track.
8. Contractor shall make every effort to minimize the environmental impacts caused by the hauling and spreading of construction materials along the right-of-way.

1.03 PERMANENT TRAFFIC CONTROL

A. Permanent traffic control measures and devices shall be provided and placed in accordance with the Plans, the Manual on Uniform Traffic Control Devices and the respective State, County or City traffic control requirements, whichever is more stringent.

B. All traffic control materials and devices shall meet the respective State Department of Transportation's Approved Products List.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 01 55 16 - HAUL ROADS

PART 1 - GENERAL

1.01 GENERAL

A. Construction of Roads and Parking Areas on Railroad Right of Way:

1. The location of haul roads and parking areas which the Contractor needs to construct, on the Railroad's Right-of-Way or property, and which the Railroad has an easement or an interest in shall be approved by the Engineer before such roads or parking areas are built. All haul roads and parking areas constructed by the Contractor which the Engineer deems unsuitable for future Railroad use shall be removed upon completion of the Work, at the Contractor's expense, and shall be stabilized with gravel or put back to pre-existing conditions where required.

B. Use of Railroad Roads - Existing and Protection:

1. Heavy Equipment:

a. The Contractor shall not operate heavy equipment on paved roads located on the Railroad's property without the Engineer's prior approval.

2. Temporary Protection and Removal:

a. The Contractor, if he needs to have heavy equipment on the right of way, shall provide a temporary protective surface, approved by the Engineer, over such paved roads. Upon completion of the Work, the Contractor shall remove any such temporary protective surfacing from the Railroad's paved roads and property.

3. Flagmen:

a. When necessary for the Contractor's equipment to operate on or across roads, not railroad tracks or crossings, located on the Railroad's property, the Contractor shall furnish flagmen, lights and other necessary safeguards as directed by the Engineer or road authority to safely control the flow of traffic. The Contractor shall also provide flagmen to control and direct traffic where hauling equipment enters or crosses roads located on the Railroad's property. The Contractor shall conduct the Work in such a manner which will obstruct and inconvenience traffic as little as possible.

C. Paved Roads:

1. If the Contractor must cross any paved road, on Railroad property, with cleated or crawler type equipment, then the pavement shall be protected with a temporary surfacing approved by the Engineer.

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D. Railroad Crossings:

1. Crossings:

   a. Except as authorized by the Engineer, the Contractor will not construct crossings over any track at any location. Where crossings are needed or desired, the Contractor shall make arrangements directly with the Engineer. If a crossing or crossings are required to complete the Work as set forth in the Request for Bids, the Proposal and Bid, the Specifications, the Drawings and the Agreement, such crossings may be constructed by the Railroad unless the Railroad specifically authorizes the Contractor to construct such crossings. If the Contractor must cross tracks with cleated or crawler type equipment, the track shall be protected with a temporary surfacing approved by the Engineer.

2. Flagging - Railroad Track:

   a. The Railroad will provide flagmen at crossings which have been established pursuant to the provisions of this Section. The Railroad will bear the cost of such flagmen, provided however, the Contractor shall bear the cost of flagmen required at crossings established for the Contractor's convenience. Crossings established for the Contractor's convenience, all temporary and/or construction crossings, will the responsibility of the Contractor to provide flagmen. All other flagging charges not involving the safety of Railroad operations will be at the Contractor's expense.

3. Notification:

   a. The Contractor shall notify the Engineer at least seven (14) days in advance of the date the Contractor wishes to commence using a crossing to allow the Engineer time to provide the flagmen called for herein. The Contractor must also notify the Engineer at least seven (14) days in advance of the date the Contractor will cease using crossings.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 01 56 16 - DUST CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. This includes the limitation and control of dust and spillage of earth, dusty materials, boulders and mud during construction.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.01

A. Spillage of earth, dusty materials, boulders and mud on roads located on or off the Railroad's property will not be permitted. If spillage cannot be prevented, the Contractor shall provide an hourly patrol, or more frequently if needed, to police and sweep such areas throughout the Work day, and at the conclusion of each work day, any paved roads which have been used by the Contractor shall be broom cleaned and left to the satisfaction of the Engineer. Any expense incurred in the use of Railroad access roads shall be borne by the Contractor.

B. The Contractor shall provide dust control for construction equipment on and off project site. Twenty-four hour dust control may be required. Non-paved haul roads shall be periodically watered to keep dust down.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No separate measurement will be made for dust control.

4.02 PAYMENT

A. Dust control shall be incidental applicable service items. No separate payment shall be made.

END OF SECTION

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SECTION 01 56 24 - FENCING AND BARRICADES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. This Section addresses procedures for providing, erecting and maintaining temporary fences and barricades.

PART 2 - PRODUCTS

2.01 TEMPORARY FENCE

A. Temporary construction fence used shall be a high visibility orange color, composite fence, a minimum of 42" high, supported and tightly secured to steel posts located on maximum 10' centers.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The Contractor shall provide, erect and maintain adequate temporary fences and barricades to prevent damage and/or trespassing upon the Right-of Way, damage of adjoining property, and for reasons of safety.

B. Where environmentally sensitive areas exist along the limits of the project, the Contractor shall construct temporary construction fence along delineated wetlands and waterways and post appropriate signage along the fence to prevent disturbance and encroachment of construction activities into environmentally sensitive areas not explicitly impacted by the proposed grading footprint.

C. As directed by the Engineer, the Contractor shall furnish, install, maintain the temporary construction fence in a satisfactory condition for the duration of the project, and remove the temporary construction fence upon completion of construction.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No separate measurement will be made for fencing and barricades.

4.02 PAYMENT

A. Fencing and barricades shall be incidental applicable service items. No separate payment shall be made.

END OF SECTION

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SECTION 01 60 00 - MATERIALS, PRODUCTS, AND EQUIPMENT

PART 1 - GENERAL

1.01 SPECIFIED MANUFACTURERS

A. Specified manufacturers are those named in the Contract Documents in conjunction with a specific material, piece of equipment, or product. The specified item establishes the minimum technical and physical requirements and quality standards.

1.02 LISTED MANUFACTURERS

A. Manufacturers listed in the Specifications and/or Addenda prior to the bid opening are manufacturers capable of meeting the quality standards established.

B. Acceptance of a manufacturer prior to the bid opening does not imply acceptance of a specific material, piece of equipment, or product.

1.03 NON-LISTED MANUFACTURERS

A. Manufacturers not listed in the Specifications and/or Addenda prior to the bid opening may bid only material, equipment, or products by listing them on the bid form, as an "add to" or "deduct from" voluntary substitution for the specified item.

B. Utilization of the "Voluntary Substitutions" paragraph by the successful Bidder does not imply acceptance of that substitution.

1.04 NON-SPECIFIED MANUFACTURERS OF MATERIALS, EQUIPMENT OR PRODUCTS

A. At the bid opening, an item of material, equipment, or product may be used in lieu of an item which is specified provided that the following provisions are met:

1. The item is manufactured by one of the manufacturers listed in the Specifications and/or Addenda. The item, if not listed in the Specifications and or Addenda, is listed on the Bid Form as a "Voluntary Substitution."

2. The material, equipment, or product meets or exceeds the minimum technical and physical requirements established by the specified item.

3. The item is throughout the project so that all items of material, equipment, or product used in place of specified items are of the same manufacture and type.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 01 61 02 - BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED REQUIREMENTS (SECTIONS)

A. This section shall apply to all phases of the work specified, shown on the Drawings, and required to provide for the complete installation of the mechanical systems for this project.

B. This Section applies to all items located within the mechanical and plumbing Specifications.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Section 01 33 04 – Operation and Maintenance Manuals

1.03 REFERENCED STANDARDS

A. Applicable standards of the following organizations shall establish the quality of materials and equipment, the type and quality of workmanship, mode of operations, safety rules and, if so noted, performance certifications:

1. Acoustical Society of America (ASA).
2. Air Diffusion Council (ADC).
3. Air Movement and Control Association (AMCA).
4. American Gas Association (AGA).
5. American National Standards Institute (ANSI).
6. American Petroleum Institute (API)
7. American Refrigeration Institute (ARI).
8. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE).
9. American Society of Mechanical Engineers (ASME).
10. American Society of Safety Engineers.
11. American Society of Testing and Materials (ASTM).
12. American Waterworks Association (AWWA).
13. American Welding Society (AWS).
14. Associated Air Balance Council (AABC).
15. Canadian Standards Association (CSA).
16. Cast Iron Soil Pipe Institute (CISPI).
17. Federal Specifications (FS).
18. Hydronics Institute (HYDI).
19. Institute of Boiler and Radiator Manufacturers (I-B-R).

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20. International Association of Plumbing and Mechanical Officials (IAPMO).
21. Military Specifications (MIL SPEC).
22. National Electrical Manufacturers Association (NEMA).
23. National Environmental Balancing Bureau (NEBB).
24. National Fire Protection Association (NFPA).
25. National Sanitation Foundation (NSF).
26. Occupational Safety and Health Act (OSHA).
27. Plastic Pipe Institute (PPI).
28. Sheet Metal and Air Conditioning Contractors National Association (SMACNA).
29. Underwriters Laboratories Inc. (UL).

1.04 QUALITY ASSURANCE

A. Unless specifically named in the Specifications, a manufacturer shall have furnished equipment of the type and size specified which has been in successful operation for not less than the past 5 years.

B. Unless otherwise noted or required by the Authority Having Juristiction, the latest published edition of applicable codes and regulations shall be followed:

1. National Electrical Code (NEC).
2. Uniform Mechanical Code (UMC).
3. Uniform Plumbing Code (UPC).
4. International Building Code (IBC).
5. International Fire Code (IFC).
6. National Fire Protection Association (NFPA).
7. Local amendments to above established codes.
8. UPRR Fuel Standards, as applicable.

1.05 WARRANTY

A. Provide one-year warranty, unless otherwise noted, to the Owner for all fixtures, equipment, materials, and workmanship.

B. The warranty period for all mechanical, plumbing, and temperature control work in these Specifications shall commence on the date of final acceptance, unless a whole or partial system or any separate piece of equipment or component is put into use for the benefit of any party other than the installing contractor with prior written authorization. In this instance, the warranty period shall commence on the date when such whole system, partial system or separate piece of equipment or component is placed in operation and accepted in writing by the Owner.

C. Warranty requirements shall extend to correction, without cost to the Owner, of all Work found to be defective or nonconforming to the contract documents. The Contractor shall bear the cost of correcting all damage resulting from defects or nonconformance with contract documents.

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D. Mechanical, plumbing, and temperature contractor shall provide manufacturer recommended maintenance at recommended intervals for all equipment during the one-year warranty period.

1.06 CONTRACT DOCUMENTS

A. All work shall be executed in accord with the requirements of national, state, and local codes, regulations, and standards and regulations shall be done as shown or specified.

B. Work required by the Contract Documents, which exceed the minimum requirements of the governing codes, standards, and regulations, shall be done as shown or specified.

C. Include payments for fees, permits, inspections, and licensing required for the Mechanical Work under this division.

1.07 DRAWING AND MEASUREMENTS

A. Drawing Use:

1. Mechanical Drawings shall be diagrammatic and indicate the general arrangement of systems and equipment, except when specifically dimensioned or detailed. Plumbing and piping and ductwork plans shall show size, capacity, approximate location, direction, and the general relationship of one work phase to another.

2. As the mechanical drawings are of small scale, it is not possible to show all the necessary offsets, fittings and accessories. Examine the General Contractor, Mechanical, and Electrical Drawings and Specifications. The Contractor shall obtain exact locations, measurements and levels at the site, and arrange all systems accordingly, furnishing such fittings, offsets, and accessories as may be required at no additional expense to the Owner.

B. Drawing Measurement:

1. Drawings shall not be scaled for roughing-in measurements nor used as shop drawings.

2. For exact locations of building elements, refer to the dimensioned Architectural and Structural Drawings. Other Drawings are diagrammatic or schematic.

3. Field measurements shall take precedence over dimensioned Drawings.

1.08 RECORD DRAWINGS

A. Keep a complete set of Mechanical Drawings in the jobsite office for showing actual installation of mechanical systems and equipment.

B. This set of Drawings shall be used for no other purpose.

C. Where any material, equipment, or systems components are installed differently from that shown, indicate such differences clearly and neatly.

D. Upon project completion, submit the record set of Drawings, As-Builts, to the Owner in MicroStation format in same version issued.

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1.09 FIELD VERIFICATION

A. The Contractor shall examine the premise and all conditions thereon and/or therein. He shall compare these conditions with all Drawings and Specifications. He shall ascertain and check all conditions that may affect his work. The Contractor's Bid shall take into consideration all such conditions as may affect the work under this Contract. No allowance shall be made in his behalf for an extra expense incurred as a result of his failure to verify reasonably ascertainable field information.

1.10 COORDINATION WITH OTHER TRADES

A. The Contractor shall coordinate all details of the equipment with other related parts of the Work, including verification that all structures, piping, wiring, and equipment components are compatible. The Contractor shall be responsible for all structural and other alterations in the Work required to accommodate equipment differing in dimensions or other characteristics from that contemplated in the Contract Drawings or Specifications.

B. Refer to other Drawings and parts of this Specification that cover the work of other trades carried on in conjunction with the Mechanical Work such that all work can proceed without interference resulting from lack of coordination.

C. Properly size and locate inserts for hangers, chases, sleeves, equipment bases, and accesses including future items as indicated by the Drawings. Whenever applicable, provide accurate wiring diagrams to the Electrical Contractor for equipment furnished by the Mechanical Contractor.

D. Ceiling cavity must be carefully reviewed and coordinated with all trades. In the event of the conflict, the installation of mechanical equipment and piping shall conform to the following priority lists:

1. Plumbing, Waste and Soil Lines or other lines requiring a definite slope.
2. Refrigerant piping.
3. Supply, Return and Exhaust Ductwork.
4. Water and Natural Gas Piping.
5. Control Conduit and Wiring.

1.11 SUBMITTALS

A. Submit as specified in Division 01, Section 01 33 00.

B. Shop Drawings, Product Data and Samples:

1. Submit shop drawings, product data, and samples for materials, products, equipment, and systems noted in each Section of the Specifications.
2. Submittals shall clearly indicate the proposed item, its quality, capacities, characteristics, and details. Items shall be identified with the same "MARK" as used in the Contract Documents.

C. Reports, Equipment, Startup and Commissioning plans, Warranties and Certificates:

1. Submit reports, equipment startup, warranties, and certificates as noted in each Section of the Specifications.

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2. Where equipment startup is specified, provide a factory authorized and trained representative to supervise installation, startup and/or proper operation of equipment. Submit start-up report to the Owner certifying that equipment is installed properly and test at operating conditions as indicated in the Contract Documents.

D. Operation and Maintenance Manuals:

1. Submit operation and maintenance manuals for major pieces of mechanical equipment and mechanical systems in accordance with Section 01 33 04.

1.12 LUBRICATION

A. Equipment shall be adequately lubricated by systems which require attention no more frequently than weekly during continuous operation. Lubrication systems shall not require attention during equipment startup or shutdown and shall not waste lubricants.

B. Lubricants of the types recommended by the equipment manufacturer shall be provided in sufficient quantities to fill all lubricant reservoirs and to replace all consumption during testing, startup, and operation prior to acceptance of equipment by the Owner. Unless otherwise specified or permitted, the use of synthetic lubricants will not be acceptable.

C. Lubrication systems shall be convenient and accessible. Oil drains and fill openings shall be easily accessible from the normal operating area or platform. Drains shall allow for convenient collection of waste oil in containers from the normal operating area or platform. Drains shall allow for convenient collection of waste oil in containers from the normal operating area or platform without removing the unit from its normal installed position.

1.13 OWNER TRAINING

A. The Contractor shall prepare a detailed, written training agenda and submit it to the Engineer a minimum of four weeks prior to the formal training for approval. The written agenda shall include specific training points within the items described above. For example: How to adjust setpoints, troubleshooting, proper start-up, proper shut-down, seasonal changes, draining, venting, changing filters, changing belts, etc. Failure to provide and follow an approved training agenda may result in additional training required at the expense of the Contractor.

B. Provide qualified, factory-trained manufacturers' representatives to give detailed instructions to the Owner's personnel in the operation and maintenance for each piece of equipment. All such training shall be done at the jobsite.

C. Contractor shall maintain a detailed log of training activities and who was trained under each training session.

D. Contractor shall make a DVD video recording of instructions to the Owner while explaining the system so additional personnel may view the instructions at a later date. The video recording shall be the property of the Owner.

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E. Instructions for different items of equipment, that are parts of a complete system, shall be given in an integrated, progressive manner. Instructors for each piece of component equipment in a system shall be available until instructions for all items included in a system are complete.

F. Instruction period shall be at times scheduled by the Owner's Representative, and shall be considered concluded only when the Owner's Representative is satisfied in regard to complete and thorough coverage. These services shall be available for a period of not less than forty (40) hours.

G. Refer to individual specification sections for additional Owner training requirements.

H. Instruction shall include at a minimum the following:

1. Explanation of all systems.
2. Temperature control system operation including calibration, adjustment and proper operating conditions of all sensors.
3. Maintenance of all equipment.
4. Start-up procedures for all equipment.
5. Explanation of seasonal system changes for all systems.
6. Description of emergency system operation for all systems.

1.14 SYSTEM COMMISSIONING

A. The mechanical, fueling and plumbing systems shall be complete and operating. System start-up, testing, balancing, and satisfactory system performance is the responsibility of the Contractor. This includes calibration and adjustments of all controls, noise level adjustments and final comfort adjustments as required.

B. Operate all HVAC systems continuously for at least one week prior to occupancy to bring construction materials to suitable moisture levels. Areas with mechanical cooling shall be maintained below 60 percent RH.

C. Contractor shall adjust the mechanical/plumbing systems and controls at season changes during the one year warranty period, as required, to provide satisfactory operation and to prove performance of all systems in all seasons.

D. All operating conditions and control sequences shall be tested during the start-up period. Test all interlocks, safety shutdowns, controls, and alarms.

E. The Contractor, subcontractors, and equipment suppliers shall have skilled technicians to ensure that all systems perform properly. If the Architect/Engineer is requested to visit the job site for trouble shooting, assisting in start-up, obtaining satisfactory equipment operation, resolving installation and/or workmanship problems, equipment substitution issues or unsatisfactory system performance, including call backs during the warranty period, through no fault of the design; the Contractor shall reimburse the Owner on a time and materials basis for services rendered at the Architect/Engineer's standard hourly rates in effect when the services are requested. The Contractor shall pay the Owner for services required that are product, installation or workmanship related. Payment is due within 30 days after services are rendered.

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PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 01 61 03 - EQUIPMENT BASIC REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Requirements of this Section apply to all equipment provided on the Project even if not specifically referenced in individual "Equipment" articles of those Specifications.

B. Related Sections include but are not limited to:

1. UPRR Contract Section.
2. Division 1 - UPRR General Conditions.
3. Section 03 09 00 - Concrete Work.
4. Section 05 12 00 - Structural Steel.
5. Section 07 92 00 - Joint Sealants.
6. Section 09 90 00 - Painting and Protective Coatings.
7. Section 10 14 00 – Identifying Devices
8. Section 33 05 26 – Mechanical Identification

1.02 QUALITY ASSURANCE

A. Referenced Standards:

1. American Bearing Manufacturers Association (ABMA).
2. American Gear Manufacturers Association (AGMA).
3. ASTM International (ASTM):
   a. F593 – Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
4. Institute for Electrical and Electronic Engineers (IEEE).
5. National Electrical Manufacturers Association (NEMA):
   a. 250 – Enclosures for Electrical Equipment (1000 Volts Maximum).
   b. ICS 6 – Industrial Controls and Systems Enclosures.
   c. MG 1 – Motors and Generators.
6. National Fire Protection Association (NFPA):
   a. 70 – National Electrical Code (NEC).
7. U.S. Department of Labor, Occupational Safety and Health Administration (OSHA):
   a. 29 CFR 1910 – OSHA Safety and Health Standards for General Industry (referred to herein as OSHA Standards).
8. Building Code:

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a. International Building Code (Latest Edition).

B. Miscellaneous:

1. A single manufacturer of a "product" is to be selected and utilized uniformly throughout the Project even though:

a. More than one manufacturer is listed for a given "product" in the Specifications.

b. No manufacturer is listed.

2. Equipment, electrical assemblies, related electrical wiring, instrumentation, controls and system components shall FULLY comply with specific NEC requirements related to area classification and to NEMA 250 and NEMA ICS-6 designations shown on Electrical Power Drawings and defined in Section 26 05 00.

1.03 DEFINITIONS

A. Product: Manufactured materials and equipment.

B. Major Equipment Supports – Supports for Equipment:

1. Located on or suspended from elevated slabs with supported equipment weighing two-thousand pounds (2000 LBS) or greater or;

2. Located on or suspended from roofs with supported equipment weighing five hundred pounds (500 LBS) or greater, or;

3. Located on slab-on-grade or earth with supported equipment weighing five-thousand pounds (5000 LBS) or more.

C. Equipment: One or more assemblies capable of performing a complete function. Mechanical, electrical, instrumentation or other devices requiring an electrical, pneumatic, electronic, or hydraulic connection. Not limited to items listed under "Equipment" article within the Specifications.

D. Installer or Applicator: Installer or applicator is the person actually installing or applying the product in the field at the Project Site.

1. Installer and Applicator are synonymous.

1.04 SUBMITTALS

A. Shop Drawings:

1. General for all equipment:

a. See Section 01 33 00 and 01 33 23.

b. Acknowledgement that products submitted comply with the requirements of the standards referenced.

c. Manufacturer's delivery, storage, handling, and installation instructions.

d. Equipment identification utilizing numbering system and name utilized in the Drawings.

e. Equipment Installation Details:

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1) Location of anchorage.
2) Type, size, and materials of construction of anchorage.
3) Anchorage setting templates.
4) Manufacturer's installation instructions.

f. Equipment area classification rating.
g. Shipping and operating weight.
h. Equipment physical characteristics:
1) Dimensions (both horizontal an vertical).
2) Materials of construction and construction details.
i. Equipment factory primer and paint data.
j. Manufacturer's recommended spare parts list.
k. Equipment lining and coatings.
l. Equipment utility requirements include air, natural gas, electricity, and water.
m. Ladders and platforms provided with equipment:
1) Certification that all components comply fully with OSHA requirements.
2) Full details of construction/fabrication.
3) Scaled plan and sections showing relationship to equipment.

2. Mechanical and process equipment:
a. Operating characteristics:
1) Technical information including applicable performance curves showing specified equipment capacity, rangeability, and efficiencies.
2) Brake horsepower requirements.
3) Copies of equipment data plates.
b. Piping and duct connection size, type and location.
c. Equipment bearing life certification.
d. Equipment foundation data:
1) Equipment center of gravity.
2) Criteria for designing vibration, special or unbalanced forces resulting from equipment operation.

3. Electrical and control equipment:
a. Electric motor information:
1) Documentation that motors provided are manufacturer's energy efficient type and not standard efficiency motors.
2) When efficiency motors are submitted, provide documentation why energy efficient motors are not available.

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3) Nameplate data as required by the NEC.
    a) Manufacturer's name.
    b) Rated Voltage.
    c) Full load current.
    d) Rated frequency.
    e) Number of Phases.
    f) Rated full load speed.
    g) Insulation system class and rated ambient temperature or rated temperature rise.
    h) Time Rating: 5,10, 30 or 60 minutes or continuous.
    i) Rated horsepower (HP).
    j) Code letter or locked rotor circuit.
    k) NEMA design letter.
    l) Marked "Thermally Protected" where applicable.
4) Motor service factor.
5) Motor enclosure type.
6) NEMA frame size.
7) NEMA design code.
8) Insulation type and temperature rise.
9) Motor locked rotor current.
10) Current efficiency and power factor at one half (1/2) three quarters (3/4) and full load.

b. Control Panels:
1) Panel Construction.
2) Point-to-point ladder diagrams.
3) Scaled panel face and subpanel layout.
4) Technical product data or panel components.
5) Panel and subpanel dimensions and weights.
6) Panel access openings.
7) Nameplate test.
8) Panel anchorage.

c. Systems Schematics and Data:
1) Provide system schematics where required in system specifications.
    a) Acknowledge all system components being supplied as part of the system.

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b) Utilize equipment, instrument and valving tag numbers defined in the contract documents for all components.

c) Provide technical data for each system component showing compliance with the Contract Document requirements.

d) For piping components, identify all utility connections, vents and drains which will be included as part of the system.

B. Operation and Maintenance Manuals:

1. See Section 01 33 04.

C. Miscellaneous Submittals:

1. Sample form letter for equipment field certification.
2. Certification that equipment has been installed properly, has been initially started up, has been calibrated and /or adjusted as required, and is ready for operation.
3. Certification for major equipment supports that equipment foundation design loads shown on the Drawings or specified have been compared to actual loads exhibited by equipment provided for this Project and that said design loadings are equal to or greater than the loads produced by the equipment provided.
4. Field noise testing reports if such testing is specified in narrow scope sections.
5. Field vibration testing reports if vibration testing is specified in narrow scope sections.
6. Notification, at least one (1) week in advance, that motor testing will be conducted at the factory.
7. Certification from equipment manufacturer that all manufacturer-supplied control panels that interface in any way with other controls or panels have been submitted to and coordinated with the suppliers/installer of those interfacing systems.
8. Motor test reports.
9. Certification prior to Project closeout that electrical panel drawings for manufacturer-supplied control panels truly represent panel wiring including any field-made modifications.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Motors:

a. Siemens.

b. Westinghouse.

c. General Electric.

d. U.S. Motors.

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e. Reliance Electric.

f. Baldor.

2. Mechanical Variable Speed Drives:

a. U.S. Motors (VariDrive).

b. Reeves.

B. Submit requests for substitution in accordance with Specification Section 01 33 00.

2.02 MANUFACTURED UNITS

A. Electrical Motors:

1. Provide motors designed and applied in compliance with NEMA, IEEE and the NEC for specific duty imposed by driven equipment and location.

2. Where used in conjunction with adjustable speed AC or DC drives, provide motors that are fully compatible with the speed controllers.

3. Design for frequent starting duty equivalent to duty service required by driven equipment.

4. Design for full voltage starting.

5. Design bearing life based upon actual operating load conditions imposed by driven equipment.

6. Size for altitude of project.

7. Furnish with stainless steel nameplates which include all data required by Article 430 of the National Electrical Code.

8. Use of manufacturer's standard motor will be permitted on integrally constructed motor driven equipment specified by model number in which a redesign of the complete unit would be required in order to provide a motor with features specified.

9. Electric Motors less than one third horsepower (1/3 HP):

a. Single phase, sixty Hertz (60Hz), designed for the supply voltage shown on the Drawings.

b. Totally enclosed non-ventilated (TENV) or totally enclosed fan-cooled (TEFC).

c. Permanently lubricated sealed bearings conforming to ABMA standards.

d. Built-in manual reset thermal protector or integrally mounted manual motor starter with thermal overload element with stainless steel enclosure.

10. Electric motors 1/3 to 1 HP:

a. Single or three phase, sixty Hertz (60Hz), designed for supply voltage shown on the Drawings.

b. Totally enclosed non-ventilated (TENV) or totally enclosed fan cooled (TEFC).

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c. Permanently lubricated sealed bearings conforming to ABMA standards. For single phase motors, provide built-in manual reset thermal protector or integrally mounted manual motor starter with thermal overload element.

11. Electric motors 1 1/2 to 10HP:

a. Three phase, 60 Hz, designed for the supply voltage shown on the Drawings.

b. Totally enclosed fan cooled (TEFC).

c. Permanently lubricated sealed bearings conforming to ABMA standards.

d. For vertical motors provide 15 year, average-life thrust bearings conforming to ABMA standards.

12. Electric motors greater than 10HP:

a. Three phase, 60 Hz, designed for the supply voltage on the Drawings.

b. Totally enclosed fan cooled (TEFC).

c. Oil or grease lubricated anti-friction bearings conforming to ABMA standards. Design bearing life for 90 percent survival rating at 50,000 HRS of operation for motors up to and including 100 HP. For motors greater than 100 HP, design bearing life for 90 percent survival rating at 100,000 HRS of operation.

d. For vertical motors provide 15-year, average-life thrust bearings conforming to ABMA standards.

B. Submersible Motors: Refer to individual narrow scope specifications for submersible motor requirements.

C. V-Belt Drive:

1. Provide each V-belt drive with sliding base or other suitable tension adjustment.

2. Provide V-belts with a service factor of at least 1.6 at maximum speed.

3. Provide staticproof belts.

D. Mechanical Variable Speed Drives:

1. Oil-lubricated shaft-mounted reduction gear drive capable of 300 percent shock load and providing a 1.5 service in accordance with AGMA.

2. Assure infinite speed adjustment over a 4:1 range.

3. Secure drive to equipment base.

4. Flexible coupling between drive shaft and equipment shaft.

2.03 COMPONENTS

A. Gear Drives and Drive Components:

1. Size drive equipment capable of supporting full load including losses in speed reducers and power transmission.

2. Provide nominal input horsepower rating of each gear or speed reducer at least equal to nameplate horsepower of drive motor.

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3. Design drive units for 24 HR continuous service, constructed so oil leakage around shafts is precluded.
4. Utilize gears, gear lubrication systems, gear drives, speed reducers, speed increasers and flexible coupling meeting applicable standards of American Gear Manufacturers Association.
5. Gear Reducers:
    a. Provide gear reducer totally enclosed and oil lubricated.
    b. Utilize anti-friction bearings throughout.
    c. Provide worm gear reducers having a service factor of at least 1:20.
    d. Furnish other helical, spiral bevel, and combination bevel-helical gear reducers with a service factor of at least 1:50.

2.04 ACCESSORIES

A. Guards:
1. Provide each piece of equipment having exposed moving parts with full length, easily removable guards, meeting OSHA requirements.
2. Interior applications:
    a. Construct form expanded galvanized steel rolled to conform to shaft or coupling surface.
    b. Utilize non-flattening type 16 GA galvanized steel with nominal 1/2 IN spacing.
    c. Connect to equipment frame with hot-dip galvanized bolts and wing nuts.
3. Exterior applications:
    a. Construct from 16 GA stainless steel or aluminum.
    b. Construct to preclude entrance of rain, snow, or moisture.
    c. Roll to conform to shaft or coupling surface.
    d. Connect to equipment frame with stainless steel bolts and wing nuts.

B. Anchorage:
1. Cast-in-place anchorage:
    a. Provide ASTM F593, Type 316 stainless steel anchorage for all equipment.
    b. Configuration and number of anchor bolts shall be per manufacturer's recommendations.
    c. Provide two nuts for each bolt.
2. Drilled Anchorage:
    a. Epoxy grout per Section 03 09 00.
    b. Threaded rods same as cast-in-place.

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C. Data Plate:

1. Attach a stainless steel data plate to each piece of rotary or reciprocating equipment.
2. Permanently stamp information on data plate including manufacturer's name, equipment, operating parameters, serial number and speed.

D. Gauges:

1. Provide gauges in accordance with Section 23 09 00.
2. Provide at the following locations:
   a. Inlet and outlet of all reciprocating, centrifugal, and positive displacement mechanical and process equipment.
   b. At locations identified on Drawings.
3. Utilize tapping sleeves for mounting per Section 40 05 07.

E. Lifting Eye Bolts or Lugs:

1. Provide on all equipment 50 LBS or greater.
2. Provide on other equipment or products as specified in the narrow specifications.

2.05 FABRICATION

A. Design, fabricate and assemble equipment in accordance with modern engineering and shop practices.

B. Manufacture individual parts to standard sizes and gauges so that repair parts, furnished at any time, can be installed in field.

C. Furnish like parts of duplicate units to be interchangeable.

D. Ensure that equipment has not been in service at any time prior to delivery, except as required by tests.

E. Furnish equipment which requires periodic internal inspection or adjustment with access panels which will not require disassembly of guards, dismantling of piping, or equipment or similar major efforts. Quick opening but sound, securable access ports or windows shall be provided for inspection of chains, belts, or similar items.

F. Provide common, lipped base plate mounting for equipment and equipment motor where said mounting is a manufacturer's standard option. Provide connection for 3/4 IN PVC tubing.

G. Machine the mounting feet of rotating equipment.

H. Fabricate equipment which will be subject to a corrosive environment in such a way as to avoid back to back placement of surfaces that cannot be properly prepared and painted. When such back to back fabrication cannot be avoided, provide continuous welds to seal such surfaces from contact with a corrosive environment. Where continuous welds are not practical, after painting, seal the back to back surfaces from the environment in accordance with Section 07 92 00.

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2.06 SHOP OR FACTORY PAINT FINISHES

A. Electrical Equipment:

1. Provide factory-applied paint coating system(s) for all electrical equipment components except those specified in Section 09 90 00 or receive field painting.

B. Field paint other equipment in accordance with Section 09 90 00.

2.07 SOURCE QUALITY CONTROL

A. Motor Tests:

1. Test motors in accordance with NEMA and IEEE standards.
2. Provide routine test for all motors.
3. The Engineer reserves the right to select and have tested, either routine or complete, any motor included in the project.
    a. The Contractor shall pay all costs, including shipping and handling, for all motors tests.
    b. If two consecutive motors of the same manufacturer fail testing, the Engineer has the right to reject all motors from that manufacturer.

2.08 SEISMIC DESIGN

A. Equipment (400 LBS or greater) and its anchorage to be designed to resist the total design seismic forces prescribed in the most current relevant Code in the jurisdiction in which the project is to be constructed.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install equipment as shown on Drawings and in accordance with manufacturer's directions.

B. Utilize templates for anchorage placement for slab-mounted equipment.

C. For equipment having drainage requirements such as seal water, provide 3/4 IN PVC or clear plastic tubing from equipment base to nearest floor or equipment drain. Route clear of major traffic areas and as approved by the Engineer.

D. DO NOT construct foundations until major equipment supports are approved.

E. Extend all non-accessible grease fittings using stainless steel tubing to a location which allow easy access of fittings.

F. Construct subbases, either concrete, steel or cast iron, level in both directions. Particular care shall be taken at hold-down bolt locations so these areas are flat and level.

G. Machine Base:

1. Mount machine bases of rotating equipment on subbases in a manner that they are level in both directions according to machined surfaces on base. Use machinist level for this procedure.

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2. Level machine bases on subbases and align couplings between driver and driven unit using steel blocks and shims.

    a. Size blocks and shims to provide solid support at each anchor bolt location. Area size of blocks and shims shall be approximately 1-1/2 times area support surface at each anchor bolts point.

    b. Provide blocks and shims at each anchor bolt. Blocks and shims that are square shape with "U" cut out to allow blocks and shims to be centered on anchors bolts.

    c. After all leveling and alignment has been completed and before grouting, tighten anchor bolts to proper torque value.

    d. Do not use nuts below the machine base in anchor bolts for base leveling.

H. Couplings:

1. Align in the annular and parallel positions.

    a. For equipment rotating at 1,200 RPM or less, align both annular and parallel within 0.001 IN tolerance for couplings 4 IN in size or smaller. Couplings larger than 4 IN in size: Increase tolerance 0.0005 IN per inch of coupling diameter, i.e., allow 6 IN coupling, 0.002 IN tolerance, and allow a 10 IN 0.004 IN tolerance.

    b. For equipment rotating at speed greater than 1,200 RPM allow both annular and parallel positions within a tolerance rate of 0.00025 IN per inch of coupling diameter.

2. If equipment if delivered as a mounted unit from factory, verify factory alignment on site after installation and realigned if necessary.

3. Check surfaces for run out before attempting to trim or align units.

I. Grouting:

1. After the machine base has been shimmed, leveled, couplings aligned, and anchor bolts tightened to correct torque value, a dam or formwork shall be placed around the base to contain grouting. Extend the dam or formwork at least 1/2 IN above the top of the leveling shims and blocks.

2. Saturate the top of the roughened concrete subbase with water before grouting. Add grout until entire space under the machine base is filled to the top of the base underside. Puddle grout by working a stiff wire through the grout and vent holes to work grout in place and release any entrained air in the grout or base cavity.

3. When the grout has sufficiently hardened, remove dam or formwork and finish the exposed grout surface to fine, smooth surface. Cover exposed grout surfaces with wet burlap and keep covering sufficiently wet to prevent too rapid evaporation of water from the grout. When the grout has fully hardened (after a minimum of seven (7) days) tighten all anchor bolts and recheck driver-driven unit for proper alignment.

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3.02 INSTALLATION CHECKS

A. For all equipment specifically required in detailed specifications, secure services of experienced, competent and authorized representative(s) of equipment manufacturer to visit site of work and inspect, check, adjust, and approve equipment installation. In each case, representative(s) shall be present during placement and startup of equipment and as often as necessary to resolve any operational issues that may arise.

B. Secure from equipment manufacturer's representative(s) a written report certifying that equipment:

1. Has been properly installed and lubricated.
2. Is in accurate alignment.
3. Is free from any undue stress imposed by connecting piping and anchor bolts.
4. Has been operated under full load conditions and that it operated satisfactorily. Secure and deliver a field report to the Engineer immediately prior to leaving the jobsite.

C. No separate payment shall be made for installation checks. All or any time expended during the installation check does not qualify as O&M training or instruction time when specified.

3.03 IDENTIFICATION OF EQUIPMENT AND HAZARD WARNING SIGNS

A. Identify equipment and install hazard warnings signs in accordance with Sections 10 14 00 and 33 05 26.

3.04 FIELD PAINTING AND PROTECTIVE COATINGS

A. For required field painting and protective coatings, comply with Section 09 90 00.

3.05 WIRING CONNECTIONS AND TERMINATION

A. Clean wires before installing lugs and connectors.

B. Coat connection with oxidation eliminating compound for aluminum wire.

C. Terminate motor circuit conductors with copper lugs bolted to motor leads.

D. Tape stripped ends of conductors and associated connectors with electrical tape. Wrapping thickness shall be 150 percent of the conductor insulation thickness.

E. Connections to carry full ampacity of conductors without temperature rise.

F. Terminate spare conductors with electrical tape.

3.06 FIELD QUALITY CONTROL

A. Furnish equipment manufacturer services as specified in the individual equipment specifications.

B. Inspect wire and connections for physical damage and proper connection.

C. Bump motor to check for correct rotation.

1. Ensure motor to check for correct rotation.

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2. Check prior to connection to driven equipment, before coupling are bolted or belts installed.

D. Subbase that supports the equipment base and that is made in the form of a cast iron or steel structure that has supporting beams, legs and cross member that are cast welded or bolted, shall be tested for a natural frequency of vibration after equipment is mounted. Keep the ratio of the natural frequency of the structure to the frequency of the disturbing force out of the range from 0.5 to 1.5.

3.07 DEMONSTRATION

A. Demonstrate equipment in accordance with UPRR requirements.

END OF SECTION

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SECTION 01 61 04 - ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Basic requirements for electrical components which are an integral part of packaged mechanical equipment. These components include, but are not limited to factory installed motors, starters, and disconnect switches furnished as an integral part of packaged mechanical equipment.

B. Specific electrical requirements (i.e. horsepower and electrical characteristics) for mechanical equipment are scheduled on the Drawings.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Drawings and General Provisions of Contract, including Special Conditions, apply to the work of this section.

1.03 REFERENCED STANDARDS

A. Electrical components and material shall be UL labeled.

B. NEMA Standards MG-1: Motors and Generators.

C. NEMA Standard ICS 2: Industrial Control Devices, Controllers, and Assemblies.

D. NEMA Standard 250: Enclosures for Electrical Equipment.

E. NEMA Standard KS 1: Enclosed Switches.

F. Comply with National Electrical Code (NFPA 70).

PART 2 - PRODUCTS

2.01 MOTORS

A. The following are basic requirements for simple or common motors.

1. Motor Sizes: Motors shall be large enough so that the driven load will not require the motor to operate in the service factor range.

2. Service Factor: 1.15 for poly-phase motors and 1.35 for single phase motors.

3. Motor Construction: NEMA Standard MG 1, general purpose, continuous duty, Design “B”, except “C” where required for high starting torque.

2.02 STARTERS, ELECTRICAL DEVICES, AND WIRING

A. Motor Starter Characteristics:

1. Enclosures: NEMA 1, general purpose enclosures with padlock ears.

2. Manual switches shall have pilot lights.

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3. Overload protection: Melting alloy type thermal overload relays

2.03 MAGNETIC STARTERS

A. Maintained contact push buttons and pilot lights, properly arranged for single speed operation as indicated.

B. Trip-free thermal overload relays, each phase.

C. Interlocks and similar devices as required.

D. Built-in 120 volts control circuit transformer, fused from line size, where service exceeds 240 volts.

E. Externally operated manual reset.

F. Under-Voltage release or protection.

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFCATION SECTION)

END OF SECTION

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SECTION 01 65 50 - DELIVERY, STORAGE AND HANDLING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes minimum requirements for the delivery, storage and handling of materials and equipment required to complete the Work.

1.02 RESPONSIBILITY FOR MATERIALS AND EQUIPMENT

A. Items Furnished by Owner: Contractor's responsibility for materials and equipment furnished by Owner shall begin at the point of delivery to the contractor or job site.

B. Delivery:

1. All materials and equipment furnished by Owner will be delivered to the job site. Such items will be available to Contractor, as required to maintain contractor's construction schedule.

2. Contractor shall be responsible for inspection, verification of quantities, unloading and proper storage.

3. All materials and equipment furnished by Owner which disappear or are damaged after their acceptance by Contractor shall be replaced by and at the expense of Contractor. Replacements shall conform to the original procurement specifications.

C. Delivery and Handling of Items Furnished by Owner:

1. Equipment and materials furnished by Owner for installation by Contractor will be delivered f.o.b. cars or trucks to the Union Pacific Railroad Company, at or near the job site. Contractor shall be responsible for all unloading, reloading, transporting to the site, storage if necessary, rehandling, and installation.

2. All items shall be unloaded promptly after arrival. All charges for demurrage due to negligence or delay by Contractor shall be paid by Contractor. Equipment and materials shall be handled by methods which will prevent damage.

3. Equipment and materials shall be protected from exposure to the elements.

4. Contractor shall accept the risk of any delay in delivery of equipment or materials furnished by Owner, and if the Work is delayed, Contractor shall have no claim for damages or contract adjustment other than an extension of time occasioned by the delay.

5. All equipment shall be arranged and installed as indicated on the Drawings, and in conformity with installation drawings and instructions furnished to Owner by the manufacturer of the equipment.

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6. Before being placed in operation, all equipment furnished by Owner and installed by Contractor will be inspected, checked and adjusted by an experienced and competent technical representative of the equipment manufacturer. The technical representative will also place the equipment in initial operation under both trial and full load conditions and determine whether its operation is satisfactory and proper. This service is included as part of the equipment procurement contract and will be provided by Owner at no cost to Contractor, as set forth in the quality control section.

D. Items Furnished by Contractor: Contractor shall be fully responsible for all materials and equipment which it has furnished.

1.03 DEFECTIVE MATERIALS

A. Defective materials and equipment discovered after installation and prior to final acceptance of the Work, where the defect is of a nature not detectable by visual examinations and other appropriate field inspection methods, shall be replaced by Owner, together with such additional materials and supplies as may be necessary for their replacement. Contractor shall furnish all necessary tools, equipment, and appliances, and perform all necessary labor, for the removal and replacement of such defective items in a manner acceptable to Owner; adjustment to the Contract Price for the costs of the removal and replacement shall be made in accordance with the General Conditions.

1.04 OFFSITE STORAGE

A. Offsite storage arrangements shall be approved by Owner for all materials and equipment not incorporated into the Work. Such offsite storage arrangements shall be presented in writing and shall afford adequate and satisfactory security and protection. Offsite storage facilities shall be accessible to Owner and Engineer. The Contractor will be responsible for all items held in the offsite storage.

1.05 PREPARATION FOR SHIPMENT

A. All materials provided by the Contractor shall be suitably packaged to facilitate handling and protect against damage during transit and storage. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. All painted surfaces which are damaged prior to acceptance of equipment shall be repainted to the satisfaction of Owner.

B. Each item, package, or bundle of material shall be tagged or marked as identified in the delivery schedule or on the Shop Drawings. Complete packing lists and bills of materials shall be included with each shipment.

1.06 SALVAGE OF MATERIALS AND EQUIPMENT

A. Existing materials and equipment removed, and not reused as a part of the Work or indicated as salvage items, shall become Contractor's property upon approval by the railroad.

B. Contractor shall carefully remove, in a manner to prevent damage, all materials and equipment specified or indicated to be salvaged and reused or to remain the property of Railroad. Contractor shall store and protect salvaged items specified.

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C. Salvaged items not to be reused in the Work, but to remain Railroad's property, shall be delivered by Contractor in good condition to Railroad at the site.

D. Any salvage items damaged in removal, storage, or handling through carelessness or improper procedures shall be replaced by Contractor in kind or with new items.

E. Contractor may furnish and install new items instead of those specified or indicated to be salvaged and reused, in which case such removed items will become Contractor's property.

F. Existing materials and equipment removed by contractor shall not be reused in the Work except where so specified or indicated.

1.07 PROTECTION

A. Protect finished surfaces, including jambs and soffits of openings used as passageways, through which equipment and materials are handled.

B. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.

C. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Railroad.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFACTION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECION)

END OF SECTION

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SECTION 01 71 13 - MOBILIZATION AND EQUIPMENT RENTAL

PART 1 - GENERAL

1.01 SUMMARY

A. Mobilization Description:

1. This work consists of preparatory work and operations, including those necessary for movement of personnel, equipment, supplies and incidentals to the project site; the establishment of offices, buildings and other facilities necessary for work on the project; the cost of bonds and any required insurance; the cost for as-built production and other preconstruction expenses necessary for start of the Work, excluding the cost of construction materials.

B. Equipment Rental Description:

1. This work consists of providing equipment for rent to the Railroad during the project as requested by Railroad Engineer.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Section 01 78 39 – Project Record Documents

PART 2 - PRODUCTS

2.01 EQUIPMENT RENTAL

A. All equipment expected to be used on the project should be listed on the "Statement of Equipment". These hourly rates will be used for any extra equipment rental that might occur during the project. Mobilization and demobilization costs shall be included in the hourly rate for any equipment not already on the job site. Daily work tickets must be filled out for all equipment rentals. Contractor shall ensure that these tickets are accurately maintained on a daily basis. Hours of equipment rental use will not be continuous. Individual pieces of equipment will be used sporadically throughout the project. Equipment Rental on equipment that is not on site shall be used for a 4 HR minimum. All equipment shall be in good condition and include both operator and fuel.

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 4 - MEASUREMENT AND PAYMENT

4.01 PAYMENT

A. Mobilization payment will be made at the contract lump sum price subject to the following provisions:

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1. Payment for mobilization shall be made at a rate of 70 percent when Work is commenced and 30 percent upon demobilization. Request for retention invoice shall include all lien releases, the delivery of project record documents, the amount of retention withheld for every payment is outlined in the contract.

B. Equipment Rental payment shall be based on the unit prices provided in project bid items.

END OF SECTION

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SECTION 01 71 23 - FIELD ENGINEERING

PART 1 - GENERAL

1.01 GENERAL

A. Provide such field engineering services as are required for proper completion of the Work including, but not necessarily limited to:

1. All construction surveying and staking, including, but not limited to, establishing and maintaining lines and levels, slope stakes and grade stakes, any intermediate stakes, right-of-way fence and final blue tops (finished grade stakes) for the grading, bedding for culverts, rip rap, bridge construction, and track construction, including work to be performed by the Railroad, will be the responsibility of the Contractor.
2. Structural design of shoring, forms and similar items provided by the Contractor as part of his means and methods of construction.

1.02 RELATED REQUIREMENTS (SECTIONS)

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions and Special Conditions.
2. Additional requirements for field engineering also may be described in other Sections of these Specifications.
3. As described in the General Conditions, and if available, the Railroad will furnish survey describing the physical characteristics, legal limitations, utility locations, and legal description of the site.

1.03 REFERENCED STANDARDS

A. UPRR/BNSF Guidelines for Temporary Shoring

1.04 SUBMITTALS

A. Upon request of the Engineer, submit:

1. Data demonstrating qualifications of persons proposed to be engaged for field engineering services.
    a. Documentation verifying accuracy of field engineering work.
    b. Certification, signed by the Contractor's retained field engineer, certifying that elevations and locations of improvements are in conformance with requirements of the Contract Documents.
2. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

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PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.01 PREPARATION

A. Horizontal and vertical control will be furnished by the Railroad.

B. The Contractor shall re-establish the project engineering stationing and remark missing or obscured stationing with a paint stick on the field side of the rail.

3.02 INSTALLATION

A. Grading

1. Right of way fence – Set lath with flag on right of way line at 100' intervals and at all intermediate break points. Lath shall be marked with station and offset.

2. Subgrade - Set slope stakes and grade stakes, any intermediate stakes, and final blue tops (finished grade stakes) for the grading, at the vertical cut next to existing track, track centerline, shoulder(s) and other break points shown on the cross sections. Stakes shall be set on 100' intervals and intermediate locations shown on the cross sections. For grading areas greater than 50' wide blue tops will be required on a 50 FT by 50 FT grid in addition to those listed prior. Point identity, station, offset, and cut and fill information shall be provided on lath next to hub.

3. Subballast – Set blue tops (finished grade stakes) for subballast at the vertical cut next to existing track, track centerline, shoulder(s) and other break points shown on the cross sections. Blue tops shall be set on 100' intervals and intermediate locations shown on the cross sections. For grading areas greater than 50' wide blue tops will be required on a 50 FT by 50 FT grid in addition to those listed prior.

B. Culverts

1. Set stakes with appropriate offsets to establish horizontal location, grade and invert elevation at each end of culvert. Set additional stakes to locate bedding and rip rap limits.

C. Bridges

1. Set stakes with appropriate offset to establish elevation and horizontal location of bridge backwalls, wingwalls, piles, pile caps, piers, and other associated features.

D. Railroad Tracks

1. Set stakes for track construction, including track to be constructed by the Railroad, to the planned horizontal and vertical alignments.

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2. All tangent track shall be staked at 100 FT intervals and at vertical curve cardinal points, which include point of vertical curvature (PVC) and point of vertical tangent (PVT). Set nail at actual point with flagging or whisker attached to nail. If a nail cannot be set at actual point, use a paint stick to mark actual point on rail. Offset actual point 15 FT from nail and write description, including point type, station, top of rail elevation shown with horizontal bar and "V" , and horizontal offset to centerline of track, on flag or lath at offset point. If a lath cannot be set at 15 FT, use an offset that will work.

3. All horizontal curves in track shall be staked at 50 FT intervals and at cardinal points, which include point of curvature (PC) and point of tangent (PT) for simple curves, and point of spiral to tangent (PS), point of spiral to curve (PSC), point of curve to spiral (PCS), and point of spiral to tangent (PT) for spiral curves. Set nail at actual point with flagging or whisker attached to nail. If a nail cannot be set at actual point, use a paint stick to mark actual point on rail. Offset actual point 15 FT from nail and write description, including point type, station, top of rail elevation shown with horizontal bar and "V", and horizontal offset to centerline of track, on flag or lath at offset point. If a lath cannot be set at 15 FT, use an offset that will work. If possible, give line reference (LR) in case of actual point gets disturbed. Line Reference can be on adjacent rail or by setting another offset out further.

4. Turnouts shall be staked at point of switch (POS), 1/2 IN point of frog (PF), and last long tie (LLT). Each point shall be set with a nail on actual point with flagging or whisker attached to nail. If a nail cannot be set at actual point, use a paint stick to mark actual point on rail. Offset actual point 15 FT from nail and write description, including turnout size and type for POS and PF points, and top of rail elevation shown with horizontal bar and "V", on flag or lath at offset point. If possible, give line reference (LR) in case actual point gets disturbed. Line Reference can be on adjacent rail or by setting another offset out further.

5. Offsets and LR may also be marked on adjacent rail with permission from the Engineer.

E. In addition to procedures directed by the Contractor for proper performance of the Contractor's Responsibilities:

1. Locate and protect control points before starting Work on the site.

2. Preserve permanent reference points during progress of the Work.

3. Do not change or relocate reference points or items of the Work without specific approval from the Engineer.

F. Promptly advise the Engineer when a reference point is lost or destroyed, or requires relocation because of other changes in the Work.

1. The Contractor shall replace all disturbed stakes or markers disturbed by construction activities.

2. Locate such replacements according to the original survey control.

G. Shoring designs shall be according to UPRR/BNSF Guidelines for Temporary Shoring. Submit shoring designs to Engineer for review prior to installing shoring.

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PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No separate measurement will be made for field engineering.

4.02 PAYMENT

A. Field engineering shall be incidental applicable service items. No separate payment shall be made.

END OF SECTION

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SECTION 01 74 13 - CLEANING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Intermediate and final cleaning of Work not including special cleaning of closed systems specified elsewhere.

1.02 DELIVERY, STORAGE, AND HANDLING

A. Store cleaning products and cleaning wastes in containers specifically designed for those materials.

1.03 SCHEDULING

A. Schedule cleaning operations so that dust and other contaminants disturbed by cleaning process will not fall on newly painted surfaces.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cleaning Agents:

1. Compatible with surface being cleaned.
2. New and uncontaminated.
3. For Manufactured Surfaces: Material recommended by manufacturer.

PART 3 - EXECUTION

3.01 CLEANING - GENERAL

A. Prevent accumulation of wastes that create hazardous conditions.

B. Conduct cleaning and disposal operations to comply with laws and safety orders of governing authorities.

C. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains or sewers.

D. Dispose of degradable debris at an approved solid waste disposal site.

E. Dispose of nondegradable debris at an approved solid waste disposal site or in an alternate manner approved by Engineer and regulatory agencies.

F. Handle materials in a controlled manner with as few handlings as possible.

G. Do not drop or throw materials from heights greater than 4 FT or less than 4 FT if conditions warrant greater care.

H. On completion of work, leave area in a clean, natural looking condition.

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1. Remove all signs of temporary construction and activities incidental to construction of required permanent Work.

I. Do not burn on-site.

3.02 INTERIOR CLEANING

A. Cleaning During Construction:

1. Keep work areas clean so as not to hinder health, safety or convenience of personnel in existing facility operations.
2. At maximum weekly intervals, dispose of waste materials, debris, and rubbish.
3. Vacuum clean interior areas when ready to receive finish painting.
    a. Continue vacuum cleaning on an as-needed basis, until substantial completion.
4. Control dust in work areas of existing facilities.
    a. Provide protection to existing electrical and mechanical equipment as required to eliminate detrimental effects due to construction.
    b. Weekly check air handling filters in existing units having construction activities.
        1) Replace as necessary.
    c. At maximum monthly intervals, check interior of existing electric panels and vacuum if dust accumulation has occurred.
    d. At maximum weekly intervals, sweep all floors, including basins, tunnels, platforms, walkways, and pick up and dispose of all debris.
        1) Use dust suppressant sweeping compound in areas open to areas of existing facility operations.

B. Final Cleaning:

1. Complete immediately prior to Demonstration Period.
2. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed surfaces.
3. Wipe all lighting fixture reflectors, lenses, lamps and trims clean.
4. Wash and shine glazing and mirrors.
5. Polish glossy surfaces to a clear shine.
6. Ventilating systems:
    a. Clean permanent filters and replace disposable filters if units were operated during construction.
    b. Clean ducts, blowers and coils if units were operated without filters during construction.
7. Replace all burned out lamps.
8. Broom clean process area floors.

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9. Mop office and control room floors.

3.03 EXTERIOR (SITE) CLEANING

A. Cleaning During Construction:

1. Construction debris:

a. Confine in strategically located container(s):

1) Cover to prevent blowing by wind.

2) Haul from site minimum once a week.

b. Remove from work area to container daily.

2. Vegetation: Keep weeds and other vegetation trimmed to 3 IN maximum height.

3. Soils, sand, and gravel deposited on paved areas and walks:

a. Remove as required to prevent muddy or dusty conditions.

b. Do not flush into storm sewer system.

B. Final Cleaning:

1. Remove trash and debris containers from site.

a. Re-seed areas disturbed by location of trash and debris containers.

2. Clean paved roadways.

3.04 FIELD QUALITY CONTROL

A. Immediately prior to Demonstration Period, conduct an inspection with Engineer to verify condition of all work areas.

END OF SECTION

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SECTION 01 77 00 - TIME OF COMPLETION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Information relevant to the completion of the Work in a timely manner.

1.02 DETERMINATION OF CONTRACT TIME ALLOWABLE FOR COMPLETION OF WORK

A. The proposal will show a tentative date on which it is anticipated that the contractor may begin operations, and a specified number of calendar days in which to complete the Work. A written "Notice to Proceed" will be furnished to the contractor as soon as feasible after the award and execution of the contract and determination has been made that all or a major portion of the site is available to permit the start of the Work.

B. The determination of the days to be charged against the time allowance for completion of the Work shall be made by the Engineer, and shall be calculated based upon the number of calendar days elapsed since the start of the work, regardless of whether the Contractor worked each of those days.

1.03 DETERMINATION OF DAYS CHARGED

A. Contract days charged to the project will begin to amass on:

1. The actual date work began on the project, or

2. A given number of days, based on the Contractor's schedule, after the "Notice to Proceed" which matches the days needed to mobilize, whichever is earlier.

B. The computation of days charged against the allowable contract time, shall be continued, until all work is completed, unless the Engineer authorizes a temporary suspension of the operations in accordance with Subsection 1.04. However, when the work is temporarily suspended by the Engineer for failure on the part of the Contractor to correct conditions unsafe for the workmen, employees of the Railroad or the general public, to carry out provisions of the contract, or to carry out orders given, the computation of calendar days will not be suspended.

C. Once each month the Engineer will furnish the Contractor a report of days charged against the completion of the work. Any disagreement with the charges shown must be expressed in writing to the Engineer within seven (7) days of receipt of the report giving detailed reasons for the disagreement. The Engineer will make the final resolution of the disagreement.

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1.04 DELAY OF WORK

A. Should the Contractor find they are unable to complete the work within the number of days specified due to conditions beyond their control, The Contractor shall promptly make a written request to the Engineer for an extension in the time of completion. The request shall describe the nature of the delay, conditions responsible, the length of time and/or its anticipated time, and submit sufficient evidence to substantiate those conditions. If the Engineer determines conditions are beyond the control of the Contractor, The Engineer may either authorize a temporary suspension of operations, adjust the number of days previously charged, or grant in writing an extension of the time of completion consistent with the facts presented. The action taken will depend upon the nature and extent of the delay involved. The Engineer's decision shall be final and conclusive.

B. When the Special Provisions call for the necessity of performing work in cold weather, consideration will not be given to possible loss of efficiency due to prosecution of the work during the winter months in the determination of days to complete the Work.

C. It is considered that, generally, materials will be available for delivery in sufficient time to permit completion of the work within the specified time of completion. Delays due to slow delivery from material suppliers will not be considered as justification for an extension in the specified time of completion. A letter from the supplier shall substantiate any requests for extension in the time of completion due to delay of delivery. The letter shall relate the date the Contractor ordered the material, the date the supplier confirmed the order, the cause or reason for the delivery delay, and the anticipated delivery date. The request for extensions in the time of completion should also provide information relative to efforts made to obtain the material from sources other than the supplier that incurred the delay in delivery of the material.

D. If the Engineer determines the delay involved was due to a delay in delivery of material needed for the prosecution of the controlling operation or severe weather, The Engineer may authorize a temporary suspension of that operation, adjust the number of days charged, or grant in writing, an extension of the time of completion consistent with the facts presented.

E. Shortage of labor in the vicinity of the project will not be considered as justification for an extension in the specified time of completion. It is advised that the Contractor investigate the anticipated availability of labor in the area during the period that the Work is to be performed and give careful thought in preparing their proposal to the necessity of importing labor.

F. The Engineer may grant an extension in days specified when items of “Extra Work” not contemplated in the original contract or additional quantities of contract items of work are required. Extension in time of completion granted for such reasons shall be in proportion to the value of extra and additional work as compared to the total amount of the original contract for the group or groups of work included in the time of completion to be extended, except that further consideration may be given when it can be shown that the extra or additional work was of such character that it required more time than the proportionate value of the contract.

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PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 01 77 10 - PROJECT CLOSEOUT AND CLEANING

PART 1 - GENERAL

1.01 SUMMARY

A. Cleaning Up:

1. Upon completion of the Work involved, the Contractor shall clean the location of the Work and all ground occupied by him in connection with the Work and shall remove all rubbish, excess materials, falsework, temporary structures, and equipment, leaving the location of the Work cleaned to the satisfaction of the Engineer.

B. Material Delivery:

1. The Contractor shall pick up and deliver to a site or sites designated by the Engineer all excess and useable materials furnished by the Railroad in connection with the Work.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 01 78 19 - MAINTENANCE CONTRACT

PART 1 - GENERAL

1.01 SUMMARY

A. Contractor shall provide a full service contract that provides 100% coverage for all labor, parts and materials for a period of one year (12 months) beginning at Substantial Completion; a comprehensive preventive maintenance plan for all covered equipment emergency services' and a semi-annual equipment inspection to insure proper operation of the systems. A maximum response time of four (4) hours for all computer room HVAC equipment and next day service will also be required.

B. Any building having HVAC equipment to have all such equipment covered by this contract.

C. Contractor shall provide an example contract for the Owner's review at Notice to Proceed.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. See Packaged Engine Generators, if included in the project, for maintenance of emergency generators

PART 2 - PRODUCTS

2.01 NOT USED

PART 3 - EXECUTION

3.01 SCHEDULING

A. Perform regular and systematic Maintenance, during normal working hours and according to the manufacturer’s recommendations. Normal working hours are defined as 8:00 a.m. to 5:00 p.m. Monday through Friday inclusive, excluding holidays.

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3.02 MAINTENANCE ROUTINES

A. Maintenance shall be performed in accordance with a prepared program of standardized maintenance routines according to the manufacturer's recommendations and approved by the Owner

B. Maintenance routines at a minimum shall consist of:

1. Check air handler filters. Clean or replace as necessary.
2. Check for adequate refrigerant charge.
3. Check condenser and clean if necessary.
4. Lubricate condenser fan motor.
5. Check condenser fan blades for tightness.
6. Tighten electrical connections at equipment.
7. Check voltage at unit under load.
8. Check condensate drain for blockage. Clean as necessary.
9. Check blower belt for condition, tension, and alignment, replace as necessary.
10. Lubricate all bearings where applicable.
11. Check blower for cleanliness.
12. Check all safety controls.
13. Inspect contractor points
14. Check and clean thermostat.
15. Check lockout control.
16. Inspect evaporator coil cleanliness.
17. Inspect starting capacitor.
18. Inspect running capacitor.
19. Check for vibration and noise.
20. Inspect relays.
21. Check and record running and starting amperages.
22. Check and record suction and discharge pressures.
23. Make recommendations of any needed repairs to system.

END OF SECTION

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SECTION 01 78 34 - GUARANTEES, WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall guarantee all Work under this Agreement for a period of one year from the date of acceptance by the Railroad or unless otherwise specified. Contractor shall leave the Work in perfect order at completion, and the final certificate of payment shall not relieve him of the responsibility for negligence, faulty materials, or workmanship; upon written notice, he shall remedy any defects or workmanship that may appear during the time hereinbefore mentioned and pay all expenses due therefrom to the entire satisfaction of the Engineer.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 1 - MEASUREMENT AND PAYMENT

1.01 MEASUREMENT

A. No separate measurement will be made for project guarantees, warranties and bonds.

1.02 PAYMENT

A. Guarantees, warranties and bonds shall be incidental to applicable service items. No separate payment shall be made.

END OF SECTION

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SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall provide an Electronic Closeout Library to the Engineer prior to final invoice. The Library shall contain (if project applicable):

1. All as-built drawings for the project including but not limited to grading, top of rail, utilities, buildings, facilities, bridges, culverts and work associated with road crossings. The drawings shall reflect all modifications made during construction. Each sheet shall be stamped "As-Built," signed and dated. Required documentation includes:

    a. As-built CAD format file (base file to be provided by UP)

    b. As-built pdf format file: Issued for Construction drawings annotated to show all changes made during construction.

2. All density tests and soil proctor data.

3. All concrete break tests.

4. All welding data.

5. Material certifications.

6. VERSE test reports.

7. Ultrasonic test reports on rail welds.

8. All pile driving and drilled shaft data. Also send this data via email to pilereports@up.com with a copy to UP Project Manager.

9. All reviewed submittals sent to engineer during project duration.

10. Any DWR forms for equipment rental used on the project.

11. Per Section 01 33 00, the Contractor will supply the instructions, operating and maintenance instruction bulletins, complete parts lists and wiring diagrams for all panels.

12. Per Section 01 55 13, supply any agreements made between the Contractor and private landowners.

B. Provide two (2) hard copy sets of O&M's sent to the Yard Office, Terminal, or other facility designated by the Engineer, and two (2) electronic set sent to Facility Department at UPRR Headquarters. (No preferred electronic method, via FTP, CD/DVD, or flash drive).

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PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No separate measurement will be made for project record documents.

4.02 PAYMENT

A. Payment will be incidental the project mobilization with the following provisions:

1. Failure to submit the electronic closeout library will result in **5% hold to the remaining 30% of the mobilization pay item.**

END OF SECTION

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SECTION 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes general requirements that apply to implementation of commissioning without regard to specific systems, assemblies, or components.

1.02 RELATED DOCUMENTS

A. OPR (Owner Project Requirements) and BoD (Basis of Design) documentation.

1.03 DEFINITIONS

A. BoD: Basis of Design. A document that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.

B. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.

C. CxA: Commissioning Authority.

D. OPR: Owner's Project Requirements. A document that details the functional requirements of a project and the expectations of how it will be used and operated. These include Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information.

E. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.04 COMMISSIONING TEAM

A. Members Appointed by Contractor(s): Individuals, each having the authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated action. The commissioning team shall consist of, but not be limited to, representatives of each Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.

B. Members Appointed by Owner:

1. Representatives of the facility user and operation and maintenance personnel.
2. Engineering design professionals.

1.05 OWNER'S RESPONSIBILITIES

A. Provide the OPR documentation to the CxA and each Contractor for information and use.

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B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities.

C. Provide the BoD documentation, prepared by Engineer and approved by Owner, to the CxA and each Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.06 EACH CONTRACTOR'S RESPONSIBILITIES

A. Each Contractor shall assign representatives with expertise and authority to act on its behalf and shall schedule them to participate in and perform commissioning process activities including, but not limited to, the following:

1. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
2. Cooperate with the CxA for resolution of issues recorded in the Issues Log.
3. Attend commissioning team meetings held on a variable basis.
4. Integrate and coordinate commissioning process activities with construction schedule.
5. Review and accept construction checklists provided by the CxA.
6. Complete paper construction checklists as Work is completed and provide to the Commissioning Authority on a weekly basis.
7. Review and accept commissioning process test procedures provided by the Commissioning Authority.
8. Complete commissioning process test procedures.

1.07 CXA'S RESPONSIBILITIES

A. Organize and lead the commissioning team.

B. Provide commissioning plan.

C. Convene commissioning team meetings.

D. Provide Project-specific construction checklists and commissioning process test procedures.

E. Verify the execution of commissioning process activities using random sampling. Verification will include, but is not limited to, equipment submittals, construction checklists, training, operating and maintenance data, tests, and test reports to verify compliance with the OPR. When a random sample does not meet the requirement, the CxA will report the failure in the Issues Log.

F. Prepare and maintain the Issues Log.

G. Prepare and maintain completed construction checklist log.

H. Witness systems, assemblies, equipment, and component startup.

I. Compile test data, inspection reports, and certificates; include them in the systems manual and commissioning process report.

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PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - GENERAL - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 02 00 00 - SITE WORK FOR BUILDINGS

PART 1 - GENERAL

1.01 SUMMARY

A. This section does not apply to the construction of mainline and/or yard track projects.

1.02 FIBER OPTIC CABLE

A. Before beginning any work under these specifications, the Contractor shall, without fail, telephone Union Pacific Railroad at 1-800-336-9193 (a 24 HR number) to determine if fiber optic cable is buried anywhere on the Railroad's premises to be used by the Contractor. If fiber optic cables are buried on the premises, the Contractor shall telephone the telecommunications company(ies) involved, arrange for a cable locator, make arrangements for relocation or other protection of the fiber optic cable, and shall not commence any work on the premises until all such protection or relocation has been accomplished. If the Contractor contacts the Railroad and telecommunications company(ies) as required, the Contractor will not be responsible for the cost to locate, relocate, or protect the fiber optic cable.

1.03 RAILROAD SIGNAL CABLE

A. Before beginning any work under these specifications, the Contractor shall, without fail, coordinate location of Railroad Signal Cables with the Engineer to determine if signal cable is buried anywhere on the Railroad's premises to be used by the Contractor. If signal cables are buried on the premises, the Contractor shall pothole all located wires to determine both horizontal and vertical location to the satisfaction of the Engineer.

1.04 CUT AND FILL

A. The Contractor shall, under Division 02 and 31, clear the site within the limits shown, make all excavations and fills to the lines and elevations indicated on the drawings, and as required for the proper completion of the work under this contract, and shall dispose of all excess excavation materials not deemed suitable for use as fill by the Engineer. In case it is necessary to place excavation material adjacent to structures, the Contractor shall erect barriers to keep the earth at least 4 FT from such structures.

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1.05 SITE WORK

A. Site work shall include the removal of any and all trees, stumps, brush, trash, stone walls, obstructions, and other materials, re-handling for the limits of the Work and shall include all pumping, bailing, draining, sheeting, and shoring, prevention of damage to existing structures, piping and embankments constructed by others, protection of trees, all embankments, fills, compacted fill, compacting and protection therefore, and all incidental work. Moreover, the Contractor must assume all responsibility for any added expense or other liability which may arise by means of quicksand, obstacles or conditions, foreseen or unforeseen, and encountered or manifest during the prosecution of any work which is specified or required under this contract. If underground utilities and/or obstacles not shown on the drawings are encountered, notify the Engineer and do not proceed until the Engineer's instructions are obtained.

1.06 CLEARING OF SITE

A. The Railroad shall clear the site of all storage materials, equipment, scrap iron, or other materials which would require special equipment for removal or which would interfere with normal excavating procedures.

1.07 UNDERGROUND UTILITIES

A. Necessary arrangements shall be made by the Contractor with all persons, firms, or corporations owning or using any poles, pipes, or conduits, etc., affected by the construction of this project, to maintain and protect such facilities during construction. In the event that any existing gas pipes, water pipes, conduits, sewers, tile drains, or poles are blocked, or interfered with by the excavation required on this project, the Contractor shall maintain them in continuous operation, and restore them to the same or better condition than they were prior to the start of construction on this project.

1.08 SITE IMPROVEMENTS

A. All permanent site improvements such as driveways, roads, sidewalks, walls, drainage ditches, culverts, fencing, etc., shall be protected. If damaged, they shall be restored by the Contractor to a condition equal or better to that existing at the date of award of the contract.

1.09 CONTAMINATED SOIL

A. If indications of contaminated soils, springs or running water are encountered, the Contractor shall contact the Engineer for instructions.

1.10 TESTING

A. The laboratory performing sampling and testing required herein shall be subject to approval of the Engineer. Reports of all tests shall be submitted to the Engineer for approval. The costs of the required tests are covered by Contractor. Should any tests not meet these specifications, the Contractor shall be responsible for all costs of any additional re-testing.

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PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFCATION SECTION

PART 3 - EXECTUION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 02 24 23 – SOIL DISTURBANCE PROGRAM

PART 1 - GENERAL

1.01 SUMMARY

A. The purpose of the Soil Disturbance Program is to limit environmental liabilities and reduce project delays associated with soil disturbed during construction activities. This specification includes requirements for contractor compliance with the UPRR Soil Disturbance Program.

B. The contractor shall comply with this specification for the following scenarios involving soil disturbance:

1. Visual or olfactory indications of contamination are observed during any ground disturbance activity on UP property.
2. Surplus soil is anticipated during project design and in advance of soil disturbance activities. A Soil Management Plan Technical Memorandum has been assembled and provides results of the soil evaluation. The contractor shall perform soil disturbance activities as directed in the Soil Management Plan Technical Memorandum.
3. Surplus soil is not anticipated at the design stage, but is realized during project execution and/or completion and cannot be used as fill material within the project extent. A soil evaluation is required to determine if special handling of soil is necessary.
4. Areas on UP properties with documented historical soil contamination where ground disturbing activities will occur.

1.02 EXEMPTION

A. Soil may be reused on-site without restrictions if 1) All disturbed soil is reused as fill material within the designed project extent and 2) no visual or olfactory indications of contamination are observed during ground disturbance. A soil evaluation is not necessary if all conditions are met.

1.03 RELATED REQUIREMENTS

A. Section 01 33 00 Submittal Procedures

B. Section 01 35 29.13 Health, Safety, and Emergency Response Procedures for Contaminated Sites as identified.

C. Section 01 56 16 Dust Control

D. Section 02 61 13 Excavation and Handling of Contaminated Material.

E. Section 02 81 00 Transportation and Disposal of Hazardous Materials

F. Section 31 23 19 Dewatering

1.04 REFERENCED STANDARDS

A. USEPA Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods"

B. 29 CFR 1910 – Occupational Safety and Health Standards

C. 29 CFR 1926 – Safety and Health Regulations for Construction

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D. 40 CFR 261 – Identification and Listing of Hazardous Waste

1.05 DEFINITIONS

A. Ground disturbance - Any work or activity that results in a disturbance of the earth, including excavating, digging, trenching, plowing, drilling, tunneling, augering, backfilling, and grading. This includes any mechanical excavation (back hoes, digging, drilling, grading) that results in penetration of the ground or manual ground penetration (hand shoveling, hand augering).

B. Hazardous soil – Soil identified as hazardous as defined in Title 40 of the Code of Federal Regulations, Chapter 261 (40 CFR 261), whether by listing or characteristic. Management of hazardous soil requires special handling.

C. Non-hazardous soil – Soil which does not meet the definition of hazardous as presented in 40 CFR 261 and is not Non-RCRA hazardous soil. Non-hazardous soil may contain contaminants which present a risk to human health or the environment, may be characterized as contaminated or "Special Waste" or other definition by State regulation, and may require special handling.

D. Unrestricted use soil – Soil which does not exhibit contaminant concentrations in excess of the most conservative regulatory screening level, for the state in which the work is being performed. Unrestricted soil can be reused on UP property without restriction or can be exported off-site as clean fill to a soil wasting facility.

E. Restricted use soil – Soil which exhibits contaminant concentrations in excess of the most conservative regulatory screening levels , for the state in which the work is being performed; note that in some states this is defined as 'Special Wastes'. Restricted use soil cannot be exported off-site as clean fill to a soil wasting facility. The soil may require disposal at a UP-approved landfill or may be available for preferential reuse at the project site.

F. Preferential Reuse – Practice of using soils which exhibit low levels of contamination as fill material within the project extent. The concentration of contaminants must be less than the state-specific screening levels for both the industrial/commercial and construction worker exposure scenarios. Reuse within the project extent is generally preferred over disposal at a landfill.

G. Export soil – Surplus soil that is not available for use within the project extent and requires removal from UP property.

H. Soil evaluation – An assessment performed by an environmental professional and comprised of soil sample collection, analysis of soil samples by an analytical testing laboratory, and data evaluation to determine the risk associated with soil contaminants, if present. Results of a soil evaluation are summarized in a Soil Management Plan Technical Memorandum.

I. Waste Management Program – UP program for management of waste materials, including soil. The program stipulates requirements associated with preliminary planning, disposal facility approval, and waste manifest and bill of lading submittal. Information regarding the UP Waste Management Program is available by emailing UPRR-WM@ghd.com.

1.06 SUBMITTALS

A. Submit as specified in Section 01 33 00 Submittal Procedures.

B. Submittals required by this Section include, but are not limited by, the following:

1. Waste Request Form for off-site disposal of contaminated soil

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2. Disposal facility name and location
3. Waste manifests and bills of lading for off-site disposal of contaminated soil shall be conveyed by the Contractor to UP via the UP Waste Management Program (UPRR-WM@ghd.com)
4. Import soil facility name and location and associated laboratory analytical reports. See Appendix A – UP Soil Import Specification for State-specific laboratory analyses to be performed on all import soil.

1.07 QUALITY ASSURANCE

A. Contractor shall dispose of contaminated soil at a disposal facility or landfill which has not incurred fines, citations, or other indications of regulatory non-compliance. Contractor shall submit to the designated UP project representative prior to commencement of work the proposed disposal facility for approval.

B. Contractor shall import soil for fill material on UP property from a construction material facility which has not incurred fines, citations, or other indications of regulatory non-compliance. Contractor shall submit to the designated UP representative prior to commencement of work the proposed construction material facility for approval.

1.08 SEQUENCING AND SCHEDULING

A. Performance of a soil evaluation and assembly of a Soil Management Plan Technical Memorandum requires a minimum of 45 business days to complete. The UP Site Remediation 7007 Soil Disturbance Program Manager shall be contacted to initiate a soil evaluation, if needed.

B. Laboratory analytical reports associated with import soil qualifications require a minimum of ten (10) business days for review and approval. UP is not responsible for delays caused by an untimely request by the contractor for review of import soil analytical reports.

C. Submittal of a Waste Request Form is required as an initial activity of the UP Waste Management Program for all soils sent to a landfill or disposal facility. A minimum of five (5) days is required for review and approval of a submitted Waste Request Form.

PART 2 - PRODUCTS

2.01 SOIL MANAGEMENT PLAN TECHNICAL MEMORANDUM

A. A Soil Management Plan Technical Memorandum may be available for projects where export soil was anticipated during project design; contact 7007 Soil Disturbance Program Manager to determine if the information is available. The designated UP project representative will provide the Soil Management Plan Technical Memorandum to the contractor, if available.

B. The Soil Management Plan Technical Memorandum presents results of the soil evaluation, including but not limited to, reported contaminants, estimated volumes and locations of Unrestricted and restricted use soil, handling requirements and disposal alternatives for contaminated soil, requirements for transportation of contaminated soil, and compliance requirements for UP's Waste Management Program.

2.02 IMPORT SOIL

A. The Contractor is responsible for providing imported soil, if needed, that is clean and free of contaminants. Prior to use, the imported soil shall be tested at the source by the Contractor.

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B. Soil samples shall be collected in accordance with USEPA Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a NELAC-certified laboratory approved to perform analytical testing in the project state.

State-specific sampling requirements shall be met for all soil imported and placed on UP property. Contactor is responsible for meeting state-specific requirements with the appropriate submittal if soil will be imported to UP property. State-specific sampling requirements for import soil are provided in the UP Soil Import Specification, available in Appendix A, and from the UP Site Remediation Group 7007 Soil Disturbance Program Manager.

C. A minimum of one representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil.

D. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency of a minimum of one representative soil sample collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil.

E. Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample are below the state-specific regulatory screening values.

F. Laboratory analytical reports for import soil qualifications shall be provided to designated UP project representative as a submittal to verify the soil is free from contamination. A minimum of ten (10) business days is required for review and approval.

PART 3 - EXECUTION

3.01 INSPECTION

A. The contractor shall inspect the project extent for visual and olfactory indications of contamination prior to commencement of soil disturbance activities.

B. The contractor shall identify within the project extent those areas with restricted soil use, as presented in the Soil Management Plan Technical Memorandum.

3.02 VISUAL OR OLFACTORY INDICATIONS OF SOIL CONTAMINATION

A. The contractor shall stop work and immediately notify the designated UP project representative if visual or olfactory indications of soil contamination are observed during inspection or ground disturbance activities.

B. Soil which exhibits visual or olfactory indications of contamination shall be segregated in a soil staging area identified by the designated UP project representative and placed on polyethylene sheeting. Contaminated soil shall be stockpiled and managed according to Section 02 61 13 - Excavation and Handling of Contaminated materials.

C. The 7007 Soil Disturbance Program Manager shall be contacted for evaluation of potentially contaminated soil stockpiles. An environmental consulting firm will be assigned by the UP Site Remediation Group to evaluate potentially contaminated soil stockpiles in accordance with the UP Soil Disturbance Program. A soil evaluation will be performed and a Soil Management Plan Technical Memorandum will be assembled for handling of the soil stockpile.

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3.03 SOIL DISTURBANCE FOR PROJECTS WHERE SURPLUS SOIL IS ANTICIPATED PRIOR TO COMMENCEMENT OF WORK

A. A soil evaluation is required prior to commencement of ground disturbance activities as defined where soil export is anticipated.

B. Results of the soil evaluation are presented in a Soil Management Plan Technical Memorandum.

C. The contractor shall perform soil disturbance activities as directed in the Soil Management Plan Technical Memorandum. Adherence to the Soil Management Plan Technical Memorandum is presented in Section 3.05.

D. Costs associated with transportation and disposal of contaminated soil, if present, shall be performed according to Section 02 81 00 – Transportation and Disposal of Hazardous Materials, under a separate PO from UP Site Remediation by contacting the 7007 Soil Disturbance Program Manager.

E. Unanticipated soil disturbance projects may preclude completion of a soil evaluation in advance of work. Soil shall be managed in accordance with Section 3.04.

3.04 SOIL DISTURBANCE FOR PROJECTS WHERE SURPLUS SOIL IS REALIZED DURING PROJECT EXECUTION AND/OR COMPLETION

A. The contractor shall inform the UP designated project representative if unanticipated surplus soil is expected upon completion of ground disturbance activities, and cannot be accommodated within the project design. The estimated volume of surplus soil shall be communicated to the designated UP project representative by the contractor.

B. Surplus soil shall be temporarily stockpiled at a location which minimizes disturbance to UP operations. The maximum stockpile size shall be 750 cubic yards for a single stockpile. Multiple stockpiles are required if the surplus soil exceeds 750 cubic yards.

C. The designated UP project representative shall contact UPRR Site Remediation's 7007 Soil Disturbance Program Manager to request a soil evaluation.

D. An environmental consulting firm will be assigned by UP Site Remediation to evaluate surplus soil stockpiles in accordance with the UP Soil Management Program. A soil evaluation will be performed and a Soil Management Plan Technical Memorandum will be assembled for handling of the soil stockpile.

E. Costs associated with transportation and disposal of contaminated soil, if present, shall be performed according to Section 02 81 00 – Transportation and Disposal of Hazardous Materials, under a separate PO from UP Site Remediation by contacting the 7007 Soil Disturbance Program Manager .

3.05 ADHERENCE TO THE SOIL MANAGEMENT PLAN TECHNICAL MEMORANDUM

A. The Soil Management Plan Technical Memorandum shall present the findings of the soil evaluation and requirements for proper handling of disturbed soil.

B. Soil handling recommendations shall be strictly followed to prevent improper placement or use of contaminated soils.

C. The Soil Management Plan Technical Memorandum is certified for a period of one year from the date of the document. The Contractor shall contact their UP point of contact if the proposed soil disturbance activities will not be conducted in advance of the certification date.

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Contact Site Remediation's 7007 Soil Disturbance Program Manager to initiate recertification of the Soil Management Plan Technical Memorandum.

END OF SECTION

APPENDIX A – UP SOIL IMPORT SPECIFICATIONS

NOTE: Import soil qualifications may not be all inclusive and/or most current; Contractor shall validate at the time of work commencement the most current guidelines applicable to work location.

- **Import Soil Qualifications – Arizona**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with US Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-accredited laboratory approved to perform analytical testing in Arizona.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270
- Total Extractable Hydrocarbons by Iowa Method OA-2
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- The Arizona Department of Environmental Quality (ADEQ) Residential Soil Remediation Levels (SRLs) as published in Arizona Administrative Code Title 18, Chapter 7, Article 2, Appendix A, can be found at the following web page:

  https://apps.azsos.gov/public_services/Title_18/18-07.pdf

  - In the event that metal constituents exceed SRLs, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

    http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the Arizona SRL criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated lab report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Arkansas**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with United States Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Arkansas.

One representative sample of the imported soil shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270
- Total Petroleum Hydrocarbons (TPH) by Texas Method TX1005
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- United States EPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites assuming Residential Land Use (http://www.epa.gov/risk/regional-screening-table) as the Arkansas Department of Environmental Quality (ADEQ) does not have state-specific criteria (https://www.adeq.state.ar.us/hazwaste/technical/risk/).

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the EPA criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated lab report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – California**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with United States Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a NELAP-Accredited laboratory approved to perform analytical testing in California.

Sampling of the imported soil shall be collected based on the stockpile volume, as follows:

VOLUME OF IMPORT SOIL	SAMPLES PER VOLUME
Up to 1,000 cubic yards	1 sample per 250 yards
1,001 to 5,000 cubic yards	4 samples for the first 1,000 cubic yards + 1 sample per each additional 500 cubic yards
Greater than 5,000 cubic yards	12 samples for the first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards

If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) and a general description of the soil type sampled in accordance with the Unified Soil Classification System (USCS), shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination as per the recommendations from the Department of Toxic Substances Control's "Information Advisory – Clean Imported Fill Material" (https://www.dtsc.ca.gov/Schools/upload/SMP_FS_Cleanfill-Schools.pdf).

- Volatile Organic Compounds (VOCs) by 8260, combined with collection by EPA Method 5035
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270
- Polycyclic Aromatic Hydrocarbons (PAHs) by EPA method 8310
- Total Petroleum Hydrocarbons (TPH) by modified EPA method 8015
- California Assessment Manual 17 metals (CAM 17 Metals) by EPA methods 6010 and 7471
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082

- Organophosphorus Pesticides by EPA Method 8141
- Organochlorine Pesticides by EPA Method 8081
- Chlorinated Herbicides by EPA Method 8151
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the most conservative (lowest threshold) value when compared to the following two criteria:

1) EPA Region 9 Regional Screening Levels: (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables)

    - For soil placed within 10 feet of groundwater table at the project site, use the screening level for "Resident Soil to Groundwater" with TR=1E-06 and THQ=0.1.
    - For soil placed greater than 10 feet from groundwater table at the project site, use the screening level for "Resident Soil" with TR=1E-06 and THQ=0.1.

2) San Francisco Bay Regional Water Quality Control Board (SFRWQCB) Environmental Screening Levels (ESL) Summary Tables (Feb. 2016, Rev 3 or most recent): (https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.html, then "Summary of Soil ESLs" link)

    - For soil placed at a depth less than 3 meters below ground surface (bgs) at the project site use the "Summary of Soil ESLs (mg/kg)" table and refer to values presented under the heading "Direct Exposure Human Health Risk Levels" and sub-heading "Res: Shallow Soil Exposure".
    - For soil placed at a depth greater than 3 meters bgs at the project site use the "Summary of Soil ESLs (mg/kg)" table and refer to values presented under the heading "Direct Exposure Human Health Risk Levels" and sub-heading "Any Land Use/Any Depth Soil Exposure: Construction Worker".

In cases where an analyte is not listed in the applicable RSL table, the value from the applicable ESL table will be used; in cases where an analyte is not listed in the applicable ESL table, the value from the applicable RSL table will be used.

Analyte concentrations must be evaluated on a case-by-case basis where:

1) An analyte is not listed in either agency's screening criteria
2) Concentrations of metals exceed screening criteria (regional background levels may be higher than screening levels)

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the criteria outlined above. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated laboratory report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Colorado**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with US Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Colorado.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270
- Total Extractable Hydrocarbons by Iowa Method OA-2
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- The most conservative Environmental Protection Agency (EPA) Regional Screening Levels (RSLs), as presented in https://semspub.epa.gov/work/HQ/197414.pdf.

- In the event that metal constituents exceed RSLs, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the EPA RSL criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated lab report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Idaho**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with US Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-accredited laboratory approved to perform analytical testing in Idaho.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260;
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270 SIM;
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6020/7471;
- Organophosphorus Compounds by EPA Method 8141;
- Chlorinated Herbicides by EPA Method 8151;
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082;
- Organochlorine Pesticides by EPA Method 8081;
- pH/Corrosivity by EPA Method 9045; and,
- Total and Amenable Cyanide by EPA Method 9012.

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- The most conservative Environmental Protection Agency (EPA) Regional Screening Levels (RSLs), as presented at the following website:

  https://semspub.epa.gov/work/HQ/197414.pdf

- In the event that metal constituents exceed RSLs, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

  http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

- In the event that petroleum-related constituents exceed RSLs, the most conservative screening levels listed in Table 2 of the 2018 Risk Evaluation Manual for Petroleum Releases shall be used for comparison. The 2018 Risk Evaluation Manual for Petroleum Releases can be found at the following website:

  http://www.deq.idaho.gov/risk-evaluation-manual

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the IDEQ criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated laboratory report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Illinois**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with US Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Illinois.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Polynuclear Aromatic Hydrocarbons (PAHs) by EPA Method 8270
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- The most conservative soil remediation objectives (SROs) presented in Illinois EPA Tiered Approach to Corrective Action Objectives (TACO), Appendix B, Table A, *Tier 1 Soil Remediation Objectives for Residential Properties,* located in 35 IAC 742.
- The most conservative TACO SRO values are presented in Illinois EPA *Maximum Allowable Concentrations (MACs) of Chemical Constituents in Uncontaminated Soil Used as Fill Material*

at Regulated Fill Operations, as defined in 35 IAC 1100 Subpart F. A summary table of the MACs can be found at the following website:
http://www.epa.state.il.us/land/ccdd/new-max-allowable-concentrations-table.pdf

- In the event that metal constituents exceed SROs or MACs, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

  http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the Illinois EPA criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated laboratory report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Iowa**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with US Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Iowa.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270
- Total Extractable Hydrocarbons by Iowa Method OA-2
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- Iowa Department of Natural Resources (IDNR) Statewide Standards for Soil, as defined by 567 IAC 137.55. A summary table of the Statewide Standards for Soil can be found at the following website:

  https://programs.iowadnr.gov/riskcalc/Home/statewidestandards.

  - In the event that metal constituents exceed Statewide Standards for Soil, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

  http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the IDNR criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated laboratory report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Kansas**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with US Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Kansas.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270
- Total Extractable Hydrocarbons by Iowa Method OA-2
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- The most conservative Kansas Department of Health and Environment (KDHE) Risk-Based Standards for Kansas (RSKs) for the Residential scenario soil pathway. A summary table of KDHE RSKs can be found in Appendix A at the following website:

  http://www.kdheks.gov/remedial/download/RSK_Manual_15.pdf

  - In the event that metal constituents exceed RSKs, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

    http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the KDHE RSKs. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated laboratory report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Louisiana**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with United States Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Louisiana.

One representative sample of the imported soil shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270
- Total Petroleum Hydrocarbons (TPH) by Texas Method TX1005
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- Louisiana Department of Environmental Quality (LDEQ) Risk Evaluation/Corrective Action Program (RECAP) Non-Industrial Screening Standards (SSni), assuming residential (non-industrial) areas (https://deq.louisiana.gov/assets/docs/Land/RECAP/Table1.pdf).

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the LDEQ criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated lab report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Minnesota**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with: US Environmental Protection Agency (EPA) Publication No. SW-846, *"Test Evaluating Solid Wastes, Physical/Chemical Methods";* Minnesota Pollution Control Agency (MPCA) *"Soil Sample Collection and Analysis Procedure, Guidance Document c-prp4-04" (updated July 2018);* and, MPCA "Guidelines for *Risk-Based Guidance for the Soil – Human Health Pathway, Volume 2".* MPCA-required soil analysis shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-certified laboratory approved to perform analytical testing in Minnesota.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Polyaromatic Hydrocarbons (PAHs) by EPA method 8270
- Wisconsin DNR Modified Gasoline Range Organics (GRO) Method
- Wisconsin DNR Modified Diesel Range Organics (DRO) Method
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Pesticides MDA List 1 EPA Method 8270
- Herbicides MDA List 2 EPA Method 8321
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- The most conservative regulatory threshold values presented by MPCA and Minnesota Department of Agriculture (MDA). The following regulatory references are provided:

1. The MPCA most conservative Residential Soil Reference Values (SRVs), as presented in the *"Risk-Based Guidance for the Soil-Human Pathway, Volume 2"* & *"Tier 1 SRV Spreadsheet"* documents at the following web site:

   http://www.pca.state.mn.us/index.php/waste/waste-and-cleanup/cleanup/superfund/risk-based-site-evaluation-process-guidance-documents.html

   - In the event that metal constituents exceed SRVs, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

   http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

2. A DRO concentration of less than 100 milligrams per kilogram (mg/kg), and a GRO concentration of less than 100 mg/kg.

3. The MDA Preliminary Soil Cleanup Goals for High Groundwater Risk, as presented in Table 1 of Guidance Document 19 at the following web site:

   https://www.mda.state.mn.us/pesticide-fertilizer/guidance-document-19-soil-cleanup-goals

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the MPCA and MDA criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated laboratory report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Missouri**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with US Environmental Protection Agency (EPA) Publication No. SW-846, *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods;* Missouri Department of Natural Resources (MDNR) *Missouri Risk-Based Corrective Action Technical Guidance*; and MDNR *Guidelines for Soil and Groundwater Sampling – Brownfields/Voluntary Cleanup Program* (PUB2432). Soil samples shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Missouri.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Total Petroleum Hydrocarbons as Diesel and Oil Range Organics (TPH-DRO/ORO) by EPA Method 8270
- Polynuclear Aromatic Hydrocarbons by EPA Method 8270
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9045
- Nitrate as Nitrogen by EPA Method 353.2
- Ammonia as Nitrogen by EPA Method 350.1

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- The most conservative MDNR Default Target Levels (DTLs), as published in the *Missouri Risk-Based Corrective Action Technical Guidance, Appendix B*. A summary table of DTLs can be found in the technical guidance at the following website:

  http://dnr.mo.gov/env/hwp/mrbca/docs/appb-6-06.pdf

  - In the event that metal constituents exceed DTLs, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

  http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the MDNR criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated laboratory report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Nebraska**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with US Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Nebraska.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270
- Total Extractable Hydrocarbons by Iowa Method OA-2
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- The most conservative Nebraska Department of Environmental Quality (NDEQ) Voluntary Cleanup Program (VCP) Remediation Goals, as presented in Table A-1, *Groundwater and Soil Remediation Goals,* in Attachment A of the VCP Guidance Document. The VCP Guidance document can be found at the following website:

http://deq.ne.gov/publica.nsf/PubsForm.xsp?documentId=D243C2B56E34EA8486256F2700698997&action=openDocument

- In the event that metal constituents exceed Soil Remediation Goals, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

Analytical data shall be compared to the above remediation goals to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the NDEQ criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated laboratory report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Nevada**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with US Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Nevada.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270
- Total Petroleum Hydrocarbons as Diesel and Oil Range Organics (TPH-DRO/ORO) by EPA Method 8015
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- The most conservative Basic Comparison Levels (BCLs) for soil, as defined in the Nevada Division of Environmental Protection (NDEP) Basic Comparison Levels table. The table can be found at the following website:

  https://ndep.nv.gov/resources/risk-assessment-and-toxicology-basic-comparison-levels

  - In the event that metal constituents exceed BCLs, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the NDEP criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated laboratory report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – New Mexico**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with United States Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in New Mexico.

One representative sample of the imported soil shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270
- Total Petroleum Hydrocarbons (TPH) by Texas Method TX1005
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- New Mexico Environment Department (NMED) Risk Assessment Guidance for Site Investigations and Remediation (July 2015) Residential Soil Screening Levels Appendix A, Table A-1, presented at the following website:

https://www.env.nm.gov/wp-content/uploads/2016/11/NMED_SSG_VOL-I_-March_2017_revised.pdf

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the NMED criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated lab report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Oklahoma**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with United States Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Oklahoma.

One representative sample of the imported soil shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270
- Total Petroleum Hydrocarbons (TPH) by Texas Method TX1005
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- United States EPA Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites assuming Residential Land Use (http://www.epa.gov/risk/regional-screening-table) as the Oklahoma Department of Environmental Quality (ODEQ) does not have state-specific criteria (http://www.deq.state.ok.us/factsheets/LPD/RiskBasedSiteCleanup_04-2018.pdf). ODEQ does allow evaluation using a 10^{-5} cancer risk level for establishing RSLs.

- ODEQ Total Petroleum Hydrocarbons (TPH) Tier 1 Residential Generic Cleanup Levels (http://www.deq.state.ok.us/factsheets/LPD/RiskBasedLevelsTPH_04-2018.pdf).

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the EPA/ODEQ criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated lab report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Oregon**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with US Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Oregon.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Polynuclear Aromatic Hydrocarbons (PAHs) by EPA Method 8270
- Volatile Total Petroleum Hydrocarbons (TPH) by Method NWTPH-Gx
- Semi-volatile TPH by Method NWTPH-Dx
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- The Clean Fill Screening Level, as defined in the Oregon Department of Environmental Quality (DEQ) Clean Fill Table for Uplands. The table can be found at the following website:

https://www.oregon.gov/deq/Filtered%20Library/IMDcleanfill.pdf

- In the event that metal constituents exceed Clean Fill Screening Levels, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the Oregon DEQ criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated laboratory report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Texas**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with United States Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Texas.

One representative sample of the imported soil shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270
- Total Petroleum Hydrocarbons (TPH) by Texas Method TX1005
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- Texas Commission on Environmental Quality (TCEQ) Texas Risk Reduction Program (TRRP) Tier 1 Residential Protective Concentration Levels (PCLs) assuming 0.5-acre source area. Applicable PCLs should be based on the lower concentration between the TRRP Tier 1 Residential total soil combined ($^{Tot}Soil_{Comb}$) PCL and the soil to groundwater ingestion ($^{GW}Soil_{Ing}$) PCL (https://www.tceq.texas.gov/remediation/trrp/trrppcls.html) for each constituent; and

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- TCEQ Texas-Specific Soil Background Concentrations (TSBCs) (if TSBCs are greater than the applicable Residential PCLs, then the TSBC concentrations shall be used).

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the TCEQ criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated lab report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Utah**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with US Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Utah.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270
- Total Extractable Hydrocarbons by Iowa Method OA-2
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Compounds by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Total and Amenable Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- The most conservative Environmental Protection Agency (EPA) Regional Screening Levels (RSLs), as presented at the following website:

https://semspub.epa.gov/work/HQ/197414.pdf

- In the event that metal constituents exceed RSLs, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

  http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential (COCs) above the EPA RSLs criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated lab report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Washington**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with US Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Washington.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260;
- Polynuclear Aromatic Hydrocarbons (PAHs) by EPA Method 8270 SIM;
- Volatile TPH by Method NWTPH-Gx;
- Semivolatile TPH by Method NWTPH-Dx with silica gel cleanup;
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6020/7471;
- Organophosphorus Pesticides by EPA Method 8141;
- Chlorinated Herbicides by EPA Method 8151;
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082;
- Organochlorine Pesticides by EPA Method 8081;
- pH/Corrosivity by EPA Method 9045; and,
- Cyanide by EPA Method 9012.

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- The most conservative values of the Cleanup Levels and Risk Calculation (CLARC) table as described by the Washington State Department of Ecology's (Ecology) Model Toxics Control

Act (MTCA) WAC 173-340, Part VII. A summary of the CLARC table can also be found at the following website:

https://fortress.wa.gov/ecy/clarc/CLARCDataTables.aspx

- In the event that metal constituents exceed MTCA Method A Cleanup Levels, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the Ecology criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated laboratory report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Wisconsin**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with US Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Wisconsin.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Semi-volatile Organic Compounds (SVOCs) by EPA Method 8270C
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- The most conservative WDNR Non-Industrial Direct Contact – Residual Contaminant Levels (DC-RCL), as defined in NR720. A calculation table can be found at the following website:

  http://dnr.wi.gov/topic/Brownfields/Professionals.html

- In the event that metal constituents exceed DC-RCLs, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential chemicals of concern (COCs) above the WDNR criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated laboratory report must be sent to UPRR for review and approval.

- **Import Soil Qualifications – Wyoming**

If import soil is needed, analytical testing shall be performed to ensure that the import soil is free from contamination. Costs associated with analytical testing of import soil are the responsibility of the Contractor.

Soil samples shall be collected in accordance with US Environmental Protection Agency (EPA) Publication No. SW-846, "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," and shall be analyzed by a National Environmental Laboratory Accreditation Program (NELAP)-Accredited laboratory approved to perform analytical testing in Wyoming.

One representative soil sample shall be collected for every 5,000 cubic yards (in place), or fraction thereof, of import soil. If import soil will be derived from more than one source or location, import soil qualifications must be attained from each source in accordance with the sampling frequency mentioned in this section. Approximate geographic coordinates (latitude/longitude) of the import soil sample location(s) shall be provided to Union Pacific Railroad (UPRR) in addition to the analytical data detailed below.

The following laboratory analyses shall be performed to document that imported soil is free from contamination:

- Volatile Organic Compounds (VOCs) by EPA Method 8260
- Semi-Volatile Organic Compounds (SVOCs) by EPA Method 8270
- Total Extractable Hydrocarbons by Iowa Method OA-2
- Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6010/7471
- Organophosphorus Pesticides by EPA Method 8141
- Chlorinated Herbicides by EPA Method 8151
- Polychlorinated Biphenyls (PCBs) by EPA Method 8082
- Organochlorine Pesticides by EPA Method 8081
- Cyanide by EPA Method 9010
- pH/Corrosivity by EPA Method 9040
- Nitrate as Nitrogen by EPA Method 4500

Imported soils shall be deemed acceptable for use if concentrations of all analytes from the representative soil sample(s) are below the following criteria:

- Wyoming Department of Environmental Quality (WDEQ) Voluntary Remediation Program (VRP) Soil and Groundwater Cleanup Levels Table as defined in the VRP Fact Sheet 12, *Soil Cleanup Levels*. A summary of the requirements from the VRP program can be found at the web links below:

http://deq.wyoming.gov/shwd/voluntary-remediation-program/resources/fact-sheets/

http://deq.wyoming.gov/media/attachments/Solid%20%26%20Hazardous%20Waste/Voluntary%20Remediation%20Program/Fact%20Sheets/FS_12_10.30.2018.pdf

- In the event that metal constituents exceed Cleanup Levels, the maximum value of the county-specific USGS dataset for naturally-occurring elements will be used for comparison. These values can be obtained at the following website:

  http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm

- If a chemical of concern (COC) is not listed on the VRP Soil and Groundwater Cleanup Table, then the analyte must be below the most conservative Environmental Protection Agency (EPA) Regional Screening Levels (RSLs), as presented in https://semspub.epa.gov/work/HQ/197414.pdf

Analytical data shall be compared to the above standards to preliminarily evaluate if the import soil contains any potential (COCs) above the VRP or EPA RSLs criteria. Laboratory analytical reports shall be provided to UPRR for all imported soil to verify the soil is free from contamination. To qualify a given volume of soil for use as import soil, a copy of the associated lab report must be sent to UPRR for review and approval.

SECTION 02 30 10 - SOILS INVESTIGATION REPORT

PART 1 - GENERAL

1.01 SUMMARY

A. This Section describes soils investigation at the site, and use of data resulting from that investigation.

1.02 SOILS INVESTIGATION REPORT

A. General:

1. A soils investigation report may have been prepared for the site of this Work by an independent testing laboratory selected by the Railroad.
2. If available, the soils investigation report is attached to the Specification and copies may be obtained upon request addressed to the Railroad.

B. Use of Data:

1. This report was obtained for the Railroad's use in design purposes and is not a part of the Contract Documents.
2. The report is available for the Contractor's information, but is not a warranty of subsurface conditions and the Railroad does not guarantee the accuracy of the report.
3. Bidders should visit the site and acquaint themselves with existing conditions.
4. Prior to bidding, bidders may make their own soil investigations to satisfy themselves as to site and subsurface conditions, investigations may be performed only under time schedules and arrangements approved in advance by the Engineer.

1.03 QUALITY ASSURANCE

A. An independent testing laboratory may be retained by the Railroad to perform tests in connection with embankment, excavating, trenching, grading, and to report the findings to the Engineer and the Contractor.

B. The Contractor is to readjust work performed that does not meet technical or design requirements, but make no deviation from the Contract Documents without specific and written approval from the Engineer.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

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PART 4 - MEASUREMENT AND PAYMENT

4.01 GENERAL

A. All cost associated with soil investigation shall be incidental to the total project cost.

END OF SECTION

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SECTION 02 41 00 - DEMOLITION FOR BUILDINGS

PART 1 - GENERAL

1.01 SUMMARY

A. This section covers all wrecking and demolition, together with the removal, handling, and disposal of items. This section shall be used in coordination with building demolition specifications, with the more stringent specification requirements taking precedence.

B. Demolition shall be done in an orderly and careful manner with due consideration for neighbors and the public. Execute the work to ensure adjacent properties and the public against damages incurred by falling debris or other causes.

C. The Contractor and their sub-contractors shall perform their sitework, and any work which will disturb the soil in compliance with United States Occupational Safety and Health Administration (OSHA) regulations 29 CFR 1910.120. The Contractor shall utilize safe work practices that prevent dust emissions.

D. This section does not apply to the construction of mainline and/or yard track projects.

1.02 RESPONSIBILITY

A. The Contractor shall be responsible for any damage to existing buildings or to equipment and furnishings housed therein which are due directly or indirectly to the construction operations.

B. Except where site grading or location of new buildings necessitates removal, use every possible precaution to prevent injuries to drives, curbs, and walks on or adjacent to the site of the work and replace at no expense to the Railroad any such damaged or destroyed.

1.03 SUBMITTALS

A. Submit as specified in Section 01 33 00.

B. Schedule of Demolition:

1. Submit proposed methods and operations of demolition to the Engineer for review prior to the start of work. Include in the schedule the coordination for shutoff, capping and continuation of utility services as required, together with details for dust and noise control protection.

2. Provide a detailed sequence of demolition and removal work to minimize interruptions of Railroad, Utility or neighbor operations.

1.04 WRECKING AND DEMOLITION

A. Completely remove all items and obstructions as shown on the drawings or called out in these specifications. Remove any existing rubbish, trash and junk and leave the site clear of such materials.

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1.05 REMOVAL

A. Unless otherwise noted or specified to be relocated or stored, all materials removed become the property of the Contractor and are to be removed completely away from the site and disposed of in a legal manner by the Contractor. Do not store or permit debris to accumulate on the site. If the Contractor fails to remove excess debris promptly, the Railroad reserves the right to cause same to be removed at the Contractor's expense.

B. Where it is necessary to remove fences to permit the accomplishment of construction work, they shall be returned to a condition as good or better condition as they were originally found and if necessary, relocated as shown on the drawings.

1.06 PIPE ABANDONMENT

A. Piping specified to be abandoned-in-place shall be completely drained of all liquid by the Contractor using low point drains and/or pigs. All collected liquid shall be legally disposed of offsite by the Contractor unless alternate arrangements are agreed upon prior to bid. In some cases, the Railroad may accept liquid for on-site disposal subject to prior agreement.

B. Fill the piping with non-shrink flowable grout. Flushing liquids mixed with product which are displaced by the grout shall be collected by the Contractor and properly disposed of.

C. Ensure that all abandoned-in-place piping is completely filled with grout.

D. The open end or ends of the abandoned-in-place piping shall be permanently capped or blind-flanged after the filling is complete. The Contractor is to provide documentation of the location of abandoned-in- place piping to the Railroad.

1.07 BURNING OF MATERIALS

A. Burning of materials or debris on the premises is not permitted.

1.08 GROUND AND SURFACE WATER

A. After the removal operation, the Contractor shall protect the resulting excavation or open area from surface or groundwater. The Contractor shall execute prompt removal of any water that accumulates in the excavation or opening, at the Contractor’s expense.

1.09 GRADING

A. After the removal work is completed, grade all areas within the construction area so that proper drainage will be provided at all times.

B. Bring all low sections, holes or depressions to proper level by filling and compacting as specified in SECTION 31 00 00 - Earthwork as required.

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PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.01 INSPECTION

A. Prior to commencement of demolition work, the Contractor shall inspect areas in which work will be performed. The Contractor shall photograph existing conditions of structures, surfaces, equipment, and surrounding properties that could be misconstrued as damage resulting from selective demolition work. Deliver copies to the Railroad prior to starting work.

B. The Contractor is to maintain a project book on-site of photographs taken during demolition and construction phases. Photograph significant features of demolition and construction activities. Upon completion of the work and prior to final payment, the Contractor shall deliver the project book to the Engineer.

3.02 WASTE MATERIALS

A. All materials classified as hazardous or special waste, excluding contaminated soils and groundwater, shall be disposed of by methods approved by the Railroad at the disposal facility identified at the pre-bid meeting. If no disposal facility is identified, the disposal facility shall be at Contractor's option, subject to approval by the Railroad.

B. Hazardous or Special Wastes Removed from Tanks and Piping:

1. All fuel, debris, loose scale, liquid and sludge shall be removed by the Contractor from the tank and piping and handled in accordance with EPA, State and Local regulations to a properly permitted treatment, storage and disposal facility. The Contractor shall be responsible for waste sampling as necessary to satisfy the disposal facility requirements.

2. Hazardous and special waste removed from tanks and piping shall be packaged and transported in accordance with State and Federal Department of Transportation regulations and disposed of, or stored, in accordance with Federal, State and Local regulations. The Contractor shall prepare shipping papers, including manifests, to be signed by a representative of the Railroad, who is the generator, before any shipments leave the premises.

3. The Contractor shall furnish Department of Transportation (DOT) or U.S. EPA approved containers for collection and transport of demolished materials.

4. Generated copies of the waste shipping manifest shall be returned to a specified representative of the Owner to verify the receipt and proper disposal of the material. The Owner shall provide copies of the documents to the Contractor. Any disposal discrepancies identified by the Owner, or others, shall be the responsibility of the Contractor and shall be resolved by the Contractor, the Waste Transporter and the Disposal Facility.

5. If agreed to by the Railroad and the Contractor in advance, the Contractor may dispose of hydrocarbon liquids at the Railroad's wastewater treatment plant.

C. The Contractor shall be responsible for any costs such as sampling, analysis, removal and disposal resulting from contamination or spillage caused by the Contractor. The laboratory to be used and tests to be performed will be identified by the Engineer.

D. All other demolished materials shall be removed from the site and disposed of by the Contractor in accordance with all Federal, State and Local regulations.

END OF SECTION

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SECTION 02 41 17 - BUILDING DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

A. The extent of demolition work is shown on the Drawings.

B. Demolition requires removal and disposal, off site, in a proper and legal manner, of the following:

1. Buildings and other structures.
2. Foundations.
3. Footings.
4. Slabs on grade.
5. Existing fence.
6. Above and below grade improvements.

1.02 CONDITIONS

A. Occupancy: Structures to be demolished will be vacated, discontinued in use, prior to start of work.

B. Condition of Structure: The Railroad assumes no responsibility for actual condition of structures to be demolished. Conditions existing at time of inspection for bidding purposes will be maintained by Railroad insofar as practicable.

C. Storage or sale of items on the right of way site will not be permitted.

D. Traffic: Conduct demolition operations and removal of debris to ensure minimum interference with railroad service, roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways, if required, by the governing regulations.

E. Explosives: Use of explosives will not be permitted.

1.03 PROTECTIONS

A. Ensure safety of persons around area of demolition.

B. Contractor will, disconnect and seal utilities, and shut off power, serving the structures to be demolished, prior to demolition work.

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PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION

3.01 DUST AND WIND EROSION CONTROL

A. Excavations and embankments section on dust control is in section 31 35 20.

B. Approved temporary methods of dust control, including sprinkling, chemical treatment, light bituminous treatment or similar methods may be approved. Sprinkling must be repeated at such intervals as to keep all potential sources of dust wet at all times, and the Contractor shall provide sufficient sprinkling equipment to comply with this requirement.

3.02 DEMOLITION

A. Demolish buildings completely and remove from site. Use such methods as required to complete work within limitations of governing regulations.

B. Break up and remove concrete slabs on grade.

C. Demolish foundation walls, footings, and basement slabs and remove.

D. Demolish and remove below grade wood, metal and floor construction.

3.03 ABOVE AND BELOW GRADE IMPROVEMENTS

A. Demolish and remove above and below grade construction, including concrete slab on grade, as shown on site plan.

B. Remove existing fence, posts, and all related materials from locations at perimeter of site, and other locations on the site.

3.04 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Remove from site debris, rubbish, and other materials resulting from demolition operations.

B. Burning of removed materials from demolished structures will not be permitted on site.

C. Transport materials removed from demolished structures and dispose of legally off site.

3.05 ASBESTOS

A. Pre-Demolition Walk-Through:

1. Before building demolition, the Contractor and Engineer shall have made a thorough visual walk-through of the building(s) to be demolished.

2. Purpose of this inspection is to locate any suspect asbestos-containing materials (ACM). If suspect material is discovered, the Contractor must verify its composition using formal testing procedures. Example: Polarized Light Microscopy (Asbestos).

3. Arrangements for removal of any ACM discovered during the pre-demolition walk-through will be coordinated by the Railroad. This abatement will be performed either as an extra order on the demolition contract or under separate contract with an asbestos abatement Contractor.

3.06 ASBESTOS OR SUSPECT ASBESTOS DISCOVERED (DURING DEMOLITION)

A. The Contractor must be able to verify any suspect material as ACM or non-asbestos during the course of the entire demolition process. In the unlikely event the Contractor finds suspect ACM, he is to immediately stop work and notify the Engineer for further instructions and arrangements for testing.

B. Any testing or if necessary, asbestos removal, will be handled as an extra order with the demolition Contractor under the terms of the contract.

3.07 ASBESTOS - CONTRACTOR PENALTY CLAUSE

A. As previously stated in this section, the Contractor shall be held responsible, during the entire demolition project, for determining what, if any, materials contain ACM. If the Contractor encounters or overlooks suspect ACM and **does not stop** work immediately upon its initial discovery and notify the Engineer; the Contractor will be held responsible for the cleanup of the ACM (if determined to be ACM) and decontamination of the project site or that portion of the project which he contaminated as a result of his demolition work.

3.08 GENERAL CONDITIONS

A. The Contractor shall be responsible for any damage to existing and remaining buildings or to equipment and furnishings housed therein which are due directly or indirectly to the demolition operations. Use every precaution to prevent injuries to curbs, drives and sidewalks adjacent to the site of the work and replace at no expense to the Railroad any such destroyed. Unless specified otherwise by the Railroad's Engineering Environmental Department or their representative all necessary wrecking or demolition together with the removal and disposal of items shall be performed to the following requirements.

3.09 INSPECTIONS

A. Prior to the razing of any structure, an inspection by the Railroad Environmental Representative shall be performed to identify and quantify any existing hazardous materials.

B. Identify any utilities such as electrical, gas, sewers or water supply that may have to be disconnected or rerouted prior to any structural disassembly. Disconnection of said utilities not to interfere with operations of adjacent or structures not within the scope of demolition.

C. Identify any special conditions that exist that need to be preserved, protected, or require special handling. Examples of such being EPA monitoring devices, wells, or test locations. Any salvageable equipment or apparatus to be retained by the Railroad.

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3.10 PERMITS, BONDS AND LICENSES

A. In the event of hazardous materials that require abatement prior to or during demolition, Contractor and/or subcontractors shall be familiar with all Federal, state and municipal and be licensed to perform this nature of work. The Railroad reserves the right to subcontract any abatement or remediation as separate contract to work in conjunction with the General Contractor.

3.11 DISPOSAL OF MATERIALS

A. Contractor to be responsible for segregation of all scrap, trash, structural materials, concrete, contaminates, etc., that may be required before disposal. Contractor to indemnify the Railroad of any costs or liabilities arising from his transport and disposal of said materials arising from demolition or excavation. Contractor to provide the Railroad the required documentation verifying compliance with Federal, State and Local laws, codes and regulations governing the disposal and transportation of the demolition materials.

B. All excavated earthen soils that, by examination, indicate contaminates form petrochemical absorption of diesel fuel, lube oils, etc., shall be placed on protective plastic, covered for protection and enclosed by a temporary berm. Railroad to furnish railcars or mode of transport for eventual disposal. Railroad to assume costs and responsibility for disposal of these soils unless specified by other Contract agreement. Structural components identified as having surface contaminates in excess of EPA guidelines shall be disposed of in an approved manner dictated by Federal, State, and Local laws, codes and regulations. Excavated concrete or mortar products indicating contamination to be segregated from soils and held for Railroad disposal. Temporary storage of this concrete to be handled the same as contaminated soils aforementioned.

3.12 EXCAVATIONS AND GRADING

A. Excavations arising from demolition to remove equipment, foundations, piping, etc., shall be restored to general grade with clean earthen fill and compacted to reduce settlement and graded to provide adequate drainage. Excavations within areas identified by a Railroad representative as having petroleum contamination shall be excavated to the extent that Federal, State and Local laws, codes and regulations require, (typically 1,000 ppm). Contaminated soils to be separated from contaminated masonry or concrete and stored for disposal by the Railroad. (See 3.11.B above for temporary storage requirements)

3.13 SCOPE OF DEMOLITION

A. Building, Structures, and Above and Below Grade Improvements:

1. Excavations or pits existing within the building proper shall be drained and cleared if necessary of any residual petroleum contaminates. Drainage holes shall be provided to prevent any future entrapment of water before being back filled with clean earthen fill.

2. Abandoned manholes, whether sanitary, industrial, or storm, shall have top broken to 24 IN below finished grade, all piping plugged and capped, bottom penetrated for drainage, then back filled with clean earth to grade.

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B. Utilities:

1. Natural Gas Lines:

   a. Municipal services shall be cut off and capped at street, property easement or meter, whichever is applicable to property, i.e., partial or total facility demolition.

   b. Intra facility or building gas lines to be flushed with water, plugged and abandoned in place. Connections to be cut at 12 IN below grade level.

2. Water Lines:

   a. Abandoned lines shall be drained, cut off and plugged at 24 IN below finished grade.

3. Sanitary and Storm Sewers:

   a. Abandon in place with ends cut and capped 24 IN below finished grade. All drains and any other associated influent openings also removed to 24 IN below grade and plugged.

4. Industrial Sewers, Fuel Lines & Waste Water Systems:

   a. Industrial piping to be drained and water flushed to waste water treatment plant. After flushing, abandon in place with connections severed and plugged 24 IN below finished grade.

   b. Waste Water Treatment Plants involve piping, hardware, storage tanks and in some cases, settling ponds. Each situation requires special instructions and methodologies to remediate or remove. Refer to Engineer for requirements and/or instructions.

   c. All fuel meters and ancillary controls, pump skids, (circa 1985 or newer), and specialized valves to be property of the Railroad unless pre-designated as scrap by the Railroad.

   d. The Railroad shall salvage those items it deems necessary. The responsibility for removal by either the Contractor or another party to be dictated by the Railroad at the time of bidding.

   e. All existing EPA monitoring wells or inspection points are to be preserved and marked in a method to prevent damage from equipment or personnel during the term of the demolition contract.

5. Electrical:

   a. Contact Municipal Power Company for disconnect and relocation needs

   b. All transformers to be salvaged for storage and reuse by Railroad. Panel boxes, disconnects, controllers, conduit, etc., shall be considered property of Contractor unless specified by contractual agreement.

   c. All electrical inventories or components stored as new or reusable within buildings or premises shall be property of the Railroad unless specified by contract agreement.

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d. Transformers deemed by Railroad to be obsolete or defective to be marked by Railroad as scrap together with latest date tested (PCBs). If no test date available, units shall be considered possible hazardous waste.

6. Communications:

a. Any Railroad antennas, transmitters, computer equipment, or communication devices shall be salvaged as property of the Railroad unless previously designated as scrap. Contact the Railroad Communications Department for disposition if questionable.

b. All communication wiring and coaxial cables overhead and internal to buildings to be considered as scrap. If fiber optical cabling systems are encountered, notify Communications Department for instructions.

c. All locations of underground fiber optics shall be located, marked and protected from excavation.

C. Storage Tanks (Above Ground):

1. Tank Contents:

a. If indicated, contents are to be pumped down and transported for disposal or salvage by the Contractor. Contractor to arrange transfer and transport of contents unless specified differently by contract. At the option of Railroad, excess fuel or oils may be sold to "scavenger" refiners or given to Contractor for his removal, transport or disposal.

2. Tank Removal:

a. Clean interior and degas, remove sludge and haul away to licensed disposal facility.

b. Sever underground pipe lines at 24 IN below general grade. Prior to capping, water flush with influent routed to waste water facility for processing.

c. Cut up tank and auxiliary steel components and haul away as scrap, if scheduled for demolition. If tanks are reusable at other Railroad facilities, clean and sever connections for transport per Railroad instructions.

d. All work shall be accomplish in accordance with Federal, State, and Local regulations including API Bulletin 1604, 40 CFR 280 & 281 latest revisions and OSHA. Prior to mobilization Contractor is responsible for making necessary notification to appropriate state agency and obtaining proper permits from local fire departments. Prior to commencement of work, provide disposal plan to the Railroad's Engineer for approval. Upon completion, Contractor shall provide the Railroad Engineer all documentation of disposal and/or product disposition.

3. Containment Dikes:

a. Earth berms to be bladed to general ground elevation with contaminated soils removed. Any remaining depressions shall be backfilled with clean earth and compacted to reduce settlement and provide adequate drainage.

b. Concrete Ring Walls to be treated as building foundations and cleared to a minimum of 24 IN below general grade unless prescribed to additional depths by contract.

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c. Slab pads to be removed to 24 IN below grade and removed from the demolition site. If concrete or base soils indicate contamination, treat as hazardous materials. Restore all excavations to general grade.

4. Pump and Meters:

   a. Any pumps or meters removed during tank dismantling shall be salvaged for the Railroad, unless contract designates as scrap.

   b. Salvaged meters or pumps shall be covered or preserved from dirt and water pending railroad disposition.

END OF SECTION

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SECTION 02 41 19 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 SUMMARY

A. This section covers limited scope, selective demolition as defined on the Drawings, together with the removal, handling, and disposal of items. Work Included shall include but shall not be limited to:

1. Demolition and removal of selected portions of the building.
2. Disconnecting, capping or sealing and removing or abandoning in place utilities.
3. Salvaging items for re-use by Owner

B. This is an active facility and is in operation 24 hours per day; seven days per week; 52 weeks per year and the building must remain fully operational during construction. Work shall be accomplished within phases and sequences so as to minimize impacts to operations. The contractor shall be responsible for maintaining access to building at all times. Provide temporary walkways, barricades and safety provisions to keep employees, visitors, and other contractors on site away from and safe from construction operations

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

1.03 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. 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.

1.04 MEETING REQUIREMENTS.

A. Pre-demolition Conference: Conduct at project site.

1. Attendees: In addition to representatives of Owner, Construction Manager, Architect, and Contractor shall be represented at the meeting.
2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:
   a. Fire-prevention plan.

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b. Governing regulations.

c. Areas where existing construction is to remain and the required protection.

d. Review procedures for noise control and dust control.

e. Hauling routes.

f. Sequence of alteration work operations.

g. Storage, protection, and accounting for salvaged and specially fabricated items.

h. Existing conditions, staging, and structural loading limitations of areas where materials are stored.

3. Reporting: Record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.

B. Coordination Meetings: Conduct coordination meetings specifically for alteration work at weekly intervals. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of alteration work. Include topics for discussion as appropriate to status of Project.

2. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting

1.05 RESPONSIBILITY

A. The Contractor shall be responsible for any damage to existing buildings or to equipment and furnishings housed therein which are due directly or indirectly to the demolition operations.

B. Contractor shall repair at no cost to the Owner any damaged materials or building elements not designated for demolition.

1.06 SUBMITTALS

A. Submit as specified in Section 01 33 00.

B. Pre-demolition Photographs or Video: Submit before Work begins.

C. Alteration Work Program: Submit 30 days before work begins.

1. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project alteration work program with specific requirements of programs required in other alteration work sections.

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2. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.

3. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.

D. Fire-Prevention Plan: Submit 30 days before work begins.

1. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-control devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire-watch personnel's training, duties, and authority to enforce fire safety

1.07 CLOSEOUT SUBMITTALS

A. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.08 REMOVAL

A. Unless otherwise noted or specified to be relocated or stored, all materials removed become the property of the Contractor and are to be removed completely away from the site and disposed of in a legal manner by the Contractor.

1. Do not store or permit debris to accumulate on the site. If the Contractor fails to remove excess debris promptly, the Railroad reserves the right to cause same to be removed at the Contractor's expense.

B. Burning of materials or debris on the premises is not permitted.

1.09 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.01 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements:

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1. Comply with governing EPA notification regulations before beginning selective demolition.
2. Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

B. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

3.02 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

1. Comply with requirements for existing services/systems interruptions specified by Owner's representative.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment

3.03 SELECTIVE DEMOLITION, GENERAL

A. 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:

1. 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.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. 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 fire watch and portable fire-suppression devices during flame-cutting operations.

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4. Dispose of demolished items and materials promptly.
5. Comply with requirements in Section 01741 "Construction Waste Management."

B. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
2. Protect items from damage during storage.
3. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.04 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

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SECTION 02 61 13 – EXCAVATION AND HANDLING OF CONTAMINATED MATERIALS

PART 1 - GENERAL

1.01 SUMMARY OF WORK

A. This specification includes the requirements for contractor compliance with the the excavation, loading and hauling of contaminated soil on UP property.

1.02 RELATED REQUIREMENTS

A. Section 01 33 00 Submittal Procedures

B. Section 01 35 29.13 Health, Safety, and Emergency Response Procedures for Contaminated Sites as identified.

C. Section 01 56 16 Dust Control

D. Section 02 24 23.13 Soil Management Program

E. Section 02 81 00 Transportation and Disposal of Hazardous Waste

F. Section 31 23 19 Dewatering

1.03 REFERENCED STANDARDS

A. 29 CFR 1910.120 – Hazardous Waste Operations and Emergency Response

B. 29 CFR 1910.1200 – Hazard Communication

C. 29 CFR 1926 – Safety and Health Regulations for Construction

D. 40 CFR 302 – Designation, Reportable Quantities, and Notification

E. USACE EM 385-1-1 Safety and Health Requirements Manual

F. Contractor's Stormwater Pollution Prevention Plan

1.04 DEFINITIONS

A. Contaminated Materials:

1. Soil shall be considered contaminated if soil is from a location where previous investigations have documented existing contamination as stated in the UP Soil Management Plan Technical Memorandum prepared for the project.

2. Soils shall be considered potentially contaminated if visual or field screening indicates evidence of contamination in areas not previously identified as contaminated. These soils will be segregated for stockpiling and sampled by the UP environmental representative to determine appropriate disposition.

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B. The following types of contaminated soil may be encountered on UP property:

1. Hazardous soil – Soil identified as hazardous as defined in Title 40 of the Code of Federal Regulations, Chapter 261 (40 CFR 261), whether by listing or characteristic. Management of hazardous soil requires special handling.

2. Non-hazardous soil – Soil which does not meet the definition of hazardous as presented in 40 CFR 261 and is not Non-RCRA hazardous soil. Non-hazardous soil may contain contaminants which present a risk to human health or the environment, may be characterized as contaminated or "Special Waste" or other definition by State regulation, and may require special handling.

3. Non-restricted use soil – Soil which does not exhibit contaminant concentrations in excess of the most conservative regulatory screening level, for the state in which the work is being performed. Non-restricted soil can be reused on UP property without restriction, or can be exported off-site as clean fill to a soil wasting facility.

4. Restricted use soil – Soil which exhibits contaminant concentrations in excess of the most conservative regulatory screening levels, for the state in which the work is being performed; note that in some states this is defined as 'Special Wastes'. Restricted use soil cannot be exported off-site as clean fill to a soil wasting facility. The soil may require disposal at a UP-approved landfill or may be available for preferential reuse at the project site.

5. Preferential Reuse – Practice of using soils which exhibit low levels of contamination as fill material within the project extent. The concentration of contaminants must be less than the state-specific screening levels for both the industrial/commercial and construction worker exposure scenarios. Reuse within the project extent is generally preferred over disposal at a landfill.

C. Areas of Work:

1. General Area of Work is defined as any area not identified as having pre-existing evidence of an environmental release or not addressed under a regulatory program and not identified as a Contaminated Area of Work. All soils from this area will be stockpiled at the designated Soil Stockpile Area unless field screening or visual and olfactory inspection indicates evidence of contamination. Soils will then be segregated for stockpiling and sampled by UP's Designated Environmental Representative to determine appropriate disposition.

2. Contaminated Area of Work is defined as the area where contaminated soils have been previously identified as documented in the UP Soil Management Plan Technical Memorandum for the project. All soil generated from this area will be field screened, segregated for stockpiling, and sampled by UP's Designated Environmental Representative to determine appropriate disposition.

D. Designated Environmental Representative – A UP Manager Environmental Field Operations, Manager Site Remediation or their designated contractor responsible for assisting the Project Manager with Regulatory and UP Policies regarding waste handling disposal compliance.

1.05 SUBMITTALS

A. Submittal of a Waste Request Form is required as an initial activity of the UP Waste Management Program for all soils sent to a landfill or disposal facility. A minimum of five (5) days is required for review and approval of a submitted Waste Request Form according to 02 24 23.13 - Soil Management Program Sequencing and Scheduling

1.06 SEQUENCING AND SCHEDULING

A. Soil Management Plan Technical Memorandum shall be scheduled according to 02 24 23.13 - Soil Management Program Sequencing and Scheduling.

B. The UP Designated Environmental Representative shall be responsible for contacting UP Site Remediation of the scheduled contaminated soil disturbance activities.

PART 2 - PRODUCTS

2.01 SPILL RESPONSE MATERIALS

A. Contractor shall provide appropriate spill response materials including, but not limited to the following: containers, adsorbents, shovels, and personal protective equipment. Spill response materials shall be available at all times when contaminated materials/wastes are being handled or transported. Spill response materials shall be compatible with the type of materials and contaminants being handled.

2.02 IMPORT SOIL

A. Import soil shall be obtained from the offsite sources approved by the UP Project Manager per Appendix A of Section 02 24 23.13 - Soil Management Program. Import soil shall be classified in accordance with ASTM D2487 as GW, GP, GM, GC, SW, SP, SM, SC, ML, MH, CL, or CH and shall be free from roots and other organic matter, trash, debris, snow, ice or frozen materials. Import soil shall be tested for the State-specific chemical parameters listed in Section 02 24 23 – Soil Management Program. Contractor shall not import soil to UP property until borrow source chemical and physical test results have been submitted and approved by UP Site Remediation.

2.03 POLYETHYLENE SHEETING FOR STOCKPILING CONTAMINATED SOIL

A. Continuous sheeting, minimum 0.020-inch (20 mil) thickness, fabricated from a single ply of construction grade polyethylene plastic shall be used for soil stockpiling and cover.

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PART 3 - EXECUTION

3.01 SURVEYS

A. Contractor shall perform surveys immediately prior to and after excavation of contaminated material to determine the volume of contaminated material removed. Contractor shall also perform surveys immediately after backfilling of each excavation. Provide cross-sections on one-foot intervals and at break points for all excavated areas. Locations of confirmation samples, if collected, shall also be surveyed and shown on the drawings.

3.02 EXISTING STRUCTURES AND UTILITIES

A. No excavation shall be performed until site utilities have been field located. Contractor shall take all necessary precautions to ensure no damage occurs to existing structures and utilities. Damage to existing structures and utilities resulting from the Contractor's operations shall be repaired at no additional cost to UP. Utilities encountered that were not previously shown or otherwise located shall not be disturbed without approval from UP's Designated Environmental Representative.

3.03 CLEARING

A. Clearing shall be performed to the limits shown on the drawings in accordance with Section 31 11 00 - Clearing and Grubbing.

3.04 EXCAVATION IN CONTAMINATED AREA OF WORK

A. Excavation of contaminated soil shall be performed to the depth and extent shown on the drawings and not more than one foot beyond the depth and extent shown on the drawings unless directed by UP's Designated Environmental Representative. Excavation shall be performed in a manner that will minimize the potential for contaminated material to be mixed with uncontaminated material.

B. Contractor's personnel shall be properly trained to handle soil that contains laboratory detectable concentrations of contaminants identified in the UP Soil Management Plan Technical Memorandum. These soils shall be given consideration in the Contractor's Health and Safety Plan.

C. Contractor shall set up an exclusion zone and limit access to Contaminated Work Areas as necessary.

D. The UP Designated Environmental Representative will field screen soils and perform visual and olfactory inspections throughout excavation activities.

E. The UP Designated Environmental Representative may collect, or request collection of, samples from excavation for documentation purposes. If the excavation is unsafe for entry by field personnel, Contractor shall make a backhoe or other equipment available to obtain soil samples.

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3.05 EXCAVATION IN GENERAL AREAS OF WORK

A. During excavation in the General Work Area, Contractor shall immediately stop work and notify UP's Designated Environmental Representative if suspected contaminated soil is encountered based on visual or olfactory evidence of contamination.

3.06 SHORING

A. If workers must enter the excavation, it shall be evaluated, shored, sloped or braced as required by 29 CFR 1926 section 650.

3.07 DEWATERING

A. To the extent practical, Contractor shall provide means to divert all surface water from the excavations and stockpile areas. No dewatering shall be performed without prior approval from UP's Designated Project Manager.

3.08 CONTAMINATED MATERIAL STORAGE

A. STOCKPILES:

1. Stockpiles shall be constructed to isolate stored contaminated material from the environment. The maximum stockpile size shall be 750 cubic yards. Stockpiles shall be constructed to include:

   a. A chemically resistant geomembrane liner free of holes and other damage. Non-reinforced geomembrane liners shall have a minimum thickness of 20 mils. Scrim reinforced geomembrane liners shall have a minimum weight of 40 lbs./1000 square feet. The ground surface on which the geomembrane is to be placed shall be free of rocks greater than 0.5 inches in diameter and any other object which could damage the membrane.

   b. Geomembrane cover free of holes or other damage to prevent precipitation from entering the stockpile. Non-reinforced geomembrane covers shall have a minimum thickness of 10 mils. Scrim reinforced geomembrane covers shall have a minimum weight of 26 lbs/1000 square feet. The cover material shall be extended over the berms and anchored or ballasted to prevent it from being removed or damaged by wind.

   c. Berms surrounding the stockpile, a minimum of 12 inches in height. Vehicle access points shall also be bermed.

   d. The liner system shall be sloped to allow collection of leachate. Storage and removal of liquid which collects in the stockpile shall be handled in accordance with paragraph Liquid Storage below.

B. ROLL- OFF UNITS:

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1. Roll-off units used to temporarily store contaminated material shall be water tight. A cover shall be placed over the units to prevent precipitation from contacting the stored material. The units shall be located as shown on the drawings. Liquid which collects inside the units shall be removed and stored in accordance with paragraph Liquid Storage.

C. LIQUID STORAGE

1. Liquid collected from excavations and stockpiles shall be temporarily stored in water-tight containers and placed within secondary containment.

3.09 SOIL AND LIQUID ANALYTICAL TESTING

A. The UP Designated Environmental Representative shall sample and analyze all stockpiled soil and liquid for waste disposal characterization.

3.10 SPILLS

A. In the event of a spill or release of a hazardous substance, pollutant, contaminant, or oil, immediately contact UP Response Management Communications Center (RMCC) : 1-888-UPRRCOP (877-7267) , along with the UPRR Project Manager/Construction Project Manager, to report hazardous materials releases or environmental incidents. Immediate containment actions shall be taken to minimize the effect of any spill or leak. Cleanup shall be in accordance with applicable federal, state, and local regulations. As directed by UP's Designated Environmental Representative, additional sampling and testing shall be performed to verify spills have been cleaned up. Spill cleanup and testing shall be done at no additional cost to UP.

3.11 BACKFILLING

A. Excavations shall be backfilled immediately after all contaminated materials have been removed and, if necessary, confirmation sampling results have been approved. Backfill shall not begin until laboratory testing data for the import soil has been reviewed and approved by UP Site Remediation.

B. Backfill shall be in accordance with State requirements per Appendix A of Section 02 24 23.13 - Soil Management Program

C. Backfill will placed and compacted shall be performed according to Section 31 00 00 - Earthwork.

3.12 CONTAMINATED SOIL DISPOSAL

A. Off-site disposal of contaminated material shall be performed according to Section 02 81 00 - Transportation and Disposal of Hazardous Materials.

END OF SECTION

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SECTION 02 81 00 – TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS

PART 1 - GENERAL

1.01 SUMMARY

A. This specification covers the requirements for transportation and disposal of project related hazardous materials, hazardous wastes or other regulated wastes, including, but not limited to:

1. Wastes produced from use of UP specified hazardous materials products during the project;

2. Soils and other materials contaminated by UP specified hazardous materials or hazardous wastes that are removed as part of earthmoving or demolition under the project's scope of work.

B. This specification does not apply to the hazardous materials owned by Contractor, hazardous wastes generated by the Contractor that are the responsibility of the Contractor, and products purchased by the Contractor for UP that do not comply with UP's specification.

1.02 RELATED REQUIREMENTS

A. Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Section 01 33 00 Submittal Procedures

D. Section 01 35 29.13 Health, Safety, and Emergency Response Procedures for Contaminated Sites as identified.

E. Section 01 56 16 Dust Control

F. Section 02 61 13 Excavation and Handling of Contaminated Materials

1.03 REFERENCED STANDARDS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

B. Codes & Standards: To comply with most recent provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified.

C. United States Code of Federal Regulations:

1. 40 CFR 261, Identification and Listing of Hazardous Waste

2. 40 CFR 262, Standards Applicable to Generators of Hazardous Waste

3. 40 CFR 263, Standards Applicable to Transporters of Hazardous Waste

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4. 40 CFR 264, Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

5. 40 CFR 265, Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities

6. 40 CFR 266, Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities

7. 40 CFR 268, Land Disposal Restrictions

8. 40 CFR 270, EPA Administered Permit Programs: The Hazardous Waste Permit Program

9. 40 CFR 279, Standards for the Management of Used Oil

10. 40 CFR 300, National Oil and Hazardous Substances Pollution Contingency Plan

11. 40 CFR 302, Designation, Reportable Quantities, and Notification

12. 40 CFR 61, National Emission Standards for Hazardous Air Pollutants

13. 40 CFR 761, Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions

14. 49 CFR 107, Hazardous Materials Program Procedures

15. 49 CFR 172, Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

16. 49 CFR 173, Shippers - General Requirements for Shipments and Packaging

17. 49 CFR 178, Specifications for Packaging

1.04 DEFINITIONS

A. Designated Environmental Representative – A UP Manager Environmental Field Operations, Manager Site Remediation or their designated contractor responsible for assisting the UP Designated Project Manager with Regulatory and UP Policies regarding waste disposal compliance.

B. Hazardous Material - A substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated pursuant to the Hazardous Materials Transportation Act, 49 U.S.C. Appendix Section 1801 et seq. The term includes materials designated as hazardous materials under the provisions of 49 CFR 172, Sections .101 and .102 and materials which meet the defining criteria for hazard classes and divisions in 49 CFR 173. EPA designated hazardous wastes are also hazardous materials.

C. Hazardous Waste - A waste which meets criteria established in RCRA or specified by the EPA in 40 CFR 261 or which has been designated as hazardous by a RCRA authorized state program.

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1.05 SUBMITTALS

Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

A. Product Data

1. Hazardous Waste Management Plan;

2. USDOT Security Plan, where applicable; and

3. Certificates of Disposal, executed originals of Generator's and TSDF's Hazardous Waste Manifests, and completed Land Disposal Restriction forms, where applicable.

4. Laboratory analytical data and hazardous waste profile information

B. Reports

1. Contractor's assignment of Transportation and Disposal Coordinator;

2. Hazardous waste manifest exception report;

3. Spill response notifications and written reports;

4. Notices of Non-Compliance and Notices of Violation; and

5. Recordkeeping.

C. Certificates

1. Contractor's USDOT, USEPA RCRA and OSHA HAZWOPER Training;

2. Other Training such as asbestos or lead worker required in the specifications, drawings or by federal, state or local regulation not contained herein;

3. Permits and licenses held by the Contractor and their subcontractors related to the work described herein;

4. USDOT shipping documents and packaging certifications; and

5. Certification of waste minimization efforts.

1.06 QUALITY ASSURANCE

A. TRANSPORTATION AND DISPOSAL COORDINATOR

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The Contractor's employee that is designated by position and title to act as the Transportation and Disposal Coordinator (TDC) for this contract. The TDC must serve as the single point of contact for all environmental regulatory matters related to the Contractor's work. The TDC will coordinate all waste identification, characterization, disposal facility authorization, and record keeping with the UP's Designated Environmental Representative. The TDC will have overall responsibility for environmental compliance at the site including, but not limited to, accurate identification and classification of hazardous waste and hazardous materials; determination of proper shipping names; identification of marking, labeling, packaging and placarding requirements; completion of waste profiles, hazardous waste manifests, asbestos waste shipment records, PCB manifests, bill of ladings, exception and discrepancy reports; and all other environmental documentation. The TDC must have, at a minimum, one year of specialized experience in the management and transportation of hazardous waste and have been Department of Transportation certified under 49 CFR 172, Subpart H.

B. TRAINING

Hazardous materials employees must be trained, tested, and certified to safely and effectively carry out their assigned duties in accordance with Section 01 35 29.13 -HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES. Employees transporting hazardous materials or preparing hazardous materials for transportation, including samples, must be trained, tested, and certified in accordance with 49 CFR 172, Subpart H, including security awareness and any applicable security plans. Employees must be trained, tested, and certified in accordance with 49 CFR 172, Subpart H to determine that shipments do not constitute DOT regulated hazardous materials.

C. PERMITS AND LICENSES

Transporters, disposal facilities, their employees and subcontractors shall possess current business licenses, permits, registrations, other regulatory requirements and UP's contract, and shall comply with the provisions. The UP shall be advised of variances granted the Contractor or their subcontractors by regulatory authorities such as "Special Permits" granted by the USDOT Pipeline and Hazardous Materials Safety Administration.

D. LAWS AND REGULATIONS REQUIREMENTS

Comply with Federal, state, and local laws and regulations which are applicable. These requirements are amended frequently and compliance with amendments is required as they become effective. Notify the Contracting Officer immediately if compliance exceeds the scope of work or conflicts with specific requirements of the contract.

PART 2 - PRODUCTS

2.01 MATERIALS –

A. Provide all the materials required for the packaging, labeling, marking, placarding and transportation of hazardous wastes and hazardous materials in conformance with Department of Transportation standards. Details in this specification must not be construed as establishing the limits of the Contractor's responsibility.

1. Packaging - Provide bulk and non-bulk containers for packaging hazardous materials/wastes consistent with the authorizations referenced in the Hazardous Materials Table in 49 CFR 172, Section .101, Column 8. Bulk and non-bulk packaging must meet the corresponding specifications in 49 CFR 173 referenced in the Hazardous Materials Table, 49 CFR 172, Section .101. Packaging must conform to the general packaging requirements of Subpart B of 49 CFR 173, to the requirements of 49 CFR 178 at the specified packing group performance level, to the requirements of special provisions of column 7 of the Hazardous Materials Table in 49 CFR 172, Section .101, and be compatible with the material to be packaged as required by 40 CFR 262. Also provide other packaging related materials such as materials used to cushion or fill voids in overpacked containers. The hazardous materials being packaged must not react dangerously with, decompose or ignite the sorbent packaging materials. Additionally, sorbents used to treat free liquids to be disposed of in landfills must be non-biodegradable as specified in 40 CFR 264, Section .314. In addition, packaging notifications will be provided to the UP in accordance with 49 CFR 172, Section .178.2(c) regarding type and dimensions of closures, including gaskets, needed to satisfy performance test requirements.

2. Markings - Provide markings for each hazardous material/waste package, freight container, and transport vehicle consistent with the requirements of 49 CFR 172, Subpart D, 40 CFR 262, Section .32 (for hazardous waste), 40 CFR 761, Section .45 (for PCBs), or 40 CFR 61, Section .149(d) (for asbestos). Markings must withstand a 180-day exposure to conditions reasonably expected to be encountered during container storage and transportation, without deterioration or substantial color change.

3. Placards - For each offsite shipment of hazardous material/waste, provide primary and subsidiary placards consistent with the requirements of 49 CFR 172, Subpart F. Provide placards for each side and each end of bulk packaging, freight containers, transport vehicles, and rail cars requiring such placarding. Placards may be plastic, metal, or other material capable of withstanding, without deterioration, a 30-day exposure to open weather conditions and must meet design requirements specified in 49 CFR 172, Subpart F.

4. Spill Response Equipment, Materials and Tools - Provide spill response materials including, but not limited to, containers, adsorbent, shovels, and personal protective equipment. Spill response materials must be available at all times when hazardous materials/wastes are being handled or transported. Spill response materials must be compatible with the type of material being handled.

5. Provide miscellaneous equipment and tools necessary to handle hazardous materials and hazardous wastes in a safe and environmentally sound manner.

2.02 SERVICES

A. Provide all supervision, labor, equipment, supplies and vehicles necessary for the minimization of wastes generated as described in the “Hazardous Waste Management Plan”.

B. Provide all supervision, labor, equipment and vehicles required for the transportation of hazardous wastes and hazardous materials from the project site to the UP's approved disposal facility in conformance with Department of Transportation standards. Details in this specification must not be construed as establishing the limits of the Contractor's responsibility.

C. Provide all "SUBMITTALS" described in this specification.

PART 3 - EXECUTION

3.01 PREPARATION

A. HAZARDOUS WASTE MANAGEMENT PLAN

Prepare a Hazardous Waste Management Plan detailing the manner in which hazardous wastes will be managed and describing the types and volumes of hazardous wastes anticipated to be managed. The plan must address both onsite and offsite hazardous waste management. Describe the methods to be used to ensure accurate piece counts or weights of shipments; describe waste minimization methods; identify and describe facilities to be used for treatment, storage, and disposal (TSD); identify areas onsite where hazardous wastes are to be handled; and identify whether transfer facilities are to be used; and if so, how the wastes will be tracked to ultimate disposal. Submit the plan to the Union Pacific's Project Manager for approval prior to start of work. Submit written documentation of weekly hazardous waste inspections on a weekly basis.

B. ONSITE HAZARDOUS WASTE MANAGEMENT

Coordinate the onsite management of all hazardous materials and waste with the UP's Project Manager and Designated Environmental Representative. The Contractor is responsible for ensuring compliance with federal, state, and local hazardous waste laws and regulations and verifying those requirements when preparing reports, waste shipment records, hazardous waste manifests, or other documents. Identify hazardous wastes using criteria set forth in 40 CFR 261 or applicable state and local laws, regulations, and ordinances. Comply with generator requirements in 40 CFR 262 and applicable state or local law or regulations when accumulating hazardous waste onsite. Onsite accumulation times must be restricted to applicable time frames referenced in 40 CFR 262, Section .34 and applicable state or local laws or regulations. Accumulation start dates commence when waste container is transferred into a 90-day accumulation site or permitted storage facility. Only use containers in good condition and compatible with the waste to be stored. Ensure containers are closed except when adding or removing waste, and immediately mark all hazardous waste containers with the words "hazardous waste" and other information required by 40 CFR 262, Section .32 and applicable state or local laws or regulations as soon as the waste is containerized. An additional marking must be placed on containers of "unknowns" designating the date sampled for waste characterization and profiling, and the suspected hazard. Inspect containers for signs of deterioration and for responding to any spills or leaks. Inspect all hazardous waste areas weekly and provide written documentation of the inspection. Include date and time of inspection, name of individual conducting the inspection, problems noted, and corrective actions taken on the inspection logs.

1. Hazardous Waste Classification - Identify, in consultation with UP's Project Manager and Designated Environmental Representative, all waste codes applicable to each hazardous waste stream based on requirements in 40 CFR 261 or applicable state or local law or regulation. Also identify applicable treatment standards in 40 CFR 268 and state land disposal restrictions and make a determination as to whether or not the waste meets or exceeds the standards. Submit waste profiles, analyses, classification and treatment standards information to the Project Manager for review and approval.

C. OFFSITE HAZARDOUS WASTE MANAGEMENT

Coordinate the offsite transfer of all hazardous materials and waste with the UP's Project Manager and Designated Environmental Representative. Use UP pre-approved RCRA Subtitle C permitted facilities which meet the requirements of 40 CFR 264 or facilities operating under interim status which meet the requirements of 40 CFR 265. Do not use offsite treatment, storage, and disposal facilities that are not approved by UP or that have significant RCRA violations or compliance problems (such as facilities known to be releasing hazardous constituents into ground water, surface water, soil, or air).

1. Treatment, Storage, and Disposal Facility and Transporter - Provide UP's Project Manager with EPA ID numbers, names, locations, and telephone numbers of TSD facilities and transporters. This information must be contained in the Hazardous Waste Management Plan and be approved by UP's Project Manager and Designated Environmental Representative prior to waste disposal.

2. Facility Status Information - Facilities receiving hazardous waste must be permitted in accordance with 40 CFR 270 or operating under interim status in accordance with 40 CFR 265 requirements or permitted by a state authorized by the Environmental Protection Agency to administer the RCRA permit program.

3. Shipping Documents and Packaging Certifications - Prior to shipment of any hazardous material offsite and a minimum of 14 days prior to anticipated pickup, provide for review written certification to UP's Project Manager that hazardous materials have been properly packaged, labeled, and marked in accordance with Department of Transportation and EPA requirements. Furnish designated disposal facility packaging assurances not later than 35 days after acceptance of the shipment. The Contractor's TDC must also provide written certification regarding waste minimization efforts documenting that efforts have been taken to reduce the volume and toxicity of waste to the degree economically practicable and that the method of treatment, storage, or disposal selected minimizes threats to human health and the environment.

4. Transportation - Transportation must comply with all requirements in the Department of Transportation referenced regulations in the 49 CFR series. Prepare hazardous waste manifests for each shipment of hazardous waste shipped offsite. Complete manifests using instructions in 40 CFR 262, Subpart B and applicable state or local law or regulation. Submit manifests and waste profiles to UP's Project Manager for review and approval as required. Prepare land disposal restriction notifications as required by 40 CFR 268 or applicable state or local law or regulation for each shipment of hazardous waste. Submit notifications with the manifest to UP's Project Manager for review and approval. In accordance with DOT 4500.9R, inspect motor vehicles used to transport hazardous materials in accordance the 49 CFR and DOT safety regulations. Complete DDForm 626, Motor Vehicle Inspection which is the responsibility of the contractor to submit to UP.

5. Treatment and Disposal of Hazardous Wastes - Coordinate any offsite shipments of hazardous materials or hazardous wastes with the UP's Project Manager and Designated Environmental Representative. Ship hazardous wastes only to facilities which are properly permitted to accept the hazardous waste or operating under interim status. Ensure wastes are treated to meet land disposal treatment standards in 40 CFR 268 prior to land disposal. Propose TSD facilities via submission of the Hazardous Waste Management Plan, subject to the approval of the UP's Project Manager and Designated Environmental Representative. Submit Certificates of Disposal and TSDF executed hazardous waste manifests documenting the ultimate disposal, destruction or placement of hazardous wastes, CERCLA remediation waste, polychlorinated biphenyls (PCBs) contaminated wastes, and asbestos containing materials (ACM) within 30 days of initial shipment. Receipt of these certificates will be required for final payment.

D. SPECIAL REQUIREMENTS FOR ASBESTOS AND LEAD CONTAINING WASTES

If work involves asbestos or lead containing wastes, manage these wastes in accordance with UP's policies and instructions, and with federal, state and local regulations.

3.02 APPLICATION

A. WASTE MINIMIZATION

Minimize the generation of hazardous waste to the maximum extent practicable and take all necessary precautions to avoid mixing clean and contaminated wastes. Identify and evaluate recycling and reclamation options as alternatives to land disposal. Requirements of 40 CFR 266 apply to: hazardous wastes recycled in a manner constituting disposal; hazardous waste burned for energy recovery; lead-acid battery recycling; and hazardous wastes with economically recoverable precious metals. Submit written certification that waste minimization efforts have been undertaken to reduce the volume and toxicity of waste to the degree economically practicable and that the method of treatment, storage, or disposal selected minimizes threats to human health and the environment.

B. SPILL RESPONSE

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In the event of a spill or release of a hazardous substance (as designated in 40 CFR 302), or pollutant or contaminant, or oil (as governed by the Oil Pollution Act (OPA), 33 U.S.C. 2701 et seq.), notify the UP's Project Manager and Designated Environmental Representative immediately. Direction from the UP's Project Manager and Designated Environmental Representative concerning a spill or release is not considered a change under the contract. If the spill exceeds a reporting threshold, the UP's Project Manager and Designated Environmental Representative will arrange for the required notifications to federal, state and local agencies. Comply with applicable requirements of federal, state, or local laws or regulations regarding any spill incident.

C. TRANSPORTATION MANAGEMENT

Prior to shipment of any material offsite, consult with the UP's Project Manager and Designated Environmental Representative to evaluate whether the material is regulated as a hazardous material or hazardous waste. Perform the evaluation and apply the following proper shipping descriptions, marking requirements, and other criteria, as described below.

1. Identification of Proper Shipping Names

   Use 49 CFR 172, Section .101 to identify proper shipping names for each hazardous material (including hazardous wastes) to be shipped offsite. Submit proper shipping names to the Contracting Officer in the form of draft shipping documents for review and approval.

2. Packaging, Labeling, and Marking

   Package, label, and mark hazardous materials/wastes using the specified materials and in accordance with the referenced authorizations. Mark each container of hazardous waste of 110 gallons or less with the following:

   "HAZARDOUS WASTE - Federal Law Prohibits Improper Disposal.

   If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency.

   Generator's name _____

   Manifest Document Number _____".

3. Shipping Documents

   Ensure that each shipment of hazardous material sent offsite is accompanied by properly completed shipping documents. This includes shipments of samples that may potentially meet the definition of a Department of Transportation regulated hazardous material.

4. PCB Waste Shipment Documents

   Prepare hazardous waste manifests for each shipment of PCB waste shipped offsite. Complete manifests using instructions in 40 CFR 761, Sections .207 and .208 and other applicable requirements. Submit documents to Contracting Officer for review and approval.

5. Asbestos Waste Shipment Documents

   Prepare waste shipment records, as required by 40 CFR 61, for shipments of asbestos. Submit waste shipment records to the Contracting Officer for review and approval. Waste shipment records must be signed by the Contractor.

6. Other Hazardous Material Shipment Documents

   Prepare a bill of lading for each shipment of hazardous material which is not accompanied by a hazardous waste manifest or asbestos waste shipment record which fulfills the shipping paper requirements. The bill of lading must satisfy the requirements of 49 CFR 172, Subpart C, and 40 CFR 279 if shipping used oil, and applicable state or local law or regulation and must be submitted to the UP's Project Manager for review and approval. For laboratory samples and treatability study samples, prepare bills of lading and other documentation as necessary to satisfy conditions of the sample exclusions in 40 CFR 261, Section 4(d) and (e) and any applicable state or local law or regulation. Bill of ladings requiring shipper's certifications must be signed by the Contractor.

7. EMERGENCY CONTACTS

   Comply with the emergency contact provisions in 49 CFR 172, Section .604. Whenever the Contractor ships hazardous materials, provide a 24-hour emergency response contact and phone number of a person knowledgeable about the hazardous materials being shipped and who has comprehensive emergency response and incident mitigation information for that material, or has immediate access to a person who possesses such knowledge and information. Emergency contact shall monitor the phone on a 24-hour basis at all times when the hazardous materials are in transportation, including during storage incidental to transportation. Ensure that information regarding this emergency contact and phone number are placed on all hazardous material shipping documents. Designate an emergency coordinator and post the following information at areas in which hazardous wastes are managed:

   a. The name of the emergency coordinator.

   b. Phone number through which the emergency coordinator can be contacted on a 24-hour basis.

   c. The telephone number of the local fire department.

   d. The location of fire extinguishers and spill control materials.

D. NOTICES OF REGULATORY NON-COMPLIANCE AND VIOLATION

Submit Notices of Non-Compliance and Notices of Violation issued by a federal, state, or local regulatory agency to the Contractor in relation to any work performed under this contract. Immediately provide copies of such notices to the UP's Project Manager. Also furnish relevant documents regarding the incident and any information requested by the UP's Project Manager and coordinate its response to the notice with the UP's Project Manager or their designated representative prior to submission to the notifying authority. Also, furnish UP's Project Manager with copies of all documents submitted to the regulatory authority, including the final reply to the notice, and all other materials, until the matter is resolved.

E. RECORDKEEPING

Maintain adequate records to support information provided to the UP's Project Manager and/or Designated Environmental Representative including, but not limited to,

1. Training records – Employee training required for asbestos containing, lead containing and/or PCB containing materials and wastes as provided in required in related specifications, other contract documents, and federal, state and local regulations.

2. Manifest exception reports - In the event that a manifest copy documenting receipt of hazardous waste at the treatment storage and disposal facility is not received within 35 days of shipment initiation, or that a manifest copy documenting receipt of PCB waste at the designated facility is not received within 35 days of shipment initiation, prepare and submit an exception report to the Contracting Officer within 37 days of shipment initiation.

3. Hazardous Waste Annual and Biennial reports - Submit information necessary to file state annual or EPA biennial reports for hazardous waste transported, treated, stored, or disposed of under this contract. Do not forward these data directly to the regulatory agency but to the Contracting Officer at the specified time. Submit the information necessary for filing of the formal reports in the form and format required by the governing Federal or state regulatory agency. A cover letter must accompany the data to include the contract number, Contractor name, and project location.

4. Asbestos waste shipment records - Maintain asbestos waste shipment records for a minimum of 3 years from the date of shipment or any longer period required by applicable law or regulation or other provision of this contract

5. Bills of ladings (aka waybills) - Maintain bills of ladings for a minimum of 375 days from the date of shipment or longer period required by applicable law or regulation or other provision of this contract.

6. Employee monitoring – Logs of workplace and employee monitoring for asbestos, lead, PCB, and other potential exposure.

3.03 FIELD QUALITY CONTROL

A. Field quality control shall be performed and monitored consistent with the requirements in the "Hazardous Waste Management Plan".

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Hazardous materials and hazardous waste transportation and disposal shall be measured by the bills of ladings, fully executed waste manifests, and/or receiving facility's scale tickets consistent with the units of measure of the contract.

4.02 PAYMENT

A. Payment for hazardous materials and hazardous waste transportation and disposal will be made at the contract unit price and shall be full compensation for all costs for work specified herein and shown on the drawings.

PART 5 - ATTACHMENTS

5.01 ATTACHMENT A – SAMPLE OFF-SITE WASTE DISPOSAL POLICY COMPLIANCE CERTIFICATION MEMO

Attachment A SAMPLE OFF-SITE WASTE DISPOSAL POLICY COMPLIANCE CERTIFICATION MEMO	
Project/Contract #:	
Waste Stream:	
Primary TSD Facility, EPA ID # and Location:	
Alter. TSD Facility, EPA ID # and Location:	
UP Designated Environmental Representative contacted:	
UP Designated Environmental Representative phone number:	
Date contacted:	
Comment:	
The above UP representative was contacted on _____. As of that date the above sites were considered acceptable in accordance with UP's waste and hazardous waste disposal policies.	

Attachment A SAMPLE OFF-SITE WASTE DISPOSAL POLICY COMPLIANCE CERTIFICATION MEMO	
Date:	Signature:
Phone number:	

END OF SECTION

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SECTION 03 09 00 - STRUCTURAL CONCRETE FOR BUILDINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Contractor to furnish all labor, materials, tools, equipment, and services for all concrete work as indicated in accord with provisions of the contract documents.

B. Contractor to coordinate with work of all other trades.

C. Contractor to furnish and install all supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a sound, secure and complete installation.

1.02 REFERENCED STANDARDS

A. Codes and Standards: To comply with most recent provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified.

B. American Concrete Institute (ACI):

1. 117, Standard Specifications for Tolerances for Concrete Construction and Materials.
2. 301, Specifications for Structural Concrete for Buildings.
3. 304, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
4. 305, Hot Weather Concreting.
5. 306, Cold Weather Concreting.
6. 318, Building Code Requirements for Reinforced Concrete.

C. American Society of Testing and Materials (ASTM):

1. A615, Standard Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
2. C31, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
3. C33, Standard Specification for Concrete Aggregates.
4. C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
5. C42, Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
6. C94, Standard Specification for Ready-Mixed Concrete.
7. C150, Standard Specification for Portland Cement.
8. C171, Standard Specification for Sheet Materials for Curing Concrete.
9. C172, Standard Practice for Sampling Freshly Mixed Concrete.

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10. C260, Standard Specification for Air-Entraining Admixtures for Concrete.
11. C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing.
12. E1155, Standard Test Method for Determining Floor Flatness and Levelness Using the F-Number System.

D. Concrete Reinforcing Steel Institute (CRSI) - Manual of Standard Practice.

E. American Association of State Highway and Transportation Officials (AASHTO).

1.03 QUALITY ASSURANCE

A. Concrete Testing Service: Concrete Testing specified hereinafter shall be done by an independent testing laboratory approved by the Railroad. Costs of the testing will be paid for by the Contractor.

B. Materials and installed work may require testing and re-testing, as directed by the Railroad, at any time during the progress of work. The Contractor is to allow free access to material stockpiles and facilities. Re-testing of rejected materials and installed work shall be done at the Contractor's expense.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Shop Drawings: Reinforcement – Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required and openings through concrete structures.

C. Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design for each class of concrete specified.

PART 2 - PRODUCTS

2.01 FORM MATERIALS

A. Forms for Exposed Finished Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood-faced or other panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Finish the largest practicable sizes to minimize the number of joints. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.

B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least two (2) edges and one (1) side for tight fit.

C. Form Coatings: Provide commercial formulation form-coating compounds that will not bind with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

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2.02 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A615, Grade 60, deformed.

B. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bar and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications, unless otherwise acceptable.

C. Fabrication of reinforcing steel shall be per the CRSI "Manual of Standard Practice." Dimension of bending details on drawings are measured out to out of bar.

2.03 CONCRETE MATERIALS

A. Portland Cement: ASTM C150, Type II, unless otherwise acceptable to the Engineer. Use one (1) brand of cement throughout the project, unless otherwise accepted by the Engineer. Normal weight aggregates shall conform to ASTM C33.

B. Water: Potable.

C. Air-Entraining Admixture: ASTM C260.

D. Water-Reducing Admixture: ASTM C494, Type A. Calcium chloride or admixtures containing chloride ions are not permitted. Use in concrete as required for placement and workability.

2.04 GROUT

A. Non-shrink, Non-metallic Grout: ASTM C1107, grade B.

1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic cement grout, non-staining, non-corrosive, non-gaseous, and recommended for interior and exterior applications.

2. Design Mix: 500 psi compressive strength at twenty-eight (28) days.

2.05 ABSORPTIVE COVER

A. Burlap cloth made from jute or kenaf, weighing approximately 9 OZ/SQ YD complying with AASHTO M182, Class 2.

2.06 MOISTURE-RETAINING COVER

A. One of the following, complying with ASTM C171.

1. Waterproof paper.

2. Polyethylene film.

3. Polyethylene-coated burlap.

2.07 LIQUID MEMBRANE FORMING CURING COMPOUND

A. Liquid type membrane-forming curing compound complying with ASTM C309, Type I-D, Class A unless other types acceptable to the Railroad. Moisture loss not more than 9.955 gm/SQ CM when applied to 2300 SQ FT/GAL.

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2.08 PROPORTIONING AND DESIGN OF MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method is used, use an independent testing facility acceptable to the Architect-Engineer for preparing and reporting proposed mix designs.

B. Submit written reports to the Railroad of each proposed mix for each class of concrete at least 15 days prior to the start of work. Do not begin concrete production until mixes have been reviewed by the Engineer.

C. Design mixes to provide normal weight concrete as indicated in the structural general notes on the drawings.

D. Concrete shall have a minimum compressive strength of 4,000 PSI at twenty-eight (28) days unless otherwise noted.

2.09 CONCRETE MIXES

A. Ready-Mix Concrete: Comply with requirements of ASTM C94.

PART 3 - EXECUTION

3.01 GENERAL

A. Comply with ACI 304 Guide for Measuring, Mixing, Transporting and Placing Concrete and as herein specified.

3.02 PLACING REINFORCEMENT

A. Comply with Concrete Reinforcing Steel Institute's (CRSI) Manual of Standard Practice for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean reinforcement of loose rust and mill scale, earth, ice and other materials that reduce or destroy bond with concrete.

C. Accurately position, support, and securely wire reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcement by metal chairs, runners, bolsters, spacers, and hangers as required. Wet setting is prohibited of reinforcing steel unless approved by Engineer of record.

D. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.

E. Unless noted otherwise, all reinforcing steel shall conform to the Minimum Concrete Cover Schedule listed in the general construction notes sheet and ACI 318, whichever is greater.

F. Reinforcing shall be lap spliced in accordance to ACI 318. Mechanical splices may be substituted when used in accordance with ACI 318 where they develop 125 percent of yield strength of the reinforcing steel. Mechanical splices must be submitted to the Railroad prior to incorporation into the work. Welding of reinforcing steel is not allowed under any circumstances.

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3.03 PLACING CONCRETE SLABS

A. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

B. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

C. Bring slab surface to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.

D. Maintain reinforcing in proper position during concrete placement operations.

3.04 PLACING VERTICAL CONCRETE

A. (Pending Review).

3.05 COLD WEATHER CONCRETING

A. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures in compliance with ACI 306 and as herein specified.

B. Do not use calcium chloride, salt or other materials containing antifreeze agents or chemical accelerators.

3.06 HOT WEATHER CONCRETING

A. When hot weather conditions exist, place concrete in compliance with ACI 305.

3.07 MONOLITHIC SLAB FINISH

A. Float Finish:

1. Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified.

2. After screeding, consolidating and leveling concrete slabs, float concrete surface immediately. Do not trowel surface. Before surface water has appeared, check and level surface plane so that depressions between high spots do not exceed 1/4 IN under a 10 FT straightedge. Cut down high spots, and fill in low spots. Uniformly slope surfaces to drains. Immediately after leveling, re-float surface to a uniform, smooth, granular texture.

B. Broom Finish: Apply non-slip medium broom or dragged burlap finish to exterior slabs.

3.08 CONCRETE CURING AND PROTECTION

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Start curing as soon as free water has disappeared from surface. Continue curing for seven days.

B. Curing Methods: Perform curing of concrete by curing and sealing compound or moist curing or by moisture-retaining cover, or by combinations thereof, as specified in ACI 301.

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C. If liquid membrane curing compound is used, the Contractor shall ascertain that it is compatible with subsequent concrete coatings or finishes or shall remove all compound from the surface to prepare floor for seal coat or other finish.

3.09 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. A testing laboratory shall perform test and submit test reports. Cost of the testing laboratory shall be paid by the Contractor.

B. Sampling and testing for quality control during placement of concrete shall include the following, as directed by the Engineer:

1. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.

2. Compression Test Specimen: ASTM C31; one set of standard cylinders as required for the 28 day compressive strength test and one additional cylinder for 7 day compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.

3.10 COMPRESSIVE STRENGTH TESTS

A. ASTM C39: One (1) set for each days' pour plus additional sets for each 50 CU YDS over and above the first 50 CU YDS of each concrete class placed in any one (1) day; one (1) specimen tested at seven (7) days and specimens tested at twenty-eight (28) days.

B. Strength level of concrete will be considered satisfactory if averages of sets of three (3) consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive by more than 500 PSI.

C. Test results will be reported in writing to the Architect/Engineer and Contractor within 24 HRS after tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, compressive strength at twenty-eight (28) days, concrete mix proportions and materials; compressive breaking strength and type of break for both seven (7) day tests and twenty-eight (28) day tests.

3.11 ADDITIONAL TESTS

A. The testing service will make additional test of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Architect/Engineer. The testing service may conduct test to determine adequacy of concrete by cored cylinders complying with ASTM C42, or other methods as directed. The Contractor shall pay for such tests conducted and any other additional testing may be required, when unacceptable concrete is verified.

END OF SECTION

UP-Pirate-0004833

SECTION 03 10 00 - FORMWORK

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Formwork requirements for concrete construction.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Section 01 12 10 - Contracts.

B. Section 03 09 00 - Structural Concrete For Buildings.

1.03 REFERENCED STANDARDS:

A. American Concrete Institute (ACI):

1. 116R Cement and Concrete Terminology.
2. 347R Guide to Formwork for Concrete.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Formwork, shoring and reshoring shall be designed by a professional structural engineer currently registered in the state where the Work is located and having a minimum of 3 years' experience in this type of design work.

B. Miscellaneous:

1. Design and engineering of formwork, shoring, and reshoring as well as its construction is the responsibility of the Contractor.
2. Design Requirements:
   a. Design formwork for loads, lateral pressures, and allowable stresses outlined in ACI 347R and for design considerations, wind loads, allowable stresses and other applicable requirements of the controlling local building code. Where conflicts occur between the above two standards, the more stringent requirements shall govern.
   b. Design formwork exposed to view to 1/240th of span between structural members.
3. Develop a procedure and schedule for removal of shores and for calculating the loads transferred to the structure during this process.
   a. Perform structural calculations as required to prove that all portions of the structure in combination with remaining forming and shoring system has sufficient strength to safely support its own weight plus the loads placed thereon.

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b. When developing procedure, schedule and structural calculations, consider the following at each stage of construction.

1) The structural system that exists.

2) Effects of all loads during construction.

3) Strength of concrete.

4) The influence if deformation of the structure and shoring system on the distribution of dead loads and construction loads.

5) The strength and spacing of shores or shoring systems used, as well as the method of shoring, bracing, shore removal, and reshoring including the minimum time intervals between the various operations.

6) Any other loading or condition that affects the safety if serviceability of the structure during construction.

1.05 DEFINITIONS

A. The words and terms used in these Specifications are defined in ACI 116R.

1.06 SUBMITTALS

A. Shop Drawings:

1. Submit under provisions of Section 01 33 00.

2. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.

b. Manufacturer's installation instructions.

c. Manufacturer and type of proposed form materials.

d. Manufacturer and type of proposed form ties.

e. Manufacturer and type of proposed form coating material.

f. Manufacturer and type of void forms including compressive strength.

3. Formwork designer qualifications.

4. If requested, submit structural analysis and concrete strength data used in planning and implementing form removal and shoring.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Forms for Surfaces Exposed to View:

1. Wood Forms:

a. New 5/8 IN or 3/4 IN, 5-ply structural plywood of concrete form grade.

b. Built-in-place or prefabricated type panel.

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c. 4 x 8 FT sheets for built-in-place type except where smaller pieces will cover the entire area.

d. When approved, plywood may be reused.

2. Metal forms:

a. Metal forms excluding aluminum may be used.

b. Forms to be tight to prevent leakage, free of dust, and straight without dents to provide members of uniform thickness.

B. Forms for Surfaces Not Exposed to View:

1. Wood or metal sufficiently tight to prevent leakage. Do not use Aluminum forms.

2.02 ACCESSORIES

A. Form Ties:

1. Commercially fabricated for use in form construction. Do not use wire ties.

2. Constructed so that ends or end fasteners can be removed without causing spalling at surfaces of the concrete.

3. 3/4 IN minimum to 1 IN maximum diameter cones on both ends.

4. Embedded portion of ties to be not less than 1-1/2 IN from face of concrete after ends have been removed.

5. Provide ties with built-in water stops in all exterior pit and containment wall as well as exterior retaining walls.

PART 3 - EXECUTION

3.01 PREPARATION

A. Form Surface Treatment:

1. Before placing of either reinforcing steel or concrete, cover surfaces of forms with an approved coating material that will effectively prevent absorption of moisture and prevent bond with concrete, will not stain concrete or prevent bonding of future finishes. A field-applied form release agent or sealer of approved type or a factory-applied, non-absorptive liner may be used.

2. Do not allow excess form coating material to stand in puddles in forms nor in contact with hardened concrete against which fresh concrete is to be placed.

B. Provide temporary openings at base of column and wall forms and at other points where necessary to facilitate cleaning and observation immediately before concrete is placed, and to limit the height of free fall of concrete to prevent aggregate segregation. Temporary openings to limit height of free fall of concrete shall be spaced no more than 8 FT apart.

C. Clean surfaces of forms, reinforcing steel and other embedded materials of any accumulated mortar or grout from previous concreting and of all other foreign material before concrete is placed.

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3.02 ERECTION

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

B. Tolerances:

1. Variations from plumb:

a. In lines and surfaces of columns, piers, wall and risers:

1) Maximum in any 10 FT of height: 1/4 IN.

2) Maximum for entire height: 1/2 IN.

b. For exposed corner columns, control-joint grooves, and other exposed to view lines:

1) Maximum in any 20 FT length: 1/4 IN.

2) Maximum for entire length: 1/2 IN.

2. Variation from level or from grades specified:

a. In slab soffits, ceilings, beam soffits and in arises, measured before removal of supporting shores.

1) Maximum in any 10 FT of length: 1/4 IN.

2) Maximum in any bay or in 20 FT length: 1/4 IN.

3) Maximum for entire length: 3/4 IN.

b. In exposed lintels, sills, parapets, horizontal grooves and other exposed to view lines:

1) Maximum in any bay or in 20 FT length: 1/4 IN.

2) Maximum for entire length: 1/2 IN.

3. Variation of linear structure lines from established position in plan and related position of columns, walls, and partitions:

a. Maximum in any bay: 1/2 IN.

b. Maximum in any bay 20 FT of length: 1/2 IN.

c. Maximum for entire length: 1 IN.

4. Variation in sizes and location of sleeves, floor openings, and wall openings:

a. Maximum of ±1/2 IN.

5. Variation in horizontal plan location of beam, column, and wall centerlines from required location:

a. Maximum of ±1/2 IN.

6. Variation in cross-sectional dimensions of columns and beams and in thickness of slabs and walls:

a. Maximum of -1/4 IN, +1/2 IN.

7. Footings and foundations:

a. Variations in concrete dimensions in plan: -1/2 IN, +2 IN.

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b. Misplacement or eccentricity:

1) 2 percent of footing width in direction of misplacement but not more than 2 IN.

c. Thickness:

1) Decrease in specified thickness: 5 percent.

2) Increase in specified thickness: No limit except that which may interfere with other construction.

8. Variation in steps:

a. In a flight of stairs:

1) Rise: ±1/8 IN.

2) Tread: ±1/4 IN.

b. In consecutive steps:

1) Rise: ±1/16 IN.

2) Tread: ±1/8 IN.

9. Establish and maintain in an undisturbed condition and until final completion and acceptance of the Project, sufficient control points and bench marks to be used for reference purposes to check tolerances.

10. Regardless of tolerances listed allow no portion of structure to extend beyond legal boundary of the Project.

11. To maintain specified tolerances, camber formwork to compensate for anticipated deflections in formwork prior to hardening of concrete.

C. Make forms sufficiently tight to prevent loss of mortar from concrete.

D. Place 3/4 IN chamfer strips in exposed to view corners of forms to 3/4 IN wide beveled edges.

E. At construction joints, overlap contact surface of form sheathing for flush surfaces exposed to view over hardened concrete in previous placement by at least 1 IN. Hold forms against hardened concrete to prevent offsets or loss of mortar at construction joint and to maintain a true surface. Where possible, locate juncture of built-in-place wood or metal forms at architectural lines, control joints, or at construction joints.

F. Construct wood forms for wall openings for wall openings to facilitate loosening, if necessary, to counteract swelling.

G. Anchor formwork to shores or other supporting surfaces or members so that movement of any part of formwork system is prevented during concrete placement.

H. Provide runways for moving equipment with struts or legs, supported directly on formwork or structural member without resting on reinforcing steel.

I. Provide positive means of adjustment (wedges or jacks) of shores and struts and take up all settlement during concrete placing operation. Securely brace forms against lateral deflection. Fasten wedges used for final adjustment of forms prior to concrete placement in position after final check.

3.03 REMOVAL OF FORMS

A. No construction loads shall be supported on, nor any shoring removed from, any part of the structure under construction except when that portion of the structure in combination with remaining forming and shoring system has sufficient strength to safely support its weight and loads places thereon.

B. When required for concrete curing in hot weather, required for repair of surface defects or when finishing is required at an early age- remove forms as soon as concrete has hardened sufficiently to resist damage from removal operations or lack of support.

C. Remove top forms on sloping surfaces of concrete as soon as concrete has attained sufficient stiffness to prevent sagging. Perform any needed repairs or treatment required on such sloping surfaces at once, followed by curing as specified in UPRR Specification Section 03 09 00.

D. Loosen wood forms for wall openings as soon as this can be accomplished without damage to concrete.

E. Formwork of columns, walls, sides of beams and other parts not supporting weight of concrete may be removed as soon as concrete has hardened sufficiently to resist damage from removal.

F. Where no reshoring is planned, leave forms and shoring used to support weight of concrete in place until concrete has attained its specified 28-day compressive strength. Where a reshoring procedure is planned, supporting formwork may be removed when concrete has reached the concrete strength required by the formwork designer's structural calculations.

G. When shores and other vertical supports are so arranged that non-load-carrying form facing material may be removed without loosening or disturbing shores and supports, facing material may be removed when concrete has sufficiently hardened to resist damage from removal.

END OF SECTION

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SECTION 03 10 10 - CONCRETE FORMWORK

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section includes but is not necessarily limited to:

1. Footings, foundation walls, floor slab, house pads, trash enclosure foundations, other similar concrete items not specifically mentioned herein.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Section 03 20 00 - Concrete Reinforcement

B. Section 03 30 00 - Cast-in-Place Concrete.

1.03 QUALITY ASSURANCE

A. Qualifications of workmen:

1. Provide at least one person who shall be present at all times during execution of this portion of the Work and who shall be thoroughly familiar with the type of materials being installed, the referenced standards, and the requirements of this Work, and who shall direct all Work performed under this Section.

B. Codes and standards:

1. Comply with applicable provisions of the latest edition of the Building Code that has jurisdiction and occupational Safety and Health Act.
2. Where provisions of pertinent codes and standards conflict with the requirements of this Section of these Specifications, the more stringent provisions shall govern.
3. Product Standard PS 1-74 for softwood plywood.
4. American Concrete Institute Standard recommended practice for concrete formwork, ACI 347-latest edition.

1.04 TESTING LABORATORY SERVICES

A. In accordance with Section 01 43 26.

PART 2 - PRODUCTS

2.01 FORM MATERIALS

A. Form lumber:

1. Forms for Exposed Finished Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood-faced or other panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Finish the largest practicable sizes to minimize the number of joints. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection. All form lumber in contact with exposed concrete shall be new except as allowed for re-use of forms in Part 3 of this Section of these Specifications, and all form lumber shall be one

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of the following, a combination thereof, or an equal approved in advance by the Architect:

a. Plyform", Class I 5/8" PS 1-66, C-D exterior plywood, bearing the label of the Douglas Fir Plywood Association.

b. Douglas Fir-Larch, number two grade seasoned, surfaced four (4) sides.

B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least two (2) edges and one (1) side for tight fit.

C. Chamfer strips: Wood, metal, PVC, or rubber strips, ¾ by ¾ inch minimum.

2.02 OTHER MATERIALS

A. Form Coatings: Provide commercial formulation form-coating compounds that will not bind with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

B. All other materials, not specifically described but required for proper completion of concrete framework, shall be as selected by the Contractor subject to the advanced approval of the Architect.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection:

1. Prior to all Work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

2. Verify that forms may be constructed in accordance with all pertinent codes and regulations, the referenced standards, and the original design.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Architect.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 CONSTRUCTION OF FORMS

A. General:

1. Design, erect, shore, brace, and maintain formwork, according to ACI 301 to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

2. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

3. Construct forms tight enough to prevent loss of concrete mortar.

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4. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
5. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
6. Chamfer exterior corners and edges of permanently exposed concrete.
7. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required for the Work. Determine sizes and locations from trades providing such items.
8. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
9. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
10. Coat contact surfaces of forms with form release agent, according to manufacturer's written instructions, before placing reinforcement.

B. Embedded items:

1. Set all required steel frames, angles, grilles, bolts, inserts, and other such items required to be anchored in the concrete before the concrete is placed. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

C. Bracing:

1. Properly brace and tie the forms together so as to maintain position and shape and to ensure safety to personnel.
2. Construct all bracing, supporting members, and centering of ample size and strength to safely carry, without excessive deflection, all loads to which they may be subjected.
3. Properly space the forms apart and securely tie them together, using metal spreader ties that give positive tying and accurate spreading

3.03 RE-USE OF FORMS

A. General:

1. Re-use of forms shall be subject to advance approval of the Architect.

B. Requirements:

1. Except as specifically approved in advance by the Architect, re-use of forms shall in no way delay or change the schedule for placement of concrete from the schedule obtainable if all forms were new.
2. Clean and repair surfaces of forms to be reused in the Work.
3. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces.
4. Apply new form-release agent.
5. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets.
6. Do not use patched forms for exposed concrete surfaces unless approved by Architect.
7. Except as specifically approved in advance by the Architect, re-use of forms shall in no way impart less structural stability to the forms nor less acceptable appearance to finished concrete

3.04 REMOVAL OF FORMS -USE OF FORMS

A. General:

1. Removal of formwork may be extended if deemed necessary by the Architect.
   a. Slabs and curbs: 24 hours
   b. Vertical walls (4'-0" Ht. and less): 36 hours
   c. Vertical walls (over 4'-0" Ht.): 7 days
2. Do not remove forms until the Architect's approval has been obtained.

B. Removal:

1. Remove metal spreader ties on exposed concrete by removing or snapping off inside the wall surface and pointing up and rubbing the resulting pockets to match the surrounding areas.
2. Flush all holes resulting from the use of spreader rods and sleeve nuts, using water, and then solidly pack throughout the wall thickness with cement grout applied under pressure by means of a grouting gun; grout shall be (1) part Portland cement to two and one-half (2-1/2) parts sand; apply grout immediately after removing forms

END OF SECTION

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SECTION 03 12 00 - NON-REINFORCED CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Installation of non-reinforced concrete, in accordance with these Specifications, and in close conformity with the lines, grades and dimensions as shown on the Drawings or established by the Engineer.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. 01 43 26 Laboratory and Field Testing Services

B. 03 09 00 Concrete Work

C. 03 10 00 Formwork

D. 31 24 13 Excavation, Embankments and Other Fills

PART 2 - PRODUCTS

2.01 HORIZONTAL AND LONGITUDINAL TIE BARS

A. The Contractor shall furnish all reinforcing steel bars fabricated to shapes and dimensions shown on drawings. Contractor shall unload and place reinforcing steel where indicated on drawings or where required to carry out the intent of the drawings or specifications. Before being placed, reinforcing steel shall be thoroughly cleaned of loose or flaky rust, mill scale or coating, including ice, or any other substance that would reduce or destroy the bond.

B. Reinforcing steel reduced in section shall not be used. It shall not be bent or straightened in a manner injurious to the steel. Bars with kinks or bends not shown on plans shall not be placed. The use of heat to bend or straighten reinforcing steel will be permitted only if the entire operation is approved by the Engineer.

C. Splicing of reinforcing steel, if required, will be made of lap splices of a minimum length of 24 bar diameters, not less than 12 IN.

D. All reinforcing steel shall meet the requirements of ASTM A615 for Grade 60 deformed billet steel bars for concrete reinforcement.

2.02 CONCRETE

A. Contractor shall furnish and place concrete in accordance with these Specifications and in close conformity with the lines, grades and dimensions as shown on the Drawings or established by Engineer.

B. Concrete material, mixing, transportation, placing and curing shall conform to AREMA Specifications for Concrete and Reinforced Concrete Railroad Bridges and Other Structures.

1. Compressive Strength: 4,000 LBS/SQ IN @ 28 days.

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2. Water Content: 6-1/2 GAL Maximum per Sack of Cement.
3. Concrete Aggregates: To comply with current ASTM C33 Specifications.
4. Coarse aggregate shall be graded #4 to 1 IN size.

C. Mix:

1. Approximate proportions Cement: Sand: Gravel: by volume measure to be 1:2.5:3.2. Minimum cement content to be 6.5 sacks per CU YD.

D. Slump:

1. 2 IN to 3 IN for heavy mass construction and pavements.
2. 2 IN to 5 IN for reinforced foundation walls and footings.
3. 3 IN to 5 IN for reinforced structural members - slabs, columns, beams and walls.

E. Curing: Membrane curing shall be used following recommendations and procedures of AREMA Specifications Chapter 8, Part 1, Sec. P, Art. 4.

PART 3 - EXECUTION

3.01 GENERAL

A. Concrete shall be placed within 1-1/2 HRS after the cement has been added to the mix. A delivery ticket shall be furnished to the Engineer with the following information: name of concrete firm, serial number of ticket, date, truck number, specific class of concrete, amount of concrete, time loaded, water added and time unloaded.

B. Prior to placing concrete, remove water, all debris and foreign material from forms. Check the reinforcing steel for proper placement and correct any discrepancies. Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, without splashing forms or steel above, and in layers not over 2 FT deep.

C. The vertical drop to final placement shall not exceed 4 FT. Placement shall conform to the requirements of the before mentioned.

D. After the initial water has been absorbed, float with wood float and trowel with steel trowel to a smooth finish free from trowel marks. Concrete abutments shall not vary from level or true plane more than 1/8 IN in 10 FT when measured with a straightedge.

E. Construction joints shall be placed as indicated on the plans or as directed by the Engineer and shall be formed so as not to impair the strength and appearance of the structure.

F. In joining fresh concrete to concrete that has already set, the work already in place shall have its surface sand or water blasted until well bonded aggregate is exposed. This surface shall be washed and scrubbed with wire brooms and thoroughly drenched with water until saturated. It shall remain saturated until the new concrete is placed. Immediately prior to the placing of the new concrete, all forms shall be drawn tight against the concrete already in place and the old surface shall be thoroughly coated with a water cement paste, scrubbed into the existing concrete surface.

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G. Remove form after concrete has set sufficiently to carry the dead load and construction loads and when approved by the Engineer. Remove forms with care to prevent scarring and damaging the surface. As soon as forms are removed, remove fins or projections from surface of exposed areas and rub surface with wood float or burlap sack to provide a uniform surface texture.

H. Cure formed surfaces with an approved curing compound applied in conformance with the manufacturer's directions as soon as the forms are removed and finishing completed.

I. The quantity of concrete for which payment will be made shall be computed from the dimensions shown in the plans, or ordered by the Engineer. No deductions shall be made for the volume of concrete displaced by steel reinforcement, floor drains or expansion joint material.

3.02 FIELD QUALITY CONTROL

A. Concrete samples shall be obtained in accordance with the requirements of ASTM C172. Air content, slump, and unit weight shall be checked at least twice during each shift that concrete is placed. Air content shall be determined in accordance with ASTM C231. Slump shall be measured in accordance with ASTM C143. Unit weight shall be checked in accordance with ASTM C138.

B. Samples for strength testing of each concrete mix shall be taken not less than once each day nor less than once for each 150 CU YDS of concrete. A minimum of three cylinders shall be made from each sample, two shall be tested at 28 days and one shall be tested at 7 days. Compression test specimens shall be made and cured in accordance with ASTM C31 and tested in accordance with ASTM C39.

C. Any concrete represented by a test which indicates a strength which is less than the specified 28-day strength will be subject to rejection and shall be removed and replaced with acceptable concrete as directed by the Engineer at no additional cost to the Railroad.

PART 4 - MEASUREMENT AND PAYMENT

4.01 PAYMENT

A. Payment for "Non-reinforced Concrete" will be made at the contract unit price and shall be full compensation for all costs involved in furnishing, forming and placing all concrete, reinforcing steel, welded wire fabric, required grouts, dowels, expansion joint material, epoxy, and mortars, all as specified herein and shown on the drawings. It includes all tools, labor, supplies, materials, equipment, testing and work incidental thereto.

END OF SECTION

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SECTION 03 13 00 - REINFORCED CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Installation of reinforced concrete, in accordance with these Specifications, and in close conformity with the lines, grades and dimensions as shown on the Drawings or established by the Engineer.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. 01 43 26 Laboratory and Field Testing Services

B. 03 09 00 Structural Concrete For Buildings

C. 03 10 00 Formwork

PART 2 - PRODUCTS

2.01 REINFORCING STEEL

A. The Contractor shall furnish all reinforcing steel bars fabricated to shapes and dimensions shown on drawings. Contractor shall unload and place reinforcing steel where indicated on drawings or where required to carry out the intent of the Drawings or Specifications. Before being placed, reinforcing steel shall be thoroughly cleaned of loose or flaky rust, mill scale or coating, including ice, or any other substance that would reduce or destroy the bond.

B. Reinforcing steel reduced in section shall not be used. It shall not be bent or straightened in a manner injurious to the steel. Bars with kinks or bends not shown on plans shall not be placed. The use of heat to bend or straighten reinforcing steel will be permitted only if the entire operation is approved by the Engineer.

C. Splicing of reinforcing steel, if required, will be made of lap splices of a minimum length of 24 bar diameters, not less than 12 IN.

D. All reinforcing steel shall meet the requirements of ASTM A615 for Grade 60 deformed billet steel bars for concrete reinforcement.

2.02 CONCRETE

A. Contractor shall furnish and place concrete in accordance with these Specifications and in close conformity with the lines, grades and dimensions as shown on the Drawings or established by Engineer.

B. Concrete material, mixing, transportation, placing and curing shall conform to AREMA Specifications for Concrete and Reinforced Concrete Railroad Bridges and Other Structures.

1. Compressive Strength: 4,000 LBS/SQ IN @ 28 days.

2. Water Content: 6-1/2 GAL Maximum per Sack of Cement.

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3. Concrete Aggregates: To comply with current ASTM C33 Specifications.

4. Coarse aggregate shall be graded #4 to 1 IN size.

C. Mix - Approximate proportions Cement: Sand: Gravel: by volume measure to be 1:2.5:3.2. Minimum cement content to be 6.5 sacks per CU YD.

D. Slump:

1. 2 IN to 3 IN for heavy mass construction and pavements.

2. 2 IN to 5 IN for reinforced foundation walls and footings.

3. 3 IN to 5 IN for reinforced structural members - slabs, columns, beams and walls.

E. Curing: Membrane curing shall be used following recommendations and procedures of AREMA Specifications Chapter 8, Part 1, Sec. P, Art. 4.

PART 3 - EXECUTION

3.01 GENERAL

A. Concrete shall be placed within 1-1/2 HRS after the cement has been added to the mix. A delivery ticket shall be furnished to the Engineer with the following information: name of concrete firm, serial number of ticket, date, truck number, specific class of concrete, amount of concrete, time loaded, water added and time unloaded.

B. Prior to placing concrete, remove water, all debris and foreign material from forms. Check the reinforcing steel for proper placement and correct any discrepancies. Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, without splashing forms or steel above, and in layers not over 2 FT deep.

C. The vertical drop to final placement shall not exceed 4 FT. Placement shall conform to the requirements of the before mentioned.

D. After the initial water has been absorbed, float with wood float and trowel with steel trowel to a smooth finish free from trowel marks. Concrete abutments shall not vary from level or true plane more than 1/8 IN in 10 FT when measured with a straightedge.

E. Construction joints shall be placed as indicated on the plans or as directed by the Engineer and shall be formed so as not to impair the strength and appearance of the structure.

F. In joining fresh concrete to concrete that has already set, the work already in place shall have its surface sand or water blasted until well bonded aggregate is exposed. This surface shall be washed and scrubbed with wire brooms and thoroughly drenched with water until saturated. It shall remain saturated until the new concrete is placed. Immediately prior to the placing of the new concrete, all forms shall be drawn tight against the concrete already in place and the old surface shall be thoroughly coated with a water cement paste, scrubbed into the existing concrete surface.

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G. Remove form after concrete has set sufficiently to carry the dead load and construction loads and when approved by the Engineer. Remove forms with care to prevent scarring and damaging the surface. As soon as forms are removed, remove fins or projections from surface of exposed areas and rub surface with wood float or burlap sack to provide a uniform surface texture.

H. Cure formed surfaces with an approved curing compound applied in conformance with the manufacturer's directions as soon as the forms are removed and finishing completed.

I. The quantity of concrete for which payment will be made shall be computed from the dimensions shown in the plans, or ordered by the Engineer. No deductions shall be made for the volume of concrete displaced by steel reinforcement, floor drains or expansion joint material.

3.02 FIELD QUALITY CONTROL

A. Concrete samples shall be obtained in accordance with the requirements of ASTM C172. Air content, slump, and unit weight shall be checked at least twice during each shift that concrete is placed. Air content shall be determined in accordance with ASTM C231. Slump shall be measured in accordance with ASTM C143. Unit weight shall be checked in accordance with ASTM C138.

B. Samples for strength testing of each concrete mix shall be taken not less than once each day, nor less than once for each 150 CU YD of concrete. A minimum of three cylinders shall be made from each sample, two shall be tested at 28 days and one shall be tested at 7 days. Compression test specimens shall be made and cured in accordance with ASTM C31 and tested in accordance with ASTM C39.

C. For bridges, five cylinders will be cast at the beginning of concrete placement for each shaft and each cap. Compressive strength testing on the cylinders will be as follows:

1. 1 cylinder for a 3-day break.
2. 1 cylinder for a 7-day break.
3. 2 cylinders for a 28-day break.
4. 1 extra cylinder.

D. Any concrete represented by a test which indicates a strength which is less than the specified 28-day strength will be subject to rejection and shall be removed and replaced with acceptable concrete as directed by the Engineer at no additional cost to the Railroad.

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PART 4 - MEASUREMENT AND PAYMENT

4.01 PAYMENT

A. Payment for "Reinforced Concrete" will be made at the contract unit price and shall be full compensation for all costs involved in furnishing, forming and placing all concrete, reinforcing steel, welded wire fabric, required grouts, dowels, expansion joint material, epoxy, and mortars, all as specified herein and shown on the drawings. It includes all tools, labor, supplies, materials, equipment, testing and work incidental thereto.

END OF SECTION

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SECTION 03 15 13 - CHEMICALLY RESISTANT WATERSTOPS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Embedded waterstop in concrete including control, expansion and construction joints creating a continuous diaphragm to prevent passage of fluid.
2. Use of non-metallic waterstops for use in concrete joints subjected to chlorinated water, seawater, oils, solvents, acids, salts, fuels and many other aggressive chemicals and fluids.

1.02 REFERENCED STANDARDS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

B. Codes & Standards: To comply with most recent provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified.

C. American Society for Testing and Materials (ASTM):

1. D395, Test Methods for Rubber Property – Compression Set.
2. D412, Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers – Tension.
3. D471, Test Method for Rubber Properties – Effects of Chemicals.
4. D624, Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
5. D746, Test Method for Brittleness Temperature of Plastics by Impact.
6. D792, Test Method for Specific Gravity (Gravity Density) and Density of Plastics by Displacement.
7. D1171, Test Method for Ozone Resistance at 500 pphm.
8. D2240, Test Method for Shore Hardness.

D. Federal Specifications:

1. COE CEGS-03250 July 1995 Guide Specification for Military Construction.
2. EPA Title 40 CFR Section 265.193

E. American Concrete Institute (ACI):

1. 350.2R-04, Concrete Structures for Containment of Hazardous Wastes

F. NSF International (NSF):

1. 61, Certification for Drinking Water System Components – Health Effects.

G. Canadian Council of Ministers of the Environment:

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1. Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products

H. BuildingGreen, Inc.:

1. GreenSpec® - Green Spec® Directory 6th Edition.

1.03 SUBMITTALS

A. Chemical Resistant Waterstops:

1. TPV Waterstop submittal shall contain the following:

a. Samples of each size and shape used.

b. Plate drawings of waterstop profile indicating all dimensions.

c. Shop drawings of each shop made fittings to be provided by the manufacturer or prepared by the contractor.

d. Copy of test results of ASTM D471 Chemical Resistance showing compliance with Appendix A.

e. Copy of independent certification to NSF/ANSI Standard 61 Certification for Drinking Water System Components – Health Effects.

f. Copy of independent testing to ASTM D1171 Ozone Resistance to 500 pphm concentration.

g. Manufacturer's Literature, including MSDS sheets, installation instructions and splicing instructions.

h. Certificate of compliance to physical properties outlined in this specification.

2. Non-Metallic Waterstop and Splices – Specimens identified to indicate manufacturer, type of material, size, quantity of material and shipment or lot presented. Each sample shall be a piece not less than 6 IN long of each type, size, and lot furnished. One splice sample of each size and type for every fifty (50) splices made in the shop and every ten (10) splices made at the job site. The splice samples shall be made using straight run pieces with the splice located at the mid-length of the sample and finished as required for the installed waterstop. The total length of each splice shall be not less than 1 FT long.

1.04 QUALITY ASSURANCE

A. Edge welding will not be permitted. Center bulbs shall be compressed or closed when welding to non-center-bulb type.

B. Waterstop splicing defects which are unacceptable include, but are not limited to the following:

1. Tensile strength not less than 60 percent of parent sections.

2. Free lap joints.

3. Misalignment of center bulbs, ribs and end bulbs greater than 1/16 IN.

4. Misalignment which reduces waterstop cross section more than 15 percent.

5. Bond failure at joint deeper than 1/16 IN or 15 percent of material thickness.

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6. Misalignment of waterstop splice resulting in misalignment of waterstop in excess of 1/2 IN in 10 FT.
7. Visible porosity in the weld.
8. Charred or burnt material.
9. Bubbles or inadequate bonding.
10. Visible signs of splice separation when cooled splice (24 HRS or greater) is bent by hand at a sharp angle.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Material delivered and placed in storage shall be stored off the ground and protected from moisture, dirt and other contaminates.

PART 2 - PRODUCTS

2.01 WATERSTOPS

A. Intersections and changes of direction of waterstops shall be shop fabricated.

B. Manufacturers:

1. JP Specialties Inc.
551 Birch Street, Lake Elsinore, CA 92530
P. 888-836-5778
F. 951-674-1315
Web: www.earthshield.com

2. Greenstreak Group, Inc.
3400 Tree Court Industrial Blvd, St. Louis, MO 63122
P. 800-325-9504
F. 800-551-5145
Web: www.greenstreak.com

C. Non-Metallic Waterstops – Nonmetallic waterstops shall be manufactured from a fully cross-linked thermoplastic vulcanizate, containing no scrap or reclaimed material.

1. Thermoplastic Vulcanizate (TPV) Waterstop shall conform to EPA title 40 CFR Section 265.193. The suitability of the waterstop for a specific application should be determined by specific testing for that particular requirement by ASTM D471.

2. Thermoplastic Vulcanizate (TPV) Waterstop shall be certified for use in potable water per NSF / ANSI Standard 61. Third-party certified documentation to be provided by the Manufacturer.

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D. Thermoplastic Vulcanizate (TPV) Waterstop shall conform to the following typical physical properties:

PROPERTY	TEST METHOD	REQUIRED RESULTS
Specific Gravity	ASTM D792	.96
Shore A Hardness (5 sec.)	ASTM D2240	90±3 at 25 Deg. C (77 Deg. F)
Tensile Strength	ASTM D412	2300 psi
Ultimate Elongation	ASTM D412	530 percent
100% Modulus	ASTM D746	1000 psi
Tear Strength	ASTM D624	278 pli @ 35 Deg. C
Compression Set	ASTM D395	29 percent at 25 Deg. C (77 Deg. F)
Brittle Point	ASTM D746	-73 Deg. C (-174 Deg. F)
Drinking Water Safe	NSF / ANSI 61	Certified for use in potable water (see Appendix B)
Ozone Resistance	ASTM D1171	Passed, no cracking at 500 pphm
Chemical Resistance	ASTM D471	Meet or exceed specific testing standards for contained fluids as required by the Owner and *certified* by the Manufacturer.
Green Certification	GreenSpec	Approved

PART 3 - EXECUTION

3.01 WATERSTOP INSTALLATIONS AND SPLICES

A. Waterstops shall be installed at the locations shown to form a continuous fluid-tight diaphragm. Adequate provision shall be made to support and completely protect the waterstops during the progress of the work. Any waterstop punctured or damaged shall be repaired or replaced. Exposed waterstops shall be protected during application of form release agents to avoid being coated. Suitable guards shall be provided to protect exposed projecting edges and end of partially embedded waterstops from damage when concrete placement has been discontinued.

1. Non-Metallic Shop Made Fittings – Fittings shall be shop made using a machine specifically designed to mechanically weld the waterstop. A miter gauge, proper fixturing (profile dependent) and portable power saw shall be used to miter cut the ends to be joined to ensure good alignment and contact between jointed surfaces. The splicing of straight lengths shall be done by squaring the ends to be jointed and using a manufacturer approved waterstop splicing tool. Continuity of the characteristic features of the cross section of the waterstop (ribs, tabular center axis, protrusions, etc.) shall be maintained across the splice.

2. Thermoplastic Vulcanizate Waterstop – The splicing of straight lengths shall be done by squaring the ends to be joined and using the manufacturers recommended waterstop splicing tool utilizing a thermoplastic splicing iron with a non-stick surface specifically designed for waterstop welding. The correct temperature (410 to 430 Deg. F) shall be used to sufficiently melt without charring the plastic. The spliced area, when cooled, shall show no signs of separation, holes or other imperfections when bent by hand in as sharp an angle as possible.

3.02 PREPARATION

A. Uncoil waterstop 24 HRS prior to installation for ease of handling and fabrication.

B. Position waterstop to ensure proper distance from steel reinforcing bars to prevent rock pockets and honeycomb (See installation Section 3.04).

C. Protect Waterstop from damage during progress of work.

D. Clean Concrete joint after each pour to remove debris and dirt.

3.03 EXAMINATION / INSPECTION

A. Prior to placement of concrete notify the Engineer for field inspection approval.

B. Inspect waterstop and field splices for defects and conformance to Quality Assurance Standard Section 3.05.

C. Upon inspection of waterstop installation, replace any damaged or unacceptable waterstop and dispose of defective material.

3.04 INSTALLATION

A. Position waterstop in joint as indicated on Drawings.

B. Center waterstop on joint, with approximately one-half of waterstop width to be embedded in concrete on each side of the joint.

C. Allow clearance between waterstop and reinforcing steel of a minimum of two times the largest aggregate size. Prevent rock pockets and air voids caused by aggregate bridging.

D. Ensure center bulb is not embedded at expansion joints.

E. Secure waterstop in correct position using optional factory-installed brass eyelets (or JPS hog rings crimped between the two ribs on 1 FT maximum centers), and wire tie to adjacent reinforcing steel. Center to center spacing may be increased upon request and approval from the Engineer.

F. Carefully place concrete without displacing waterstop from its proper position.

G. Thoroughly and systematically vibrate concrete in the vicinity of the joint, and to maximized intimate contact between concrete and waterstop.

H. After first pour, clean the un-embedded waterstop leg to ensure full contact of second concrete pour. Remove laitance, spillage, form oil and dirt.

I. Wet setting of waterstop is not an acceptable installation method.

END OF SECTION

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SECTION 03 20 00 - CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes but is not necessarily limited to:

1. Reinforcing bars, wire & wire fabric.

1.02 1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Division 03 - Concrete Formwork.

D. Division 03 - Cast-in-Place Concrete.

1.03 QUALITY ASSURANCE

A. Qualifications of Workmen:

1. Provide at least one person who shall be present at all times during execution of this portion of the Work and who shall be thoroughly familiar with the type of materials being installed and the best methods for their installation and who shall direct all Work performed under this Section.

1.04 REFERENCED STANDARDS

A. Comply with applicable provisions of the latest edition of the Building Code that has jurisdiction.

B. Where provisions of pertinent codes and standards conflict with this Specification, the more stringent provisions shall govern.

C. ACI – American Concrete Institute

1.05 SUBMITTALS

A. Shop Drawings:

1. Before any concrete reinforcement materials are fabricated and/or delivered to the job site, submit Shop Drawings to the Architect.

2. Do not fabricate and/or deliver concrete reinforcement to the job site until receipt of Shop Drawings approval from the Architect.

3. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

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1.06 TESTING LABORATORY SERVICES

A. In accordance with Section 01 43 26.

1.07 PRODUCT HANDLING

A. Protection:

1. Use all means necessary to protect concrete reinforcement before, during, and after installation and to protect the installed work and materials of all other trades.

2. Store in a manner to prevent excessive rusting and fouling and dirt, grease, and other bond-breaking coatings.

B. Replacements:

1. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 CONCRETE REINFORCEMENT

A. All concrete reinforcement materials shall be new, free from rust, and complying with the following reference standards:

1. Bars for reinforcement: "Specifications for Deformed Billet-Steel Bars for Concrete Reinforcement", ASTM, A615 latest editions, Grade 60.

2. Wire for reinforcement: "Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement", ASTM A82.

3. Wire fabric "Specifications for Wire Fabric for Concrete Reinforcement", ASTM A185 latest editions.

2.02 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper installations of concrete reinforcement, shall be as selected by contractor subject to approval of the Architect.

B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacturer bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete. Concrete blocks or bricks shall not be used.

C. Joint Dowel Bars: Plain-steel bars, ASTM A615/A615M, Grade 60. Cut Bars true to length with ends squared and free of burns.

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PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection:

1. Prior to installation of the Work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
2. Verify that concrete reinforcement may be installed in strict accordance with all pertinent codes and regulations, the approved Shop Drawings, and the original design.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Architect.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 BENDING

A. General:

1. Fabricate all reinforcement in strict accordance with the approved Shop Drawings.
2. Do not use bars with kinks or bends not shown on the Drawings or on the approved Shop Drawings.
3. Do not bend or straighten steel in a manner that will injure the material.

3.03 PLACING

A. General:

1. Comply with CRSI's "Manual of Standard Practice" for placing reinforcing.
2. Before the start of concrete placement, accurately place all concrete reinforcement, positively securing and supporting by means of chairs, spacers, and metal hangers. Do not tack weld crossing reinforcing bars.

B. Clearance:

1. Preserve clear space between bars of not less than 1-1/2 times the nominal diameter of round bars.
2. Provide minimum concrete covering of reinforcement as shown or noted on the Drawings.
3. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
4. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.04 CLEANING REINFORCEMENT

A. Steel reinforcement, at the time concrete is placed around it, shall be free from rust scale, loose mill scale, oil paint, and all other coatings which will destroy or reduce bond between steel and concrete.

END OF SECTION

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SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes but is not necessarily limited to:

1. Footings.
2. Foundation Walls.
3. Slabs on Grade.
4. Fill for Steel Deck.
5. Equipment Pads and Bases.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Section 01 33 23 - Shop Drawings.

B. Section 01 43 26 - Testing Laboratory Services.

C. Section 32 01 13 - Asphalt Concrete Paving.

D. Section 03 10 00 - Concrete Formwork.

E. Section 03 20 00 - Concrete Reinforcement.

F. Section 03 35 00 - Cement Finishes and Surface Treatments.

1.03 QUALITY ASSURANCE

A. Perform cast-in-place concrete work in accordance with ACI 318, unless specified otherwise in this Section.

B. Where provisions of pertinent codes and standards conflict with this Specification, the more stringent provisions shall govern.

1.04 REFERENCED STANDARDS

A. American Concrete Institute (ACI):

1. 301, Specifications for Structural Concrete for Buildings.
2. 304, Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
3. 305, Recommended Practice for Hot Weather Concreting.
4. 306, Recommended Practice for Cold Weather Concreting.
5. 318, Building Code Requirements for Reinforced Concrete.

B. ASTM International (ASTM):

1. C31, Standard Practice for Making and Curing Concrete Test Specimens in the Field
2. C33, Concrete Aggregates.

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3. C39, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
4. C94, Ready-mixed Concrete.
5. C150, Portland Cement.
6. C172, Standard Practice for Sampling Freshly Mixed Concrete
7. C260, Air Entraining Admixtures for Concrete.

1.05 SUBMITTALS

A. Materials List:

1. Before any concrete is delivered to the job site, submit to the Architect a complete list of all materials proposed to be furnished and installed under this portion of the Work, showing manufacturer's name and catalog number of all items and the name and address of transit mix concrete supplier and proposed mix design and test data.
2. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

B. Laboratory Test Reports:

1. Submit laboratory test reports for concrete materials and mix design for each class of concrete specified.

1.06 TESTING LABORATORY SERVICES

A. Concrete Testing Service: Concrete Testing specified hereinafter shall be done by an independent testing laboratory approved by the Owner.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

A. Portland Cement: Conforming to requirements of ASTM C150, Type I, and shall be the product of one (1) manufacturer.

B. Normal Weight Aggregates: Well graded to minimize the quantity of cement past required yet provide for the specified slump and workability. Provide aggregates from a single source with documented service record data of at least 10 years satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Normal weight aggregates shall conform to ASTM C33.
2. Use 3/4 IN aggregate maximum in all concrete.
3. All aggregates shall be from State DOT approved sources.

C. Water: Potable, clean and free from deleterious matter and complying with ASTM C94.

D. Fly-Ash: Not permitted unless approved in writing by the Engineer and Union Pacific.

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2.02 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material and to be compatible with other admixtures and cementitious materials. Do not use admixtures containing calcium chloride.

B. Air Entraining Admixture: ASTM C260.

1. "Air-mix", Euclid Chemical Company.
2. "Sika-Aer", Sika Corp.
3. "MB-VR OR MB-AE", Master Builders.
4. "Darex AEA" or "Darrair"; W.R. Grace.

C. Water Reducing Admixtures: ASTM C 494, Type A., and containing no more than 0.1 percent chloride ions.

1. WRDA Hycol", W.R. Grace.
2. "Eucon WR-75", Euclid Chemical Co.
3. "Pozzolith Normal", Master Builders.
4. "Plastocrete 160", Sika Chemical Co.

D. High-Range, Water-Reducing Admixture: ASTM C494, Type F.

E. Water-Reducing and Accelerating Admixture: ASTM C494, Type E.

1. "Accelguard 80", Euclid Chemical Company.
2. "Pozzolith High Early", Master Builder.

F. Water Reducing and Retarding Admixture:

1. "Pozzolith Retarder", Master Builders.
2. "Eucon Retarder 75", Euclid Chemical Co.
3. "Daratard", W.R. Grace.
4. "Plastiment", Sika Chemical Co.

2.03 ABSORPTIVE COVER

A. Burlap cloth made from jute or kenaf, weighting approximately 9 OZ/SQ YD complying with AASHTO M182, Class 2.

2.04 MOISTURE RETAINING COVER

A. Vapor Retarder: ASTM E1745, Class A, not less than 10 mils thick.

2.05 LIQUID MEMBRANE FORMING CURING COMPOUND

A. Liquid type membrane-forming curing compound complying with ASTM C309, Type I-D, Class A unless other types acceptable to the Railroad. Moisture loss not more than 0.55 kg/SQ M when applied at 300 SQ FT/GAL.

1. Clear, Waterborne, Membrane-Forming Curing Compound:

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a. Rez-Seal by Euclid Chemical Company.

b. Safe-Cure & Seal 20; ChemMasters.

c. Safe Cure and Seal; Dayton Superior Corporation.

d. L&M Cure R, L&M Construction Chemicals.

e. Vocomp-20; W. R. Meadows, Inc.

f. Masterkure, Master Builders, Inc.

g. Kure-N-Seal WB; Sonneborn, Div. of ChemRex, Inc.

h. Cure & Seal 14 percent E; Symons Corporation.

2. The Contractor shall verify that the selected curing compound in each area is compatible with the selected floor finish for that area.

2.06 RELATED MATERIALS

A. Non-shrink, Non-metallic Grout: ASTM C1107 Grade B.

1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic cement grout, non- staining, non-corrosive, non-gaseous, and recommended for interior and exterior applications.

2. Design Mix: 5000 psi compressive strength at twenty-eight (28) days.

B. Waterstops:

1. Flexible Rubber Waterstops: CE CRD-C 513, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

a. Profile: Flat, dumbbell with center bulb.

2. Flexible PVC Waterstops: CE CRD-C 572, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

a. Profile: Flat, dumbbell with center bulb.

C. Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber, or ASTM D1752, cork or self- expanding cork.

D. Bonding Agent: ASTM C1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

E. Other Materials: All other materials, not specifically described but required for a complete and proper installation of cast-in-place concrete shall be as selected by the Contractor subject to approval of the Architect / Engineer.

2.07 PROPORTIONING AND DESIGN OF MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method is used, use an independent testing facility acceptable to the Architect-Engineer for preparing and reporting proposed mix designs.

B. Submit written reports to the Railroad of each proposed mix for each class of concrete at least 15 days prior to the start of work. Do not begin concrete production until mixes have been reviewed by the Engineer.

C. Design mixes to provide normal weight concrete as indicated in the structural general notes on the drawings.

D. Compressive Strengths:

1. All concrete shall attain a minimum twenty-eight (28) day compressive strength of 4,000 psi.

2. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows:

a. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.

b. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.

E. Water - Cement Ratio:

1. Maximum Water-Cementitious Materials Ratio:

a. Foundations & all concrete exposed to de-icers or subject to freezing and thawing - 0.40.

b. Enclosed Building Slabs - 0.45.

F. Slump:

1. Maximum slump for 4,000 psi concrete shall be 3 IN, ±1 IN.

G. Air Content:

1. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of +1 or -1.5 percent, unless otherwise indicated. Air entraining admixture is not required for the enclosed building slabs and shall not be used in concrete to receive a trowel finish.

a. Air Content: 6 percent for 3/4 IN nominal maximum aggregate size

PART 3 - EXECUTION

3.01 GENERAL

A. Comply with ACI 304 "Recommended Practice For Measuring, Mixing, Transporting and Placing Concrete" and as herein specified.

3.02 SURFACE CONDITIONS

A. Inspection:

1. Prior to all Work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

2. Verify that all items to be embedded in concrete are in place.

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3. Verify that concrete may be placed to the lines and elevations indicated on the Drawings, with all required clearance from reinforcement.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Architect.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.03 PLACING CONCRETE

A. Handling and Placing:

1. Transporting and placement of concrete shall be as per Reference Standards.
2. Concrete temperatures controlled during hot or cold weather shall be as per Reference Standards.
3. Immediately after depositing, compact concrete thoroughly by mechanical vibration. No vibrating of formwork is allowed.
4. There shall be a minimum of two (2) mechanical vibrators at all times during pours.
5. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.
6. Deposit concrete in forms in horizontal layers no deeper than 24 IN (600 mm) and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
    a. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
    b. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 IN 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 mix constituents to segregate.
7. 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.
    a. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
    b. Maintain reinforcement in position on chairs during concrete placement.
    c. Screed slab surfaces with a straightedge and strike off to correct elevations.
    d. Slope surfaces uniformly to drains where required.

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e. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

8. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

   a. When air temperature has fallen to or is expected to fall below 40 DegF (4.4 DegC), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 DegF (10 DegC) and not more than 80 DegF (27 DegC) at point of placement.

   b. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

   c. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

9. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:

   a. Cool ingredients before mixing to maintain concrete temperature below 90 DegF (32 DegC) 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.

   b. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

   c. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

10. Slabs-on-Grade:

   a. All Slabs-on-grade laid over a carefully prepared sub-grade. See also foundation plan for vapor barrier and associated preparation.

   b. Standard for "Level Slab," maximum variation 1/8 IN under 10 FT straight edge. Pitch all exterior flat work for positive drainage or as indicated on the Drawings.

3.04 PLACING REINFORCING STEEL

A. Refer to Section 03 20 00 for placement of Reinforcing Steel.

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3.05 EMBEDDED ITEMS

A. Pipes and conduit in concrete, located, sized and if required, sleeved in accordance with requirements of the Reference Standards. No sleeve greater than 4 IN shall pass through grade beams and it shall be located at mid-height of grade beam running horizontally. Bolts and anchorage devices embedded in concrete to fasten sills, tie-down columns and other structural and framing members to concrete shall be installed and secured in place before concrete is placed.

3.06 CONSTRUCTION JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Location: Make and locate construction joints so as to not impair the strength of the structure (See Structural Drawings).

C. Approval: Obtain the Architect's approval of location of all construction joints and control joints in the Work prior to start of concrete placement.

D. 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- fourth of concrete thickness, as follows:

1. Sawcutting shall start immediately as the concrete will allow without raveling along the sawcut to minimize drying shrinkage cracks.

3.07 CURING

A. Beginning immediately after placement, protect concrete from premature drying, excessive hot or cold temperatures, and mechanical injury. Maintain concrete with minimal water loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.08 DRY PACK

A. Ram in dry pack under column base plates in thin layers using a short length of ram, the free end of which shall be struck with a heavy hammer, or mallet, several blows for each layer, to compact the mixture. When completed, the exposed dry pack shall show slight indication of moisture. The ram for dry packing around bolts shall be a short length of pipe which will pass within the hole and over the bolt. Do not tension bolts sooner than seven (7) days after dry packing. Cure dry pack with a curing agent or with burlap kept wet for not less than seven (7) days.

3.09 WATERSTOPS

A. Flexible Waterstops: Install in construction joints as indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's written instructions.

3.10 VAPOR RETARDER

A. Place, protect, and repair vapor-retarder sheets according to ASTM E1643 and manufacturer's written instructions.

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3.11 MONOLITHING SLAB FINISH

A. Refer to Section for 03 35 00 for Concrete Finishes.

3.12 INSPECTIONS

A. Notify the Architect and the Testing Agency and Owner Representative at least 48 HRS in advance of the initial placement of concrete and sufficiently in advance of subsequent placement to permit inspection.

3.13 TESTING

A. The representative of the testing laboratory will take at least (1) set for each days pour plus additional sets of four (4) cylinders from each pour and/or 200 CY or fraction thereof. Field specimens of concrete taken and tested in accordance with the Reference Standards. Label each cylinder with job name, date, number, result of slump test, and the point in the pour in the structure from which the sample was taken noted thereon.

1. The Contractor will deliver or pay for shipping all cylinders to the laboratory. See Section 01 43 26 of these Specifications.
2. Test concrete, one at seven (7) days and two at twenty-eight (28) days. Carry out a third test at fifty-six (56) days in the event the first two tests fail.
3. Strength level of concrete will be considered satisfactory if averages of sets of three (3) consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive by more than 500 psi.
4. Test results will be reported in writing to the Architect/Engineer and Contractor within 24 HRS after tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of compressive strength at twenty-eight (28) days, concrete mix proportions and materials; compressive breaking strength and type of break for both seven (7) day tests and twenty- eight (28) day tests.
5. Concrete slump shall be within the maximum allowable as noted below.
    a. If the concrete slump test shows greater slump than the maximum allowable, the concrete batch shall be rejected by the testing engineer.
    b. Adding water into the transit-mixed concrete at the site will not be permitted without the testing engineer's inspection and approval.
    c. The testing engineer shall notify the Architect immediately of any and all irregularities.

B. Additional Tests:

1. The testing service will make additional test of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Architect/Engineer. The testing service may conduct test to determine adequacy of concrete by cored cylinders complying with ASTM C42, or other methods as directed. The Contractor shall pay for such tests conducted and any other additional testing may be required, when unacceptable concrete is verified.

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3.14 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 IN in height.

3.15 EQUIPMENT BASES AND FOUNDATIONS:

A. 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 of manufacturer furnishing machines and equipment.

END OF SECTION

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SECTION 03 35 00 - CONCRETE FINISHES AND SURFACE TREATMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes but is not necessarily limited to:

1. Interior slabs
2. Exterior slabs.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Section 03 30 00 - Cast-in-Place Concrete.

D. Section 09 78 50 – Epoxy Floor Coating

1.03 QUALITY ASSURANCE

A. For finishing of exposed surfaces of the concrete, use only thoroughly trained and experienced journeyman concrete finishers.

1.04 TESTING LABORATORY SERVICES

A. In accordance with Section 01 43 26.

1.05 PRODUCT HANDLING

A. Use all means necessary to protect concrete finishes and the installed work and materials of all other trades.

PART 2 - PRODUCTS

2.01 FLOOR AND SLAB TREATMENT

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

1. See 3.01 for locations to receive troweled or “broom” finishes.
2. Slabs within buildings shall receive Floor Hardener or Epoxy Coating as indicated on the Drawings.
3. Floor Hardener:
    a. Ashford Formula as manufactured by Curecrete Chemical Company, Inc., or approved equal.
    b. Floor areas shall be chemically hardened at the application rate of 100 to 150 SQ FT/GAL as recommended for heavy duty floors.

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1) Second application at a rate of 400 to 500 SQ FT/GAL.

c. Floor hardener shall be applied in successive coats with a minimum of 24 HRS between coats with curing method shall be by means of damp curing only.

4. Epoxy Floor Coating: Where indicated on the Drawings concrete areas are to be sealed with a 2-part epoxy sealant.

a. Section 09 78 50 – Epoxy Floor Coating

PART 3 - EXECUTION

3.01 GENERAL

A. All concrete slabs not otherwise indicated shall have a steel troweled monolithic finish.

B. Slab at rooms to receive ceramic tile shall have a "light broom" finish.

C. Trash Enclosure slab shall have a "medium broom" finish.

D. Exterior flatwork surfaces such as sidewalks and shall receive a "medium broom" finish.

3.02 MONOLITHIC FINISH

A. Just after the concrete has been rodded off, the monolithic concrete shall be tamped to bring fines to the surface. After tamping, the surface shall be screeded level, using a roller screed wherever possible. After screeding, the concrete shall be of proper design and shall not be used until the slab will bear the weight of a man without indentation. Precautions shall be taken to avoid overfloating or other practices that will bring an excess of fines to the surface. After floating, the surface shall be steel troweled to a smooth hard finish. A 10 FT straight-edge placed anywhere on the surface shall not allow a deviation of more than 1/8 IN from a true surface.

3.03 EXPOSED CONCRETE FINISH

A. Rubbed finish shall be applied to all exposed wall surfaces, whether specified to be painted or not. All fins and projections shall be removed, offsets leveled, holes filled, damages repaired. Surfaces shall be rubbed with carborundum or other suitable non-staining abrasives and shall be washed with clean water. No mortar or grout shall be used. The finish shall be smooth and of uniform appearance, acceptable to the Owner.

B. Medium broom finish shall be applied where shown on the Drawings. The finish shall be applied by a non-staining broom, producing a medium grain of even depth and appearance at right angle to the slope of the area. The edges shall be neatly tooled.

C. Light broom finish shall be applied where shown on the Drawings. The finish shall be applied by a non-staining broom, producing a light grain of even depth and appearance at right angle to the slope of the area. The edges shall be neatly tooled.

D. Finish Sample: Contractor shall provide a concrete finish sample to determine the degree of finish to be applied to the slab. This sample shall be cast prior to placing the slab, approved by the Owner and used as a comparison to the actual finish.

1. Contractor shall provide a 4 FT x 4 FT square concrete finish sample of light broom finish.
2. Contractor shall provide a 4 FT x 4 FT square concrete finish sample of medium broom finish
3. The approved samples shall be available at the job site to match the actual slab finish work with the approved sample.

3.04 FLOOR & SLAB TREATMENT

A. General:

1. With Applicator present, examine substrates and conditions under which coatings will be applied, for compliance with coating application requirements.
2. Apply coatings only after unsatisfactory conditions have been corrected and surfaces to receive coatings are thoroughly dry.
3. Start of application is construed as Applicator's acceptance of surfaces within that particular area.
4. Coordination of Work: Review other Sections in which primers or other coatings are provided to ensure compatibility of total systems for various substrates. On request, furnish information on characteristics of specified finish materials to ensure compatible primers.

B. Preparation:

1. General: 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.
2. Surface Preparation: Clean and prepare surfaces to be coated according to manufacturer's written instructions for each substrate condition and as specified.
    a. Cementitious Substrates: Prepare concrete surfaces to be coated. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods to prepare surfaces.
    b. Use abrasive blast-cleaning methods if recommended by coating manufacture.
3. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not coat surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
4. After completing coating operations, reinstall items that were removed; use workers skilled in the trades involved.

C. Application:

1. Apply high-performance surface treatments and coating according to manufacturer's written instructions.
2. Floor Hardener:
    a. Floor areas shall be chemically hardened at the application rate of 100 - 150 SQ FT/GAL as recommended for heavy duty floors.
    b. Floor hardener shall be applied in successive coats with a minimum of 24 HRS between coats.
    c. Curing method shall be by means of damp or membrane curing only.

3.05 CURING AND PROTECTION

A. For surfaces not receiving treatments membrane curing shall be commenced immediately following finishing of surface. During hot or windy weather, temporary wet covering or other approved methods shall be used to maintain moisture in concrete in advance of the membrane application.

B. Surfaces that have been membrane cured shall be protected during the entire curing period from all forms of abrasion.

C. The floors shall remain covered and be kept free of traffic and loads for at least ten (10) days after their completion. Adequate provision shall be made for maintaining proper concrete curing temperature.

3.06 WORKMANSHIP

A. The finishing of all concrete shall be of highest quality. Surfaces shall have neat patterns, tooled edges and joints.

B. All cracked and/or chipped slabs shall be repaired at no additional cost to the Owner.

END OF SECTION

SECTION 04 05 13 - MORTAR AND MASONRY GROUT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Mortar and grout for masonry.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

1.03 REFERENCED STANDARDS

A. American Concrete Institute (ACI):

1. 530, Building Code Requirements for Masonry Structures.
2. 530.1, Specifications for Masonry Structures.

B. ASTM International (ASTM):

1. C94, Ready-Mixed Concrete.
2. C144, Aggregate for Masonry Mortar.
3. C207, Hydrated Lime for Masonry Purposes.
4. C270, Mortar for Unit Masonry.
5. C387, Packaged, Dry, Combined Materials, for Mortar and Concrete.
6. C404, Aggregates for Masonry Grout.
7. C780, Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
8. C1019, Method of Sampling and Testing Grout.
9. E447, Test Methods for Compressive Strength of Masonry Prisms.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 23.

B. Include design mix, indicate whether the Proportion or Property specification of ASTM C270 is to be used, required environmental conditions, and admixture limitations.

C. Samples: Submit two samples of mortar, illustrating mortar color and color range.

D. Reports: Submit reports on mortar indicating conformance of mortar to property requirements of ASTM C270 and test and evaluation reports to ASTM C780.

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E. Reports: Submit reports on grout indicating conformance of component grout materials to requirements of ASTM C476 and test and evaluation reports to ASTM C1019.

F. Manufacturer's Certificates: Certify that products meet or exceed specified requirements.

G. Submit premix mortar manufacturer's installation instructions under provisions of Section 01 33 23.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 530 and ACI 530.1.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Section 01 65 50.

B. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

B. Maintain materials and surrounding air temperature to maximum 90 DegF (32 DegC) prior to, during, and 48 HRS after completion of masonry work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Premix Mortar: ASTM C387, Type S, using gray color cement.

1. Use Type S Mortar for all masonry unless otherwise indicated.

B. Mortar Aggregate: ASTM C144, standard masonry type.

C. Hydrated Lime: ASTM C207, Type S.

D. Water: Clean and potable.

E. Bonding Agent: Latex type.

F. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMU, containing integral water repellent by same manufacturer.

1. Product: Subject to compliance with requirements, provide "Dry-Block" admixture by W. R. Grace & Co.

2.02 MORTAR COLOR

A. Mortar Color: As selected by architect from manufacturer's full range of colors.

2.03 MORTAR MIXES

A. Mortar for Masonry: ASTM C270, Type S using the Property specification.

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2.04 MORTAR MIXING

A. Thoroughly mix mortar ingredients in accordance with ASTM C270 in quantities needed for immediate use.

B. Maintain sand uniformly damp immediately before the mixing process.

C. Add mortar color and admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.

D. Do not use anti-freeze compounds to lower the freezing point of mortar.

E. If water is lost by evaporation, re-temper only within two hours of mixing.

F. Use mortar within two hours after mixing at temperatures of 90 DegF (32 DegC), or two-and-one-half hours at temperatures under 40 DegF (5 DegC).

2.05 MIX TESTS

A. Test mortar in accordance with Section 01 43 26.

B. Testing of Mortar Mix: In accordance with ASTM C270.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Request inspection of spaces to be grouted.

3.02 PREPARATION

A. Apply bonding agent to existing concrete or masonry surfaces.

B. Plug clean-out holes with masonry units. Brace masonry for wet grout pressure.

3.03 INSTALLATION

A. Install mortar in accordance with ASTM C270.

B. Do not displace reinforcement while placing grout.

C. Remove excess mortar from grout spaces.

3.04 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01 43 26.

B. Test and evaluate mortar in accordance with ASTM C780.

C. Test mortar and masonry units to ASTM E447; test in conjunction with masonry unit sections specified.

END OF SECTION

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SECTION 04 20 00 - UNIT MASONRY SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Concrete masonry units. (standard gray color).
2. Split-faced and ground-faced concrete masonry units as indicated on the drawings. (Aggregate, color and texture to be as selected by Architect.)
3. Reinforcement, anchorage, and accessories.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Section 04 72 00 - Cast Stone.

D. Section 05 50 10 - Metal Fabrications.

E. Section 07 62 00 - Sheet Metal Flashing and Trim.

F. Section 07 19 00 - Water Repellents.

G. Division 26 - Pipe and conduit sleeves for placement in walls.

1.03 REFERENCED STANDARDS

A. American Concrete Institute (ACI):

1. 530, Building Code Requirements for Masonry Structures.
2. 530.1, Specifications for Masonry Structures.

B. ASTM International (ASTM):

1. A641, Zinc-Coated (Galvanized) Carbon Steel Wire.
2. C129, Non-Load Bearing Concrete Masonry Units.

C. International Masonry Industry All-Weather Council (IMIAC):

1. Recommended Practices and Guide Specification for-Cold Weather Masonry Construction

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 23.

B. Product Data: Provide data for masonry units and fabricated wire reinforcement.

C. Samples:

1. Submit one complete set of manufacturers samples of each type of concrete masonry unit to illustrate color, texture and extremes of color range.

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2. After final selection is made by Architect and Owner, provide 4 samples of final selection for Architect's use.

D. Manufacturer's Certificate: Certify that concrete masonry units meet or exceed specified requirements.

E. Test Reports: Submit test results indicating compressive strength, water absorption, saturation and suction.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 530 and ACI 530.1.

B. Single Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01 65 50.

B. Accept split-faced units on site. Inspect for damage.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

B. Perform the following construction procedures while masonry work is progressing. Temperature ranges indicated below apply to air temperatures existing at time of installation except for grout. For grout, temperature ranges apply to anticipated minimum night temperatures. In heating mortar and grout materials, maintain mixing temperature selected within 10 DegF (6 DegC).

1. 40 DegF (4 DegC) to 32 DegF (0 DegC):

a. Mortar: Heat mixing water to produce mortar temperature between 40 DegF (4 DegC) and 120 DegF (49 DegC).

b. Grout: Follow normal masonry procedures.

2. 32 DegF (0 DegC) to 25 DegF (-4 DegC):

a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40 DegF (4 DegC) and 120 DegF (49 DegC) maintain temperature of mortar on boards above freezing.

b. Grout: Heat grout materials to 90 DegF (32 DegC) to produce in-place grout temperature of 70 DegF (21 DegC) at end of work day.

3. 25 DegF (-4 DegC) to 20 DegF (-7 DegC):

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a. Mortar: Heat mixing water and sand to produce mortar temperature between 40 DegF (4 DegC) and 120 DegF (49 DegC); maintain temperature of mortar on boards above freezing.

b. Grout: Heat grout materials to 90 DegF (32 DegC) to produce in-place grout temperature of 70 DegF (21 DegC) at end of work day.

c. Heat both sides of walls under construction using salamanders or other heat sources.

d. Use windbreaks or enclosures when wind is in excess of 15 mph.

4. 20 DegF (-7 DegC) and below:

a. Mortar: Heat mixing water and sand to produce mortar temperatures between 40 DegF (4 DegC) and 120 DegF (49 DegC).

b. Grout: Heat grout materials to 90 DegF (32 DegC) to produce in-place grout temperature of 70 DegF (21 DegC) at end of work day.

c. Masonry Units: Heat masonry units so that they are above 20 DegF (-7 DegC) at time of laying.

d. Provide enclosure and auxiliary heat to maintain an air temperature of at least 40 DegF (4 DegC) for 24 HRS after laying units.

e. Do not heat water for mortar and grout to above 160 DegF (71 DegC).

C. Protect completed masonry and masonry not being worked on in the following manner. Temperature ranges indicated apply to mean daily air temperatures except for grouted masonry. For grouted masonry temperature ranges apply to anticipated minimum night temperatures.

1. 40 DegF (4 DegC) to 32 DegF (0 DegC):

a. Protect masonry from rain or snow for at least 24 HRS by covering with weather- resistive membrane.

2. 32 DegF (O DegC) to 25 DegF (-4 DegC):

a. Completely cover masonry with weather resistive membrane for at least 24 HRS.

3. 25 DegF (-4 DegC) to 20 DegF (-7 DegC):

a. Completely cover masonry with weather resistive insulating blankets or - similar protection for at least 24 HRS, 48 HRS for grouted masonry.

4. 20 DegF (-7 DegC) and below:

a. Except as otherwise indicated, maintain masonry temperature above 32 DegF (o DegC) for 24 HRS using enclosures and supplementary heat, electric heating blankets, infrared lamps or other methods proven to be satisfactory. For grouted masonry maintain heated enclosure to 40 DegF (4 DegC) for 48 HRS.

1.09 COORDINATION

A. Coordinate the masonry work with veneer, door and window frames, cast stone window sills, embedment and anchors for other work.

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PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Hollow and Solid Non-Load Bearing Block Units (CMU): ASTM C129, Normal Weight. Color to be selected by architect from manufacturer's full range.

1. Split Face Units

2. Ground Face Units

B. Size and Shape: Nominal modular size of 8 IN x 16 IN x 4 IN, 6 IN, 8 IN or 12 IN as indicated on the drawings. Provide special units for 90 degree corners, lintels, jambs, sashes, sills, movement joints, headers, bonding and other special conditions.

C. Integral Water Repellent: Provide units produced with liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive according to ASTM E514, with test period extended to 24 HRS, show no visible water or leaks on the back of the test specimen.

1. Product: Subject to compliance with requirements, provide units made with "Dry-Block" by W. R. Grace & Co. or equal product approved by Architect.

2.02 REINFORCEMENT AND ANCHORAGE

A. Single Wythe Joint Reinforcement: Truss type; steel wire, hot dip galvanized (for exterior and below grade) to ASTM A641 Class 3 after fabrication, 3/16 IN (4.8 mm) side rods with 9 GA (4.8 mm) cross ties.

1. Acceptable Manufacturers:

a. Dur-O-Wal, Inc.

b. Hohmann & Barhard, Inc.

c. A-A Wire Products Co.

d. Heckman Building Products, Inc.

e. Masonry Reinforcing Corp. of America (Wirebound).

B. Reinforcing Steel: ASTM A615, 60 ksi (414 MPa) yield grade, deformed billet bars, uncoated finish.

C. Strap anchors: Bent steel shape as detailed.

2.03 MORTAR AND GROUT

A. Mortar and Grout: As specified in Section 04 05 13.

2.04 FLASHINGS

A. Copper-Fabric Laminated Flashing: Copper sheet weighing 5 OZ/SQ FT bonded with asphalt between 2 layers of glass fiber cloth. Use where flashing is fully concealed in masonry.

B. Acceptable Manufacturers: Subject to compliance with requirements, provide one of the following:

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1. Copper Fabric; Afco Products, Inc.
2. Type FCC - Fabric Covered Copper; Phoenix Building Products.
3. Copper Fabric Flashing; Sandell Manufacturing Co., Inc.
4. York Copper Fabric Flashing; York Manufacturing, Inc.

C. Adhesive for Flashing: Of type recommended by manufacturer of flashing material for use indicated.

2.05 ACCESSORIES

A. Building Paper: No. 15 asphalt saturated felt.

B. Weeps: Performed round plastic tubes, 3/8 IN (9 mm) outside diameter.

C. Cavity Vents: Molded polyvinyl chloride grilles; insect resistant.

1. Acceptable Manufacturer:

a. Williams Products, Inc., Model Williams-Goodco Vinyl Block Vent. Vents shall be 7-5/8 IN in color to match mortar color.

D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.06 LINTELS

A. Steel Lintels: angle type, nominal 3 1/2 IN x 3 1/2 IN x 5/16 IN, refer to lintel schedule on Drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Verify items provided by other sections of work are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied in other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COURSING

A. Provide coursing as shown on the Drawings for all Unit Masonry.

B. Establish lines, levels, and coursing indicated. Protect from displacement.

C. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

D. Concrete Masonry Units:

1. Bond: Running bond.

2. Coursing: One unit and one mortar joint to equal 8 IN (200 mm).
3. Mortar Joints: Concave (Tooled).

3.04 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.

D. Remove excess mortar as work progresses.

E. Interlock intersections and external corners.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Cut mortar joints flush where resilient base is scheduled and where CMU is indicated to receive Acrylic Based Fiber Reinforced Wall Coating.

I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.05 WEEPS

A. Install weeps in veneer at 16 IN (600 mm) OC horizontally above through-wall flashing, above shelf lintels, at bottom of walls, and above doors, windows and frames.

3.06 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Install horizontal joint reinforcement 16 IN (400 mm) OC.

B. Place joint reinforcement continuous in first joint below top of walls.

C. Lap joint reinforcement ends minimum 6 IN (150 mm).

D. Embed wall ties in dovetail inserts in concrete wall back-up to bond veneer at maximum 16 IN (400 mm) OC vertically and 32 IN (1200 mm) OC horizontally.

E. Reinforce joint corners with strap anchors 16 IN (400 mm) OC.

3.07 MASONRY FLASHINGS

A. Extend flashings horizontally at foundation walls, above lintels, at bottom of walls, and above door and window frames.

B. Turn flashing up minimum 8 IN (200 mm) and bed into mortar joint of masonry or seal to back- up.

C. Lap end joints minimum 6 IN (150 mm) and seal watertight.

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D. Turn flashing, fold, and seal at corners, bends, and interruptions.

E. Extend flashing through exterior face of masonry and cut off flashing flush with face of wall after masonry wall construction is completed.

3.08 LINTELS

A. Install lintels over openings.

B. Maintain minimum 8 IN bearing on each side of opening.

3.09 CONTROL AND EXPANSION JOINTS

A. Install control joints in masonry walls in locations and methods as described in the Concrete Masonry Handbook, latest edition, by the Portland Cement Association. Control joint spacing to not exceed 24 FT horizontally. Caulk each side of joint with caulking as specified in Section 07 92 00.

B. Do not continue horizontal joint reinforcement through control and expansion joints.

C. Form control joint with a sheet building paper bond breaker fitted to one side of the hollow contour end of the block unit. Fill the resultant core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.

D. Size control joint in accordance with Section 07 92 00 for sealant performance.

E. Form expansion joint as detailed.

3.10 BUILT-IN WORK

A. As work progresses, install built-in metal door and glazed frames, fabricated metal frames, window frames, wood blocking, anchor bolts, plates, and embeds and other items to be built-in the work and furnished by other sections.

B. Install built-in items plumb and level.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout. Fill adjacent masonry cores with grout minimum 12 IN (300 mm) from framed openings.

D. Do not build in organic materials subject to deterioration.

3.11 TOLERANCES

A. Maximum Variation from Unit to Adjacent Unit: 1/32 IN (1.5 mm).

B. Maximum variation from Plane of Wall: 1/4 IN in 10 FT (6 mm/3 m) and 1/2 IN in 20 FT (13 mm/6 m) or more.

C. Maximum Variation from Plumb: 1/4 IN in 10 FT (6 mm/3 m); 3/8 IN in 20 FT (0 mm/6 m); 1/2 IN in 40 FT (12 mm/12 m) or more.

D. Maximum Variation from Level Coursing: 1/4 IN in 20 FT (6mm/6 m); 1/2 IN in 40 FT (12mm/12 m).

E. Maximum Variation of Joint Thickness: ±1/8 IN (3mm) from joint thickness indicated; maximum bedjoint thickness shall be 1/2 IN (12 mm).

F. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 IN (6 mm).

3.12 CUTTING AND FITTING

A. Cut and fit for chases, pipes, conduit, sleeves, and grounds. 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.

3.13 QUALITY CONTROL

A. Field testing will be performed under provisions of Section 01 43 26.

B. Inspect all masonry work.

3.14 CLEANING

A. Clean work under provisions of Section 01 77 10.

B. Remove excess mortar and mortar smears as work progresses.

C. Replace defective mortar. Match adjacent work.

D. Clean soiled surfaces with cleaning solution.

E. Use non-metallic tools in cleaning operations.

3.15 PROTECTION OF FINISHED WORK

A. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

END OF SECTION

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SECTION 04 21 13 - BRICK MASONRY ASSEMBLIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Face brick.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

C. Section 04 05 13 - Mortar and Masonry Grout

D. Section 04 72 00 - Cast Stone

E. Section 07 92 00 - Joint Sealants.

1.03 SUBMITTALS

A. Action Submittals:

1. Product Data: For each type of product indicated.

2. Samples:

B. Samples:

1. Sample Boards for each type and color of brick and colored mortar showing manufacturer's full range of colors

2. After initial color selection, provide minimum three samples of each color and finish selected.

C. Informational Submittals:

1. Material Certificates: For each type and size of product indicated.

1.04 QUALITY ASSURANCE

A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

B. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects.

1. Build sample panels of exposed unit masonry construction approximately 48 IN long.

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1.05 PROJECT CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 DegF and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.01 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

2.02 BRICK

A. General: Provide shapes indicated and as follows.

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.

2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Face Brick: Facing brick complying with ASTM C216.

1. Grade: SW.

2. Type: FBS.

3. Efflorescence: Provide brick that has been tested according to ASTM C67 and is rated "not effloresced."

2.03 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C 91.

E. Aggregate for Mortar: ASTM C 144.

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1. White-Mortar Aggregates: Natural white sand or crushed white stone.
2. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

2.04 REINFORCEMENT

A. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.

2.05 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
   1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M; with ASTM A153/A153M, Class B-2 coating.
   2. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.

B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8 IN cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 IN parallel to face of veneer.

C. Adjustable Masonry-Veneer Anchors:
   1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
   2. Contractor's Option: Unless otherwise indicated, provide any of the following types of anchors:
      a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      b. Dayton Superior Corporation, Dur-O-Wal Division; D/A 213.
      c. Heckmann Building Products Inc.; 315-D with 316 or Pos-I-Tie.
      d. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, having slotted holes for inserting wire tie.

2.06 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
   1. Metal Drip Edge: Fabricate from stainless steel. Extend at least 3 IN into wall and 1/2 IN out from wall, with outer edge bent down 30 degrees and hemmed.
   2. Metal Sealant Stop: Fabricate from stainless steel. Extend at least 3 IN into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 IN and down into joint 1/4 IN to form a stop for retaining sealant backer rod.

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B. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.07 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; formulated from PVC.

B. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D226, Type I (No. 15 asphalt felt).

C. Weep/Vent Products: Use one of the following unless otherwise indicated:

1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 IN less than depth of outer wythe, in color selected from manufacturer's standard.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Blok-Lok Limited; Cell-Vent.

2) Heckmann Building Products Inc.; No. 85 Cell Vent.

3) Hohmann & Barnard, Inc.; Quadro-Vent.

4) Wire-Bond; Cell Vent.

D. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Archovations, Inc.

b. Dayton Superior Corporation, Dur-O-Wal Division.

c. Mortar Net USA, Ltd.

2.08 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.09 MORTAR MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water- repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar.

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2. Use portland cement-lime mortar unless otherwise indicated.

3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide Type N unless another type is indicated.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

C. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 SQ IN per minute when tested per ASTM C67. Allow units to absorb water so they are damp but not wet at time of laying.

3.02 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than +1/2 IN or -1/4 IN.

2. For location of elements in plan do not vary from that indicated by more than ±1/2 IN.

3. For location of elements in elevation do not vary from that indicated by more than ±1/4 IN in a story height or 1/2 IN total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 IN in 10 FT, or 1/2 IN maximum.

2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 IN in 10 FT, 1/4 IN in 20 FT, or 1/2 IN maximum.

3. For vertical lines and surfaces do not vary from plumb by more than 1/4 IN in 10 FT, 3/8 IN in 20 FT , or 1/2 IN maximum.

4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 IN in 10 FT, 1/4 IN in 20 FT, or 1/2 IN maximum.

5. For lines and surfaces do not vary from straight by more than 1/4 IN in 10 FT, 3/8 IN in 20 FT, or 1/2 IN maximum.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than ±1/8 IN, with a maximum thickness limited to 1/2 IN; do not vary from bed-joint thickness of adjacent courses by more than 1/8 IN.

2. For exposed head joints, do not vary from thickness indicated by more than ±1/8 IN. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 IN.

3.03 LAYING MASONRY WALLS

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. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal horizontal face dimensions at corners or jambs.

3.04 MORTAR BEDDING AND JOINTING

A. Lay hollow brick as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.

2. With entire units, including areas under cells, fully bedded in mortar at starting course on footings.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.05 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:

1. Provide an open space not less than 1 IN wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.

2. Anchor masonry with anchors embedded in masonry joints and attached to structure.

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3. Space anchors as indicated, but not more than 24 IN OC vertically and 36 IN OC horizontally.

3.06 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated

3.07 CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes

2. Protect adjacent surfaces from contact with cleaner.

3. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

4. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION

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SECTION 04 22 10 - CONCRETE MASONRY (LOAD BEARING)

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Concrete masonry construction (CMU), including:
    a. Standard concrete masonry.
2. Integral water repellent admixture.
3. Masonry special inspection.

1.02 RELATED REQUIREMENTS (SECTIONS)

1.03 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements..

C. Division 03 - Concrete..

D. Division 04 - Masonry Systems

E. Division 07 - Joint Sealants.

1.04 REFERENCED STANDARDS

A. American Concrete Institute (ACI)/American Society of Civil Engineers (ASCE)/The Masonry Society (TMS):

1. ACI 530.1/ASCE 6/TMS 602, Specification for Masonry Structures.

B. ASTM International (ASTM):

1. C33, Standard Specification for Concrete Aggregates.
2. C90, Standard Specification for Loadbearing Concrete Masonry Units.
3. C140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
4. C173, Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
5. C231, Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
6. C423, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
7. C426, Standard Test Method for Linear Drying Shrinkage of Concrete Masonry Units.

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8. C744, Standard Specification for Prefaced Concrete and Calcium Silicate Masonry Units.
9. C1194, Standard Test Method for Compressive Strength of Architectural Cast Stone.
10. C1195, Standard Test Method for Absorption of Architectural Cast Stone.
11. C1314, Standard Test Method for Compressive Strength of Masonry Prisms
12. C1357, Standard Test Methods for Evaluating Masonry Bond Strength.
13. C1364, Standard Specification for Architectural Cast Stone
14. D2244, Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
15. E514, Standard Test Method for Water Penetration and Leakage Through Masonry.

C. Cast Stone Institute (CSI):
1. Technical Manual With Case Histories.

D. National Concrete Masonry Association (NCMA):
1. TEK 2-3A, Architectural Concrete Masonry Units.
2. TEK 3-4B, Bracing Concrete Masonry Walls During Construction.
3. TEK 8-2A, Removal of Stains from Concrete Masonry.
4. TEK 8-3A, Control and Removal of Efflorescence.

E. Building code:
1. International Code Council (ICC):
a. International Building Code and associated standards, 2006 Edition including all amendments, referred to herein as Building Code.

F. Concrete masonry unit manufacturer shall be licensed or qualified, in writing, by manufacturer of integral water repellent admixture to produce masonry units containing manufacturer's admixture.
1. Concrete masonry unit manufacturer shall have a minimum of five (5) years' experience producing masonry units containing manufacturer's admixture.

G. Testing laboratory shall have a minimum of 10 years' experience in the testing of concrete masonry units using the method(s) specified.

H. Technician conducting tests shall have a minimum of five (5) years' experience in the testing of concrete masonry units using the method(s) specified.

1.05 DEFINITIONS

A. Definitions to be in accordance with Standard Unit Nomenclature Table 1, NCMA TEK 2-3A.

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1.06 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
2. Product technical data including:
    a. Manufacturer's information on aggregate and cement type used in manufacture.
    b. Data sheet on each type of masonry unit, including:
        1) Pre-colored masonry.
        2) Split-face masonry.
3. Drawings:
    a. Scaled (minimum 1/8 IN per foot) plans showing proposed locations of masonry control joints.
    b. Wall elevations and sections, indicating special shapes, shape part numbers, applicable dimensions.
    c. Detail drawings for:
        1) Precast concrete lintels.
            a) Show profiles, cross-sections, reinforcement and steel components.
4. Certifications:
    a. Certification that concrete masonry units meet or exceed requirements of standards referenced.
    b. Certification that fire-resistive rated units meet the requirements of the Building Code.
    c. Certification that integral water repellent admixture will not affect the use of coloring processes or alter the actual colors of factory colored masonry units.
    d. Data sheets on integral water repellent admixture being used in masonry unit manufacturing.
    e. Technical bulletins on cleaning masonry containing integral water repellent.
    f. Certification of integral water repellent admixture dosage rates from concrete masonry unit producer.
    g. Concrete masonry producer shall certify that integral liquid water repellent admixture has been provided at dosage rate recommended by admixture manufacturer for use in exterior wall construction.
5. Qualifications of testing lab and technician.
6. Test results for all masonry testing.

B. Informational Submittals:

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1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.

1.07 QUALITY ASSURANCE

A. All masonry units of any one (1) particular type, color or face style shall be from the same production run.

1. Special shapes shall be factory fabricated unless noted otherwise.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver units on pallets with tight covers or deliver in cubes and store on dunnage.

B. Protect units from damage.

C. Inspect units upon delivery for damage, to assure color match with or approved samples, dimensional quality, and trueness of unit.

1. Remove damaged or otherwise unacceptable units from the Project Site.

D. Store units in accordance with manufacturer's recommendations.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

1. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

2. Standard masonry units: Any manufacturer capable of meeting the requirements of this Specification Section.

3. Integral water repellent admixture:

a. Grace Construction Products.

b. ACM Chemistries, Inc.

2.02 MATERIALS

A. Cement: Type I or II Portland, ASTM C150.

B. Aggregate: ASTM C33.

C. Reinforcing Bars: Refer to Specification Section 03 13 00.

D. Mortar: Refer to Specification Section 04 05 14.

E. Masonry Grout: Refer to Specification Section 04 05 14.

F. Masonry Accessories: Refer to Specification Section 04 20 10.

G. Sealants: Refer to Specification Section 07 92 00.

H. Integral Concrete Masonry Water Repellent:

1. Liquid polymeric admixture.

2. Grace "DRY-BLOCK".

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2.03 MANUFACTURED UNITS

A. General:

1. Fabricated in the manufacturing plant.
2. Provide square corners unless noted otherwise.

B. Concrete Masonry Units:

1. Modular units: ASTM C90.
   a. Normal weight units: Minimum of 125 LB/CF.
2. Color:
   a. Interior units: Standard gray.
   b. Exposed exterior units: Precolored,.
3. Design compressive strength: f'm=1,500 psi minimum.
   a. Determine in accordance ACI 530.1/ASCE 6/TMS 602.
      1) Unit strength method.
4. Provide masonry units manufactured with integral water repellent admixture for the following exposures:
   a. Exterior single-wythe construction.
   b. Exterior composite wall construction.
   c. Interior areas defined as wet and/or corrosive.
      1) See Specification Section 07 92 00 for definition of wet and/or corrosive areas.

2.04 PERFORMANCE AND DESIGN REQUIREMENTS

A. Integral Concrete Masonry Water Repellent:

1. Water permeance of masonry: Capable of achieving a Class E Rating when evaluated using ASTM E514 with the test extended to 72 HRS, using the rating criteria specified in ASTM E514.
2. Flexural bond strength of masonry: An increase of 10 percent, minimum, in masonry flexural bond strength shall occur as a result of adding integral water-repellent concrete masonry and mortar admixtures when compared to a control (containing no admixtures) concrete masonry and mortar tested in accordance with ASTM C1357.
3. Compressive strength of masonry prisms: Maximum 5 percent decrease in compressive strength of prisms shall occur as a result of adding integral water-repellent concrete masonry and mortar admixtures when compared to a control (containing no mortar admixtures) concrete masonry and mortar when tested in accordance with ASTM C1314.

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4. Drying shrinkage of masonry: Maximum 5 percent increase in drying shrinkage of the concrete masonry units shall occur as a result of adding integral water repellent concrete masonry admixture when compared to a control (containing no admixtures) concrete masonry when tested in accordance with ASTM C426.
5. Grout shear bond strength: Maximum 5 percent decrease in grout shear bond strength shall occur as a result of adding integral water repellent admixture to the concrete masonry units when compared to a control (containing no admixtures).

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify that anchors and flashings are correct.

B. Lay out walls in advance for uniform and accurate spacing of bond patterns and joints.

1. Properly locate openings, movement type joints, returns, and offsets weep joints and weep vents.

3.02 INSTALLATION

A. General:

1. Build cavity walls to thickness indicated on Drawings.
2. Build composite walls to thickness indicated on Drawings.
3. Build in flashing, reinforcing, reglets, weeps, weep vents and related accessory items.
    a. See Specification Section 04 20 10 for installation of accessory items.
4. Perform all cutting with masonry saws using masonry saw blades.
5. Drill holes with power drill using masonry drill bits.
6. Holes made by chipping unit will not be accepted.
7. Install field units in running bond, unless noted otherwise.
    a. Provide special coursing where indicated on the Drawings.
8. Cut as required to maintain bond pattern.
9. Use solid units where cutting or laying would expose holes and as noted on Drawings.
10. Avoid use of less than half size units, whenever possible.
11. Do not use chipped, cracked, spalled, stained or imperfect units exposed in finish work.
12. Provide units of uniform color, within the range demonstrated on the approved mock-up.
13. Do not wet concrete masonry units.
14. Build chases and recesses as indicated and required for work of other trades.

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a. Provide not less than 8 IN of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses unless detailed otherwise on the Drawings.

15. In fire-resistive rated wall construction, install fire resistive units in accordance with the Building Code.

B. Concrete Masonry Units:

1. Grout solid all cells containing steel reinforcing and as indicated on Drawings.

a. Refer to Specification Section 04 05 14 for grouting.

C. Laying and Tooling:

1. Lay masonry units with completely filled bed and head joints.

a. Provide full mortar bed on all block cross webs and completely fill head joints.

1) Do not slush head joints.

2) Protect cells requiring grout fill from mortar droppings.

3) Omit mortar from head joint at weep joint opening.

2. Maintain nominal 3/8 IN joint widths.

a. Cut joints flush where concealed.

b. Tool exposed joints concave.

c. Compress mortar in below ground joints and in joints concealed by insulation in cavity wall construction.

d. Provide wider joints where noted on Drawings.

1) In no case shall any mortar joint be more than 3/4 IN wide.

e. Where masonry sits on top of steel support omit the mortar joint on top of the support and sit masonry directly on top of the thru wall flashing or the steel support member unless a mortar joint is required to maintain coursing.

3. During tooling of joints, enlarge any voids or holes except weeps, and completely fill with mortar.

4. Point-up all joints at corners, openings, and adjacent work to provide neat, uniform appearance.

5. Remove masonry disturbed after laying.

a. Clean and relay in fresh mortar.

b. Do not pound units to fit.

c. If adjustments are required, remove units, clean, and reset in fresh mortar.

6. Where work is stopped and later resumed, rack back 1/2 masonry unit length in each course.

a. Remove loose units and mortar prior to laying fresh masonry.

7. As work progresses, build in items indicated on Drawings and specified.

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a. Fill in solidly with mortar around built-in items.

b. Where built-in items are to be embedded in cores of hollow masonry units, place grout screen in joint below and fill core solid with mortar.

D. Control Joints and Sealants:

1. Provide vertical expansion, control and isolation joints where indicated on Drawings.

2. Where not indicated on Drawings, submit proposed control joint locations in accordance with the following requirements:

a. Provide control joints at maximum 24 FT OC.

b. Provide at all T intersections.

c. Locate joints so as to allow lintels and bond beams above and below openings to extend beyond the opening as indicated on the Drawings without control joints thru the lintel or bond beam.

3. Rake out mortar in joint.

4. Refer to Specification Section 07 92 00 for sealant installation requirements.

a. Seal control and expansion joints.

E. Tolerances:

1. Maximum variation from plumb in vertical lines and surfaces of columns, walls, and arises:

a. 1/4 IN in 10 FT.

b. 3/8 IN in a story height not to exceed 20 FT.

c. 1/2 IN in 40 FT or more.

2. Maximum variation from plumb for external corners, expansion joints, and other conspicuous lines:

a. 1/4 IN in any story or 20 FT maximum.

b. 1/2 IN in 40 FT or more.

3. Maximum variation from level of grades for exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines:

a. 1/4 IN in any bay or 20 FT.

b. 1/2 IN in 40 FT or more.

4. Maximum variation from plan location of related portions of columns, walls, and partitions:

a. 1/2 IN in any bay or 20 FT.

b. 3/4 IN in 40 FT or more.

5. Maximum variation in cross-sectional dimensions of columns and thicknesses of walls from dimensions shown on Drawings:

a. Minus 1/4 IN.

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b. Plus 1/2 IN.

6. Maximum variation in mortar joint width:

a. Bed joints: 3/32 IN in 10 FT.

b. Head joints:

1) Minus 1/8 IN.

2) Plus 1/8 IN.

F. Protect against weather when work is not in progress.

1. During inclement weather conditions, cover top of walls with translucent waterproof membrane.

3.03 FIELD QUALITY CONTROL

A. Bracing Concrete Masonry Walls During Construction:

1. At a minimum, provide bracing in accordance with NCMA TEK 3-4B.

2. Contractor is responsible for adequately bracing all masonry during construction.

B. Remove and replace loose, stained, damaged and other unacceptable units as directed by Engineer.

1. Provide new units to match.

2. Install in fresh mortar.

3. Point to eliminate evidence of replacement.

C. Special Masonry Inspection:

1. Masonry inspection services will be provided during the following construction activities:

a. Cost of masonry inspection services will be paid by Owner.

b. During laying of units:

1) During the first day of the masonry construction, inspect proportions of site prepared mortar, construction of mortar joints, location of all reinforcing and connectors, size and location of structural elements, type, size and location of anchors, protection of masonry during cold weather.

2) Inspection to be continuous the first full day of masonry construction which requires special inspection.

a) Thereafter, a minimum of 3 HRS every third day of construction until the concrete masonry work is complete.

3) Inspection while laying masonry units may be made concurrently with other inspection duties provided all inspection duties are adequately performed.

4) When deficiencies are found, additional inspection shall be provided as required until deficiencies have been corrected.

5) If masonry crews change, an additional full day of inspection is required during the first day the new crew is on-site.

c. Placement of reinforcing steel:

1) Verification of all reinforcing including size, grade, lap lengths, and type.

2) Inspection may be periodic as required to verify all reinforcing.

3) Inspector to be present during the concrete pour in which any dowels connecting concrete to masonry are cast.

a) Inspector to verify proper location of dowels.

d. Prior to each grouting operation, verify that grout space is clean, reinforcing is clean and connectors are properly placed, proportions of site-prepared grout are correct and mortar joints have been properly constructed.

1) Inspection may be periodic as required to verify proper grout space.

e. Verify compliance with Building Code and Specifications continuously during all grouting operations.

a. Provide special inspection in accordance with the Building Code Table 1704.5.1 including observation of masonry work for conformance to the Contract Documents:

1) Provide inspection reports to the Engineer, Building Official and Owner.

a) Notify Contractor of discrepancies for correction.

b) Notify Engineer, Building Official and Owner, in writing, when discrepancies have been satisfactorily corrected.

2) Submit final signed report stating that work requiring special inspection was, to the best of the inspector's knowledge, in conformance to the Contract Documents and the applicable workmanship previsions of the Building Code.

3.04 CLEANING

A. Clean concrete masonry as the wall is being constructed using fiber brushes, wooden paddles and scrapers.

1. Do not use metal tools or wire brushes.

2. No acid-based cleaning solutions shall be used unless approved in writing by Engineer.

B. Remove dirt and stains in accordance NCMA TEK 8-2A.

C. Remove primary efflorescence in accordance with NCMA TEK 8-3A.

END OF SECTION

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SECTION 04 72 00 - CAST STONE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Cast stone sill and cap.

1.02 SUBMITTALS

A. Product Data: Include dimensions of individual components.

B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.

C. Samples: For each color and texture of cast stone required.

D. Colored Mortar Samples: For each mortar color required.

E. Qualification Data: For manufacturer.

F. Material Test Reports.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, with sufficient production capacity to manufacture required units.

1. Manufacturer is a producing member of the Cast Stone Institute.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Architectural Cast Stone Corp.
2. Continental Cast Stone Manufacturing, Inc.
3. Custom Cast Stone, Inc.
4. Dallas Cast Stone Co., Inc.
5. Or Approved Equal.

2.02 CAST STONE UNITS

A. Provide cast stone units complying with ASTM C1364 using the wet-cast method.

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1. Freeze-Thaw – The CPWL shall be less than 5 percent after 300 cycles of freezing and thawing.
2. Slope exposed horizontal surfaces 1:12, unless otherwise indicated.
3. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
4. Provide drips on projecting elements, unless otherwise indicated.
5. Compressive strength – 6,500 psi minimum for products at 28 days.
6. Absorption – 6 percent max by the cold water method, or 10 percent max by the boiling method for products at 28 days.
7. Air Content – 4-8 percent for units exposed to freeze-thaw environments.
8. Linear Shrinkage – Shall not exceed 0.065 percent.

B. Cure units by one of the following methods:
1. Cure units with steam in enclosed curing room at temperature of 105 DegF or above and 95 to 100 percent relative humidity for 6 hours.
2. Cure units with dense fog and water spray in enclosed warm curing room at 95 to 100 percent relative humidity for 24 HRS.
3. Cure units to comply with one of the following:
a. Not less than 5 days at mean daily temperature of 70 DegF or above.
b. Not less than 6 days at mean daily temperature of 60 DegF or above.
c. Not less than 7 days at mean daily temperature of 50 DegF or above.
d. Not less than 8 days at mean daily temperature of 45 DegF or above.

C. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

D. Colors and Textures: As selected by Architect from manufacturer's full range. All surfaces exposed to view shall have a fine-grained texture similar to natural stone, with no air voids in excess of 1/32 IN and the density of such voids shall be less than 3 occurrences per any 1 in. 2 and not obvious under direct daylight illumination at a 5 FT distance.

2.03 ACCESSORIES

A. Anchors and Dowels: Type 304 stainless steel.

B. Proprietary Acidic Cleaner: Manufacturer's standard-strength, general-purpose cleaner complying with requirements in Section 04 20 10 - "Unit Masonry System" and approved for intended use by cast stone manufacturer and approved by cleaner manufacturer for use on cast stone and adjacent masonry materials.

2.04 MORTAR

A. Comply with requirements in Section 04 20 10 - "Unit Masonry System" for mortar materials and mixes.
1. For setting mortar, use Type S.
2. For pointing mortar, use Type S.

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3. Pigmented Mortar: Use colored cement product.

2.05 SOURCE QUALITY CONTROL

A. Employ an independent testing agency to sample and test cast stone units according to ASTM C1364.

PART 3 - EXECUTION

3.01 SETTING CAST STONE IN MORTAR

A. Install cast stone units to comply with requirements in Section 04 20 10 - "Unit Masonry System".

B. Set units in full bed of mortar with full head joints, unless otherwise indicated.

1. Fill dowel holes and anchor slots with mortar.

2. Fill collar joints solid as units are set.

3. Build concealed flashing into mortar joints as units are set.

4. Keep head joints in coping and other units with exposed horizontal surfaces open to receive sealant.

5. Keep joints at shelf angles open to receive sealant.

C. Rake out joints for pointing with mortar to depths of not less than 3/4 IN. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.

D. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 IN. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

E. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.

F. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated. Keep joints free of mortar and other rigid materials.

G. Prepare joints indicated to receive sealant and apply sealant of type and at locations indicated to comply with applicable requirements in Section 07 92 00 - "Joint Sealants".

3.02 SETTING ANCHORED CAST STONE WITH SEALANT-FILLED JOINTS

A. Set cast stone units accurately in locations indicated with edges and faces aligned.

1. Install anchors, supports, fasteners, and other attachments to secure units in place.

2. Shim and adjust anchors, supports, and accessories.

B. Fill anchor holes with sealant. Where dowel holes occur at pressure-relieving joints, provide compressible material at ends of dowels.

C. Set cast stone supported on clip or continuous angles on resilient setting shims. Hold shims back from face of cast stone a distance at least equal to width of joint.

D. Keep joints free of mortar and other rigid materials. Remove temporary spacers from joints after anchors and supports are secured in place and cast stone units are anchored.

E. Prepare joints and apply sealant of type and at locations indicated to comply with applicable requirements in Section 07 92 00 - "Joint Sealants".

3.03 INSTALLATION TOLERANCES

A. Variation from Plumb: Do not exceed 1/8 IN in 10 FT, 1/4 IN in 20 FT maximum.

B. Variation from Level: Do not exceed 1/8 IN in 10 FT, 1/4 IN in 20 FT.

C. Variation in Joint Width: Do not vary joint thickness more than 1/8 IN in 36 IN or 1/4 of nominal joint width, whichever is less.

D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 IN, except due to warpage of units.

3.04 ADJUSTING AND CLEANING

A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.

1. Replace units in a manner that shows no evidence of replacement.

B. In-Progress Cleaning: Clean cast stone as work progresses.

1. Remove mortar fins and smears before tooling joints.

2. Remove excess sealant immediately, including spills, smears, and spatter.

C. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone to comply with requirements in Section 04 20 10 - "Unit Masonry System".

3.05 WATER REPELLANT

A. Apply silane or siloxane water repellant for weatherproofing cast stone in accordance with manufacturer's instructions.

B. Apply water repellant after pointing, repair, cleaning, inspection, and acceptance are completed.

END OF SECTION

SECTION 05 12 00 - STRUCTURAL STEEL

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Structural steel framing members, support members, sag rods, struts and as shown.
2. Base plates, shear stud connectors and expansion joint plates.
3. Grouting under base plates.

1.02 REFERENCED STANDARDS

A. American Institute of Steel Construction (AISC):

1. Code of Standard Practice, Manual of Steel Construction Allowable Stress Design (ASD).

B. ASTM International (ASTM):

1. A36, Structural Steel.
2. A53/A 53M, Steel Pipe.
3. A325, High Strength Bolts for Structural Steel Joints.
4. A500, Steel Tube.
5. A568/A568M, General Requirements for Steel, Carbon and High-Strength Low-Alloy Hot- Rolled Sheet and Cold-Rolled Sheet.
6. A572, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

C. American Welding Society (AWS):

1. A2.4, Symbols for Welding, Brazing, and Nondestructive Examination.
2. Dl.1, Structural Welding Code.

D. Steel Structures Painting Council (SSPC):

1. Painting Manual.

1.03 SUBMITTALS FOR REVIEW

A. Submit under provisions of Section 01 33 00.

B. Shop Drawings:

1. Indicate profiles, sizes, spacing, and locations of structural members, openings, attachments, and fasteners.
2. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

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1.04 SUBMITTALS FOR INFORMATION

A. Submit under provisions of Section 01 33 00.

B. Manufacturer's Mill Certificate: Certify that Products meet or exceed specified requirements.

C. Mill Test Reports: Submit indicating structural strength, destructive and non-destructive test analysis.

D. Welders' Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC Code of Standard Practice.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Structural Steel Members: ASTM A572 (Fy = 50 ksi) and ASTM A36.

B. Bolts, Nuts, and Washers: ASTM A325 bolts.

C. Anchor Bolts: ASTM A307.

D. Welding Materials: AWS Dl. 1; type required for materials being welded.

E. Steel Pipe: ASTM A53/A53M, Type E or S, Grade B.

F. Cold-Formed Hollow Structural Sections: ASTM A500, Grade B or C, structural tubing.

G. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi (48 MPa) at 28 days.

H. Shop and Touch-up Primer: SSPC 15, Type 1, red oxide or primer compatible with finish paint specified.

2.02 FABRICATION

A. Continuously seal joined members by continuous welds. Grind exposed welds smooth. Fabricate connections for bolt, nut, and washer connectors.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Coordination and Meetings: Verification of existing conditions prior to beginning work.

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3.02 ERECTION

A. Surveys: Employ at Contractor's expense, a registered Professional Engineer or land surveyor, for accurate erection of structural steel. Check elevations of concrete and masonry bearing surface and locations of anchor bolts, and similar devices, before erection work proceeds, and report discrepancies to Architect. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been agreed upon with Architect.

B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

C. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

D. Field welded components and shear studs indicated on Drawings and/or shop drawings.

E. Field connected members with threaded fasteners; torque to required resistance.

F. Do not field cut or alter structural members without approval of Architect/Engineer.

G. After erection, welds shall be primed.

H. Grout under base plates in accordance with Section 04 05 13. Trowel grouted surface smooth; splay neatly to 45 degrees.

I. Subgrade Coating: Coat bottom 2 FT of exterior columns with subgrade coating after erection.

3.03 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 1/4 IN (6 mm) per story, non-cumulative. Maximum Offset from True Alignment: 1/4 IN (6 mm).

3.04 FIELD QUALITY CONTROL

A. An independent testing laboratory shall be retained in accordance with Section 01 43 26 to provide testing and inspection services.

B. The independent testing laboratory shall make verification tests in the field on welded and bolted connections. Failures may result in additional testing as deemed necessary by the Engineer. Retesting and repairs shall be made at no cost to the owner. All testing is to be under the guidance of the Designer.

1. Bolted Connections: Testing and inspection shall be done in accordance with "Structural Joints Using ASTM A325 or A490 Bolts; approved by the Research Council on Structural Connections of the Engineering Foundation 1985. A 100 percent visual inspection shall be made to determine that all connections have the proper number of bolts.

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2. Welded Connections:

   a. Nondestructive testing of full penetration welds shall be by ultrasonic testing for material 3/8 IN thick or thicker and by magnetic particles for material less than 3/8 IN thick. The steel fabricator shall have a certified welding inspector check all full penetration welds that are done in the shop. Fillet welds are to be visually checked.

   b. All field full penetration welds shall be checked by the independent testing lab. All fillet welds done in the field shall be visually inspected by the lab inspector. Contractor shall verify that all field welders are properly certified for the type of work they perform.

   c. All inspections and tests shall be made in accordance with AWS by use of nondestructive methods such as ultrasonic and magnetic particles. Surface preparation for nondestructive testing will be performed by the Contractor as required by the testing laboratory. All connections not certified by testing laboratory shall be replaced and retested without additional costs.

   d. Shear Connectors: Ten percent of field applied shear studs shall be bent 15 degrees as described under the shear stud specification. If the failure rate is greater than ten percent, repairs shall be made before further testing.

END OF SECTION

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SECTION 05 30 00 - METAL DECK

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Manufactured metal roof deck.
2. Manufactured metal composite deck.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Section 00 07 00 - General Conditions.

B. Division 01 - General Requirements.

C. Section 09 90 00 - Painting and Protective Coatings.

1.03 REFERENCED STANDARDS

A. American Iron and Steel Institute (AISI):

1. S100, Specification for the Design of Cold-Formed Steel Structural Members.

B. ASTM International (ASTM):

1. A36/A36M, Standard Specification for Carbon Structural Steel.
2. A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
3. A780/A780M, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
4. A1008/A1008M, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
5. D746, Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.
6. D1056, Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.

C. American Welding Society (AWS):

1. D1.1/D1.1M, Structural Welding Code - Steel.
2. D1.3/D1.3M, Structural Welding Code - Sheet Steel.

D. Steel Deck Institute (SDI):

1. 31, Design Manual for Composite Decks, Form Decks and Roof Decks.

1.04 SUBMITTALS

A. Shop Drawings:

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1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
2. Fabrication and/or layout drawings:
    a. Detailed Shop Drawings showing the following:
        1) Complete framing and erection layouts.
        2) Location, length, type, cross section, thickness, and markings of metal deck units.
            a) Size and location of openings.
            b) Accessories and reinforcing.
        3) Sequence and procedure to be followed for erecting, fastening, and securing the deck units.
        4) Shop applied coatings.
        5) Location of required shoring for composite.
        6) Details and gages of accessories and miscellaneous items showing sump pans, cant strips, ridge and valley plates, closure and filler strips and insulation supports.
        7) Welding procedures for installation including size, number, type and location of all welds required to install deck units.
        8) Recommended welding rod size, type, burn off rate and welder setting for deck thickness to be joined.
            a) Define welds by use of standard AWS welding symbols.
        9) Correct fitting of members and accessories.
        10) Size and location of all openings in deck and all conditions requiring closure panels and supplementary framing.
        11) Shop Drawings shall not be reproductions of the Contract Drawings.
3. Product technical data including:
    a. Metal deck manufacturer's specifications and installation instructions.
    b. Manufacturer's specifications and installation instructions for:
        1) Welds and welding procedure.
        2) Galvanizing repair paint.
        3) Screws.
        4) Joint sealing compound.
    c. Manufacturer's load tables for deck to be furnished on this project, including:
        1) Allowable gravity load for metal roof deck.
        2) Allowable diaphragm shear values for metal roof deck.
        3) Allowable superimposed load for metal deck.
        4) Allowable unshored span lengths for composite.

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4. Manufacturers certification that metal deck complies with specified requirements:
    a. Manufacturer member of SDI.
    b. Deck material, manufacturing, and shop testing and inspection are in accordance with SDI requirements.
    c. Welder qualifications.
5. Test reports.

1.05 QUALITY ASSURANCE

A. Qualifications:
    1. Manufacturer:
        a. Member of SDI.
        b. Structural design of manufactured deck shall be prepared by a qualified professional engineer retained by the manufacturer.
    2. Welding work:
        a. Qualify welding processes, operations, and operators in accordance with requirements of AWS D1.1 and AWS D1.3.
        b. Welding operators to have been qualified during the 12 month period prior to commencement of welding, and be experienced in welding light gage metal.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle metal deck as recommended by SDI.
    1. Exercise care to avoid damage to deck.
B. Protect materials from rusting, denting or crushing.
    1. Store metal deck on project site off the ground with one end elevated to provide drainage and protected from the elements with a waterproof covering, ventilated to avoid condensation.
    2. Prevent rust, deterioration and accumulation of foreign material.

1.07 PROJECT CONDITIONS

A. Do not overload supporting members.
    1. Until the entire assembly is complete, the structural elements may not be stable or capable of supporting code or stated design loads.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
    1. 1-1/2 IN deep composite floor deck:

a. Vulcraft, Type 1.5 VL.

b. Verco Decking, Inc., PLB FORMLOK.

c. New Millennium Building Systems, 1.5 CD.

d. Consolidated Systems, Inc. CFD 1.5.

e. DACS, Inc., 1-1/2 IN Composite Deck.

B. Submit request for substitution in accordance with Specification Section 01 33 00.

2.02 COMPOSITE FLOOR DECK

A. Composite Floor Deck:

1. Minimum depth and gage as indicated on the Drawings.
2. Minimum superimposed load capacity:
   a. 150 PSF.
   b. Design in accordance with SDI 31.
3. Fabricate deck from steel conforming to AISI S100, Section A3.
4. Finish: Galvanized coating conforming to ASTM A653 G60 zinc coating.
5. Metal closures and pour-stops:
   a. Manufacturers standard, 20 GA minimum.
   b. Finish: Galvanizing conforming to ASTM A653 G60, minimum.
   c. Form to configuration required to provide mortar-tight closures.

B. Provide composite deck to act as bottom form for cast-in-place concrete slabs and which will become positive slab reinforcement through mechanical anchorage after concrete hardens.

C. Maximum Deflection:

1. Deck as a form: Less than 1/180 of span or 3/4 IN, whichever is smaller, under the weight of wet concrete and steel deck.
2. Composite slab with deck: Less that 1/360 under superimposed loads.

2.03 ACCESSORIES

A. Metal Closures:

1. Form to configuration required to provide tight-fitting closures at open ends and sides of deck.
2. Minimum thickness before galvanizing: 0.0358 IN (20 GA).

B. Welding Washers:

1. 16 GA bent steel plate with 3/8 IN center hole.
2. Use at all deck units thinner than 20 GA.

C. Filler Sheet: Flat or formed 20 GA galvanized steel.

D. Venting: Slotted openings in bottom flutes in accordance with manufacturer's standards.

E. Metal Pour Stops: Form to configuration required to provide mortar-tight closures at open sides and ends of deck.

F. Primer Paint: Deck manufacturer's baked on, rust-inhibitive paint applied at plant to chemically cleaned and phosphate chemically treated metal surfaces.

G. Galvanized coating for metal deck accessories: Conform to ASTM A653 G60 zinc coating.

H. Galvanized Repair Paint: Comply with Specification Section 09 90 00 and ASTM A780 for repair of damaged galvanized surfaces.

I. Screws:

1. Self-drilling, self-tapping, #12 size minimum hex washer head sheet metal screws.

2. Carbon steel by Hilti.

a. Organic zinc chromate coated, Hilti Kwik-cote.

J. Miscellaneous Steel Shapes: Comply with ASTM A36.

K. Sheet Metal Accessories: Same material and finish as deck members.

2.04 FABRICATION

A. Standard Deck Profiles:

DEPTH	TYPE	RIB SPACING	TOP SURFACE MAXIMUM RIB OPENING	MINIMUM BOTTOM OF RIB WIDTH
1-1/2 IN	Composite Floor Deck	6 IN	2-1/2 IN	1-3/4 IN

B. Minimum Deck Thickness:

1. Where gage of metal is indicated, provide the minimum uncoated thickness as specified by SDI.

a. Delivered thickness of the uncoated steel: No less than 95 percent of the design thickness.

2. Use steel with a minimum yield stress of 33 ksi.

C. Fabrication:

1. Fabricate deck units in lengths to span three or more support spacings with flush, telescoped or nested 2 IN end laps.

a. End laps shall occur on supporting members.

b. Provide deck units having overlapping male and female type side laps or joints to provide positive vertical and lateral alignment of adjacent deck units.

PART 3 - EXECUTION

3.01 PREPARATION

A. Examine areas and conditions under which metal deck is to be installed for conditions detrimental to proper and timely completion of work.

B. Do not proceed with work until unsatisfactory conditions have been corrected.

C. Do not start placement of metal deck until supporting work is in place and secured.

D. Deck will be subject to rejection if metal deck:

1. Units do not comply with requirements of SDI specifications and requirements herein.

2. Is improperly manufactured, painted or installed.

3. Is damaged so that strength is impaired.

4. Is not installed as specified.

3.02 INSTALLATION

A. Install roof composite deck units and accessories as indicated, in accordance with SDI 31, manufacturer's recommendations, final approved Shop Drawings and as specified herein.

1. Furnish manufacturer's standard accessories as needed to complete the deck installation.

B. Locate deck bundles to prevent overloading of structure.

C. Do not overload metal deck or supporting members:

1. Contractor is solely responsible for safety, construction means, methods and sequencing of the Work.

2. Until the entire assembly is complete, the structural elements may not be stable or capable of supporting code or stated design loads.

3. Use care to assure deck construction loads are less than the recommendation of SDI 31, except where temporary shoring is installed.

D. Place each deck unit on supporting structural frame, adjust to final position and accurately align with ends bearing on supporting members.

1. Lap roof deck units at ends no less than 2 IN.

2. Provide a minimum of 1-1/2 IN of bearing of deck on supports, tape the joint as needed to prevent concrete leakage.

3. Interlock units at sides without stretching, contracting, or deforming.

4. Place deck units flat and square and secure to framing without warp or excessive deflection.

5. Place units in accurate and close alignment for entire length of run and with close registration of flutes of one unit with those of abutting unit.

E. Plug weld sizes specified are effective fusion diameter of welds.

1. Weld metal shall penetrate all layers of deck material and have good fusion to supporting members.
2. Do not burn through deck.

F. Prevent overtorquing of screw fasteners by using a tool with a depth limiting nosepiece and a clutch.

G. Fastening of Composite and Form Deck:

1. Secure deck units to supporting frame and side laps as indicated on the drawings.

H. Remove and replace deck which is structurally weak or unsound or which has burn holes due to improper welding or damage which Engineer declares defective.

I. Cut and fit deck units and accessories around other work projecting through or adjacent to decking.

1. Make cutting and fitting neat, square and trim.
   a. Cut deck by mechanical means, not by burning.
2. Neatly and accurately install reinforcing at all openings except:
   a. Circular openings less than 6 IN DIA.
   b. Rectangular openings having no side dimension greater than 6 IN.
3. Reinforce openings that have not been framed between 6 and 12 IN with 20 GA flat steel sheet 12 IN greater in each dimension than opening.
   a. Place sheet around opening and fusion weld to top surface of deck at each corner and midway along each side.

J. Install metal accessories to close all openings and gaps between deck and other construction, at objects projecting through deck, at locations where deck changes direction, and at open ends of deck units where deck units terminate.

1. Weld into position to provide a complete installation.

K. Install pour stops continuous around the perimeter:

1. Locate so that the slab terminates beyond the perimeter support centerline a distance as indicated on the Contract Drawings.
2. Weld into position adequately to resist forces due to placement and finishing of concrete and in accordance with manufacturer's recommendations.

L. Clean and Touch Up:

1. Remove all surplus materials and debris from surface of deck after installation.
2. Repair damaged galvanized surfaces in accordance with Specification Section 09 90 00.

3.03 FIELD QUALITY CONTROL

A. Remove and replace defective or damaged deck units.

B. Testing:

1. Make the following test in the presence of the Testing Agency employed on the project on the first deck panel to be installed.

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2. Place one (1) end of panel over a perimeter support and attach it only to that support with two (2) welds as specified 6 IN apart.
3. Move the opposite end of the panel in plane parallel to the span of the panel until shear distress is noted in the weld.
4. Make the welds of sufficient quality to cause local distortions in the panel around the welds and show good perimeter contact between the welds and the panel.
5. When the results of this test are satisfactory and approved by the Testing Agency, install the remainder of the deck using the same weld rod size and type, amperage setting, and procedures used in the tested deck.
6. Visually inspect the remainder of the welds.
    a. When, in the opinion of the Testing Agency, any weld is of poor quality, provide an additional weld adjacent to the rejected weld.
    b. Place the new weld on sound, unburned deck a sufficient distance away from the rejected weld.

END OF SECTION

SECTION 05 40 00 – COLD FORMED METAL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Load bearing formed steel stud exterior wall and roof framing.
2. Formed steel purlin and slotted channel, framing and bridging

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - General Requirements.

C. Section 06 16 44 – Exterior Gypsum Sheathing

D. Section 09 21 16 – Gypsum Board Assemblies

1.03 REFERENCED STANDARDS

A. AISI - American Iron and Steel Institute - Cold-Formed Steel Design Manual.

B. ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by Hot Dip Process, Physical (Structural) Quality.

C. ASTM A525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

D. ASTM A568 - Steel, Sheet, Carbon and High-Strength, LowAlloy, Hot-Rolled and Cold-Rolled,.General Requirements For.

E. ASTM A591 Steel Sheet, Cold-Rolled, Electrolytic Zinc Coated.

F. ASTM C955 Load-Bearing (Transverse and Axial) Steel Studs, Runners (Track), and Bracing or Bridging, for Screw Application of Gypsum Board and Metal Plaster Bases.

G. AWCI (Association of Wall and Ceiling Industries) Specifications Guide for Cold Formed Steel Structural Members.

H. AWS Dl.1 - Structural Welding Code.

I. AWS Dl.3 - Light Steel Welding Code.

J. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.

K. MFMA (Metal Framing Manufacturers Association) Guidelines for the Use of Metal Framing.

1.04 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 for requirements

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2. Product technical data including:
    a. Acknowledgement that products submitted meet requirements of standards referenced.
    b. Manufacturer's installation instructions.
    c. Manufacturer's load tables for style indicated.

1.05 SYSTEM DESCRIPTION

A. Maximum Allowable Deflection: 1/360 span.

B. Design wall and roof systems to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.

C. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

1.06 QUALITY ASSURANCE

A. Calculate structural properties of framing members in accordance with AWCI, MFMA and AWS Dl.3 requirements.

1.07 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years documented experience.

B. Installer: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

C. Design structural elements under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State where the Site is located.

1.08 FIELD MEASUREMENTS

A. Verify that field measurements are as instructed by the manufacturer.

1.09 COORDINATION

A. . Coordinate work under provisions of Division 01 - General Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
    1. Unimast Incorporated.
    2. USG.
    3. Or approved equal

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2.02 FRAMING MATERIALS

A. Studs: ASTM 653, A525 sheet steel, formed to channel shape, punched web, knurled faces

B. Track: Formed steel; channel shaped; same width as studs, tight fit; 18 gage thick, solid web

2.03 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered.

B. Plates, Gussets, Clips: Formed sheet steel, thickness determined for conditions encountered.

2.04 FASTENERS

A. Self-drilling, Self-tapping Screws, Bolts, Nuts and Washers: ASTM A123, hot dip galvanized to 1.25 oz/sq. ft.

B. Anchorage Devices: Power actuated, drilled expansion bolts, and screws with sleeves.

C. Welding: In conformance with AWS Dl.1 and AWS Dl.3.

2.05 FABRICATION

A. Fabricate assemblies of framed sections of sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements

B. Fit and assemble in largest practical sections for delivery to site, ready for installation.

2.06 FINISHES:

A. Studs: Galvanize to G90 coating class.

B. Tracks and Headers: Galvanize to G90 coating class.

C. Bracing, Furring, Bridging: Same finish as framing members.

D. Plates, Gussets, Clips: Same finish as framing members.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and building framing components are ready to receive work.

3.02 ERECTION OF STUDDING

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

B. Align floor and ceiling tracks; locate to wall layout. Secure in place as indicated by designer of structural elements. Coordinate installation of sealant with floor and ceiling tracks.

C. Place studs not more than 2 inches (50 mm) from abutting walls and at each side of openings. Space studs as indicated by designer of structural elements. Connect studs to tracks using fastener or welding method.

D. Construct corners using minimum three studs.

E. Construct openings at door and window jambs with double studs, unless noted otherwise.

F. Erect load bearing studs one piece full length. Splicing of studs is not permitted.

G. Erect load bearing studs, brace, and reinforce to develop full strength, to achieve design requirements.

H. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.

I. Install intermediate studs above and below openings to align with wall stud spacing.

J. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.

K. Attach cross studs to studs for attachment of fixtures anchored to walls.

L. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

M. Touch-up field welds and damaged galvanized surfaces with primer.

N. Complete framing ready to receive gypsum board or standing seam roof systems.

3.03 ERECTION TOLERANCES

A. Maximum Variation from True Position: 1/8 inch (3 mm).

B. Maximum Variation of any Member from Plane: 1/8 inch (3 mm).

END OF SECTION

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SECTION 05 50 10 - METAL FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. The schedule is a list of principal items only. Refer to Drawing details for items not specifically scheduled.
    a. Miscellaneous shop fabricated ferrous metal items.
    b. Bollards: Schedule 40 steel pipe, concrete filled, as detailed, paint.
    c. Plumbing chase strap reinforcing: Bent steel plates; prime paint.
    d. Pipe rails.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Section 03 30 00 - Cast-In-Place Concrete: Placement of metal fabrications in concrete.

B. Section 05 12 00 - Structural Steel: Structural steel column, beams and anchor bolts.

C. Section 09 90 00 - Paint and Protective Coatings.

1.03 REFERENCED STANDARDS

A. ASTM International (ASTM):

1. A36, Structural Steel.
2. A53, Hot-Dipped, Zinc-coated welded and Seamless Steel Pipe.
3. A123, Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed and Forged Steel Shapes, Plates, Bars, and Strip.
4. A153, Zinc - Coating (Hot-Dip) on Iron and Steel Hardware.
5. A283, Carbon Steel Plates, Shapes, and Bars.
6. A307, Carbon Steel Externally Threaded Standard Fasteners.
7. A325, High Strength Bolts for Structural Steel Joints.
8. A386, Zinc-Coating (Hot-Dip) on Assembled Steel Products.
9. A500, Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
10. A501, Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
11. A572, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
12. B177, Chromium Electroplating on Steel for Engineering Use.

B. American Welding Society (AWS):

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1. A2.4, Standard Welding Symbols.
2. Dl.1, Structural Welding Code.

C. Steel Structures Painting Council (SSPC).

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

C. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

1.05 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on Drawings.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Steel Sections: ASTM A572 (Fy = 50 ksi) and ASTM A36.

B. Plates: ASTM A283.

C. Steel Pipe: ASTM A53, standard weight (Schedule 40) unless otherwise indicated, or another weight required by structural loads.

D. Bolts, Nuts, and Washers: ASTM A325; ASTM A307. Unfinished bolts and nuts shall be regular hexagon- head types.

E. Welding Materials: AWS Dl. 1; type required for materials being welded.

F. Shop and Touch-up Primer: SSPC 15, Type 1, red oxide.

2.02 FABRICATION

A. Fit and shop assemble in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

a. Supply components required for anchorage of fabrication. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

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2.03 FINISHES

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Do not prime surfaces in direct contact with concrete or where field welding is required.

C. Prime paint items with one coat of specified primer at spreading rate not to exceed 400 SQ FT/GAL.

D. Galvanize in accordance with ASTM A123, structural steel members. Provide minimum 1.25 OZ/SQ FT (380 g/SQ m) galvanized coating.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of installation means erector accepts existing conditions.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete with setting templates, to appropriate sections.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on Drawings. Perform field welding in accordance with AWS D1.1.

D. Obtain Architect/Engineer approval prior to site cutting or making adjustments not scheduled.

E. After erection, prime welds abrasions and surfaces not shop primed, except surfaces to be in contact with concrete.

3.04 PIPE RAILINGS AND GRAB BARS

A. Pipe railings and grab bars shall be of continuous welded construction as detailed, fabricated from A. S. A. Schedule 40 steel pipe, of sizes shown. Bends shall be heated and bent smoothly and without distortion, or made with welding ells, intersections neatly formed, welded and ground smooth.

B. Handrails shall be constructed of round pipe, size and shape as shown, with closed ends. Provide all required anchorage pieces. Include all required anchorage devices for attachment to walls and floors. Ends of handrails shall be returned or shall terminate in safety terminals.

END OF SECTION

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SECTION 05 51 00 – METAL STAIRS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Straight run, steel-framed stairs.
2. Steel pipe handrails and railing systems attached to metal stairs.
3. Steel pipe handrails attached to walls adjacent to metal stairs.

1.02 RELATED REQUIREMENTS (SECTIONS)

1.03 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Section 09 90 00 - Paint and Protective Coatings.

1.04 SUBMITTALS FOR REVIEW

A. Submit under provisions of Section 01 33 00.

B. Shop Drawings:

1. Shop drawings detailing fabrication and installation of steel stairs.
   a. Include plans, elevations, sections, and details of steel stairs and their connections.
   b. Show anchorage and accessory items including bracing elements.
   c. Provide templates for anchors and bolts specified for installation under other sections.
2. Delegated-Design Submittal: For installed steel stairs indicated to comply with certain design loadings, include structural analysis data sealed and signed by the qualified professional engineer who was responsible for their preparation. Indicate profiles, sizes, spacing, and locations of structural members, openings, attachments, and fasteners.
3. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm experienced in producing steel stairs similar to those indicated for this Project with a record of successful in-service performance and with sufficient production capacity to produce required units without delaying the Work.

B. Welding Standards: Comply with applicable provisions of AWS D1.1 "Structural Welding Code--Steel" and AWS D1.3 "Structural Welding Code--Sheet Steel."

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1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

PART 2 - PRODUCTS

2.01 MANUFACTUERS

A. Subject to compliance with requirements, manufacturers offering preassembled stair units that may be incorporated in the Work include, but are not limited to, the following:

1. Alfab, Inc.
2. American Metal Works, Inc.
3. American Stair Corp., Inc.
4. The Sharon Companies, Ltd

2.02 PERFORMANCE REQUIREMENTS

A. Structural Performance: Engineer, fabricate, and install handrails and railing systems to withstand the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each of the respective components of each metal fabrication.

1. Treads of Steel Stairs: Capable of withstanding a uniform load of 100 lbf per sq. Ft. or a concentrated load of 300 lbf on a area of 4 sq. inches located in the center of the tread, whichever produces the greater stress.
2. Platforms of Steel Stairs: Capable of withstanding a uniform load of 100 lbf per sq. ft..
3. Stair Framing: Capable of withstanding stresses resulting from loads specified above as well as stresses resulting from railing system loads. Also capable of resisting lateral and longitudinal loads by providing additional bracing between the staircase support columns or connections to masonry wall.
4. Top Rail of Guardrail Systems: Capable of withstanding the following loads applied as indicated:
    a. Concentrated horizontal load of 200 lbf applied at any point and in any direction or 50 pounds per linear foot at top of rails in any direction.
    b. Above load need not be assumed to act concurrently with loads on top rails of railing systems in determining stress on guard.

2.03 METALS

A. Metal Surfaces, General: For surfaces exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, roughness, or, for steel sheet, variations in flatness exceeding those permitted by referenced standards for stretcher-leveled sheet.

B. Steel Plates, Shapes, and Bars: ASTM A 36.

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C. Steel Tubing: Product type (manufacturing method) and as follows:

1. Cold-Formed Steel Tubing: ASTM A 500.
2. Hot-Formed Steel Tubing: ASTM A 501.
    a. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating per ASTM A 53.

D. Steel Pipe: ASTM A 53, standard weight (schedule 40), unless otherwise indicated, or another weight required by structural loads.

1. Black finish, unless otherwise indicated.
2. Galvanized finish for exterior installations and where indicated.
3. Cold-Rolled Structural Steel Sheet: ASTM A 611, grade as follows:
    a. Grade A, unless otherwise indicated or required by design loading.
4. Commercial Quality: ASTM A 526, G 90 coating designation, unless otherwise indicated.

E. Wire Mesh Panels for use in Stairs and Railing Systems;

1. Plain steel welded or woven wire panels. Square opening, 3" maximum bar spacing, 1/8" minimum bar diameter. Panels to be shop primed to receive field applied coat, or prefinished black powder coating.

F. Welding Rods and Bare Electrodes: Select according to AWS specifications for the metal alloy to be welded. Continuously seal joined members by continuous welds. Grind exposed welds smooth. Fabricate connections for bolt, nut, and washer connectors

2.04 FASTENERS

A. General: Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls and where indicated. Select fasteners for the type, grade, and class required.

2.05 PAINT

A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements of FS TT-P-664, selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

B. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20

2.06 CAST ABRASIVE NOSINGS

A. Fabricate units of material, sizes, and configurations indicated. If not indicated, provide cast-iron units with integral abrasive finish. Furnish in lengths required to accurately fit each opening or conditions.

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1. Cast units with an integral abrasive grit consisting of aluminum oxide, silicon carbide, or a combination of both.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

1. American Safety Tread Co., Inc.
2. Amstep Products.
3. Armstrong Products, Inc.
4. Balco/Metalines, Inc.
5. Safe-T-Metal Co.
6. Wooster Products Inc.

C. Drill for mechanical anchors with countersunk holes located not more than 4 inches from ends and not more than 12 inches o.c.., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by the manufacturer.

D. Provide a plain surface texture, except where fluted or cross-hatched surfaces are indicated.

2.07 GROUT

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

B. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

1. Nonshrink, Nonmetallic Grouts:
   a. B-6 Construction Grout; W. R. Bonsal Co.
   b. Euco N-S Grout; Euclid Chemical Co.
   c. Crystex; L&M Construction Chemicals, Inc.
   d. Masterflow 928 and 713; Master Builders Technologies, Inc.
   e. Sealtight 588 Grout; W. R. Meadows, Inc.
   f. Sonogrout 14; Sonneborn Building Products--ChemRex, Inc.

2.08 FABRICATION, GENERAL

A. Form steel stairs from materials of size, thickness, and shapes indicated, but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support.

B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

C. Shear and punch metals cleanly and accurately.

D. Remove sharp or rough areas on exposed surfaces.

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E. Ease exposed edges to a radius of approximately 1/32 IN, unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

F. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Remove welding flux immediately.

3. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and welded surface matches contours of adjoining surfaces.

G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

H. Shop Assembly: Preassemble in shop to greatest extent possible to minimize field splicing and assembly. Use connections that maintain structural value of joined pieces. Clearly mark units for field assembly and coordinated installation.

I. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.09 STEEL-FRAMED STAIRS

A. General: Construct stairs to conform to sizes and arrangements indicated. Join pieces together by welding, unless otherwise indicated. Provide complete stair assemblies, including metal framing, hangers, columns, handrails, railing systems, newels, balusters, struts, clips, brackets, bearing plates, or other components necessary for the support of stairs and platforms, and as required to anchor and contain the stairs on the supporting structure.

1. Fabricate treads and platforms of exterior stairs to accommodate slopes to drain in finished traffic surfaces.

B. Stair Framing: Fabricate stringers of structural steel channels, plates, or a combination thereof, as indicated. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members as indicated. Bolt or weld headers to stringers; and bolt or weld newels and framing members to stringers and headers. If using bolts, fabricate and join so bolts are not exposed on finish surfaces.

C. Steel Floor Plate Treads and Platforms: Provide raised pattern steel floor plate in pattern indicated or, if not indicated, as selected from manufacturer's standard patterns.

2.10 STEEL PIPE HANDRAILS AND RAILING SYSTEMS

A. General: Fabricate pipe handrails and railing systems to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of pipe, post spacing, and anchorage, but not less than that required to support structural loads.

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B. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.

1. At tee and cross intersections, cope ends of intersecting members to fit contour of pipe to which end is joined, and weld all around.

C. Form changes in direction of handrails and rails as detailed or as follows:

1. By radius bends of radius indicated.

D. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of pipe throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of pipe.

E. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated.

F. Close exposed ends of pipe by welding 3/16-IN thick steel plate in place or with prefabricated fittings, except where clearance of end of pipe and adjoining wall surface is 1/4 IN or less.

G. Fabricate newels of steel tubing and provide newel caps of pressed steel, as shown.

H. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnections of pipe and attachment of handrails and railing systems to other work. Furnish inserts and other anchorage devices for connecting handrails and railing systems to concrete or masonry work.

1. Connect railing posts to stair framing by direct welding, unless otherwise indicated.

I. Fillers: Provide steel sheet or plate fillers of thickness and size indicated or required to support structural loads of handrails where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses. Size fillers to produce adequate bearing to prevent bracket rotation and overstressing of substrate.

J. For nongalvanized steel handrails and railing systems, provide nongalvanized ferrous metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.

PART 3 - EXECUTION

3.01 PREPARATION

A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, weld plates, and anchor bolts. Coordinate delivery of such items to Project site.

3.02 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing steel stairs to in-place construction; include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors as required.

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B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing steel stairs. Set units accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Install steel stairs by welding stair framing to steel structure or to weld plates cast into concrete, except where otherwise indicated.

D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted field connections.

F. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

3.03 INSTALLING STEEL PIPE RAILING AND HANDRAILS

A. Adjust handrails and railing systems prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:

1. Anchor posts to steel by welding directly to steel supporting members.

2. Anchor handrail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with drilled-in expansion anchors.

B. Secure handrails to wall with wall brackets and end fittings. Provide bracket with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets and wall return fittings to building construction as follows:

1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.

2. For concrete and solid masonry anchorage, use drilled-in expansion anchor.

3. For hollow masonry anchorage, use toggle bolts having square heads.

3.04 ADJUSTING AND CLEANING

A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on steel stairs are specified in Division 9 Section "Painting."

B. For galvanized surfaces, clean welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION

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SECTION 05 52 05 - STEEL RAILINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Steel handrail, stair rail and guardrail.
2. Steel guardrail gates.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Division 00 07 00 - General Conditions.

B. Division 01 - General Requirements.

C. Section 05 50 10 - Metal Fabrications.

D. Section 09 90 00 - Painting and Protective Coatings.

1.03 REFERENCED STANDARDS

A. American Architectural Manufacturers Association (AAMA):

1. 2605, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

B. U.S. Department of Justice, Architectural and Transportation Barriers Compliance Board (Access Board):

1. Americans with Disabilities Act (ADA):

a. Accessibility Guidelines for Buildings and Facilities (ADAAG).

C. ASTM International (ASTM):

1. A36, Standard Specification for Carbon Structural Steel.
2. A53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
4. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. A269, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
6. A276, Standard Specification for Stainless Steel Bars and Shapes.
7. A312, Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
8. {A392 Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.}

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9. A501, Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
10. A554, Standard Specification for Welded Stainless Steel Mechanical Tubing.
11. {A580, Standard Specification for Stainless Steel Wire.}
12. A780, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

D. American Welding Society (AWS):
1. D1.1, Structural Welding Code - Steel.

E. National Association of Architectural Metal Manufacturers (NAAMM):
1. AMP 521, Pipe Railing Systems Manual.

F. Occupational Safety and Health Administration (OSHA):
1. 29 CFR 1910, Occupational Safety and Health Standards, referred to herein as OSHA Standards.

G. Building code:
1. International Code Council (ICC):
a. International Building Code and associated standards, 2006 Edition including all amendments, referred to herein as Building Code.

1.04 DEFINITIONS

A. Hardware: As defined in ASTM A153/A153M.

B. Galvanizing: Hot-dip galvanizing per ASTM A123/A123M or ASTM A153/A153M with minimum coating of 2.0 OZ of zinc per square foot of metal (average of specimens) unless noted otherwise or dictated by standard.

C. Guardrail: A system of building components located near the open sides of elevated walking surfaces for the purpose of minimizing the possibility of an accidental fall from the walking surface to the lower level.

D. Handrail: A railing provided for grasping with the hand for support.

E. Railing: A generic term referring to guardrail, handrail and/or stair rails.

F. Stair Rail: A guardrail, installed at the open side of stairways with either a handrail mounted to the inside face of the guardrail, or where allowed by applicable codes, with the top rail mounted at handrail height and serving the function of a handrail.

1.05 SUBMITTALS

A. Shop Drawings:
1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
2. Fabrication and/or layout drawings.
a. Plan showing profile, location, section and details of each railing, and type and details of anchorage system.

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b. Location and type of expansion joints.

c. Materials of construction including shop-applied coatings.

3. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.

b. Manufacturer's installation instructions.

B. Informational Submittals:

1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.

2. Certification of welders and welding procedures indicating compliance with AWS.

3. Certification that railings have been designed and fabricated to meet the loading requirements specified.

1.06 QUALITY ASSURANCE

A. Qualify welding procedures and welding operators in accordance with AWS.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver and handle railings to preclude damage.

B. Store railings on skids, keep free of dirt and other foreign matter which will damage railings or finish and protect from corrosion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Welded railing systems:

a. Any manufacturer meeting this Specification Section.

2. Galvanizing repair paint:

a. ZRC Products.

B. Submit request for substitution in accordance with Specification Section 01 33 00.

2.02 MATERIALS

A. Pipe: ASTM A53, Types E or S, Grade B, or ASTM A501.

B. Steel Sheet, Bar (Pickets) and Plate: ASTM A36.

C. Galvanizing Repair Paint:

1. High zinc dust content paint for regalvanizing welds and abrasions.

2. Dried film shall contain not less than 95 percent zinc dust by weight.

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3. ZRC Products "ZRC."

D. Expansion and Adhesive Anchors: See Specification Section 05 50 10.

E. Welding Electrodes: AWS D1.1, E70 Series.

2.03 FABRICATION

A. General:

1. Verify field conditions and dimensions prior to fabrication.
2. For fabrication of items which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
    a. Remove blemishes by grinding and buffing or by welding and grinding, prior to cleaning, treating and application of surface finishes.
3. Form exposed work with smooth, short radius bends, accurate angles and straight edges.
    a. Ease exposed edges to a radius of approximately 1/32 IN.
    b. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
4. Form exposed connections with flush, smooth, hairline joints, using galvanized steel splice locks to splice sections together or by welding.
5. Provide for anchorage of type indicated on the Drawings or as required by field conditions.
    a. Drill or punch holes with smooth edges.
6. Design railing and anchorage system in accordance with NAAMM AMP 521 to withstand loading as required by Building Code.
7. Design railings in accordance with accessibility requirements per the Building Code and ADAAG.

B. Custom fabricate pipe railings to dimensions and profiles indicated.

1. Guardrails:
    a. 1-1/2 IN nominal diameter pipe.
    b. Top rails and intermediate rails: Schedule 40.
    c. Vertical posts: Schedule 80.
2. Handrails mounted to walls or guardrail vertical posts: 1-1/4 IN nominal diameter Schedule 40 pipe.
3. Where details are not indicated, space intermediate rails to requirements of the Building Code or OSHA Standards, whichever requires the more restrictive design.
4. Space vertical posts as required by loading requirements but not more than 4 FT OC.
    a. Avoid locating vertical posts at changes in direction of railing.

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b. Hold vertical post back from corner and provide radiused corners.

5. Space handrail brackets as required by loading requirements but not more than 4 FT OC.
6. Base plate for vertical guardrail posts mounted to top of concrete surface:
   a. 3/8 x 6 x 6 IN square plate welded to the vertical post.
   b. Predrilled to accept four (4) anchors.
7. Base plate for vertical guardrail post mounted to metal structure:
   a. 3/8 x 2-1/2 x 8 IN plate welded to the vertical post.
   b. Predrilled to accept two (2) fasteners.
8. Mounting bracket for vertical guardrail post mounted to vertical concrete surface or web of metal structural member:
   a. Pair of 3/8 IN angles or bent plates welded to vertical posts.
   b. Predrilled to accept two (2) fasteners each.
   c. Provide 1/4 x 4 IN high toe boards at elevated walkways and platforms, where indicated on the Drawings or required by OSHA Standards.
      1) Clearance between bottom of toe board and walking surface shall not exceed 1/4 IN.
   a. Guardrail gates:
      1) Constructed of same material and sizes as the guardrail system.
      2) Width of gate as shown on Drawings.
      3) Hinges:
         a) Self-closing.
            (1) Stainless steel torsion spring.
         b) Similar to Wagner, Model "IR100."
      4) Gate latch and stop:
         a) Spring-loaded pin latch.
            (1) Stainless steel spring.
         b) Similar to Wagner, Model "IR101."

C. Welded Railing Fabrication:

1. All welding to be continuous in accordance with AWS D1.1.
   a. All welded railing joints shall have full penetration welds.
2. All exposed welds to be ground and buffed smooth and flush to match and blend with adjoining surfaces.
   a. NAAMM AMP 521, Type 2.
3. No ragged edges, surface defects, or undercutting of adjoining surfaces will be accepted.

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4. Fit exposed ends of guardrails and handrails with solid terminations.
    a. Return ends of handrails to wall but do not attach to wall.
5. Preassemble items in shop to greatest extent possible to minimize field splicing and assembly of units at project site.

D. Install weeps to drain moisture from hollow sections of railing at exterior locations and in high humidity areas.
1. Drill 1/4 IN weep hole in railings closed at bottom:
    a. 1 IN above walkway surface at bottom of posts.
        1) 1 IN above solid rod at removable railing sections.
    b. At low point of intermediate rails.
    c. Drill hole prior to galvanizing.
    d. Do not drill weep holes:
        1) In bottom of base plate.

E. Expansion Joints:
1. Joints to be designed to allow expansion and contraction of railing and still meet design loads required.
    a. Top rail splices and expansion joints shall be located within 8 IN of post or other support.
    b. Where railings span building or tank expansion joints; provide a railing expansion joint in the span crossing the building or tank expansion joint.
2. Provide expansion joints in any continuous run exceeding 20 FT in length.
    a. Space expansion joints at not more than 40 FT on center.
3. Provide minimum 0.10 IN of expansion joint for each 20 FT length of top rail for each 25 DegF differential between installation temperature and maximum design temperature.
    a. Maximum expansion joint width at time of installation shall not exceed 3/8 IN.
        1) Provide additional expansion joints as required to limit expansion joint width.
4. Provide slip-joint with internal sleeve.
    a. Extend slip joint min 2 IN beyond joint at maximum design width.
    b. Fasten internal sleeve securely to one side
        1) Provide allen-head set screw located in bottom of rail.
        2) Rivets or exposed screw heads are not acceptable.

F. Finish: Galvanized after fabrication.

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PART 3 - EXECUTION

3.01 PREPARATION

A. Prior to installation, inspect and verify condition of substrate.

B. Correct surface defects or conditions which may interfere with or prevent a satisfactory installation.

3.02 INSTALLATION

A. Install handrails and guardrails to meet loading requirements of the Building Code.

B. Install products in accordance with NAAMM AMP 521 and manufacturer's instructions.

C. Set work accurately in location, alignment and elevation; plumb, level, and true.

1. Measure from established lines and items which are to be built into concrete, masonry or similar construction.

D. Align railings prior to securing in place to assure proper matching at butting and expansion joints and correct alignment throughout their length.

1. Provide shims as required.

E. Install proper sized expansion joints based on temperature at time of installation and differential coefficient of expansion of materials in all railings as recommended by manufacturer.

1. Lubricate expansion joint splice bar for smooth movement of railing sections.

F. Provide removable railing sections where indicated on Drawings.

G. Attach handrails to walls or guardrails with brackets designed for condition.

1. Provide brackets which provide a minimum 1-1/2 IN clearance between handrail and nearest obstruction.

a. Handrails shall not project more than 4-1/2 IN into required stairway width.

2. Anchor handrail brackets to concrete or masonry walls with 1/2 IN stainless steel adhesive anchors and stainless steel hex head bolts.

H. Anchor railings to concrete with minimum 1/2 IN stainless steel adhesive anchors with stainless steel bolts, nuts and washers unless noted otherwise in the Contract documents.

1. Where exposed, bolts shall extend minimum 1/2 IN and maximum 3/4 IN above the top nut.

a. If bolts are cut off to required height, threads must be dressed to allow nuts to be removed without damage to the bolt or the nut.

b. Bevel the top of the bolt after cutting to provide a smooth surface.

I. Anchor railings to metal structure with minimum 3/4 IN stainless steel bolts, nuts and washers.

J. Install toeboards to fit tight to the walking surface.

1. Attach to railing vertical post with manufacturer's standard mounting clamp:

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a. Adjustable.

b. Designed to engage in extruded slot on back of toeboard.

2. Provide splice bars, corner splices and brackets:

a. Manufacturer's standard items as required for a complete installation.

3. Notch toeboards at base plates or other obstructions.

4. Bottom of toeboard shall not exceed 1/4 IN above walking surface.

K. Repair damaged galvanized surfaces in accordance with ASTM A780.

1. Properly prepare surface in accordance with galvanizing repair paint manufacturer's recommendations.

2. Apply minimum 6 mils DFT of galvanizing repair paint in accordance with manufacturer's recommendations.

L. Prepare and paint railings in accordance with Specification Section 09 90 00.

M. Provide railings as required for stair construction identified in Specification Section 05 50 10.

N. Install guardrail gate plumb and level in location shown on Drawings.

1. Center gate in opening.

2. Top of gate to match top of guardrail.

3. Fasten hinges to gate and jamb post:

a. Minimum three (3) 1/4 IN stainless steel countersunk machine screws per leaf.

b. Drill and tap into railing and gate vertical posts.

4. Provide not less than two (2) hinges per gate.

5. Install gate latch and stop on strike side of opening.

a. Fasten to gate with 1/4 IN stainless steel countersunk machine screws.

b. Drill and tap into gate vertical post.

c. Drill hole in railing vertical post to receive latch pin.

6. Adjust to provide smooth operation:

Self-closing and self-latching.

END OF SECTION

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SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Wood blocking and nailers.
2. Wood furring
3. Wood sleepers
4. Plywood backing panels.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR, Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

1.03 DEFINITIONS

A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise indicated.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NELMA - Northeastern Lumber Manufacturers Association.
2. NLGA - National Lumber Grades Authority.
3. RIS - Redwood Inspection Service.
4. SPIB - Southern Pine Inspection Bureau.
5. WCLIB - West Coast Lumber Inspection Bureau.
6. WWPA - Western Wood Products Association.

1.04 SUBMITTALS

A. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels; place spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

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PART 2 - PRODUCTS

2.01 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

1. Factory mark each piece of lumber with grade stamp of grading agency.

2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.

3. Provide dressed lumber, S4S, unless otherwise indicated.

4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2 IN nominal (38 mm actual) thickness or less, unless otherwise indicated.

2.02 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and AWPA C9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

1. Preservative Chemicals: Acceptable to authorities having jurisdiction.

B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood, nailers, blocking and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.

2. Wood sills, blocking and similar concealed members in contact with masonry or concrete.

2.03 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, provide materials that comply with performance requirements in AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to and ASTM D5516, for plywood.

2. Use treatment that does not promote corrosion of metal fasteners.

3. Use Exterior type for exterior locations and where indicated.

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4. Use Interior Type A High Temperature (HT), unless otherwise indicated.

2.04 DIMENSION LUMBER

A. General: Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.

2.05 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including the following:

1. Nailers.

2. Blocking.

B. For items of dimension lumber size, provide Standard, Stud, or No. 3 grade lumber with 19 percent maximum moisture content and any of the following species:

1. Mixed southern pine; SPIB.

2. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.

C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine; No. 2 grade; SPIB.

2.06 PLYWOOD BACKING PANELS

A. Comm. Room: Communication and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4 IN thick. A side out, painted.

2.07 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: CABO NER-272.

D. Wood Screws: ASME B18.6.1.

E. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).

F. Bolts: Steel bolts complying with ASTM A307, Grade A (ASTM F568M, Property Class 4.6); with ASTM A563 (ASTM A563M) hex nuts and, where indicated, flat washers.

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G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E488 conducted by a qualified independent testing and inspecting agency.

1. Material: Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2 (ASTM F738M and ASTM F836M, Grade A1 or A4).

H. Screws for fastening to cold-formed metal framing: ASTM 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

C. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. CABO NER-272 for power-driven fasteners.
2. Published requirements of metal framing anchor manufacturer.
3. Table 2305.2 “Fastening Schedule”, in the Boca National Building Code.

D. 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 between members. Install fasteners without splitting wood; predrill as required.

E. Use finishing nails for exposed work, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

3.02 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build anchor bolts into masonry during installation of masonry work. Where possible, secure anchor bolts to formwork before concrete placement.

END OF SECTION

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SECTION 06 16 44 - EXTERIOR GYPSUM SHEATHING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes.

1. Fiberglass-mat faced, moisture resistant exterior gypsum sheathing.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Section 05 40 00 – Cold Formed Metal Framing

D. Section 07 21 00 - Building Insulation.

E. Section 09 21 16 - Gypsum Board Assemblies.

1.03 REFERENCED STANDARDS

A. ASTM International (ASTM):

1. C473, Standard Test Methods for Physical Testing of Gypsum Panel Products.
2. C1177, Standard Specification for Glass Mat Gypsum Substrate for use as Sheathing.
3. C1280, Standard Specification for Application of Gypsum Sheathing.

1.04 QUALITY ASSURANCE

A. Qualifications of workmen: Provide sufficient workmen and supervisors who shall be present at all times during execution of this portion of the Work and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.

1.05 PRODUCT HANDLING

A. Protection:

1. Store all materials in such a manner as to ensure proper ventilation and drainage to protect against damage and the weather.
2. Keep all material clearly identified; keep all damaged material clearly identified as damaged, and separately store to prevent its inadvertent use.
3. Do not allow installation of damaged or otherwise non-complying material.
4. Use all means necessary to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

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1.06 SUBMITTALS

A. Product Data: Manufacturer's specifications and installation instructions for each product specified.

1.07 WARRANTY

A. Five (5) years against manufacturing defects.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Georgia-Pacific Gypsum LLC.

1. Fiberglass-Mat Faced Gypsum Sheathing: DensGlass Gold.

B. Product referenced is intended to establish the preferred quality level and performance desired. Products of other manufacturers that meet or exceed this level of quality may be submitted for approval.

2.02 MATERIALS

A. Alternative Materials submitted for approval must comply with the following minimum standards:

1. Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177.

a. Thickness: 1/2 IN.

b. Width: 4 FT.

c. Length: 8 FT.

d. Weight: 1.9 LBS/SQ FT.

e. Edges: Square.

f. Surfacing: Coated fiberglass mat on face, back and long edges.

g. Racking Strength: ASTM E72 Not less than 540 LBS/SQ FT dry.

h. Flexural Strength, Parallel: ASTM C473, 80 LBF, parallel.

i. Humidification Deflection: ASTM C1177, Not more than 1/4 IN.

j. Permeance: ASTM E96, 23 perms.

k. R-Value: ASTM C518, 0.56.

2.03 ACCESSORIES

A. Screws: ASTM C1002, corrosion resistant treated.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection:

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1. Prior to all Work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
2. Verify that work may be performed in strict accordance with the original design and all pertinent codes, regulations and that installation may proceed in accordance with the manufacturer's printed instructions.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Architect.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 WORKMANSHIP

A. General: All sheathing shall be installed in such a manner as to produce joints true, tight, and well secured with all members assembled in accordance with the Drawings and with all pertinent codes and regulations.

B. Manufacturer's Recommendations:

1. Install product per current Manufacturer's printed recommendations.

3.03 GENERAL INSTALLATION

A. General:

1. Install product in strict accordance with manufacturer's printed instructions.
2. Contractor shall keep a copy of the manufacturer's printed instructions on site at all times while work is progressing.

B. Application:

1. Install in a manner to minimize the number of abutting joints.
2. Install panels with face side out.
3. Install panels with 1/4 gap where panels abut other construction or penetrations. Do not force product into place.
4. Support all panel edges securely on framing members.
5. Attach to framing with corrosion resistant screws.

3.04 PROTECTION

A. Protect installed products from damage due to weather, construction, and other causes natural or otherwise during the remainder of the construction period.

B. Remove and replace any damaged or defective panels at no cost to Owner.

END OF SECTION

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SECTION 06 20 00 - FINISH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Finish carpentry items other than shop fabricated work.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Section 06 41 10 - Architectural Cabinetwork and Millwork: Shop fabricated cabinetwork.

B. Section 08 14 16 - Flush Wood Doors.

C. Section 08 70 00 - Finish Hardware.

D. Section 09 90 00 - Painting and Protective Coatings: Painting and finishing of finish carpentry items.

1.03 REFERENCED STANDARDS

A. AWI - Quality Standards.

B. FS L-P-508 - Plastic Sheet, Laminated, Decorative, and Non-Decorative.

C. FS MM-L-736 - Lumber – Hardwood.

D. FS MMM-A-130 - Adhesive: Contact.

E. PS 1 - Construction and Industrial Plywood.

F. PS 20 - American Softwood Lumber Standard.

G. PS 58 - Basic Hardwood.

H. NLGA - National Lumber Grading Authority.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Indicate materials, component profiles, fastening methods, jointing details, finishes, accessories, and a minimum scale of 1-1/2 IN to 1 FT (1:10).

C. Shop drawings, product data, and manufacturer's instructions.

D. Samples.

1.05 QUALITY ASSURANCE

A. Perform finish carpentry work in accordance with AWI Quality Standards, custom grade.

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1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver wood materials under provisions of Section 01 65 50 - Delivery, Storage and Handling.

B. Store indoors, in ventilated areas with constant minimum temperature of 60 Deg. F and maximum relative humidity of 55 percent.

PART 2 - PRODUCTS

2.01 LUMBER MATERIALS

A. Softwood lumber: PS 20; premium grade in accordance with AWI; maximum moisture content of 6 percent of interior work.

B. Hardwood Lumber: Premium grade in accordance with A101; maximum moisture content of 6 percent; plain sliced red oak, suitable for transparent finish.

2.02 SHEET MATERIALS

A. Softwood Plywood – PS 1; premium grade in accordance with AWI; core material of lumber or particleboard; thickness 3/4 IN unless otherwise noted.

B. Hardwood Plywood – Premium grade in accordance with AWI and HPVA Grade AA; core material of lumber, or particleboard; thickness 3/4 IN unless otherwise noted; plain-sliced red oak suitable for transparent finish.

C. Wood Particleboard – 44 to 48 LB, medium density, composed of wood chips made with water resistant adhesive; thickness 3/4 IN unless otherwise noted.

D. Hardboard – Pressed wood fiber with resin binder; tempered grade.

2.03 FINISH MATERIALS

A. Plastic Laminate – 0.050 IN general purpose grade; color as shown on Drawings or specified in specific sections.

B. Plastic Laminate Backing – High pressure paper base laminate without a decorative finish; 0.020 IN thick, smooth surface finish.

2.04 ADHESIVE

A. Contact Adhesive: Type recommended by manufacturer.

2.05 ACCESSORIES

A. Nails: Size and type to suit application.

B. Bolts, Nuts, Washers, Lags, and Screws: Size and type to suit application; non-corrosive for exterior, high humidity, and treated wood locations; plain finish at other interior locations.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Set and secure materials and components in place, plumb and level.

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B. Verify mechanical, electrical, and building items affecting this section are placed and ready to receive this work.

C. Prime paint surfaces of items or assemblies in contact with cementitious materials.

D. Fit exposed edges of plywood and particleboard shelving with 3/8 IN thick hardwood edging. Width is thickness of plywood or particleboard.

E. Install hardware supplied by Section 08 70 00 in accordance with manufacturer's instructions.

F. Apply plastic laminate finishes where indicated. Adhere with adhesive over entire surface. Make joint and corners hairline. Match patterns. Slightly bevel arises. Cap exposed edges with plastic laminate of same finish and pattern. Apply laminate backing on reverse side of plastic laminate finished surfaces.

3.02 PREPARATION FOR FINISHING

A. Sand work smooth and set exposed nails and screws. Apply wood filler in exposed nail and screw indentations.

3.03 SCHEDULE

A. Interior:

1. Door and glazed light frames.
2. Moldings, bases, casings, and miscellaneous trim and stops.
3. Loose Shelving – Finish as detailed.

END OF SECTION

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SECTION 06 41 10 - ARCHITECTURAL CABINETWORK AND MILLWORK

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Architectural cabinetwork.
2. Cabinet Hardware.
3. Plastic laminate countertops.
4. Solid Surface countertops and window sills.
5. Stainless steel laminate.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR, Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

C. UPRR Section III Specifications.

D. Division 22 - Plumbing.

E. Division 26 - Electrical.

1.03 REFERENCED STANDARDS

A. American National Standards Institute (ANSI):

1. A208.1, Particleboard, Mat-Formed Wood.

B. ASTM International (ASTM):

1. A269, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
2. A423, Specification for Seamless and Electric-Welded Low-Alloy Steel Tubes.
3. A480, Specification for General Requirements for Flat-Rolled Stainless and Heat- Resisting Steel Plate, Sheet, and Strip.
4. E84, Test Method for Surface Burning Characteristics of Building Materials.

C. Architectural Woodwork Institute (AWI):

1. Architectural Woodwork Quality Standards.

D. National Electrical Manufacturers Association (NEMA):

1. LD-3, High Pressure Decorative Laminates.
2. LD-3.1, Application, Fabrication, and Installation of High-Pressure Decorative Laminates.

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1.04 SUBMITTALS

A. Shop Drawings:

1. See UPRR Division 01.
2. Show location of each item, dimensioned plans and elevations, large- scale details, attachment devices, and other components.
3. Product technical data including:
    a. Acknowledgement that products submitted meet requirements of standards referenced.
    b. Manufacturer's installation instructions.

B. Miscellaneous Submittals.

1. See UPRR Division 01.
2. Millwork fabricator experience qualifications.
3. Listing of millwork fabricators projects within last two years with similar scope.

C. Samples:

1. Provide (1) set of samples of plastic laminate and solid surface material showing full range of manufacturer's colors and finishes for Architect's initial selection.
2. After final selection, provide (4) Samples 2 IN x 3 IN of each plastic laminate, solid surface & stainless steel showing color and finish for Architect's use.

1.05 QUALITY ASSURANCE

A. Qualifications:

1. Fabricator shall have minimum of 10 years' experience in design and fabrication of architectural cabinetwork with minimum of three successfully completed projects with similar scope in the last 2 years.

B. Miscellaneous:

1. Construction details, fastening, tolerances and workmanship: Architectural Woodwork Institute (AWI) custom grade standards with exceptions indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver all millwork items to the project site to allow material to acclimate to the surrounding environment a minimum 96 HRS prior to installation.

PART 2 - PRODUCTS

2.01 WOOD MATERIALS

A. Softwood Lumber: PS 20; graded in accordance with AWI premium grade; maximum moisture content of 6 percent; species and grade as follows:

1. Cabinet Frame: Douglas Fir, plain or rotary cut.

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2.02 SHEET MATERIALS

A. Softwood Plywood: PS 1; graded in accordance with AWI premium grade; core material of lumber or medium density particleboard.

B. Semi-Exposed Surfaces: 3/4 IN, 44 LB medium-density particleboard with almond color melamine.

2.03 LAMINATE MATERIALS

A. Plastic Laminate – NEMA LD 3, GP – 50 general purpose type, color as selected; matte finish.

B. Laminate Backing Sheet – LD3 BK20 Backing Grade.

C. Acceptable laminate manufacturers:

1. Formica.
2. Nevamar.
3. Wilsonart.
4. Pionite.
5. Substitutions – Under provisions of Section 01 33 00.

D. Melamine for Interior Cabinet Surfaces:

1. Compatible with primary cabinet laminate manufacturer's standard melamine interior surfacing.

2.04 SOLID SURFACE MATERIAL COUNTERTOPS AND INTERIOR WINDOW SILLS

A. Countertops: Provide countertops with the following front and backsplash style:

1. Front: Radius edge with apron, 2 IN high with 3/8 IN radius.
2. Backsplash: Radius edge with 3/8 IN radius.
3. Endsplash: Matching backsplash.
4. 1/2 IN thick, solid surface material.
5. Backsplashes: 1/2 IN thick, solid surface material.

B. Window Sills: Provide window sills as indicated on the drawings:

1. 1/2 IN thick, solid surface material.

2.05 STAINLESS STEEL MATERIAL

A. 22 gauge, Type 304 stainless steel sheets.

2.06 ACCESSORIES

A. Adhesive: Type recommended by laminate manufacturer to suit application.

B. Fasteners: Size and type to suit application.

2.07 HARDWARE

A. Cabinet Shelf Standards and Rests: K&V #225 recessed standards with #256 supports, US26D finish.

B. Drawer and Door Pulls: Stanley 4484 – US26D finish.

C. Cabinet Locks: National C8103 or equal – US26D finish.

D. Drawer Slides: Blum 430E series.

E. Hinges: Stanley 1592 x 4 x 641, one (1) pair doors to 48 IN height 1-1/2 pair doors 48 IN to 7 FT height.

F. Catches: Stanley SP41: Magnetic.

G. Touch Latch: Ives #821.

H. Grommets: Minimum 1-1/2 IN DIA plastic grommets for countertops, color to match.

I. Mail Box Label Holders; brushed stainless steel

J. Shelving Standards and Brackets: K&V #87 recessed standards with #187 brackets, US26D finish.

2.08 FABRICATION

A. Shop assembles casework for delivery to site in units easily handled and to permit passage through building openings.

B. Fit shelves, doors, and exposed edges with 3/8 IN matching hardwood edging. Use full length pieces only.

C. Door and Drawer Fronts: 3/4 IN thick.

D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and side cutting.

E. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Make corners and joints hairline. Locate counter butt joints minimum 2 FT from sink cut-outs.

F. Cap exposed plastic laminate edges with material of same finish and pattern unless shown otherwise on Drawings.

G. Mechanically fasten backsplashes to countertops.

H. Apply laminate backing sheet to reverse side of plastic laminate surfaces.

I. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Prime paint contact surfaces of cut edges.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify dimensions at site.

B. Verify adequacy of backing and support framing.

C. Verify locations of items furnished in other sections.

3.02 INSTALLATION

A. Set and secure casework in place; rigid, plumb, and level.

B. Use purpose designed fixture attachments at concealed locations for wall mounted components.

C. Use threaded steel concealed joint fasteners to align and secure adjoining cabinet units.

D. Carefully scribe casework which is against other building materials, leaving gaps of 1/32 IN maximum. Do not use additional overlay trim for this purpose.

E. Secure cabinet and counter bases to floor using appropriate angles and anchorages.

F. Countersink anchorage devices at exposed locations used to wall mount components, and conceal with solid plugs of species to match surrounding wood. Finish flush with surrounding surfaces.

G. Cut holes in countertops where shown on drawings or required for electrical cords. Fill hole with plastic grommet with plug (cap) to be installed when cord is not in use.

H. Provide backer sheet on each plastic laminated item.

I. Provide all trim, fillers, closures, stands, supports, sleeves, collars, escutcheons, brackets, braces or other miscellaneous items required for complete installation.

J. Install extra locks where directed; deliver unused locks and keys to Owner.

3.03 ADJUSTING AND CLEANING

A. Adjusting doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly and correctly.

B. Clean casework, counters, shelves, hardware, fittings and fixtures.

END OF SECTION

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SECTION 06 64 00 – PLASTIC PANELING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Requirements for furnishing and installing fiberglass reinforced plastic panels according to manufacturer's recommendations.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Section 09 21 16 - Gypsum Board Assemblies.

1.03 SUBMITTALS

A. Submit in accordance with Section 01 33 00.

1. Color samples of each type of panel, each type of trim and fastener.

a. After Architect's selection, provide 4 samples of selected panel color

2. Manufacturer's Installation Guide.

1.04 QUALITY ASSURANCE

A. Provide panels and molding only from the same manufacturer to ensure warranty and color harmonization of accessories.

B. Qualifications of installers:

1. Use only thoroughly trained and experienced installers who are completely familiar with the requirements of this Work and the recommendations contained in the referenced standards.

2. In acceptance or rejection of installed work, no allowance will be made for lack of skill on the part of the installer.

C. Codes and Standards: In addition to complying with all pertinent codes and regulations:

1. Meet ASTM E84, flame spread less than 200, smoke developed less than 450.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials: Package sheets on skids or pallets for shipment to project site.

B. Storage of Materials: Store panels indoors in a dry place at the project site.

C. Handling: Remove foreign matter from face of panel by use of a soft bristle brush, avoiding abrasive action.

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1.06 PROJECT CONDITIONS:

A. Installation shall not begin until building is enclosed, permanent heating and cooling equipment is in operation, and residual moisture from concrete work has dissipated.

B. During installation and for not less than 48 HRS before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.

C. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

PART 2 - PRODUCTS

2.01 PLASTIC SHEET PANELING

A. Glass Fiber Reinforced Plastic Paneling:

1. Shall be manufactured by Marlite or an approved equal.
2. Interior (face) skin shall be .090 IN firerated (FRP) reinforced fiberglass.
3. Color shall be selected by Architect from manufacturer's standard color selection.
4. Surface Finish: Smooth
5. Stabilizer sheet under face shall be 6-mm thick non-asbestos fiber reinforced cement sheet.
6. Size tolerance:
   a. Width: ±1/8 IN.
   b. Length: ±1/8 IN.
   c. Thickness: ±1/16 IN.

B. Adhesive:

1. The adhesive used in laminating shall be polyurethane reactive (PUR), hot melt type, applied heated 250 DegF.
2. The entire composite shall be pressed with maximum pressure under controlled and consistent pressure to develop the maximum possible tensile strength.

C. Sealants: Panels to be sealed with Class A grade sealant.

D. Division Bars, Corner Trim, Moldings: Panel manufacturer's standard length extruded vinyl pieces; longest length possible - to eliminate end joints. Color to match panels.

E. Fasteners: Non-corrosive drive rivets in harmonizing colors. Refer to Manufacturer's Installation Guide for rivet pattern and installation instructions.

PART 3 - EXECUTION

3.01 PREPARATION

A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.

B. Do not begin installation until backup surfaces are put into satisfactory condition.

3.02 APPLICATION

A. Do all cutting and drilling with carbide tipped saw blades or drill bits, or cut with snips.

B. Install panels with manufacturer's recommended gap for panel field and corner joints.

C. Fastener holes in the panels must be predrilled 1/8 IN (3.2 mm) oversize.

D. Using products acceptable to manufacturer, install the FRP panel system in accordance with panel manufacturer's printed instructions.

3.03 CLEANING

A. Remove any adhesive or excessive sealant from panel face using solvent or cleaner recommended by panel manufacturer.

END OF SECTION

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SECTION 06 71 13 - FIBERGLASS GRATING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Fiberglass-reinforced plastic grating and stair treads used for outdoor platforms, trench covers, track pan crossings, stairs, and raised walkways. Contractor shall furnish all labor, materials, tools, equipment and services as required.

B. Completely coordinate with other related work, structural framing work in particular.

C. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a sound, secure and complete installation.

1.02 REFERENCED STANDARDS

A. ASTM International (ASTM):

1. C581, Standard Practice for Determining Chemical Resistance of Thermosetting Resins Used in Glass-Fiber-Reinforced Structures Intended for Liquid Service.
2. D790, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
3. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Submittals required by this section include, but are not limited by, the following:

1. Manufacturer's product data for grating and accessory components, including product load and deflection information.
2. Shop drawings for the fabrication and installation layout of the grating.
3. Product sample: 4 x 4 IN square.

PART 2 - PRODUCTS

2.01 FIBERGLASS GRATING

A. Grating shall be fiberglass roving reinforced thermoset plastic, constructed to provide thorough wetting of the glass by the polyester resin. The resin shall be fire-resistant, producing a Class 1 flame spread below 25 and a fuel contribution of zero (0) when tested in accordance with ASTM E84.

B. The grating shall be made in a mold and of single piece construction so the reinforcing glass of the bearing bars is interwoven with the glass of the crossbars.

C. Design:

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1. Grating grid pattern shall be 1-1/2 x 1-1/2 x 1-1/2 IN thick and capable of supporting a 100 LBS/SQ FT uniform load with a defection of less than 0.25 IN when spanning 36 IN. Approved pultruded grating with alternate grid pattern may be submitted for review.
2. Angular silica particles shall be integrally embedded or flooded to a maximum depth of 3/16 IN, in the top surface of the grating as an anti-slip surface.

2.02 FIBERGLASS STAIR TREAD

A. Stair tread shall be fiberglass roving reinforced polyester 1-1/2 IN high, having a grid pattern with bearing bars 1-1/2 IN and cross bars 6 IN OC, construction to provide thorough wetting of the glass by the polyester resin. The resin shall be fire-retardant, producing a Class 1 flame spread below 25 and a fuel contribution of zero (0) when tested in accordance with ASTM E84.

B. The tread shall be made in a mold and of single piece construction so the reinforcing glass of the bearing bars is interwoven with the reinforcing glass of the crossbars.

C. The solid nose construction shall be made integral with the tread and shall be 1-3/4 IN wide. The nose of the tread shall be a darker color to distinctively contrast with the rest of the walking surface.

D. Design:

1. The stair tread grid pattern shall be 1-1/2 x 6 x 1-1/2 IN thick and capable of supporting a concentrated load of 1,000 LBS with a deflection of less 0.65 IN when spanning 36 IN.
2. Angular silica particles shall be integrally embedded or flooded, to a maximum depth of 3/16 IN, in the top surface of the grating as an anti-slip surface.

2.03 GRADING CLIPS

A. Clips shall be recommended and supplied by grating manufacturer.

PART 3 - EXECUTION

3.01 GENERAL

A. Grating and stair tread shall be as free, as commercially possible, from visual defects such as foreign inclusions, de-lamination, blisters, resin burns, air bubbles and pits. The surface shall have a smooth finish (except for grit top surfaces) with an average of not over four (4) surface pits per square foot of surface area, with no pits exceeding 1/8 IN DIA, or 1/32 IN depth.

3.02 STORAGE AND HANDLING

A. Store grating and stair tread on pallets and cover. Do not top load. Separate each piece with a non-scratching spacer, such as wood.

B. Protect from damage. Avoid sharp or impinging loads such as chain slings. Do not drag panels across one another unless separated by a non-scratching spacer.

C. Sand and re-surface coat any scratches, crushed or shipped edges or cuts required in the field.

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3.03 INSTALLATION

A. Perform all installation in accordance with the drawings and approved submittals.

B. Check supporting structures and correct layout and alignment. Verify that support surfaces are free of debris. Check measurement of grading and stair tread to determine fit.

C. Set the work accurately in location, alignment and elevation; plumb, level, true and free from rack; measured from established lines and levels.

D. Fit grading panels together to form 1/4 IN joints at adjoining panels and at exterior curbs, unless otherwise indicated. Align bars of adjoining panels of grating.

E. Tolerances of cuts and of fitting panels shall be ±1/8 IN.

F. Field-cut or sanded surfaces shall be coated with resin furnished by manufacturer and applied in accordance with manufacturer's instructions.

G. Provide bottom support under the periphery of all panels unless shown otherwise on the drawings (such as the use of end panel connectors where panels butt together). All connectors are to be specified and determined to be suitable.

H. Each grating panel shall have hold-down clips through-bolted to each supporting beam, with a minimum of two clips at each beam, and a maximum spacing along the beam between clips of 4 FT apart. Bolts shall be stainless steel, 1/4 IN DIA, with locknuts. Clips shall be "M" type. At joints between adjacent grating panels which do not occur over a beam, the panels shall be attached to each other (between supports) to prevent differential vertical deflections, using grating manufacturer's standard clips.

I. If the scope of work requires the contractor to perform additional tasks that may damage the installed grating, the contractor is responsible for covering the grating with plywood, or other suitable protective material.

END OF SECTION

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SECTION 07 19 00 - WATER REPELLENTS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes clear water-repellent coatings for the following vertical and non-traffic horizontal surfaces:

1. Concrete Masonry Units.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

1.03 SUBMITTALS

A. Product Data: Include manufacturer's specifications, surface preparation and application instructions, recommendations for water repellents for each surface to be treated, and protection and cleaning instructions. Include data substantiating that materials are recommended by manufacturer for applications indicated and comply with requirements.

1.04 PERFORMANCE REQUIREMENTS

A. Provide water repellents with the following properties based on testing manufacturer's standard products, according to test methods indicated, applied to substrates simulating Project conditions using same materials and application methods to be used for Project.

1. Absorption: Minimum 90 percent reduction of absorption after 24 HRS in comparison of treated and untreated specimens.

   a. Concrete Unit Masonry: ASTM C140.

2. Water-Vapor Transmission: Maximum 10 percent reduction in rate of vapor transmission in comparison of treated and untreated specimens, per ASTM E96.

3. Water Penetration and Leakage through Masonry: Maximum 90 percent reduction in leakage rate in comparison of treated and untreated specimens, per ASTM E514.

4. Durability: Maximum 5 percent loss of water repellency after 2500 HRS of weathering in comparison to specimens before weathering, per ASTM G53.

5. Permeability: Minimum 80 percent breathable in comparison of treated and untreated specimens, per ASTM D1653.

1.05 PROJECT CONDITIONS

A. Weather and Substrate Conditions: Do not proceed with application of water repellent under any of the following conditions, except with written instruction of manufacturer:

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1. Ambient temperature is less than 40 DegF.
2. Concrete surfaces and mortar have cured for less than 28 days.
3. Rain or temperatures below 40 DegF are predicted within 24 HRS.
4. Application is earlier than 24 HRS after surfaces have been wet.
5. Substrate is frozen or surface temperature is less than 40 DegF.
6. Windy condition exists that may cause water repellent to be blown onto vegetation or surfaces not intended to be coated.

1.06 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Submit a written warranty, executed by the applicator and water repellent manufacturer, covering materials and labor, agreeing to repair or replace materials that fail to provide water repellency within the specified warranty period. Warranty does not include deterioration or failure of coating due to unusual weather phenomena, failure of prepared and treated substrate, formation of new joints and cracks in excess of 1/16 IN wide, fire, vandalism, or abuse by maintenance equipment.

1. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the following:

1. Siloxanes: With more than 3.3 LB/GAL (400 g/L) VOCs.
   a. Prime-A-Pell 200; Chemprobe Technologies.
   b. Klere-Seal 908-SX; Pecora Corporation.
   c. Weather Seal Siloxane; ProSoCo, Inc.

2.02 WATER REPELLENTS

A. Siloxanes: Penetrating water repellent. Alkylalkoxysiloxanes that are oligomerous with alcohol, ethanol, mineral spirits, water, or other proprietary solvent carrier.

PART 3 - EXECUTION

3.01 PREPARATION

A. Clean substrate of substances that might interfere with penetration or performance of water repellents. Test for moisture content, according to repellent manufacturer's written instructions, to ensure surface is sufficiently dry.

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B. Test for pH level, according to water repellent manufacturer's written instructions, to ensure chemical bond to silicate minerals.

C. Protect adjoining work, including sealant bond surfaces, from spillage or blow-over of water repellent. Cover adjoining and nearby surfaces of aluminum and glass if there is the possibility of water repellent being deposited on surfaces. Cover live plants and grass.

D. Coordination with Sealants: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.

1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those used in the work.

3.02 APPLICATION

A. Apply a heavy-saturation spray coating of water repellent on surfaces indicated for treatment using low-pressure spray equipment. Comply with manufacturer's written instructions for using airless spraying procedure, unless otherwise indicated.

B. Apply a second saturation spray coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

3.03 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Provide services of a factory-authorized technical service representative to inspect and approve the substrate before application and to instruct the applicator on the product and application method.

3.04 CLEANING

A. Protective Coverings: Remove protective coverings from adjacent surfaces and other protected areas.

B. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Repair damage caused by water-repellent application. Comply with manufacturer's written cleaning instructions.

END OF SECTION

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SECTION 07 21 00 - BUILDING INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board for foundation and slab insulation
2. Glass Fiber Batt and Blanket type building thermal insulation.
3. Glass Fiber Batt and blanket sound attenuation insulation.
4. Simple-Saver Pre Engineered Building insulation.
5. Required R-Values shall be as identified on the Drawings. If R-Values are not referenced on the Drawings, the Contractor will provide the following minimum R-Values.
    a. Roof: R-30.
    b. Exterior Walls: R-19.
    c. Foundation and slab: R-5.5.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Section 03 30 00 - Cast-In-Place Concrete.

D. Section 07 25 00 – Weather Barrier

E. Section 07 26 10 – Vapor Retarders

F. Section 13 34 19 - Metal Building Systems.

1.03 DEFINITIONS

A. Thermal Resistivity: Where the thermal resistivities of insulation products are designated by "R-values," they represent the reciprocal of thermal conductivity (k-values). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 IN thick. Thermal resistivities 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.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data for each type of insulation product specified.

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C. Product test reports from and based on tests performed by a qualified independent testing agency evidencing compliance of insulation products with specified requirements including those for thermal resistance, fire-test-response characteristics, water-vapor transmission, water absorption, and other properties, based on comprehensive testing of current products.

1.05 QUALITY ASSURANCE

A. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products complying with requirements indicated without delaying the Work.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test- response characteristics indicated on Drawings or specified elsewhere in this Section as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Surface-Burning Characteristics: ASTM E84.
2. Fire-Resistance Ratings: ASTM E119.
3. Combustion Characteristics: ASTM E136.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect plastic insulation as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.01 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

A. Manufacturers: Subject to compliance with requirements, provide insulation products by one of the following:

1. Extruded-Polystyrene Board Insulation:
   a. Amoco Foam Products Company.
   b. DiversiFoam Products.
   c. Dow Chemical Co.

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d. UC Industries, Inc.; Owens-Corning Co.

B. Extruded-Polystyrene Board Insulation: Rigid, cellular polystyrene thermal insulation formed from polystyrene base resin by an extrusion process using hydrochl or fluorocarbons as blowing agent to comply with ASTM C578 for type and with other requirements indicated below:

1. Type IV, 1.60 LB /CU FT minimum density, unless otherwise indicated.

2. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indices of 75 and 450, respectively.

a. Recycled Content: Not less than 50 percent blend of post-consumer and recovered polystyrene resins

2.02 GLASS FIBER BLANKET EXTERIOR WALL INSULATION

A. Manufacturers: Subject to compliance with requirements, provide insulation products by one of the following:

a. Certainteed Corporation.

b. Johns-Manville.

c. Owens-Corning Fiberglas Corporation.

d. Knauf Insulation – Fiberglass

B. Glass-Fiber Blanket, Reinforced-Foil Faced: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene

1. Flanged Units: Provide blankets fabricated with facing incorporating 5 IN wide flanges along edges for attachment to framing members.

2.03 GLASS FIBER BLANKET INTERIOR SOUND INSULATION

A. Manufacturers: Subject to compliance with requirements, provide insulation products by one of the following:

a. Certainteed Corporation.

b. Johns-Manville.

c. Owens-Corning Fiberglas Corporation.

d. Knauf Insulation – Fiberglass

B. Glass-Fiber Blanket, Unfaced: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. STC = 50 for walls.

2.04 SIMPLE SAVER SYSTEMS:

A. Manufacturers: Subject to compliance with requirements, provide insulation products by one of the following:

a. Thermal Design Inc.

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B. Reinforced Vinyl Faced Batt (Standing Seam Roof): Thermal insulation using glass fibers to comply with ASTM C665, Type II, Class C with PSK reinforced vinyl facing. Passing ASTM E136 for testing of combustion. Characteristics of unfaced material. Maximum frame speed and smoke developed values of twenty-five (25) and fifty (50) respectively. Welded pin with spacing at manufacturer's recommendation to support insulation:

1. R-Value = R 30 at Roof.

2.05 ACCESSORIES

A. Slag-Wool-Fiber Board Safing Insulation: Semi-rigid boards designed for use as a fire stop at the openings between edge of slab and exterior wall panels, produced by combining slag-wool-fibers with thermosetting resin binders to comply with ASTM C612, Type IA and IB; nominal density of 4 LB/CU FT; passing ASTME 136 for combustion characteristics; thermal resistivity of 4 Deg. F x h x SQ FT/Btu x IN at 75 Deg. F.

B. Caulking Compound: Material approved by manufacturer of safing insulation for sealing joint between foil backing of safing insulation and edge of concrete floor slab against penetration of smoke.

C. Safing Clips: Galvanized steel safing clips approved by manufacturer of safing insulation for holding safing insulation in place.

D. Eave Ventilation Troughs: Preformed rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves

2.06 VAPOR RETARDERS

A. See Section 07 26 10 – Vapor Retarders

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and to determine if other conditions affecting performance of insulation are satisfactory. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean substrates of substances harmful to insulations or vapor retarders, including removing projections capable of puncturing vapor retarders or that interfere with insulation attachment.

3.03 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Install insulation that is undamaged, dry, unsoiled, and unexposed to ice and snow.

C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Apply single layer of insulation to produce thickness indicated.

3.04 INSTALLATION OF PERIMETER AND UNDER-SLAB INSULATION

A. On vertical surfaces, set units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.

B. Protect below-grade insulation on vertical surfaces from damage during backfilling by applying protection board. Set in adhesive according to written instructions of insulation manufacturer.

C. Protect top surface of horizontal insulation from damage during concrete work by applying protection board.

3.05 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Seal joints between closed-cell (non-breathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are placed. F ill voids in completed installation with adhesive, mastic, or sealant as recommended by manufacturer.

C. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.

1. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

D. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:

1. Use blanket widths and lengths that fill cavities formed by framing members. Where more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.

2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. For metal stud construction with unfaced blankets, friction fit insulation between adjoining studs and cover with vapor barrier.

E. Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 LB/CU FT.

3.06 INSTALLATION OF SAFING INSULATION

A. Install safing insulation to fill gap between top of CMU wall and sheet metal closure. Fill voids in metal deck at rated walls. Cut safing insulation wider than gap to be filled to ensure compression fit and seal joint between insulation and edge of slab with caulking approved by safing insulation manufacturer for this purpose. Leave no voids in completed installation.

3.07 PROTECTION

A. General: Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

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SECTION 07 25 00 - WEATHER BARRIER

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Building wrap.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

1.03 ACTION SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: For each type of product.

1.04 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For water-resistive barrier and flexible flashing from ICC-ES.

PART 2 - PRODUCTS

2.01 WATER-RESISTIVE BARRIER

A. Building Wrap: ASTM E1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E84; UV stabilized; and acceptable to authorities having jurisdiction.

1. Products: Subject to compliance with requirements] provide one of the following:

a. Dow Chemical Company (The); Styrofoam Weathermate Plus Brand Housewrap.

b. DuPont (E. I. du Pont de Nemours and Company); Tyvek CommercialWrap.

c. Ludlow Coated Products; Barricade Building Wrap.

d. Pactiv, Inc.; GreenGuard Classic Wrap.

2. Water-Vapor Permeance: Not less than 50 g through 1 SQ m of surface in 24 HRS per ASTM E96/E96M, Desiccant Method (Procedure A).

B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.02 MISCELLANEOUS MATERIALS

A. Flexible Flashing: Self-adhesive butyl rubber or [rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 IN.

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1. Products: Subject to compliance with requirements, provide one of the following:
    a. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; [Vycor Plus Self- Adhered Flashing] [Vycor V40 Self-Adhered Flashing].
    b. Polyguard Products, Inc.; [Polyguard JT-20 Tape] [Polyguard JT-30 Tape].

PART 3 - EXECUTION

3.01 WATER-RESISTIVE BARRIER INSTALLATION

A. Cover sheathing with water-resistive barrier as follows:
    1. Cut back barrier 1/2 IN on each side of the break in supporting members at expansion- or control-joint locations.
    2. Apply barrier to cover vertical flashing with a minimum 4 IN overlap unless otherwise indicated.

B. Building Paper: Apply horizontally with a 2 IN overlap and a 6 IN end lap; fasten to sheathing with galvanized staples or roofing nails.

C. Building Wrap: Comply with manufacturer's written instructions.
    1. Seal seams, edges, fasteners, and penetrations with tape.
    2. Extend into jambs of openings and seal corners with tape.

3.02 FLEXIBLE FLASHING INSTALLATION

A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
    1. Lap seams and junctures with other materials at least 4 IN except that at flashing flanges of other construction, laps need not exceed flange width.
    2. Lap flashing over water-resistive barrier at bottom and sides of openings.
    3. Lap water-resistive barrier over flashing at heads of openings.

END OF SECTION

SECTION 07 26 10 – VAPOR RETARDERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Polyvinyl chloride vapor retarders under concrete slabs.
2. Polyethylene vapor retarders at exterior building walls.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Section 03 30 00 - Cast-in-Place Concrete

D. Section 07 21 00 – Building Insulation

E. Section 07 25 00 - Weather Barrier

1.03 SUBMITTALS

A. Submit manufacturer's literature to the Architect for review.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver all materials free from damage in original packages bearing manufacturer's label.

B. Store all materials on a clean, level surface in a dry place protected from sun and weather such that the temperature stays between 40 DegF and 90 DegF. Stand roll goods in such a way to prevent damage to the ends. Store all materials containing solvents in a dry, cool storage with proper fire and safety precautions.

PART 2 - PRODUCTS

2.01 UNDER-SLAB VAPOR RETARDER

A. Vapor Retarder Material: Nervastral Inc. "Barrier," or approved equal, polyvinyl chloride plastic membrane sheeting, 10 mils thick. Sheets shall be as wide as practicable for proper application which will result in the least number of laps.

B. Adhesive: "Nerva-Plast" cement, or approved equal, synthetic rubber base cement especially manufactured for use with polyvinyl chloride membrane material for cold application. Asphaltic base adhesives will not be accepted.

C. Tape: Tape for the sealing of laps and joints shall be a pressure-sensitive neoprene or vinyl- chloride rubber adhesive tape as recommended by the manufacturer of the vapor barrier material. Tape shall be a minimum of 3 IN wide.

2.02 EXTERIOR WALL VAPOR RETARDER

A. Polyethylene Vapor Retarder: ASTM D4397, minimum 6 mils thickness, with maximum permeance rating of 0.13 perm.

B. Tape: Pressure-sensitive tape pf type recommended by vapor retarder manufacturer for sealing joints and penetrations in vapor retarder

PART 3 - EXECUTION

3.01 INSTALLATION

A. Under-slab Vapor Retarder:

1. Vapor retarder sheets shall be laid directly over the compacted gravel or rock fill just before reinforcing is placed and concrete is poured, and shall be carefully installed to avoid puncture or tear.

2. Punctures and tears occurring during subsequent operations shall be patched. Edges shall be lapped not less than 4 IN and end joints shall be lapped not less than 6 IN, with all laps continuously sealed with tape.

3. Barrier shall be carried over any pipes laid on the fill and shall be sealed in waterproof manner to any pipes or conduits which penetrate the fill.

4. Membrane shall be turned up a minimum of 2 IN at the edges and secured to exterior wall foundations or footings, with specified adhesive.

5. Vapor barrier shall be applied to walls, where required, with the same specified adhesive.

6. The placing of stakes through vapor barrier membranes for screening of concrete slabs will not be permitted.

B. Exterior Wall Vapor Retarder

1. 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 filled with loose-fiber insulation.

2. Seal vertical joints in vapor retarders over framing by lapping not less than two (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 IN (406 mm) OC.

3. Seal overlapping joints in vapor retarders with adhesives or vapor-retarder tape according to vapor retarder manufacturer's instructions. Seal butt joints and fastener penetrations with vapor-retarder tape. Locate all joints over framing members or other solid substrates.

4. Firmly attach vapor retarders to substrates with mechanical fasteners or adhesives as recommended by vapor retarder manufacturer.

5. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.

6. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

3.02 PROTECTION

A. General: Protect installed vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes.

END OF SECTION

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SECTION 07 54 00 – THERMOPLASTIC MEMBRANE ROOFING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Fully Adhered membrane roofing system.
2. Vapor retarder.
3. Roof insulation

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Division 6 - “Miscellaneous Carpentry” for wood nailers, curbs, and blocking

D. Division 7 - “Building Insulation" for insulation beneath the roof deck.

E. Division 7 - "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counter flashings.

F. Division 7 - “Joint Sealants."

G. Division 32 for roof drains.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Insulation fastening patterns.

C. Samples for Verification: For the following products:

1. 12-by-12-inch square of sheet roofing, of color specified, including T-shaped side and end lap seam.
2. 12-by-12-inch square of roof insulation.
3. 12-inch length of metal termination bars.
4. 12-inch length of battens.
5. Six insulation fasteners of each type, length, and finish.
6. Six roof cover fasteners of each type, length, and finish.

D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

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E. Qualification Data: For Installer and manufacturer.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of roofing system.

G. Research/Evaluation Reports: For components of membrane roofing system.

H. Maintenance Data: For roofing system to include in maintenance manuals.

I. Warranties: Special warranties specified in this Section.

J. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.04 DEFINITIONS

A. Source Limitations: Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.

C. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

1.05 PERFORMANCE REQUIREMENTS

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.

C. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist the factored design uplift pressures calculated according to SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems."

D. Roof Insulation System. All foam plastic roof insulation shall meet UL Standard 1256.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's warranty.

B. Manufacturer Qualifications: A qualified manufacturer that has UL listing for membrane roofing system identical to that used for this Project.

C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

D. Source Limitations: Obtain components for membrane roofing system approved by roofing membrane manufacturer.

E. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.

2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

1.07 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.

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.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

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. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.08 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.09 WARRANTY

A. Special Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special warranty includes roofing membrane, base flashings, roofing accessories, roof insulation, fasteners, and other components of membrane roofing system.

2. Warranty Period: 15 years from date of Substantial Completion

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PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified.

2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.02 THERMOPLASTIC SINGLE PLY ROOFING

A. Thermoplastic Polyolefin (TPO) Sheet:

1. Carlisle Syntec Systems; Carlisle Corp.

2. Versico, Inc.

3. GenFlex

B. Thickness: 60 mils nominal.

C. Exposed Face Color: White or Gray or as approved by the Architect

2.03 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.

1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

B. Sheet Flashing: 60-mil-thick EPDM, partially cured or cured, according to application.

C. Bonding Adhesive: Manufacturer's standard bonding adhesive.

D. Seaming Material: Single-component butyl splicing adhesive and splice cleaner

E. Lap Sealant: Manufacturer's standard single-component sealant, color to match roofing membrane.

F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

G. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.

H. Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.

I. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane to substrate, and acceptable to membrane roofing system manufacturer.

J. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories

2.04 ROOF INSULATION

A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

B. Products: Provide roof insulation in thicknesses as shown on the Drawings. Note Bidders may select from the following list of products. Minimum Design R Value shall be R-20 for all roof areas.

1. Polyisocyanurate Board Insulation as manufactured by::

   a. Apache Products Co.

   b. Atlas Roofing Corporation.

   c. Celotex Corp. (The).

   d. GAF Materials Corp.

   e. NRG Barriers, Inc.

2. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV, 1.6-lb/cu. ft. minimum density, square edged. Must meet UL 1256. as manufactured by:

   a. Dow Chemical Company.

   b. Owens Corning.

   c. Tenneco Building Products.

C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 3/16 inch per 12 inches , unless otherwise indicated.

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.05 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Cold Fluid-Applied Adhesive: Manufacturer's standard cold fluid-applied adhesive formulated to adhere roof insulation to substrate.

D. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch thick.

1. Product: Subject to compliance with requirements, provided "Dens-Deck" manufactured by Georgia-Pacific Corporation.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 5 Section "Steel Deck."
4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.03 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

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G. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

H. Mechanically Fastened and Adhered Insulation: Install each layer of insulation and secure first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.

2. Install subsequent layers of insulation in a cold fluid-applied adhesive.

I. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Loosely butt cover boards together and fasten to roof deck.

1. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

3.04 ADHERED ROOFING MEMBRANE INSTALLATION

A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll roofing membrane and allow to relax before installing.

B. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

C. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.

D. Mechanically or adhesively fasten roofing membrane securely at terminations, penetrations, and perimeter of roofing.

E. Apply roofing membrane with side laps shingled with slope of roof deck where possible.

F. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.

1. Apply a continuous bead of in-seam sealant before closing splice if required by membrane roofing system manufacturer.

G. Repair tears, voids, and lapped seams in roofing that does not meet requirements.

H. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.

3.05 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

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B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings.

3.06 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

1. Notify Architect or Owner 48 hours in advance of date and time of inspection.

C. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

3.07 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

3.08 ROOFING INSTALLER'S WARRANTY

A. Upon acceptance of inspection the roofing manufacturer and installer shall provide to the Owner the manufactures standard written warranty as required under the provisions stated in Part 1 herein this section

END OF SECTION

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SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Sheet metal flashing and trim in the following categories:

a. Thru-wall flashing.

b. Miscellaneous sheet metal flashing and trim not included in the Pre-Engineered Metal Building packages.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Division 07 - Joint Sealants.

D. Division 13 - Metal Building Systems.

1.03 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 01 Specification Sections.

B. Product Data including manufacturer's material and finish data, installation instructions, and general recommendations for each specified flashing material and fabricated product.

C. Shop Drawings of each item specified showing layout, profiles, methods of joining, and anchorage details.

D. Samples of sheet metal flashing, trim, and accessory items, in the specified finish. Where finish involves normal color and texture variations, include Sample sets composed of 2 or more units showing the full range of variations expected.

1. 4 IN square samples of specified sheet materials to be exposed as finished surfaces.

E. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experience Installer who has completed sheet metal flashing and trim work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

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1.05 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing.

B. Fabricate and install flashings at roof edges to comply with recommendations of FM Loss Prevention Data Sheet 1-49 for the following wind zone:

1. Wind Zone 4: Winds up to 250 mph.

1.06 PROJECT CONDITIONS

A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART 2 - PRODUCTS

2.01 METALS

A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability of alloy and temper designated below:

1. Factory-painted aluminum sheet: ASTM B209 (ASTM B209M), 5005-H14, with a minimum thickness of 0.032 IN, unless otherwise indicated.

B. Lead Sheet: ASTM B749, Type L51121, copper-bearing lead sheet, with a minimum thickness of 0.0625 IN, except not less than 0.0937 IN thick for applications where burning (welding) is involved.

C. Galvanized steel: ASTM A525, coating G90, mill phosphatized for paint adhesion, 24 gauge unless otherwise shown or specified.

2.02 CONCEALED THROUGH-WALL SHEET METAL FLASHING

A. Material: Fabricate from the following metal:

1. Copper fabric flashing: 5 OZ/SQ FT.

B. Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

1. Advanced Flashing; Advanced Building Products.

2. Sandell Flashing; Sandell Manufacturing Co.

3. York Flashing; York Manufacturing, Inc.

2.03 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.

B. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat.

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C. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

D. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Section 07 92 00 - Joint Sealants.

E. Epoxy Seam Sealer: 2-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior and interior nonmoving joints, including riveted joints.

F. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather- resistant seaming and adhesive application of flashing sheet metal.

G. 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 thickness required for performance.

H. Roofing Cement: ASTM D4586, Type I, asbestos free, asphalt based.

I. Underlayment: Self-adhering modified-bitumen sheet with polyethylene sheet on exposed surface, type specially formulated for application under metal roofing.

2.04 FABRICATION, GENERAL

A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.

B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.

D. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

E. Expansion Provisions: Space movement joints at maximum of 10 FT with no joints allowed within 24 IN of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 IN deep, filled with mastic sealant (concealed within joints).

F. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

G. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

H. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.

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I. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.

1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.05 SHEET METAL FABRICATIONS

A. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.

B. Exposed Trim, Pit Pans, and Metal Hood: Fabricate from the following material.

1. Aluminum: 0.063 IN thick.

2.06 ALUMINUM FINISHES

A. General: Comply with Aluminum Association's (AA) "Designation System for Aluminum Finishes" for finish designations and application recommendations.

B. Surfaces Concealed from View: Mill finish or clear satin anodized as selected by fabricator.

C. Exposed Aluminum Surfaces: High-Performance Organic Coating Finish, AA-C12C42R1x (Organic Coating: as specified below).

1. Prepare, pretreat, and apply coating to to comply with coating and resin manufacturer's instructions. Fluoropolymer 2-Coat Coating System.

2. Manufacturer's standard 2-coat, thermocured system composed of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidine fluoride resin by weight; complying with AAMA 605.2.

3. Color and Gloss: As selected by Architect from manufacturer's standard range of choices for color and gloss.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions under which sheet metal flashing and trim are to be installed and verify that Work may properly commence. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General: Unless otherwise indicated, install sheet metal flashing and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "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.

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B. Install exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Expansion Provisions: Provide for thermal expansion of exposed sheet metal Work. Space movement joints at maximum of 10 FT with no joints allowed within 24 IN of corner of intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 IN deep, filled with mastic sealant (concealed within joints).

D. Seams: Fabricate nonmoving seams in aluminum with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

E. Separations: Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces, at locations of contact, with asphalt mastic or other permanent separation as recommended by manufacturer.

3.03 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

B. Provide final protection and maintain conditions that ensure sheet metal flashing and trim Work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION

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SECTION 07 72 14 - ROOF ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Self-supporting roof curbs.
2. Pipe penetration seals.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

1.03 COORDINATION

A. Contractor shall verify roof penetration size requirements and locations.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, materials, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, sections, details, and attachments to roof and/or roof purlins.

C. Coordination Drawings: Roof plans and coordinating penetrations and roof-mounted items. Show the following:

1. Size and location of roof accessories specified in this Section.
2. Method of attaching roof accessories to roof or building structure.

1.05 QUALITY ASSURANCE

A. Standards: Comply with the following:

1. SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.
2. NRCA's "Roofing and Waterproofing Manual" details for installing units.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Self-supporting roof curbs shall be similar and equal to Model SSI-8 as manufactured by Custom Curb, Inc.

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2.02 MATERIALS, GENERAL

A. Galvanized Steel Sheet: ASTM A653/A653M with G90 (Z275) coating designation; commercial quality, minimum 18 gauge thickness.

B. Fasteners: Same as metal being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.

C. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.

D. Bituminous Coating: SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil (0.4-mm) dry film thickness per coating.

E. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

F. Elastomeric Sealant: Generic type recommended by unit manufacturer that is compatible with joint surfaces; ASTM C920, Type S, Grade NS, Class 25, and Uses NT, G, A, and, as applicable to joint substrates indicated, O.

2.03 ROOF CURBS AND COVERS

A. General: Provide roof curbs capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Coordinate dimensions of existing penetrations and new exhaust fans.

B. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 18 gauge thick, galvanized steel sheet; factory finished to match roof coating with welded corner joints for a weathertight seal.

1. Form flange at perimeter bottom to interlock with support channels.
2. Fabricate units to minimum height of 8 IN above finished roof, unless otherwise indicated.
3. Insulation: 1-1/2 IN, 3 LB density fiberglass.
4. Fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.
5. Fabricate curb covers (if required for larger or multiple penetrations) from the same material as the roof curbs.

2.04 PIPE PENETRATION SEALS

A. General: Provide diverter pipe flashing or approved alternative.

2.05 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

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PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Comply with manufacturer's written instructions. Coordinate installation of roof accessories with installation of roof panels, flashing, penetrations, and other construction involving roof accessories to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight. Anchor roof accessories securely to supporting structural substrates so they are capable of withstanding lateral and thermal stresses, and inward and outward loading pressures.

B. Install roof accessory items according to construction details of NRCA's "Roofing and Waterproofing Manual," unless otherwise indicated.

C. Separation: Separate metal from incompatible metal or corrosive substrates, according to manufacturer's written instructions.

D. Provide temporary weathertight covers for Owner supplied exhaust fans.

3.02 CLEANING AND PROTECTION

A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings.

END OF SECTION

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SECTION 07 72 33 - ROOF HATCHES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Roof hatches with ladder assist post

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

1.03 COORDINATION

A. Contractor shall verify roof penetration size requirements and locations.

B. Coordinate with installation of roofing, roof curbs and related flashings

1.04 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, materials, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, sections, details, and attachments to roof and/or roof purlins.

1.05 QUALITY ASSURANCE

A. Standards: Comply with the following:

1. SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

2. NRCA's "Roofing and Waterproofing Manual" details for installing units.

1.06 DELIVERY, HANDLING AND STORAGE

A. Package products adequately and protect during shipment, and inspect for damage upon delivery to the project site.

B. Remove damaged products that cannot be restored to original undamaged condition from the site and replace at no additional cost to the Owner.

C. Handle products carefully and store to avoid damage before installation.

1.07 WARRANTY

A. Provide manufacturer’s five year warranty against defects in material or workmanship.

B. Warranty period shall commence on the Date of Substantial Completion.

1.

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PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

1. Babcock-Davis; a Cierra Products Inc. Company.
2. Bilco Company
3. Milcor Inc.; a Gibraltar Company.

2.02 PRODUCTS

A. Roof Hatches:

1. Unit: 36" x 36" size; single leaf. Fabricate roof hatches with insulated double-wall lids and 14 gauge galvanized steel curb construction with full welded corner joints; with integral deck mounting flange and lid frame counterflashing. Provide continuous weathertight perimeter gasketing and equip with corrosion-resistant or hot-dip galvanized hardware.
    a. Fabricate cover of 14 gauge prime-painted galvanized steel, welded neatly and ground at corners with 1" thick rigid glass fiber insulation fully covered and protected by a 22 gauge prime-painted galvanized steel liner.
    b. Fabricate metal curb and counterflashing of the same gauge and material as hatch with 3-1/2 inch wide mounting flanges. Insulate exterior of curb with 1" thick fiberboard insulation.
2. Opening Hardware: Manufacturer's standard manually operating type capable of ensuring effortless control and smooth operation without causing damage to hatches and roofing system; capable of being opened from inside and outside. Provide automatic hold-open and operating arms with handle grips.
3. Hinges: Heavy duty pintle type of galvanized steel.
    a. Assemble hatch completely with hinges, compression spring operators enclosed in telescopic tubes, positive snap latch with turn handles and padlock hasp inside, and neoprene draft seal. Use only zinc plated hardware.

B. Ladder-Assist Post: Roof-hatch manufacturer's standard device for attachment to roof-access ladder.

1. Operation: Post locks in place on full extension; release mechanism returns post to closed position.
2. Height: 42 inches above finished roof deck.
3. Material: Steel tube
4. Post: 1-5/8-inch diameter pipe.
5. Finish: Manufacturer's standard baked enamel or powder coat color as selected by Architect from manufacturer's full range

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Comply with manufacturer's written instructions. Coordinate installation of roof hatch with installation of roof panels, flashing, penetrations, and other construction involving roof accessories to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight. Anchor roof hatch securely to supporting structural substrates so they are capable of withstanding lateral and thermal stresses, and inward and outward loading pressures.

1. Comply with all roof guarantee requirements.

B. Install roof accessory items according to construction details of NRCA's "Roofing and Waterproofing Manual," unless otherwise indicated.

C. Separation: Separate metal from incompatible metal or corrosive substrates, according to manufacturer's written instructions.

D. Provide temporary weathertight covers for Owner supplied exhaust fans.

3.02 CLEANING AND PROTECTION

A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings.

END OF SECTION

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SECTION 07 72 53 - SNOW GUARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Snow-guards for installation on standing seam metal roofing.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Submit manufacturer's product data, installation instructions and color samples.

C. Samples: Submit one full-size snow-guard in color and material selected for approval.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protection:

1. Store all materials in such a manner as to ensure proper ventilation and drainage to protect against damage and the weather.

2. Keep all material clearly identified with all grade marks legible; keep all damaged material clearly identified as damaged, and separately store to prevent its inadvertent use.

3. Do not allow installation of damaged or otherwise non-complying material.

4. Use all means necessary to protect the installed work and materials of all other trades.

B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Basis-of-Design Product: Subject to compliance with requirements, provide Berger Building Products, Inc. E- Rail Snow Retention System or comparable product approved by the Architect.

B. Provide a dual rail, low profile snow retention system.

C. Color and finish to be selected by Architect.

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PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to start of installation, inspect existing conditions to ensure surfaces are suitable for installation of snow- guards.

3.02 INSTALLATION

A. Snow-Guard Installation: Comply with manufacturer's installation instructions. Use manufacturer's recommended installation materials and installation tools. Attach snow-guards securely. Clean adjacent surfaces after installation.

END OF SECTION

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SECTION 07 84 13 - THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:

   a. Fire Rated walls and partitions.

   b. Smoke barriers.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Division 03 - Cast-in-Place Concrete for construction of openings in concrete slabs and walls.

D. Division 07 - Building Insulation for safing insulation and accessories.

E. Division 09 - Gypsum Board Assemblies.

F. Division 26 Sections specifying cable and conduit penetrations.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: For each type of through-penetration firestop system product indicated.

C. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.

1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.

2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire- protection engineer.

D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

E. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.

F. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed through-penetration firestop systems similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.

C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:

1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.

2. Through-penetration firestop systems are identical to those tested per ASTM E814. Provide rated systems complying with the following requirements:

a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.

b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:

c. UL in "Fire Resistance Directory."

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.

B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.

B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.07 PERFORMANCE REQUIREMENTS

A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.

B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that, after curing, do not deteriorate when exposed to these conditions both during and after construction.

1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.

2. For floor penetrations with annular spaces exceeding 4 IN in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.

3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

D. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E84.

1.08 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through- penetration firestop systems.

C. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.

D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. DAP Inc.
2. International Protective Coatings Corp.-Flame Safe.
3. Isolatek International - TPS.
4. 3M Fire Protection Products - Fire Barrier.
5. United States Gypsum Company - Fire Code Compound & Thermafiber.
6. Safing Insulaiton.

2.02 FIRESTOPPING, GENERAL

A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

1. Permanent forming/damming/backing materials, including the following:
   a. Slag-/rock-wool-fiber insulation.
   b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
   c. Fillers for sealants.
2. Temporary forming materials.
3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.03 FILL MATERIALS

A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the Through-Penetration Firestop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.

B. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.

E. Intumescent Putties: Non-hardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.

G. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.

H. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.

I. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and non-sag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to non-sag grade for both opening conditions.

2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.

3. Grade for Vertical Surfaces: Non-sag formulation for openings in vertical and other surfaces.

2.04 MIXING

A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

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3.02 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.03 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

A. General: Install through-penetration firestop systems to comply with “Performance Requirements” Article and firestop system manufacturer’s written installation instructions and published drawings for products and applications indicated.

B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of the firestop system.

C. Install fill materials for the firestop system by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.04 FIELD QUALITY CONTROL

A. Inspecting Agency: Owner will engage a qualified independent inspecting agency to inspect through-penetrations firestop systems and prepare test reports.

1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.

B. Proceed with enclosing through-penetration firestop system with other construction only after inspection reports are issued.

C. Where deficiencies are found. Repair or replace through-penetration firestop system so they comply with requirements.

3.05 IDENTIFICATION

A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. In general, labels shall be attached above suspended acoustical ceiling system, concealed from public view. Include the following information on labels:

1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Through-penetration firestop system designation of applicable testing and inspecting agency.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

3.06 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occurs.

B. Provide final protection and maintain conditions during and after installation that ensure through- penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through- penetration firestop systems complying with specified requirements.

3.07 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

A. Where UL-classified systems are indicated, they refer to the alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under product Category XHEZ.

B. Firestop Systems for Metallic Pipes, Conduit, or Tubing FS-1: Comply with the following:
   1. UL-Classified Systems: W-L-1039.
   2. Type of Fill Materials: One or more of the following:
      a. Mortar.

C. Firestop Systems for Electrical Cables FS-2: Comply with the following:
   1. UL-Classified Systems W-L-3023.
   2. Type of Fill Materials: One or more of the following:
      a. Intumescent putty.
      b. Silicone foam.

D. Firestop Systems for Insulated Pipes FS-3: Comply with the following:
   1. UL-Classified Systems: W-L-5044.
   2. Type of Fill Materials: One or more of the following:
      a. Intumescent putty.
      b. Silicone foam.

E. Firestop Systems for Miscellaneous Mechanical Penetrations FS-4: Comply with the following:
   1. UL-Classified Systems: W-L-7001.
   2. Type of Fill Materials: One or both of the following:
      a. Safing.
      b. Mortar.

F. Firestop Systems for Head of Wall at Fluted Deck FS-5: Comply with the following:
   1. UL-Classified Systems: H-WD-0001.
   2. Type of Fill Materials: One or more of the following:
      a. Safing.
      b. Mortar.

G. Firestop Systems for head of wall at fluted deck FS-6: Comply with the following:
   1. UL Classified System: H-WD-0009.
   2. Type of fill materials: One or more of the following:
      a. Safing.
      b. Mortar

END OF SECTION

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SECTION 07 92 00 – JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes.

1. Exterior joints in the following vertical surfaces and non-traffic horizontal surfaces:
   a. Control and expansion joints in unit masonry.
   b. Joints between architectural precast concrete units.
   c. Joints between different materials.
   d. Perimeter joints between materials listed above and frames of doors and windows.
   e. Other joints as indicated.
2. Exterior joints in the following horizontal traffic surfaces:
   a. Control, expansion, and isolation joints in cast-in-place concrete slabs.
   b. Joints between different materials listed above.
   c. Other joints as indicated.
3. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
   a. Control and expansion joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints of exterior openings where indicated.
   c. Vertical control joints on exposed surfaces of interior unit masonry and concrete walls and partitions.
   d. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
   e. Perimeter joints between interior wall surfaces and plumbing fixtures.
   f. Other joints as indicated.
4. Interior joints in the following horizontal traffic surfaces:
   a. Control and expansion joints in cast-in-place concrete slabs.
   b. Other joints as indicated.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Division 07 – Sheet Metal Flashing and Trim

D. Division 08 - Glazing.

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1.03 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product Data: For each joint-sealant product indicated.

C. Samples for Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

B. Single Source Limitations for Joint Sealant Materials: Obtain each type of joint sealant through one source from a single manufacturer.

1.05 PRODUCT HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.

2. When joint substrates are wet.

B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Compatibility: Provide joint sealants, backings, 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

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2.02 ELASTOMERIC JOINT SEALANTS

A. [ES-1] - Low-Modulus Nonacid-Curing Silicone Sealant: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Provide one of the following:

a. 790; Dow Corning.

b. Silpruf; GE Silicones.

c. UltraPruf SCS2300; GE Silicones.

d. 864; Pecora Corporation.

e. PSI-641; Polymeric Systems, Inc.

f. Omniseal; Sonneborn Building Products Div., ChemRex Inc.

g. Spectrem 1; Tremco.

2. Type and Grade: S (single component) and NS (nonsag).

3. Class: 25.

4. Additional Movement Capability: 50 percent movement in extension and 50 percent movement in compression for a total of 100 percent movement.

5. Use Related to Exposure: NT (nontraffic).

6. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.

B. [ES-2] - Medium-Modulus Neutral-Curing Silicone Sealant: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Provide one of the following:

a. 791; Dow Corning.

b. HiFlex 393; NUCO Industries, Inc.

c. Silglaze II; GE Silicones.

d. 895; Pecora Corporation.

e. PSI-631; Polymeric Systems, Inc.

f. SM5731 Poly-Glaze; Schnee-Morehead, Inc.

g. Spectrem 2; Tremco.

2. Type and Grade: S (single component) and NS (nonsag).

3. Class: 25.

4. Use Related to Exposure: NT (nontraffic).

5. Stain-Test-Response Characteristics: Nonstaining to porous substrates per ASTM C 1248.

C. [ES-3] - High-Modulus Neutral-Curing Silicone Sealant; Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Provide one of the following:

a. 799; Dow Corning.

b. NuFlex 319, NUCO Industries, Inc.

c. SM5734 Controlled Flow Poly-Glaze; Schnee-Morehead, Inc.

2. Type and Grade: S (single component) and NS (nonsag).

3. Class: 25.

4. Use Related to Exposure: NT (nontraffic).

D. [ES-4] - Multicomponent Nonsag Urethane Sealant: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Provide one of the following

a. Chem-Calk 2641; Bostik Inc.

b. Vulkem 922; Mameco International.

c. Elasto-Thane 920 Gun Grade; Pacific Polymers, Inc.

d. Dynatred; Pecora Corporation.

e. PSI-270; Polymeric Systems, Inc.

f. NP 2; Sonneborn Building Products Div., ChemRex Inc.

2. Type and Grade: M (multicomponent) and NS (nonsag).

3. Class: 25.

E. [ES-5] - Low Modulus Silicone Sealant Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Provide one of the following

a. 880; Dow Corning.

F. [ES-6] - Pourable Silicone Sealant: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products: Provide one of the following

a. 890-SL; Dow Corning .

G. [ES-7] - Mildew-Resistant Silicone Sealant; Where joint sealants of this type are indicated, provide products formulated with fungicide that are intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and temperature extremes, and that comply with the following:

1. Products: Products: Provide one of the following

a. 786 Mildew Resistant; Dow Corning.

b. Sanitary 1700; GE Silicones.

c. NuFlex 302; NUCO Industries, Inc.

d. 898 Silicone Sanitary Sealant; Pecora Corporation.

e. PSI-611; Polymeric Systems, Inc.

f. Tremsil 600 White; Tremco.

2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Use Related to Exposure: NT (nontraffic).

H. [ES-8] - Multicomponent Nonsag Urethane Sealant: Where joint sealants of this type are indicated, provide products complying with the following:

1. Products Products: Provide one of the following:
   a. Chem-Calk 2641; Bostik Inc.
   b. Vulkem 227; Mameco International.
   c. Elasto-Thane 920 Gun Grade; Pacific Polymers, Inc.
   d. Dynatrol II-SG Pecora Corporation.
   e. PSI-270; Polymeric Systems, Inc.
   f. NP 2; Sonneborn Building Products Div., ChemRex Inc.
2. Type and Grade: M (multicomponent) and NS (non-sag).
3. Class: 25.
4. Additional Movement Capability: 50 percent movement in extension and 50 percent in compression for a total of 100 percent movement.
5. Related to Exposure: T (traffic).

2.03 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are non-staining; 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.

B. Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Type C: Closed-cell material with a surface skin.

C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. 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.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape 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.

2.04 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.

C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. 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 sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

    a. Metal.

    b. Glass.

    c. Porcelain enamel.

    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.03 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. 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 that allow optimum sealant movement capability:

1. Do not leave gaps between ends of joint fillers..
2. Do not stretch, twist, puncture, or tear joint fillers.
3. Remove absorbent joint fillers that have become wet before sealant application and replace them with dry material.

D. 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 that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

E. Tooling of Non-sag Sealants: Immediately after sealant application and prior to 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 that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

F. Provide recessed joint configuration, per Figure 5C in ASTM C 1193, of recess depth and at locations indicated.

3.04 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.05 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants 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 sealants immediately so installations with repaired areas are indistinguishable from the original work.

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3.06 SEALANT APPLICATION TABLE

A. Exterior Joints in Vertical Surfaces and Non-Traffic Horizontal Surfaces

1. Location: Joints in cast in place concrete and precast concrete

   a. Sealant. Low Modulus One-part Non-Acid Curing Silicone Sealant [ES-1].

2. Location: Joints in precast concrete and between metal and precast concrete

   a. Sealant. Low Modulus One-part Non-Acid Curing Silicone Sealant [ES-1].

3. Location: Perimeter joints between materials listed above and frames of doors, windows, aluminum entrances and storefronts.

   a. Sealant. Medium Modulus, Non-Acid Curing Silicone Sealant [ES-2].

4. Location: Exposed joints within sheet metal copings, flashings and trim, aluminum entrance and storefront system.

   a. Sealant: High-Modulus Neutral-Curing Silicone Sealant [ES-3].

B. Exterior Joints in Horizontal Traffic Surfaces

1. Location: Control, expansion, and isolation joints in cast in place concrete slabs not exposed to vehicular traffic.

   a. Sealant: .Low Modulus One-part Non-Acid Curing Silicone Sealant [ES-1].

2. Location Control, expansion, and isolation joints in cast in place concrete slabs subject to vehicular traffic.

   a. Sealant. Low Modulus Silicone Sealant [ES-5].

3. Location Joints between concrete and asphalt, and joints where asphalt impregnated compressible fillers are used

   a. Sealant; .Pourable Silicone Sealant [ES-6].

C. Interior Joints in Vertical Surfaces and Horizontal Non-Traffic Surfaces

1. Location: Control and expansion joints on exposed interior surfaces of exterior precast walls.

   a. Sealant. Low Modulus One-part Non-Acid Curing Silicone Sealant [ES-1].

2. Location: Perimeter joints of exterior openings where indicated.

   a. Sealant. Medium Modulus, Non-Acid Curing Silicone Sealant [ES-2].

3. Location: Tile control and expansion joints, except paver tile used in vertical application.

   a. Sealant. Mildew-Resistant Silicone Sealant [ES-7].

4. Location: Tile control and expansion joints, paver tile used in vertical application.

   a. Sealant. Medium Modulus, Non-Acid Curing Silicone Sealant [ES-2].

5. Location: Perimeter joints between interior wall surfaces and frames of interior doors, and windows.

   a. Sealant. Medium Modulus, Non-Acid Curing Silicone Sealant [ES-2].

6. Location: Perimeter joints of toilet fixtures.
    a. Sealant. Mildew-Resistant Silicone Sealant [ES-7].

D. Interior Joints in Horizontal Traffic Surfaces
    1. Location: Control and expansion joints in cast in place concrete subject to traffic.
        a. Sealant. Multicomponent Non-sag Urethane Sealant [ES-8] Traffic Rated.

END OF SECTION

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SECTION 08 11 20 - STANDARD STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Flush, insulated, galvanized standard steel doors for exterior and interior openings.
2. Frames: Pressed steel frames for doors - welded unit type.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Division 08 - Finish Hardware.

D. Division 09 - Paint and Protective Coatings.

1.03 REFERENCED STANDARDS

A. ASTM E152, Methods of Fire Tests of Door Assemblies.

B. NFPA 80, Fire Doors and Windows.

C. SDI-100, Standard Steel Doors and Frames.

D. SDI-105, Recommended Erection Instructions for Steel Frames.

1.04 SUBMITTALS

A. General: Submit in accordance with Division 01 sections.

B. Product data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.

C. Shop drawings showing fabrication and installation of standard 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 door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

1. Provide schedule of doors and frames using same reference numbers for details and openings as those on contract drawings.

D. Label Construction Certification: For door assemblies required being fire-rated and exceeding limitations of labeled assemblies, submitting manufacturer's certification that each door and frame assembly has been constructed to conform to design, materials and construction equivalent to requirements for labeled construction.

1.05 QUALITY ASSURANCE

A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications Standard Steel Doors and Frames" ANSI/SDI-100 and as herein specified.

B. Fire-Rated Assemblies:

1. Wherever a fire-resistance classification (3 HR, 1-1/2 HR, etc. or "A", "B", etc.) is shown or scheduled for hollow metal work, provide fire-rated hollow metal doors, frames and lites investigated and tested as a fire door assembly, complete with type of fire door hardware to be used. Identify each fire door and frame with UL labels, indicating applicable rating of both door and frame.

2. Fire rated door and frame construction to conform to ASTM E152.

3. Installed frame and door assembly to conform to NFPA 80 for fire rated class indicated in Door and Frame Schedule.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

B. Inspect doors and frames 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.

C. Store doors and frames at building site under cover. Avoid use of non-vented plastic or canvas shelters that could create a humidity chamber.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide standard steel doors and frames by one of following:

1. Standard Steel Doors and Frames:

a. Amweld Building Products, Inc.

b. Ceco Corp.

c. Curries Company.

d. Republic Builders Products.

e. Steelcraft Manufacturing Co.

2.02 MATERIALS

A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A569 and ASTM A568.

B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A366 and ASTM A568.

C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A526, or drawing quality, ASTM A642, hot dipped galvanized in accordance with ASTM A525, with A60 or G60 coating designation, mill phosphatized.

D. Supports and Anchors: Fabricate of not less than 18-gage sheet steel; galvanized where used with galvanized frames.

E. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize in compliance with ASTM A153, Class C or D as applicable.

F. Shop Applied Paint: Apply after fabrication.

1. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints complying with ANSI A224.1, "Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames."

2.03 DOORS

A. Provide metal doors of SDI grades and models specified below and as indicated on drawings or schedules:

1. Exterior and Interior Doors: ANSI/SDI-100, Level 3, extra heavy-duty, Model 2, minimum 16-gage galvanized steel faces.

2. Storm Shelter Doors: ANSI/SDI-100, Level 4, extra heavy-duty, Model 2, minimum 14-gage galvanized steel faces.

3. Doors shall be full flush seamless construction and shall have continuous vertical mechanical inter-locking joints at lock and hinge edges with visible edge seam filled and ground smooth.

2.04 FRAMES

A. General: Provide steel frames for doors, transoms, sidelights, borrowed lights, and other openings that comply with ANSI A250.8 and with details indicated for type and profile. Conceal fastenings, unless otherwise indicated.

1. Fabricate frames with mitered corners, continuously welded construction.

2. Form exterior and interior door frames from 14-gage galvanized steel.

B. Plaster Guards: Provide minimum 26-gage steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

C. Door Silencers: Except on frames equipped with weather stripping, drill stops to receive 3 silencers on strike jambs of single door frames and 2 silencers on beads of double door frames.

D. Head Reinforcing:

1. For frames over 4 FT-0 IN wide provide 2 continuous steel angles not less than 2 IN x 2 IN x 12 gauge and width of opening, welded to back of frame at head, unless otherwise shown.

2.05 FABRICATION

A. Fabricate steel door and 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 ANSI/SDI-100 requirements.

1. Internal Construction: One of the following manufacturer's standard core materials according to SDI standards:

a. Rigid polystyrene conforming to ASTM C578.

2. Clearances: Not more than 1/8 IN at jambs and heads except between non-fire-rated pairs of doors not more than 1/4 IN. Not more than 3/4 IN at bottom.

a. Fire Doors: Provide clearances according to NFPA 80.

B. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Steel Doors and Frames".

C. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel.

D. Fabricate exterior and interior doors, panels, and frames from galvanized sheet steel in accordance with SDI-112. Close top and bottom edges of exterior doors as integral part of door construction or by addition of minimum 16-gage inverted steel channels.

E. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

F. Thermal-Rated (Insulating) Assemblies: At exterior and interior locations and elsewhere as shown or scheduled, provide doors fabricated as thermal insulating door and frame assemblies and tested in accordance with ASTM C236 or ASTM C976 on fully operable door assemblies.

1. Unless otherwise indicated, provide thermal-rated assemblies with U factor of 0.067 (R=14.9) or better.

G. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware in accordance with final Door Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 Series Specifications for door and frame preparation for hardware.

1. Hinge reinforcements shall be 7 gauge. Lock reinforcements shall be 16 gauge and closer reinforcements, 12 gauge.

H. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at project site.

I. Locate hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware on Standard Steel Doors and Frames," published by Door and Hardware Institute.

J. Attach fire rated label to each frame and door unit.

K. Jamb Anchors:

1. Furnish jamb anchors as required to secure frames to adjacent construction, formed of not less than 18 gauge galvanized steel.

a. Masonry Construction:

1) Adjustable, flat or corrugated or perforated, T-shaped to suit frame size with leg not less than 2 IN wide by 10 IN long. Furnish at least 3 anchors per jamb up to 7 FT-6 IN height, 4 anchors up to 8 FT-0 IN jamb height, one additional anchor for each 24 IN or fraction thereof over 8FT-0 IN height.

b. Metal Stud Framing:

1) Insert type to engage metal building jamb, welded to back of frames. Provide at least 4 anchors for each jamb for frames up to 7 FT-6 IN in height; 5 anchors up to 8 FT-0 IN jamb height; one additional anchor each 24 IN or fraction thereof over 8 FT-0 IN height.

L. Floor Anchors:

1. Provide floor anchors for each jamb and mullion which extends to floor, formed of not less than 16 gauge galvanized steel sheet, as follows:

a. Monolithic Concrete Slabs:

b. Clip Type anchors with 2 holes to receive fasteners, welded to bottom of jambs and mullions.

M. Glazing Stops:

1. Provide non-removable stops on outside of exterior doors.

2. Provide screwless snap-in type glazing beads on inside of glass.

N. Spreader Bars:

1. Provide 2 removable spreader bars across bottom of frames, tack welded to jambs and mullions.

O. Shop Painting: Clean, treat and paint exposed surfaces of steel door and frame units, including galvanized surfaces.

1. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before application of paint.

2. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface of not less than 0.75 mils ready to receive finish paint.

PART 3 - EXECUTION

3.01 GENERAL

A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.

B. Placing Frames: Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames," unless otherwise indicated.

1. Place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.

2. In masonry construction, locate 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb.

3. Place fire-rated frames in accordance with NFPA Standard No. 80.

C. Door Installation: Fit hollow metal doors accurately in frames, within clearances specified in ANSI/SDI-100.

1. Place fire-rated doors with clearances as specified in NFPA Standard NO. 80.

3.02 ADJUST AND CLEAN

A. 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.

B. Final Adjustments: Check and readjust operating hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition. Remove and replace defective work, including doors or frames that are wrapped, bowed or otherwise damaged.

END OF SECTION

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Solid-core doors with wood-veneer faces.
2. Factory finishing flush wood doors.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Division 08 - Glazing for glass view panels in flush wood doors.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: For each type of door. Include details of core and edge construction and trim for openings.

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate requirements for veneer matching.
3. Indicate fire ratings for fire doors.

D. Samples for Initial Selection: Color charts consisting of actual materials in small sections for the following.

1. Faces of Factory Finished Doors: Show the full range of colors available for stained finishes.

E. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 x 10 IN for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

B. Quality Standard: Comply with NWWDA I.S.1-A, "Architectural Wood Flush Doors."

C. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

1. Test Pressure: Test at atmospheric pressure.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.07 WARRANTY

A. Special Warranty: Manufacturer's standard form, signed by Manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup, or twist) more than 1/4 IN in a 42 x 84 IN section, or show telegraphing of core construction in face veneers exceeding 0.01 IN in a 3 IN span.

1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.

2. Warranty shall be in effect during the following period of time from date of Substantial Completion:

a. Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flush Wood Doors:

a. Algoma Hardwoods Inc.

b. Marshfield.

c. VT Industries.

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2.02 DOOR CONSTRUCTION, GENERAL

A. Doors for Transparent Finish:

1. Grade: Custom (Grade A faces).
2. Species and Cut: Red oak, plain sliced.
3. Match between Veneer Leaves: Book match.
4. Assembly of Veneer Leaves on Door Faces: Balance match.
5. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.
6. Room Match: Provide door faces of compatible color and grain within each separate room or area of building.

2.03 SOLID-CORE DOORS

A. Particleboard Cores: Comply with the following requirements:

1. Particleboard: ANSI A208.1, Grade LD-2.
2. Wood Blocking: Provide lumber or engineered-wood blocking in particleboard-core doors as follows:
   a. 5 IN top-rail blocking, in doors indicated to have closers.
   b. 5 IN lock blocking in doors receiving mortise locks.
   c. 5 IN mid-rail blocking, in doors indicated to have exit devices.

B. Interior Veneer-Faced Doors:

1. Core: Particleboard.
2. Construction: Five plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.

C. Fire-Rated Doors:

1. Construction: Construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as required to provide fire rating indicated.
2. Blocking: For mineral-core doors, provide composite blocking with improved screw-holding capability approved for use in doors of fire ratings indicated as follows:
   a. 5 IN top-rail blocking, in doors indicated to have closers.
   b. 5 IN lock blocking in doors receiving mortise locks.
   c. 5 IN mid-rail blocking, in doors indicated to have exit devices.
   d. Other locations as required by fire-rating criteria.
3. Edge Construction:
   a. Lumber or engineered-wood stiles and rails.
   b. Apply face-matching veneer to stile faces, prior to application of face veneers.

2.04 FABRICATION

A. Fabricate doors in sizes indicated for Project-site fitting.

B. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.

C. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.

2. Metal Astragals: Pre-machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

2.05 FACTORY FINISHING

A. General: Comply with referenced quality standard AWI's "Architectural Woodwork Quality Standards Illustrated" for factory finishing.

B. Finish doors at factory.

C. Transparent Finish:

1. Grade: Premium

2. Finish: Manufacturer's standard finish with performance comparable to AWI System TR-6 catalyzed polyurethane.

3. Staining: Color shall be as selected by Architect from manufacturer's standard range for the species.

4. Effect: Open-grain finish.

5. Sheen: Satin.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine doors and installed door frames before hanging doors.

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.

2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Hardware: For installation, see Division 08 "Finish Hardware."

B. Manufacturer's Written Instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.

1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

   a. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining or scheduled, provide 1/4 IN from bottom of door to top of threshold.

2. Comply with NFPA 80 for fire-rated doors.

3. Bevel non-fire-rated doors 1/8 IN in 2 IN at lock and hinge edges.

4. Bevel fire-rated doors 1/8 IN in 2 IN at lock edge; trim stiles and rails only to extent permitted by labeling agency.

C. Factory Finished Doors: Restore Finish before installation of if fitting or machining is required at project site.

3.03 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

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SECTION 08 31 13 - ACCESS DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Access doors.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Division 09 - Gypsum Board Assemblies for gypsum board walls and ceilings.

D. Division 09 - Ceramic Tile for ceramic tile walls.

1.03 COORDINATION

A. Determine specific locations and sizes for access doors needed to gain access to concealed equipment.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Shop Drawings:

1. Include complete schedule, including types, general locations, sizes, wall and ceiling construction details, latching or locking provisions, and other data pertinent to installation.

C. Product Data:

1. Product data for each type of access door assembly specified, including details of construction relative to materials, individual components, profiles, finishes, and fire- protection ratings (if required).

PART 2 - PRODUCTS

2.01 ACCESS DOORS

A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Acudor Products Inc.
2. Bar-Co, Inc. Div., Alfab, Inc.
3. J.L. Industries.
4. Larsen's Manufacturing Co.
5. Milcor, Inc.

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B. Product Description:

1. Trimless, Recessed Doors for Gypsum Board and Perforated Metal Assemblies: Units consisting of frame with concealed edge trim, door, hardware, and complying with the following requirements:

a. Concealed, Gypsum Board Edge Trim: 0.298 IN (0.76-mm) zinc-coated steel sheet gypsum board edge trim formed to receive joint compound.

b. Hinge: Concealed, pivoting-rod type.

c. Locks: Flush to finished surface, screwdriver-operated cam.

PART 3 - EXECUTION

3.01 JOB CONDITIONS

A. Advise Installers of other work about specific requirements relating to access door installation, including sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices. Furnish inserts and anchoring devices for access doors that must be built into other construction. Coordinate delivery with other work to avoid delay.

3.02 FABRICATION

A. General: Manufacture each access door assembly as an integral unit ready for installation.

B. Steel Access Doors and Frames: Continuous welded construction. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

C. Exposed Flange: Nominal 1 to 1-1/2 IN (25.4 to 38.1 mm) wide around perimeter of frame.

D. For gypsum board assemblies or gypsum veneer plaster, furnish frames with edge trim for gypsum board or gypsum base.

E. For installation in masonry construction, furnish frames with adjustable metal masonry anchors.

3.03 INSTALLATION

A. Comply with manufacturer's instructions for installing access doors.

B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finished surfaces.

C. Install concealed-frame access doors flush with adjacent finish surfaces.

3.04 ADJUSTING

A. Adjust hardware and panels after installation for proper operation.

B. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

END OF SECTION

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SECTION 08 33 23 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. The following types of overhead coiling doors:

a. Insulated service doors, motorized. R-7 Minimum.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Division 26: All applicable sections.

1.03 DEFINITIONS

A. Operation Cycle: One complete cycle of a door begins with the door in the closed position. The door is then moved to the open position and back to the closed position.

1.04 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide overhead coiling doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:

1. Wind Load: Uniform pressure (velocity pressure) of 20 LBF/SQ FT acting inward and outward.

B. Operation-Cycle Requirements: Design overhead coiling door components and operator to operate for not less than 10,000 cycles.

1.05 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: For each type and size of overhead coiling door and accessory. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes. Provide roughing-in diagrams, operating instructions, and maintenance information. Include the following:

1. Setting drawings, templates, and installation instructions for built-in or embedded anchor devices.

2. Motors: Show nameplate data and ratings; characteristics; mounting arrangements; size and location of winding termination lugs, conduit entry, and grounding lug; and coatings.

3. Control devices: Provide information describing control devices described herein and as required by Division 16.

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4. Fire-rated doors: Information describing fire-release system, including testing and resetting instruction.

C. Shop Drawings: For special components and installations not dimensioned or detailed in manufacturer's data sheets.

1. Wiring Diagrams: Detail wiring for power, signal, and control systems. Differentiate between manufacturer-installed and field-installed wiring and between components provided by door manufacturer and those provided by others.

2. Samples for verification: Sample sets showing the full range of manufacturer's colors and finishes.

a. Curtain Slats: (3) 2 IN x 2 IN samples on actual slats of color and finish selected by Architect.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who is an authorized representative of the overhead coiling door manufacturer for both installation and maintenance of units required for this Project.

B. Source Limitations: Obtain overhead coiling doors through one source from a single manufacturer.

1. Obtain operators and controls from the overhead coiling door manufacturer.

C. Fire Rated Door Assemblies: Provide assemblies complying with NFPA 80 that are identical to door and frame assemblies tested for fire test response characteristics per IL 1ob, and that are labeled and listed for fire ratings indicated by UL, FM, ITS/Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.

D. Listing and Labeling: Provide electrically operated fixtures specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in NFPA 70, Article 100.

2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.

1.07 WARRANTY

A. Manufacturer's limited door and operator system, except the counterbalance spring and finish, to be free from defects in materials and workmanship for 3 years or 20,000 cycles, whichever first occurs.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Overhead Door Corporation, Model #625, or subject to compliance with requirements, provide products by one of the following:

1. The Cookson Company.

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2. Raynor Garage Doors.
3. Wayne-Dalton Corp.

2.02 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtain: Fabricate overhead coiling door curtain of interlocking slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of material thickness recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Steel Door Curtain Slats: Structural-quality, cold-rolled galvanized steel sheets complying with ASTM A653, with G90 zinc coating.
    a. Provide manufacturer's standard flat-profile slats.
2. Insulation: Fill slat with manufacturer's standard rigid cellular polystyrene or polyurethane- foam-type thermal insulation complying with maximum flame-spread and smoke-developed indices of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within metal slat faces. R-7 minimum.
3. Inside Curtain Slat Face: To match material of outside metal curtain slat and as follows:
    a. Galvanized Steel Sheet Thickness: Not less than 0.028 IN.

B. Windlocks: Malleable-iron castings, secured to curtain slats with galvanized rivets or high-strength nylon, as required to comply with wind load.

1. Astragal: Provide a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene, between angles or fitted to shape, as a cushion bumper for interior door.
2. Provide motor-operated doors with combination bottom astragal and sensor edge.

2.03 HOODS AND ACCESSORIES

A. Hood: Form to entirely enclose coiled curtain and operating mechanism at opening head and act as weatherseal. Contour to suit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sag.

1. Fabricate steel hoods, for steel doors, of not less than 0.028 IN thick, hot-dip galvanized steel sheet with G90 zinc coating, complying with ASTM A653.
2. Shape: Round.

B. Smoke Seals: Provide UL-listed and -tested smoke-seal perimeter gaskets.

C. Weatherseals: Provide replaceable, adjustable, continuous, compressible weather-stripping gaskets fitted to bottom and at top of exterior doors, unless otherwise indicated. At door head, use 1/8 IN thick, replaceable, continuous sheet secured to inside of curtain coil hood.

1. Provide motor-operated doors with combination bottom weatherseal and sensor edge.

2. In addition, provide replaceable, adjustable, continuous, flexible, 1/8 IN thick seals of flexible vinyl, rubber, or neoprene at door jambs for a weathertight installation.

D. Push/Pull Handles: For push up operated or emergency-operated doors, provide galvanized steel lifting handles on each side of door.

1. Provide pull-down straps or pole hooks for doors more than 84 IN high.

E. Fabricate locking device assembly with lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bar to engage through slots in tracks.

1. Locking Bars: Single-jamb side, operable from inside only.

F. Where door unit is power operated, provide safety interlock switch to disengage power supply when door is locked.

G. Provide automatic-closing device inoperative during normal door operations, with governor unit complying with requirements of NFPA 80, with easily tested and reset release mechanism, and designed to be activated by the following.

1. Governor: Oscillating type.

2. Temperature rise and melting point of 165 Deg. F replaceable fusible links interconnected an on both sides of wall of door opening.

2.04 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of adjustable-tension steel helical torsion spring, mounted around a steel shaft and contained in a spring barrel connected to door curtain with required barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 IN/FT of span under full load.

C. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast-steel barrel plugs to secure ends of springs to barrel and shaft.

D. Fabricate torsion rod for counterbalance shaft of cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Provide mounting brackets of manufacturer's standard design, cast-iron or cold- rolled steel plate with bell-mouth guide groove for curtain.

2.05 FINISHES, GENERAL

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.06 ALUMINUM FINISHES

A. Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

B. Powder-Coat-Applied Finish: Apply manufacturer's standard powder-coat applied finish consisting of primer and topcoat(s) according to coating manufacturer's written instructions for cleaning, pretreatment, application, thermosetting, and minimum dry film thickness.

1. Color and Gloss: shall be selected by architect from manufacturer's standard colors.

2.07 ELECTRIC DOOR OPERATORS

A. General: Provide electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operational life specified, with electric motor and factory- prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, remote- control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

B. Comply with NFPA 70.

C. Disconnect Device: Provide hand-operated disconnect or mechanism for automatically engaging sprocket-chain operator and releasing brake for emergency manual operation while disconnecting motor, without affecting timing of limit switch. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

D. Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency auxiliary operator.

E. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V, ac or dc.

F. Door-Operator Type: Provide wall-, hood-, or bracket-mounted, jackshaft, gear-head hoist-type door operator unit consisting of electric motor, enclosed worm-gear running-in-oil primary drive, chain and sprocket secondary drive, and auxiliary chain-hoist and floor level disconnect.

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G. Electric Motors: Provide high-starting torque, reversible, continuous-duty, Class A insulated, electric motors, complying with NEMA MG 1, with overload protection, sized to start, accelerate, and operate door in either direction, from any position, at not less than 2/3 fps or more than 1 fps, without exceeding nameplate ratings or considering service factor.

1. Type: Polyphase, medium-induction type.
2. Service Factor: According to NEMA MG 1, unless otherwise indicated.
3. Coordinate wiring requirements and electric characteristics of motors with building electrical system.
4. Provide totally enclosed, non-ventilated or fan-cooled motors, fitted with plugged drain, and controller with NEMA ICS 6, Type 4 enclosure where indicated, along with an "on/off" key switch for exterior surface-mounted station.

H. Remote-Control Station: Provide momentary-contact, 3-button control station with push-button controls labeled "Open," "Close," and "Stop."

1. Provide interior units, full-guarded, surface-mounted, heavy-duty type, with general- purpose NEMA ICS 6, Type 1 enclosure.
2. Provide exterior units, full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.

I. Obstruction Detection Device: Provide each motorized door with indicated external automatic safety sensor able to protect full width of door opening. Activation of sensor immediately stops and reverses downward door travel.

1. Sensor Edge: Provide each motorized door with an automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor immediately stops and reverses downward door travel. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.
   a. Provide electrically actuated automatic bottom bar.
   b. Monitoring Type: Provide continuously monitoring safety device, per UL 325, as required.

J. Limit Switches: Provide adjustable switches, interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Install door and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to Shop Drawings, manufacturer's written instructions, and as specified.

1. Install door controls, operators, switches, motors, low voltage transformers and remote control stations complete with all wiring, conduit and terminations. Installation shall meet the requirements of Division 26 of this specification and NFPA 70. Single point connection of power shall be provided by the Electrical contractor. Coordinate all work with other trades prior to rough-in of conduit and boxes.

2. Install fire rated doors to comply with NFPA 80.

3.02 ADJUSTING

A. Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

3.03 DEMONSTRATION

A. Startup Services: Engage a factory-authorized service representative to perform startup services and to train Contracting Officer's Technical Representative maintenance personnel as specified below:

1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

a. Test door closing when activated by detector or alarm connected fire-release system. Reset door-closing mechanism after successful test.

2. Train Contracting Officer's Technical Representative Maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventive maintenance, and procedures for testing and resetting release devices.

3. Review data in the maintenance manuals. Refer to Section 01 77 10 - Project Closeout and Cleaning.

4. Schedule training with Owner with at least 7 days' advance notice.

END OF SECTION

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SECTION 08 33 24 - RUBBER IMPACT DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Rubber impact doors used for shop buildings.

B. Doors shall be overhead coiling type, of the sizes indicated, complete with necessary guides, hoods, hardware fastenings, mechanisms and accessories as indicated and specified.

C. Doors shall be installed complete and in proper operating condition in the openings. indicated on the drawings and as specified, except that electrical conduit and wiring form the power source to the door control equipment to motors, and to disconnect switches will be furnished and installed under the electrical section.

D. Details of doors, guides, hoods and accessories shall be as indicated on the drawings and as specified herein.

E. Doors shall be the product of a manufacturer who is regularly engaged in manufacturing the items specified.

1.02 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Complete detail and installation drawings shall be submitted in accordance with the submittals section. Drawings shall indicate construction details, clearance requirements, metal thickness, finish, counter-balancing, method of anchoring, location of guides, motors, switches, controls, and fusible links, power requirements and wiring diagrams.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Door shall be protected from damage during transportation, at the jobsite and during construction.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Rubber impact doors shall be M&I Door Systems Limited “Re-Coil Away Outboard Springs Roll-Door.”

2.02 MATERIALS

A. Curtain: Styrene butadiene rubber, 1/4 IN thick.

B. Hood: Sheet steel, galvanized, cold roll formed.

C. End Locks: Malleable iron.

D. Bottom Bar and Guides: Steel angles or channels at least 3/16 IN thick.

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E. Bottom Weather Seal: Rubber or vinyl.

F. Roller Shaft: Steel pipe or tubing.

G. Roller Ends: Cast iron, ASTM A48.

H. Spring: Oil-tempered steel.

I. Brackets and Gearing: Cast iron or steel.

J. Operating Chain: Steel; hot-dip galvanized, ASTM A153 and A385; or zinc plated, ASTM B633, SC4.

K. Anchor Bolts: As specified in the anchor bolts an expansion anchors section.

2.03 FABRICATION

A. Doors shall be fabricated for installation on the interior face of the wall, with the hood mounted above the opening.

B. Door Curtain:

1. The curtain shall have tensile strength of 1,760 psi and shall be designed to resist a wind load of 20 LBS/SQ FT. The curtain shall roll up on a drum supported at the head of the opening and shall be balanced by helical springs. SBR material shall provide normal resiliency at temperatures from –40 to 150 Deg. F.

2. The curtain shall be equipped with a combination end and wind lock. Combination end locks shall have a flat surface engaging a seal of metal or other suitable material mounted on or in the guides, in a manner which will provide an effective seal against wind and water.

3. Each curtain shall be provided with a bottom bar having a “break-away” feature and extending the full width of the curtain, attached in a manner which will provide an effective seal to suit sill construction.

C. Guides: Guides shall form a pocket of sufficient depth to retain the curtain in place under the specified maximum wind pressure. Guides shall be attached in a manner to suit sill construction. Each exterior door shall be furnished with a replaceable, compressible weather seal fastened to the bottom bar.

D. Roller Shaft:

1. The Roller Shaft shall be designed so that deflection does not exceed 0.03 IN per foot of span. Ends of the roller shall be closed with plugs machined to fit and fastened with pins and screws. Welding will not be acceptable.

2. The counterbalancing spring installed inside the roller shall be capable of producing sufficient torque to permit easy operation of the curtain from any position. The spring tension shall be adjustable from outside the bracket without moving the hood.

E. Brackets: Brackets shall close the ends of roller-shaft housing and shall support the hood. Ends of the roller shaft shall be journalized into bracket hubs. The shaft shall be fitted with self-lubrication sintered bronze bearings or double sealed, grease lubricated ball bearings.

F. Hood: The hood shall be fabricated of at least 24 gauge steel, shall be formed to fit the contours of the brackets, and shall be reinforced with steel rods, rolled beads, or a stiffening flange at top and bottom edges. Hoods at openings larger than 12 FT wide shall be fitted with intermediate supporting brackets.

1. A flexible weather baffle, mounted internally or externally, shall be provided to prevent airflow around the coil, and provisions shall be included in the design of the hood to prevent the ingress of birds.

G. Doors indicated on the drawings to be motor operated shall be provided with electric motor operators and auxiliary chain gear operation.

2.04 FINISH

A. Hood and bottom rails shall be galvanized and primed in the shop. All other exposed metal parts of the door and accessories, except bearings and chains, shall be shop primed.

B. Galvanizing shall comply with ASTM A526 for commercial steel sheets and ASTM A386 for assembled steel products. Galvanized surfaces shall be phosphatized before painting.

2.05 ELECTRICAL WORK

A. Power supply to electrical operators will be 480 volts, 60 Hz, 3 phase.

B. All manual or automatic control devices necessary for proper operation of the doors shall be provided. Motors and accessories shall be pre-wired at the factory to the extent practicable, with connections brought to terminal strips in the controller enclosure.

2.06 ELECTRICAL MOTOR OPERATORS

A. Electrical motor operators shall be of a type recommended by the door manufacturer and shall be complete with an electrical motor, reduction gearing, magnetic brake, brackets, push button controls, limit switches, magnetic reversing starters, and other accessories required for proper operation. Each operator shall be designated so that the motor may be removed without disturbing the limit switch adjustment and without affecting the emergency auxiliary operators. Provisions shall be made for immediate manual operation of the door in case of electric power failure.

B. The emergency opening mechanism shall be arranged to be activated and deactivated from the floor, and its use shall not affect the adjustment of the limit switches. Whenever the mechanism is engaged, it shall be disconnected form the motor. Electric motors operators shall be wall-mounted near the head of the door.

C. Motors:

1. Motors shall be of sufficient horsepower to move doors in either direction from any position at a rate between 0.5 FT and 1 FT per second when operating under full wind load conditions.

2. Motors shall conform to the applicable portions of the General Equipment Stipulations.

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2.07 CONTROL SYSTEM

A. Each door shall be equipped with an automatic control system arranged to control the opening, closing, and stopping of curtain travel, and to automatically reverse closing travel when the lower edge of the door curtain meets an obstruction. The control system shall be mounted in a NEMA Type 1 enclosure.

2.08 MOTOR CONTROLLER

A. The motor controller shall be a full voltage, reversing, magnetic type, with 480 volt, 60 Hz, 3 phase contactors; automatically reset thermal overload relays; 120 volt AC operating coil; and 480 to 120 volt dry-type control transformer complete with one secondary lead fused and the other grounded. Starters shall be at least NEMA Size 1.

B. Three thermal overload relays, rated as required to provide the motor from damage due to overload, shall be furnished with each motor starter.

C. The motor controller enclosure shall be sized and arranged to house the control power transformer and fuses, relays if required, and a marked terminal block on which all control wiring form all devices shall be terminated. The terminal block on which all control wiring for all devices shall be terminated. The terminal block shall be located for easy installation and maintenance. All control wiring shall be 14 AWG or larger.

2.09 CONTROL SWITCHES

A. Remote control switches shall be located on the interior and exterior of the openings as indicated in the project drawings. Each switch control station shall be of the three-button, momentary contact type, with the buttons marked “Open”, “Close” and “Stop.” When the “Stop” button is pressed, the door shall stop instantly and remain in the stopped position until the “Open” or “Close” button is pushed. Push buttons shall be of the fully guarded type to prevent accidental operation.

B. Control switches located on the building exterior shall be mounted in NEMA Type 4 enclosures. Interior control switches shall be NEMA Type 12.

C. Limit switches shall automatically stop the doors in their fully opened and fully closed positions. The limit switches shall be readily adjustable.

2.10 SAFETY DEVICE

A. The bottom edge if each electric motor operated door shall be equipped with a safety device which will immediately stop the door upon contact with an obstruction and reverse its downward travel. The safety device shall be connected with the “Closed” limit switch to prevent opening a closed door by tripping the safety device. The safety device shall not serve as a substitute for a limit switch.

B. Type S cable equipped with a spring-loaded automatic take-up reel, or an equivalent device, shall be provided between the safety device and the fixed cable supports.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Doors shall be installed in accordance with details, drawings, and manufacturer's directions.

B. All anchors and inserts for guides, brackets, motors, controls, switches, and other devices shall be accurately located.

C. After installation, doors shall be free from warp, twist, or distortion, and shall be lubricated and properly adjusted to operate freely and smoothly.

3.02 CLEANING

A. After installation, factory finished metal surfaces shall be thoroughly cleaned and touched-up as recommended by the manufacturer. Abrasive, caustic, or acid cleaning agents shall not be used.

END OF SECTION

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SECTION 08 41 14 - ALUMINUM STOREFRONT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Exterior manual-swing entrance doors and door-frame units.
2. Interior manual-swing entrance doors and door-frame units.
3. Sidelights.
4. Transoms.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Division 07 - Joint Sealants.

D. Division 08 - Glazing.

E. Division 08 - Finish Hardware.

1.03 REFERENCED STANDARDS

A. The Aluminum Association (AA):

1. Designation System For Aluminum Finishes.

B. American Architectural Manufacturers Association (AAMA):

1. 1503.1, Voluntary Test Method for Thermal Transmittance of Windows, Doors and Glazed Wall Sections.

C. Americans with Disabilities Act (ADA):

1. Accessibility Guidelines for Buildings and Facilities.

D. American Society of Civil Engineers (ASCE):

1. 7-95, Minimum Design Loads for Buildings and Other Structures.

E. American Society for Testing and Materials (ASTM):

1. A924, Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
2. B221, Specification for Aluminum and Aluminum-Alloy, Extruded Bars, Rods, Wire, Profiles, and Tubes.
3. E283, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.
4. E330, Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

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5. E331, Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

F. American Welding Society (AWS):

1. D1.3, Structural Welding Code Aluminum.

1.04 DEFINITIONS

A. Installer or Applicator: Installer or applicator is the person actually installing or applying the product in the field at the Project site.

1. Installer and applicator are synonymous.

B. All weather: Capable of operation from -30 to +120 DegF.

1.05 SUBMITTALS

A. Shop Drawings:

1. See UPRR Division 01.

B. Product technical data for framing system and major accessories including:

1. Entrance door.

2. Product data sheet for each hardware item specified.

a. Acknowledgement that products submitted meet requirements of standards referenced.

b. Manufacturer's installation instructions.

3. Elevation drawings indicating all frame and door dimensions and details.

4. Warranty.

5. Test reports.

C. Samples:

1. Metal samples showing range of colors of anodized units.

2. After initial color selection, provide minimum three 2 x 3 IN samples of each color and finish selected.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store units in vertical position off ground with wood spacers between each unit. Store in accordance with manufacturer's instructions.

1.08 WARRANTY

A. Written warranty signed jointly by fabricator, installer, and Contractor, agreeing to repair or replace any items of work performed under this Section that fail.

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1. Failure includes defects in materials, installation, workmanship, water tightness of assembly, calking, glazing or any other defects in storefront system which affects its ability to perform as weather tight envelope.
2. Warranty period is 5 years from date of acceptance.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
   1. Storefront system:
      a. Kawneer Co., Inc.
      b. PPG.
      c. Amarlite.

B. Submit requests for substitution in accordance with UPRR Division 01.

2.02 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
   1. Basis of Design: Kawneer 500
   2. Door Construction: 2 IN overall thickness, with minimum 0.188 IN thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
      a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior
   3. Door Design: Wide stile; 5 IN top rail, minimum 5 IN stiles and 10 IN bottom rail.
   4. Glazing Stops and Gaskets: Square snap-on, extruded-aluminum stops and preformed gaskets.
      a. Provide nonremovable glazing stops on outside of door.

B. Framing Members: Manufacturer's standard extruded aluminum, minimum 0.125 IN thick and reinforced as required to support imposed loads.
   1. Basis of Design: Kawneer 450
   2. Nominal Size: 2 IN by 4-1/2 IN

C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

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E. Materials:

1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
    a. Sheet and Plate: ASTM B 209 (ASTM B 209M).
    b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
    c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
    d. Structural Profiles: ASTM B 308/B 308M.
2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM, and prepare surfaces according to applicable SSPC standard.
    a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
    b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
    c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.03 ENTRANCE DOOR HARDWARE

A. Refer to Division 08 - Finish Hardware.

2.04 GLAZING

A. Glazing: Comply with Division 08 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Glazing Sealants: As recommended by manufacturer.

2.05 FABRICATION

A. General:

1. Fully degrease and clean members prior to assembly or application of protective coatings.
2. Weld using methods recommended by manufacturer and AWS to avoid discoloration.
3. Grind exposed welds smooth and restore finish.
4. Ease corners of cut edges to a radius of approximately 1/64 IN.
5. Conceal fasteners wherever possible.
6. Fit and assemble work at shop to maximum extent possible.
7. Maintain true continuity of line and accurate relation of planes and angles.
8. Provide secure attachment and support at mechanical joint, with hairline fit of contacting members.
9. Reinforce work as necessary to withstand wind loadings and to support system.

10. Separate dissimilar metal with bituminous paint or preformed separators to prevent corrosion.
11. Separate metal surfaces at moving joints with plastic inserts or other nonabrasive concealed inserts to permanently prevent freeze-up of joint.
12. Prepare and reinforce frames for hardware. Refer to Section 08 70 00 for hardware.
13. Structural steel reinforcement hot-dip galvanized after fabrication meeting G-90 ASTM A934 requirements. Provide dissimilar metals protection.
14. All structural reinforcement requirements shall be determined by the frame manufacturer.
15. Minimum wall thickness of 0.090 IN for all frame components.

2.06 FINISHES:

A. Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
   1. Color: As selected by Architect from full range of industry colors and color densities.

2.07 PERFORMANCE REQUIREMENTS

A. General Test Requirements:
   1. Utilize independent testing laboratories specifically qualified to conduct all performance tests required.
   2. Performance tests may be conducted in manufacturer's laboratories provided they are witnessed and certified by qualified independent testing laboratory personnel.
   3. Perform all tests on "Test Unit": Full-sized storefront unit for Project or a minimum 5 FT x 8 Ft unit mounted in test chamber in exact accord with job conditions including anchorage system, calking, sealing, etc. Test unit to be completely assembled and glazed. Thermal tests may be conducted on 4 x 6 FT unit.
   4. Test air infiltration first, water resistance second. Other tests may be in any order.

B. Air Infiltration Tests (Doors):
   1. Test in accord with ASTM E283.
   2. Air infiltration: 0.50 cfm/LF of perimeter crack of fixed wall area when tested at 1.567 PSF pressure differential.

C. Air Infiltration Tests (Storefront Framing):
   1. Test in accordance with ASTM E283.
   2. Air infiltration: 0.06 CFM/Min/SF of wall area when tested at 6.24 PSF.

D. Water Resistance Test:
   1. Test in accordance with ASTM E331.
   2. No leakage allowed with a test pressure difference of 8 PSF.

E. Uniform Load Structural Test:

1. Subject unit to minimum load of 30 PSF applied to unit.
2. Test in accordance with ASTM E330.
3. No failure of parts allowed.

F. Thermal Tests:

1. Perform all thermal tests on unit sized as required to produce representative areas of framing, vision glass, and spandrel glass.
2. Provide test unit that reflects most restrictive situation on project (i.e., worst framing, glass, spandrel proportions for producing desired thermal results).
3. Test in accordance with AAMA 1503.1.
4. Thermal transmittance of insulated glass and framing areas: Average U-value of 0.65 BTUH/SF/DegF, maximum.
5. Condensation resistance test:
   a. Determine in accordance with ASTM C236 and AWWA 1503.1.
   b. Provide condensation resistance factor (CRF) not less than 50.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Verify suitability of substrate to accept installation. Correct defects. Installation assumes responsibility for performance.

B. General:

1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints to produce hairline joints free of burrs and distortion.
4. Rigidly secure non-movement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal perimeter and other joints watertight unless otherwise indicated.

C. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or installing nonconductive spacers.
2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

D. Set continuous sill members and flashing in full sealant bed as specified in Section 07 92 00 "Joint Sealants" to produce weathertight installation.

E. Install components plumb and true in alignment with established lines and grades.

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F. Install glazing as specified in Division 08 "Glazing."

G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.02 CLEANING

A. Clean surface promptly after installation.

B. Remove excess glazing, sealant compounds and dirt, and leave clean.

C. Clean glass inside and out and apply cross streamers attached to frame.

END OF SECTION

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SECTION 08 51 13 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. The following types of aluminum-framed windows:

a. Fixed windows.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Division 08 - Glazing, for glazing requirements for aluminum windows, including those specified to be factory glazed.

1.03 DEFINITIONS

A. Performance grade number, included as part of the AAMA/NWWDA product designation code, is actual design pressure in pounds force per square foot used to determine structural test pressure and water test pressure.

B. Structural test pressure, for uniform load structural test, is equivalent to 150 percent of design pressure.

C. Minimum test size is smallest size permitted for performance class (gateway test size). Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class.

1.04 PERFORMANCE REQUIREMENTS

A. Product Standard: AAMA/WDMA/CSA 101/I.S.2/A440.

B. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.58 BTU/SQ FT x h x DegF.

C. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.40.

D. Condensation-Resistance Factor (CRF): Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of 59.

E. Air Infiltration: Maximum rate not more than indicated when tested according to AAMA/NWWDA 101/I.S.2, Air Infiltration Test.

1. Maximum Rate: 0.3 CFM/SQ FT of area at an inward test pressure of 1.57 LBF/SQ FT.

F. Water Resistance: No water leakage as defined in AAMA/NWWDA referenced test methods at a water test pressure equaling that indicated, when tested according to AAMA/NWWDA 101/I.S.2, Water Resistance Test.

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1. Test Pressure: 20 percent of positive design pressure, but not more than 12 LBF/SQ FT.

G. Condensation-Resistance Factor: Provide aluminum windows tested for thermal performance according to AAMA 1503, showing a CRF of 45, where windows are indicated to be "thermally improved."

H. Thermal Movements: Provide aluminum windows, including anchorage, that accommodate thermal movements of units resulting from the following maximum change (range) in ambient and surface temperatures without buckling, distortion, opening of joints, failure of joint sealants, damaging loads and stresses on glazing and connections, and other detrimental effects. Base engineering calculation on actual surface temperatures of materials due to solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 Deg. F, ambient; 180 Deg. F material surfaces.

1.05 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.

C. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other Work and operational clearances.

D. Samples for Initial Selection: Metal samples showing full range of colors of anodized units.

1. After initial color selection, provide minimum three 2 x 3 IN samples of each color and finish selected.

E. Product Test Reports: Based on evaluation of comprehensive tests performed within the last four years by a qualified testing agency, for each type, grade, and size of aluminum window. Test results based on use of down-sized test units will not be accepted.

1.06 QUALITY ASSURANCE

A. Source Limitations: Obtain aluminum windows through one source from a single manufacturer.

B. Product Options: Information on Drawings and in Specifications establishes requirements for aluminum windows' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

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C. Fenestration Standard: Comply with AAMA/NWWDA 101/I.S.2, "Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors," for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1.07 PROJECT CONDITIONS

A. Field Measurements: Verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating aluminum windows without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

1.08 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fails in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:

1. Failure to meet performance requirements.
2. Structural failures including excessive deflection.
3. Water leakage, air infiltration, or condensation.
4. Faulty operation of movable sash and hardware.
5. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
6. Insulting glass failure.

B. Warranty Period: Two years from date of Substantial Completion.

C. Warranty Period for Metal Finishes: 10 years from date of Substantial Completion.

D. Warranty Period for Glass: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Fixed Windows:

a. Kawneer Company, Inc.
b. Graham Architectural Products Corp.
c. Wausau Windows
d. Custom Window Company.
e. DeSCo Windows.
f. EFCO Corporation.

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B. Basis of Design: Series Traco-9950, thermally broken, fixed window by Kawneer

2.02 GLAZING

A. Glass: Tinted, insulating, low-e glass units. Color: As selected by Architect from the full range of industry colors.

B. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

2.03 FABRICATION

A. General: Fabricate aluminum windows, in sizes indicated, that comply with AAMA/NWWDA 101/I.S.2 for performance class and performance grade indicated. Include a complete system for assembling components and anchoring windows.

B. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.

C. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated.

2.04 FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

C. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: non-specular as fabricated; Chemical Finish: Etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.

1. Color: As selected by Architect from the full range of industry colors and color densities.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances; rough opening dimensions; levelness of sill plate; coordination with wall flashings, vapor retarders, and other built-in components; operational clearances and other conditions affecting performance of work.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.

2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General: Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components; Drawings; and Shop Drawings.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.

C. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.

D. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

E. Metal Protection: Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in "Dissimilar Materials" Paragraph in Appendix B in AAMA/NWWDA 101/I.S.2.

3.03 PROTECTION AND CLEANING

A. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

C. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.

D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION

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SECTION 08 70 00 - FINISH HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Hardware as indicated in Hardware Schedule and on Drawings.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR, Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements

C. Division 08 - Standard Steel Doors and Frames.

D. Division 08 - Flush Wood Doors.

E. Division 08 - Aluminum Storefront.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data:

1. Submit manufacturer's data for each item of finish hardware.

a. Include any information that may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and exposed finishes.

b. Wherever needed, furnish templates to fabricators of other work to receive finish hardware. Indicate by transmittal that copy of applicable data has been distributed to installer.

C. Letter of Authorization:

1. Provide Letter of Authorization for Owner’s signature for all restricted keyway systems, key blanks, cylinders and cores

D. Hardware Schedule:

1. Submit final hardware schedule in manner and format specified, complying with actual construction progress schedule requirements.

a. Include separate key schedule, showing clearly how Owner's final instructions on keying of locks have been fulfilled.

b. Hardware schedules are intended for coordination of work. Review and acceptance by Architect or Owner does not relieve Contractor of his exclusive responsibility to fulfill requirements as shown and specified.

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2. Finish Hardware Schedule: Based on finish hardware requirements as indicated (including drawings, schedules and specifications), organize schedule into "hardware sets", indicating complete designation of every item required for each door or opening.

    a. Furnish initial draft of schedule at earliest possible date, in order to facilitate fabrication of other work (such as hollow metal frames) that may be critical in project construction schedule.

    b. Furnish final draft of schedule after samples, manufacturer's data sheets, and coordination with shop drawings for other work, delivery schedules and similar information has been completed and accepted.

1.04 QUALITY ASSURANCE

A. Manufacturer:

1. To greatest extent possible, obtain each kind of hardware (latch and lock sets, hinges, closers, etc.) from only one manufacturer, even though several may be specified as acceptable manufacturers.

B. Supplier:

1. Subcontract furnishing of hardware, as specified herein, only to a recognized builders' hardware supplier who has been furnishing hardware in same area as project for a period of not less than 2 years, and who has in his employment an experienced hardware consultant who is available, at reasonable times during course of work, for project hardware consultation to Owner, Architect and Contractor.

C. Installer:

1. Assign installation of hardware to experienced tradesmen in compliance with trade union jurisdictions; either at door and frame fabrication plant or at project site, at Contractor's option except as otherwise indicated. It is assumed that carpentry trade will install hardware items, except as otherwise required by manufacturer, or otherwise directed by Contractor, or otherwise specified.

D. Scheduled Designations:

1. Except as otherwise indicated, use of one manufacturer's numeric designation system in schedules does not imply that another manufacturer's products will not be acceptable, unless they are not equal in design, size, weight, finish, function, or other quality of significance. See Hardware Schedule in this Section for list of acceptable manufacturers.

E. Where no hardware is specified herein for an opening requiring hardware (nor listed as not included under this Section of Specifications), or where hardware specified herein will not function correctly, hardware supplier shall notify Contractor and Architect of such conditions promptly, to enable changes or corrections to be made in time so that construction of project will not be delayed. Failure of supplier of hardware to make such notification in writing will be supplier's responsibility for furnishing hardware required or hardware that will function and operate to satisfaction of Architect.

F. Codes and Standards:

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1. All hardware shall comply with applicable fire and building code requirements and the American's with Disabilities Act.
2. All controls, operating mechanisms and hardware in accessible spaces, along accessible routes or a part of accessible elements, shall be accessible.

1.05 COORDINATION

A. Coordinate hardware with other work.
   1. Tag each item or package separately, with identification related to final hardware schedule and include basic installation instructions in package.

B. Furnish hardware items of proper design for use on doors and frames of the thicknesses, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information in contract documents.

C. Deliver individually packaged hardware items at times and to locations (shop or field) for installation, as directed by Contractor.

D. Templates:
   1. 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 will be made for proper installation of hardware.

E. Security:
   1. Where required, coordinate installation of door hardware, keying, and access control with Owner.
      a. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

F. Provide temporary cylinders for exterior door locks during construction. Permanent cylinders for these locks shall be installed by Contractor at completion of work. Provide Owner with 2 keys for temporary construction locks.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Provide secure lock-up for hardware delivered to project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable, so that completion of work will not be delayed by hardware losses, both before and after installation.

B. Delivery:
   1. Hardware shall be delivered to job site in one shipment with door number on each package clearly marked and shall be checked on job site by supplier's personnel and contractor's representative. Hardware shall be stored in a clean, dry, secure room until ready for installation.
   2. Deliver keys and permanent cores to Owner's representative by registered mail or overnight package service

PART 2 - PRODUCTS

2.01 MATERIALS

A. Hardware Materials and Fabrication:

1. Produce hardware units of basic metal 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 FS FF-H-106, FS FF-H-111, FS FF-H-116 and FS FF-H-121. Do not substitute "optimal" materials for those indicated, except as otherwise permitted by other sections of these specifications.

2. Form the base metal into required shapes and sizes by method indicated (cast, wrought, forged, rolled, pressed, etc.), or if not indicated, by manufacturer's standard production method for class or quality of hardware units required. Do not substitute "optional" methods of forming for those indicated, except when commercially recognized as a superior method, and except as otherwise permitted by other sections of these specifications.

3. Fasteners: Manufacturer hardware to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.

4. 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 finish of such other work, as closely as possible, except as otherwise indicated.

5. Provide concealed fasteners for hardware units that are exposed when door is closed, except to extent no standard-manufactured units of type specified are available with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed under any condition, except where it is not possible to adequately reinforce work and use machine screws or concealed fasteners of another standard type, to satisfactorily avoid use of through bolts.

6. Provide fasteners compatible with both unit fastened and substrate and which will not cause corrosion or deterioration of hardware, base material or fastener.

7. Hand of Door: Drawings show swing or hand of each door leaf (left, right, reverse bevel, etc.). Furnish each item of hardware for proper installation and operation of door swing as shown.

B. Hardware Finishes:

1. General:

a. Match finish of every hardware unit at each door or opening, to greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where base metal or metal forming process is different for individual units of hardware exposed at same door or opening. In general, match all items to manufacturer's standard finish for latch and lock set for color and texture.

b. The Architect will be sole judge of whether hardware units match accepted samples and match each other satisfactorily. Units will be judged when held 2 FT-0 IN apart at 3 FT-0 IN distance.

c. Provide finishes which match those established by BHMA or, if none established, match Architect's samples.

d. 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 applicable units of hardware by FS FF-H-106, FS FF-H-111, ES FF-H-116 and FS FF-H-121.

e. Provide protective lacquer coating on all exposed hardware finishes of brass, bronze and aluminum, except as otherwise indicated. Suffix "NL" is used with standard finish designations to indicate "no lacquer".

2. Standard Finish Designations:

a. Designations used in schedules and elsewhere to indicate hardware finishes are those listed in "Materials and Finishes Standard 1301" by BHMA, including coordination with traditional U.S. finishes shown by certain manufacturers for their products.

b. Manufacturer's Standard: Aluminum lacquer or bronze lacquer (as required for approximate match with other hardware finishes); for USP finish on iron and steel; primarily on door closer arms and cases.

c. Rust Resistant Finish: For iron and steel base metal, required for exterior work and in areas shown as "High Humidity" areas (and also when designated with suffix "-RR"), provide 0.2 mil thick copper coating on base metal before applying brass, bronze, nickel or chromium plated finishes.

PART 3 - EXECUTION

3.01 HARDWARE MOUNTING HEIGHTS

A. Mount hardware units at following locations on each door or door opening, except as otherwise specifically indicated, or required to comply with governing regulations, and except as may be otherwise directed by Architect:

1. Lowest Hinge - 10 IN above floor to bottom of unit.
2. Highest Hinge - 5 IN below top of door to top of unit.
3. Intermediate Hinges - equally spaced between lowest and highest hinge units.
4. Lock and Latch Set - knobs centered 38 IN above floor.
5. Dead Lock - cylinder and turn centered 60 IN above floor.
6. Special Pulls and Other Special Units - units mounted at height recommended by manufacturer.

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3.02 INSTALLATION

A. Install each hardware item in compliance with 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, install each item completely and then remove and store in a secure place during finish application. After completion of finishes, re-install each item. Do not install surface-mounted items until finishes have been completed on substrate.

3.03 ADJUST AND CLEAN

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Lubricate moving parts with type of lubrication recommended by manufacturer (graphite-type if no other recommended). Replace units which cannot be adjusted and lubricated to operate freely and smoothly as intended for application made.

B. Final Adjustment:

1. Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to work during week prior to acceptance or occupancy, and make a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate 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.

C. Instruct Owner's personnel in proper adjustments and maintenance of hardware and hardware finishes, during final adjustment of hardware.

3.04 KEYS AND KEYING

A. Master Key System: Change keys and a master key operate cylinders.

1. Provide three cylinder change keys and five master keys.

B. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

1. Notation: "DO NOT DUPLICATE."

3.05 HARDWARE SCHEDULE

A. Manufacturers:

1. Butt hinges shall be of size and type as listed in hardware schedule. All hinges 4-1/2 IN x 4-1/2 IN unless noted otherwise in Schedule. Basis for design is Hager BB1191 Stainless Steel (satin finish) with Stainless Steel Non-Removable Pins (or equal). Butt hinges shall be manufactured by:

a.	Hager Co.	St. Louis, Missouri
b.	Stanley Hardware	New Britain, Connecticut
c.	Lawrence Bro	Sterling, Illinois
d.	McKinney	Scranton, Pennsylvania

2. Continuous Hinges shall be Stanley 660 Series Continuous Hinge design made of 6065 T5 Aluminum Finish or equal as manufactured by the following:

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a. Stanley Hardware — New Britain, Connecticut
b. Hager Co. — St Louis, MO.
c. Lawrence Bros — Sterling, IL
d. McKinney — Scranton, PA

3. Door closers and holders: Basis for design is Norton Series 7500 with hold-open and multi-spring power adjustment, Aluminum Finish (or equal) as manufactured by the following:
   a. Norton — Bensenville, Illinois
   b. Yale — Charlotte, North Carolina
   c. LCN — Princeton, Illinois
4. Locks, latches and cylinders are to be mortise type. Basis for design is Schlage L-series lever and trim, finish 630 (satin stainless steel) as indicated in hardware schedule and by the following:
   a. Schlage Lock Company — Colorado Springs, Colorado
5. Pushbutton Locksets and Cylinders shall be KABA/ILCO "PowerLever" Series Model # 455AI with lever handles and Best Model 1C7 cores. Finish: US26D (Satin Chrome) as indicated in hardware schedule and by the following:
   a. Kaba Ilco CorWinston — Salem, North Carolina
6. Thresholds shall be Hager 520S series, finish AL (aluminum) (or equal). Weatherstripping shall be Reese DS70C (or equal) and Sill Protection shall be Reese 323A (or equal) as manufactured by the following:
   a. Reese — Rosemont, Minnesota
   b. Hager Co. — St. Louis, Missouri
   c. Pemko Mfg. Co. — Emeryville, CA
   d. Zero Mfg. Co. — New York, New York
   e. National Guard Products, In — Memphis, Tennessee
7. Stops shall be Hager series 241F floor dome stops and Hager series 230W convex wall stops, finish 26D (or equal) as manufactured by the following:
   a. Glynn-Johnson Co. — Indianapolis, Indiana
   b. Ives — Wallingford, Connecticut
   c. Hager Co. — St. Louis, Missouri
8. Auto Flushbolts shall be Hager 291D/292D (or equal) and dustproof strikes shall be Hager 280X (or equal) as manufactured by the following:
   a. Hager Co. — St. Louis, Missouri
   b. Glynn-Johnson Co. — Indianapolis, Indiana
   c. Ives — Wallingford, Connecticut
9. Auto Flushbolts for Storm Shelter Doors

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a. Sargent / Assa Abloy Canada

10. Kickplates shall be Hager series 193S, stainless steel, beveled or equal as manufactured by the following:
    a. Hager Co. St. Louis, Missouri
    b. Lindstrom Co. Washington, D.C.
    c. Baldwin Hardware Reading, Pennsylvania
    d. Brookline Industries Chicago, Illinois
11. Hardware for Storm Shelter Doors (where scheduled)
    a. Sargent / Assa Abloy Canada
    b. Schlage Lock Company Colorado Springs, Colorado

B. Schedule:

1. Items shown in Hardware Schedule shall be of type, size, function and finish shown above; equal to or superior to manufacturer's products listed. Subject to compliance with requirements, products of other manufacturers listed in Paragraph A. may be used.
2. Hardware Schedule – Provide Master key system for each building.
    a. MANUFACTURERS ABREVIATIONS:
        1) A/R ADAMS RITE MFG
        2) GJ GLYNN-JOHNSON CORP
        3) HA HAGER CO
        4) ILCO KABA/ILCO MFG
        5) LCN LCN CLOSERS
        6) NGP NATIONAL GUARD PRODUCTS
        7) TR TRIMCO INDUSTRIES
        8) SCH SCHLAGE LOCK
        9) SGT SARGENT / ASSA ABLOY
        10) VD VON DUPRIN CORP

HARDWARE SET NO. 1 – EXTERIOR VESTIBULE ALUMINUM DOOR

(each to have)

Qty.	*Hardware*	*Manufacturer/Type/Style*	*Finish*
1 set	Alum Door Pivots	Aluminumn Door Manufacturer Standard	628
1 ea.	Deadbolt	Adams Rite MS1850	630
1 ea.	MortiseCylinder Turn	Schlage 09-905 118	626
1 ea.	SFIC Mortise Cyl.	Schlage 80-302	626
1 ea.	Push Pull Set	Ives 9190HD-10"-NO	630
1 ea	Surface Closer	LCN 4111 AVB SCUSH MC	689
1 ea	Mounting Plate	LCN 4110-18	689

1 ea	Cush Shoe Support	LCN 4110-30	689
1 ea	Blade Stop Spacer	LCN 4110-61	689
1 ea.	Stop	Trimco 1211 ES	689
1 ea.	Seal	Door Mfr Standard seals	628

HARDWARE SET NO. 2A – INTERIOR VESTIBULE ALUMINUM DOOR W/ CARD READER

(each to have)

Qty.	*Hardware*	*Manufacturer/Type/Style*	*Finish*
1 set	AlumDoor Pivots	AluminumnDoor Manufacturer Standard	628
1 ea.	SFIC Mortise Cyl	Schlage 80-302	626
1 ea	Card Reader	Javelin S874-EX-KP	---
1 ea.	Electric Strike	Von Duprin 6211	628
1 ea.	Surface Closer	LCN 4111 AVB SCUSH MC	689
1 ea	Mounting Plate	LCN 4110-18	689
1 ea	CushShoe Support	LCN 4110-30	689
1 ea	Blade Stop Spacer	LCN 4110-61	689
1 set	Seal	Door Mfr Standard seals	689
1 ea.	Floor Stop	Trimco 1211 ES	689

Card Reader to match existing system in Intermodal Yard, General Contractor to coordinate with Mike Miller, Security Equipment Inc., 402-778-3716 and UPRR TeleComm Department

HARDWARE SET NO. 2B – INTERIOR VESTIBULE ALUMINUM DOOR W/ KEYPAD

(each to have)

Qty.	*Hardware*	*Manufacturer/Type/Style*	*Finish*
1 set	AlumDoor Pivots	AluminumnDoor Manufacturer Standard	628
1 ea.	SFIC Mortise Cyl	Schlage 80-302	626
1 ea	Keypad	Kaba Powerplex 2000	626
1 ea.	Surface Closer	LCN 4111 AVB SCUSH MC	689
1 ea	Mounting Plate	LCN 4110-18	689
1 ea	CushShoeSupport	LCN 4110-30	689
1 ea	Blade Stop Spacer	LCN 4110-61	689
1 set	Seal	Door Mfr Standard seals	689
1 ea.	Floor Stop	Trimco 1211 ES	689

HARDWARE SET NO. 3 – EXTERIOR HOLLOW METAL DOOR *(each to have)*

Qty.	Hardware	Manufacturer/Type/Style	Finish
1 ea	Continuous Hinge	Ives 224HD	628
1 ea.	Storeroom Lock	Schlage L9080BD 03A	630
1 ea.	SFIC Everest Core	Schlage 80-037	626
1 ea.	Surface Closer	LCN 1461 EDA	626
1 ea	Overhead Stop	Glynn Johnson 90S	630
1 ea.	Threshold	NGP 896S	AL
2 ea.	Door Sweep	NGP 101VA	CL
1 set.	Seals	NGP 700SA	AL

HARDWARE SET NO. 4 – EXTERIOR HOLLOW METAL PAIR OF DOORS

(each to have)

Qty.	*Hardware*	*Manufacturer/Type/Style*	*Finish*
2 ea	Continuous Hinge	Ives 224HD	628
2 ea.	Manual Flush Bolt	Ives FB458	626
1 ea	Dust Proof Strike	Ives DP1/DP2	626
1 ea.	Entrance w/ Deadbolt	Schlage L9453BD 03A	630
1 ea	SFIC Everest Core	Schlage 80-037	626
1 ea.	Overhead Stop	Glynn Johnson 90S	630
1 ea.	Surface Closer	LCN 4111 AVB SCUSH MC	689
1 set	Seals	NGP 7000SA	CL
1 set	Astragal	NGP 125NSS	CL
1 ea	Rain Drip	Pemko 346	DB
2 ea.	Door Sweep	NGP 101VA	CL
1 ea	Threshold	NGP 896S	AL

HARDWARE SET NO. 5 – EXTERIOR HOLLOW METAL COMM DOOR

(each to have)

Qty.	*Hardware*	*Manufacturer/Type/Style*	*Finish*
1 ea	Continuous Hinge	Ives 224HD	628
1 ea.	Entrance Lock	TO BE PROVIDED BY COMM DEPT	630
1 ea.	Cylinder	TO BE PROVIDED BY COMM DEPT	630
1 ea.	Surface Closer	LCN 4111 AVB SCUSH MC	626
1 ea	Overhead Stop	Glynn Johnson 90S	630
1 ea.	Threshold	NGP 896S	AL
1 ea	Rain Drip	Pemko 346	DB
2 ea.	Door Sweep	NGP 101VA	CL
1 set.	Seals	NGP 700SA	AL

Cylinder to be provided by Communications Dept. – Abloy Protect FSIC core, no keys, ACY419NLK locking system

HARDWARE SET NO. 6 – INTERIOR DOOR WITH ENTRANCE LOCK

(each to have)

Qty.	*Hardware*	*Manufacturer/Type/Style*	*Finish*
3 ea	HW Hinge	Ives 5BB1HW 4.5 X 4.5	630
1 ea.	Entrance Lock	Schlage ND53BD TLR	626
1 ea.	SFIC Everest Core	Schlage 80-037	626
1 ea.	Floor Stop	Ives FS436	626
3 ea.	Silencers	Ives SR64	Gray

HARDWARE SET NO. 7 – INTERIOR HOLLOW METAL SERVICE DOORS WITH ENTRANCE LOCK

(each to have)

Qty.	*Hardware*	*Manufacturer/Type/Style*	*Finish*
1 ea.	Continuous Hinge	Ives 224HD	626
1 ea.	Entrance Lock	Schlage ND53BD TLR	626
1 ea.	SFIC Everest Core	Schlage 80-037	626
1 ea.	Surface Closer	LCN 1461 EDA	689
1 ea.	Floor Stop	Ives FS436	626
3 ea.	Silencers	Ives SR64	Gray

HARDWARE SET NO. 8 - INTERIOR HOLLOW METAL COMM DOOR

(each to have)

Qty.	*Hardware*	*Manufacturer/Type/Style*	*Finish*
1 ea	Continuous Hinge	Ives 224HD	628
1 ea.	Office/Entry Lock	TO BE PROVIDED BY COMM DEPT	630
1 ea.	Cylinder	TO BE PROVIDED BY COMM DEPT	630
1 ea.	Surface Closer	LCN 1461 EDA	689
1 ea	Floor Stop	Ives FS436	630
1 ea.	Threshold	NGP 896S	AL
2 ea.	Door Sweep	NGP 101VA	CL
1 set.	Seals	NGP 700SA	AL

Cylinder to be provided by Communications Dept. – Abloy Protect FSIC core, no keys, ACY419NLK locking system

HARDWARE SET NO. 9 – TOILET DOORS (*each to have)*

Qty.	*Hardware*	*Manufacturer/Type/Style*	*Finish*
1 ea	Cont Hinge	Ives 224HD	628
1 ea	Push Plate	Ives 8200 4" X 16"	630
1 ea	Pull Plate	Ives 8303 10" 4" X 16"	630
1 ea	Surface Closer	LCN 1461	689
1 ea	Kickplate	Ives 8400 10" X 2" LDW B4E CS	630
1 ea	Mop Plate	Ives 8400 4" X 2" LDW	630
1 ea.	Floor Stop	Ives FS436	626
3 ea.	Silencers	Ives SR64	Gray

HARDWARE SET NO. 10 – INTERIOR DOOR WITH PRIVACY LOCK

(each to have)

Qty.	Hardware	Manufacturer/Type/Style	Finish
3 ea	HW Hinges	Ives 5BB1HW 4.5 X 4.5	630
1 ea.	Privacy Lock	Schlage ND40S TLR	626
1 ea.	Floor Stop	Ives FS436	626
3 ea.	Silencers	GJ 64	Gray

HARDWARE SET NO. 11 - INTERIOR PAIR OF DOORS WITH PASSAGE SET

(*each to have*)

Qty.	Hardware	Manufacturer/Type/Style	Finish
2 ea	Continuous Hinge	628	US26D
1 ea.	ManualFlush Bolt	Ives FB458	626
1 ea.	Cylinder	Schlage 23-030 IC Core	626
1 ea.	Closers w/ Hold	LCN 4110 H on active leaf only	US26D
1 set	Flush Bolts	Glynn Johnson FB6 (on inactive leaf)	B26D

HARDWARE SET NO. 12 - INTERIOR PAIR OF COMM DOORS WITH LOCK

(each to have)

Qty.	*Hardware*	*Manufacturer/Type/Style*	*Finish*
1 ea	Continuous Hinge	Ives 224HD	628
2 ea.	Manual Flush Bolt	Ives FB458	626
1 ea	Dust Proof Strike	Ives DP1/DP2	626
1 ea.	Entrance w/ Deadbolt	Schlage L9453BD 03A	630
1 ea	Cylinder	TO BE PROVIDED BY COMM DEPT	630
1 ea.	Overhead Stop	Glynn Johnson 90S	630
1 ea.	Surface Closer	LCN 4111 AVB SCUSH MC	689
1 set	Astragal	NGP 125NSS	CL
1 ea	Threshold	NGP 896S	AL

Cylinder to be provided by Communications Dept. – Abloy Protect FSIC core, no keys, ACY419NLK locking system

HARDWARE SET NO. 13 – STORM SHELTER DOOR

(each to have)

Note: requires a 3 point lock system and hardware must comply with FEMA 361 Requirements for Tornado Shelter

Qty.	Hardware	Manufacturer/Type/Style	Finish
1 ea.	Continuous Hinge	Stanley 660 Series	626
1 ea.	Lockset	Schlage L9070BD-03A	626
1 ea.	Cylinder	Schlage 80-037	626
1 ea.	Concealed Vertical Rods	Schlage	626
1 ea.	Closer	LCN P1461-TB	626
1 ea.	Floor Stop	Trimco 1215	AL
3 ea.	Silencers	GJ 64	Gray

END OF SECTION

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SECTION 08 81 00 - GLAZING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

   a. Interior borrowed lites.

   b. Exterior low-e, tinted; single and insulating glass units; float and tempered.

   c. Mirrors.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR, Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements

C. Division 08 - Standard Steel Doors and Frames.

D. Division 08 – Aluminum Storefront

E. Division 08 - Aluminum Windows.

1.03 DEFINITIONS

A. Manufacturer: A firm that produces primary glass or fabricated glass as defined in referenced glazing publications.

B. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delaminating materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

C. Deterioration of Insulating Glass: Failure of the hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1.04 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

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B. Glass Design: Glass thicknesses indicated are minimums and are for detailing only. Provide glass lites for various size openings in nominal thicknesses indicated.

1.05 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

C. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

D. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 IN square.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations for Laminated Glass: Obtain laminated-glass units from one manufacturer using the same type of glass lites and interlayers for each type of unit indicated.

C. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

D. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.

E. 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.

1. GANA Publications: GANA'S "Glazing Manual" and "Laminated Glass Design Guide."

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products indicated. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Clear glass - tempered, float and heat strengthened:
    a. Libbey-Owens-Ford.
    b. PPG.
    c. Viracon.
    d. Visteon.
2. Tinted glass - tempered, float and heat strengthened:
    a. Libbey-Owens-Ford.
    b. PPG.
    c. Viracon.
    d. Visteon.
3. Wire glass:
    a. Guardian Industries.
    b. Nippon Glass Works.
4. Low emissivity glass:
    a. Libbey-Owens-Ford.
    b. PPG.
    c. Viracon.
    d. Visteon.
5. Insulating glass units - tinted and clear:
    a. Libbey-Owens-Ford.
    b. PPG.
    c. Viracon.
    d. Visteon.
6. Insulated low emissivity glass units:
    a. Libbey-Owens-Ford.
    b. PPG.
    c. Viracon.
    d. Visteon.
7. Spandrel glass:

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a. Libbey-Owens-Ford.

b. PPG.

c. Viracon.

d. Visteon.

8. Gaskets, glazing compounds, setting blocks, spacers, sealant, sealant tape, etc., as recommended by glass manufacturer, glass unit fabricator, or as required by NFPA.

9. Submit requests for substitution in accordance with UPRR Division 01.

2.02 GLASS

A. General:

1. For all glass, provide the type and thickness shown on the Drawings or specified herein.

2. Where type or thickness, or both, are not shown on the Drawings or specified herein, provide type and thickness directed by the Architect.

2.03 EXTERIOR INSULATING GLASS:

A. Insulated Low Emissivity Glass Units: Similar to Viracon "Solarscreen 85."

1. Two sheets of 1/4 IN glass sealed together at edges with spacers and sealant.

2. Coating applied to second surface.

3. 1/2 IN air space.

4. Visible light transmittance: 47 percent.

5. Visible light reflectance outside: 7 percent.

6. Solar energy transmittance: 29 percent.

7. U value summer/winter: .31/.32.

8. Shading coefficient: .46.

9. Relative heat gain: 96.

10. Color: As selected by architect from full range of colors.

2.04 CLEAR GLASS:

A. 1/4" Float Glass - Type I, Quality q3, clear.

B. Tempered Glass: Provide glazing to match adjacent applications including tinting, thickness shading coefficients and etc. Install at locations indicated on floor plans or as scheduled.

2.05 PLATE GLASS MIRRORS

A. Clear plate glass (FS DD-G-451, Type I, Class I, Quality q2), 1/4" thick, with silver coating, copper protective coating and 2 mil thick paint coating; complying with C527.

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1. Mirror Mastic: Type recommended by mirror manufacturer for spot-application system with less than 25% coverage and 1/8"-1/2" thickness of setting bed, with mirror supported only at lower edge.

2.06 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent; non-staining and non-migrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.

B. Expanded Cellular Glazing Tape: Closed-cell, PVC foam tape; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following types:

1. Type 1, for glazing applications in which tape acts as the primary sealant.
2. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.07 GLAZING GASKETS

A. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock strips, complying with ASTM C542, black.

B. Dense Compression Gaskets: Molded or extruded gaskets of material indicated below, complying with standards referenced with name of elastomer indicated below, and of profile and hardness required to maintain watertight seal:

1. EPDM, ASTM C864.
2. Silicone, ASTM C1115.
3. Thermoplastic polyolefin rubber, ASTM C1115.
4. Any material indicated above.

C. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C509, Type II, black; and of profile and hardness required to maintain watertight seal:

1. EPDM.
2. Silicone.
3. Thermoplastic polyolefin rubber.
4. Any material indicated above.

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2.08 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing maters for application indicated, and with a proven record of compatibility with contacted in installation.

B. Cleaners, Primers, and Sealants: Typers recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.09 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.

2.10 MIRRORS

A. Where shown on the Drawings, provide 1/4 IN polished float/plate glass, triple-silvered, electro-copper plated with baked enamel backing and guaranteed against silver spoilage for 15 years. Smooth polished edges, Units furnished with bright nickel finish steel mounting clips and concealed screws and clear coated aluminum frames. Provide in the dimensions and arrangements indicated on the drawings.

B. Shall be mounted to meet ADA standards.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine framing glazing, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

2. Presence and functioning of weep system.

3. Minimum required face or edge clearances.

4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

3.03 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where the length plus width is larger than 50 IN (1270 mm) as follows:

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8 IN (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width with glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.04 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

3.05 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.06 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.07 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system, unless otherwise indicated.

3.08 PROTECTION AND CLEANING

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.

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C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.

END OF SECTION

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SECTION 09 21 16 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Interior gypsum wallboard.
2. Non-load-bearing steel framing.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR, Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements

1.03 DEFINITIONS

A. Gypsum Board Terminology: Refer to ASTM C11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.04 SUBMITTALS

A. Manufacturer's Literature and Product Data Sheets: For each type of product indicated.

1.05 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

1.07 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written recommendations, whichever is the most stringent.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products of the following:

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1. Steel Framing and Furring:
    a. Dale Industries, Inc. - Dale/Incor.
    b. National Gypsum Company.
    c. Scafco Corporation.
    d. ClarkDietrich
2. Gypsum Board and Related Products:
    a. American Gypsum Co.
    b. G-P Gypsum Corp.
    c. National Gypsum Company.
    d. United States Gypsum Co.

2.02 STEEL SUSPENDED CEILING AND SOFFIT FRAMING

A. Components, General: Comply with ASTM C 754 for conditions indicated.

B. Tie Wire: ASTM A641/A64 1M, Class 1 zinc coating, soft temper, 0.0625 IN DIA wire, or double strand of 0.0475 IN DIA wire.

C. Hangers: As follows:
    1. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.162 IN DIA.

D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 IN, a minimum 1/2 IN wide flange, with manufacturer's standard corrosion-resistant zinc coating.
    1. Depth: 1-1/2 IN.

E. Furring Channels (Furring Members): Commercial-steel sheet with manufacturer's standard corrosion-resistant zinc coating.
    1. Cold Rolled Channels: 0.0538 IN bare steel thickness, with minimum 1/2 IN wide flange, 1/2 IN deep.
    2. Steel Studs: ASTM C645.
        a. Minimum Base Metal Thickness: 0.0179 IN.
        b. Depth: As indicated.
        c. Hat-Shaped, Rigid Furring Channels: ASTM C645, 7/8 IN deep. Minimum Base Metal Thickness: 0.0179 IN.

F. Grid Suspension System for Interior Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.
    1. Products: Subject to compliance with requirements, provide one of the following:
        a. Armstrong World Industries, Inc.; Furring Systems/Drywall.
        b. USG Interiors, Inc.; Drywall Suspension System.

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2.03 STEEL PARTITION AND SOFFIT FRAMING

A. Components, General: As follows:

1. Comply with ASTM C754 for conditions indicated.

2. Steel Sheet Components: Complying with ASTM C645 requirements for metal and with manufacturer's standard corrosion-resistant zinc coating.

B. Steel Studs and Runners: ASTM C645.

1. Minimum Base Metal Thickness: 20 gage. Refer to schedule on drawings.

2. Depth: As indicated.

3. Studs used as furring and attached to masonry substrate: 22 gage minimum thickness.

C. Deep-Leg Deflection Track: ASTM C645 top runner with 2 IN deep flanges.

D. Proprietary Deflection Track: Steel sheet top runner manufactured to prevent cracking of gypsum board applied to interior partitions resulting from deflection of structure above; in thickness indicated for studs and in width to accommodate depth of studs.

1. Product: Subject to compliance with requirements, provide one of the following:

a. Delta Star, Inc., Superior Metal Trim; Superior Flex Track System (SFT).

b. Metal-Lite, Inc.; Slotted Track.

c. Deitrich.

d. Marino.

E. Proprietary Firestop Track: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Product: Subject to compliance with requirements, provide one of the following:

a. Fire Trak Corp.; Fire Trak attached to studs with Fire Trak Slip Clip.

b. Metal-Lite, Inc.; The System.

F. Cold-Rolled Channel Bridging: 0.0538 IN bare steel thickness, with minimum 1/2 IN wide flange.

1. Depth: As indicated.

2. Clip Angle: 1-1/2 by 1-1/2 IN, 0.068 IN thick, galvanized steel.

G. Hat-Shaped, Rigid Furring Channels: ASTM C645.

1. Minimum Base Metal Thickness: 25 gage.

2. Depth: 7/8 IN.

H. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

2.04 INTERIOR GYPSUM WALLBOARD

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

B. Gypsum Wallboard: ASTM C 36.

1. Regular Type:

a. Thickness: 5/8 IN.

b. Long Edges: Tapered.

2. Type X:

a. Thickness: 5/8 IN.

b. Long Edges: Tapered.

C. Moisture-Resistant Gypsum Wallboard: ASTM C36.

1. Core: Moisture-resistant.

2. Long Edges: Tapered.

3. Location: At each wall with plumbing fixture and other areas indicated on drawings.

2.05 EXTERIOR GYPSUM PANELS FOR CEILINGS AND SOFFITS

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

B. Exterior Gypsum Soffit Board: ASTM C931/C931M, with manufacturer's standard edges.

1. Core: As indicated regular type and Type X.

C. Glass-Mat Gypsum Sheathing Board: ASTM C1177/C1177M.

1. Available Product: Subject to compliance with requirements, a product that may be incorporated into the Work includes, but is not limited to, "Dens-Glass Gold" by G-P Gypsum Corp.

2. Product: Subject to compliance with requirements, provide "Dens-Glass Gold" by G-P Gypsum Corp.

3. Core: As indicated regular type and Type X.

2.06 TILE BACKING PANELS

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

B. Location:

1. All walls of showers.

C. Cementitious Backer Units: ANSI A118.9.

1. Products: Subject to compliance with requirements, provide one of the following:

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a. Custom Building Products; Wonderboard.

b. FinPan, Inc.; Util-A-Crete Concrete Backer Board.

c. United States Gypsum Co.; DUROCK Cement Board.

2. Thickness: 1/2 IN.

2.07 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized steel sheet Galvanized or aluminum-coated steel sheet or rolled zinc.

2. Shapes:

a. Cornerbead: Use at outside corners, unless otherwise indicated.

b. LC-Bead: J-shaped; exposed long flange receives joint compound; use at exposed panel edges.

c. Expansion (Control) Joint: Use where indicated.

B. Exterior Trim: ASTM C1047.

1. Material: Hot-dip galvanized steel sheet or rolled zinc.

2. Shapes:

a. Cornerbead: Use at outside corners.

b. LC-Bead: J-shaped; exposed long flange receives joint compound; use at exposed panel edges.

c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening. Use where indicated.

C. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Fry Reglet Corp.

b. Gordon, Inc.

c. MM Systems Corporation.

d. Pittcon Industries.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221, alloy 6063-T5.

3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.08 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

D. Joint Compound for Exterior Applications:
1. Exterior Gypsum Soffit Board: Use setting-type taping and setting-type, sandable topping compounds.
2. Glass-Mat Gypsum Sheathing Board: As recommended by manufacturer.

E. Joint Compound for Tile Backing Panels:
1. Cementitious Backer Units: Thin-set cement and open-weave fiberglass tape, as recommended by manufacturer.

2.09 ACOUSTICAL SEALANT

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

B. Products: Subject to compliance with requirements, provide one of the following:
1. Acoustical Sealant for Exposed and Concealed Joints:
a. Pecora Corp.; AC-20 FTR Acoustical and Insulation Sealant.
b. United States Gypsum Co.; SHEETROCK Acoustical Sealant.
2. Acoustical Sealant for Concealed Joints:
a. Ohio Sealants, Inc.; Pro-Series SC-170 Rubber Base Sound Sealant.
b. Pecora Corp.; BA-98.
c. Tremco, Inc.; Tremco Acoustical Sealant.

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C. Acoustical Sealant for Exposed and Concealed Joints: Nonsag, paintable, nonstaining, latex sealant complying with ASTM C834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.

D. Acoustical Sealant for Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.

2.10 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

C. Steel Drill Screws: ASTM C1002, unless otherwise indicated.

1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 IN thick.

2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Isolation Strip at Exterior Walls:

1. Asphalt-Saturated Organic Felt: ASTM D226, Type I (No. 15 asphalt felt), nonperforated.

2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 IN thick, in width to suit steel stud size.

E. Sound Attenuation Blankets: As specified in Section 07 21 00 - Building Insulation.

F. Thermal Insulation: As specified in Section 07 21 00 - Building Insulation.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and substrates, with Installer present, and including cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLING STEEL FRAMING, GENERAL

A. Installation Standards: ASTM C754, and ASTM C840 requirements that apply to framing installation.

B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."

C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement.

1. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip- type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.

D. Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently.

3.03 APPLYING AND FINISHING PANELS

A. Installation Standards: Comply with ASTM 840.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4 to 1/2 IN wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

D. Install trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

1. Aluminum Trim: Install according to ASTM C840.

2. Control Joints: Install control joints according to ASTM C840.

3. Interior Trim: Install in the following locations:

a. Cornerbead: Use at outside corners.

b. Bullnose Bead: Use at outside corners.

c. LC-Bead: Use at exposed panel edges where gypsum board abuts another material.

d. U-Bead: Use at exposed panel edges where gypsum board abuts another material

E. Prefill open joints, rounded or beveled edges, and damaged surface areas.

F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.

2. Level 2: Panels that are substrate for tile.

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3. Level 4: At panel surfaces that will be exposed to view.
    a. Primer and its application to surfaces are specified in Section 09 90 00.
4. Level 5: Where indicated on Drawings.
    a. Primer and its application to surfaces are specified in Section 09 90 00.

H. Protect adjacent surfaces from drywall compound and texture finishes and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

I. Remove and replace panels that are wet, moisture damaged, and mold damaged.

END OF SECTION

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SECTION 09 30 13 - CERAMIC TILE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Ceramic Wall Tile.
2. Ceramic Floor Tile.
3. Porcelain Floor Tile.
4. Combination Waterproofing and Adhesive.
5. Grout.
6. Leveling Compound.
7. Marble Transition Strips.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - General Requirements.

C. Division 07 - Joint Sealants.

D. Division 09 - Gypsum Board Assemblies.

1.03 REFERENCED STANDARDS

A. American National Standards Institute (ANSI):

1. A108.1, Installation of Ceramic Tile.
2. A108.11, Specification for Interior Installation of Cementitious Backer Units.
3. A137.1, Ceramic Tile.

1.04 DEFINITIONS

A. Installer or Applicator: Installer or applicator is the person actually installing or applying the product in the field at the Project site.

1. Installer and applicator are synonymous.

1.05 SUBMITTALS

A. Submit under provisions of Section 01 33 00

B. Shop Drawings:

1. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.

b. Manufacturer's installation instructions.

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C. Miscellaneous Submittals:

1. Certification of installer qualifications.
2. Letter from grout and adhesive manufactured stating that grout and tile adhesive being used is compatible with cement backer board.

D. Samples:

1. Complete range of tile and grout color samples including all accent, bright and custom colors for selection by Architect.
   a. Unless noted otherwise, tile selection shall be made from complete range of available sizes, colors, styles, profiles and finishes
   b. Tile trim may be contrasting color.
2. After selection of colors, types, patterns and sizes, provide (4) 2 x 2 IN samples.

1.06 QUALITY ASSURANCE

A. Qualifications:

1. Installer must have minimum 5 years' experience installing similar products with similar substrates.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Ceramic Tile:
   a. American Olean Tile Co.
   b. Dal-Tile Corp.
2. Adhesives, mortars, grouts and leveling compounds (except combination waterproofing and adhesive):
   a. Bonsal Co.
   b. Bostik Construction Products.
   c. H.B. Fuller (TEC).
   d. Laticrete International Inc.
   e. Mapei Canada, Inc.
3. Combination waterproofing and adhesive:
   a. Mapei Canada Inc.

B. Submit requests for substitution in accordance with UPRR Division 01.

2.02 MATERIALS

A. General:

1. Ceramic Wall Tile: 4 IN x 4 IN Glazed Ceramic Wall Tile.
2. Ceramic Floor Tile: 2 IN x 2 IN Blended Mosaic Pattern with Matte Finish.
3. Porcelain Floor Tile: 12 IN x 12 IN

B. Adhesives for Ceramic Tile:
1. Dry-set Portland cement mortars: ANSI A118.1.
2. Latex-Portland cement mortars: ANSI A118.4.
3. Assure adhesives are compatible with cement backer board.
4. Combination waterproofing and adhesive:
a. Two-component elastomeric urethane adhesive.
b. Mapei Canada Inc. "Planicrete W."

C. Grout: Portland cement-based material, containing quartz aggregate, colorfast pigments and Portland cement:
1. Custom Building Products:
2. Alternate Color: Mapei,

D. Sealant: One- or two-component, non-sag, polyurethane or silicone sealant, as specified in Section 07 92 00.

E. Leveling Compounds: As recommended by tile manufacturer.

F. Edging: Marble floor edge strips – Provide at exposed edges where a change in elevation occurs.

G. Expansion Joint Strips: Neoprene filler recessed type. Neoprene thickness 1/8 IN (3 mm).

H. Ceramic Tile Base and Associated Trim:
1. Factory made trim shapes for all curbs, caps, corners, bullnose, bases, coves, beads, depressions, moldings, chair rails, etc.
a. Top trim (for wainscot installation): 1/4 IN radius bullnose cap 2 x 6 IN.

2.03 MAINTENANCE MATERIALS

A. Extra Material:
1. Furnish Owner with the following extra materials:
a. 2 percent of each different size, pattern, style, and/or color of tile used, including trim shapes, with minimum of 1 full size tile of each for maintenance purposes.
b. Enough extra grout mix of each different color and/or type to allow for full 2 percent of tile to be replaced.

PART 3 - EXECUTION

3.01 PREPARATION

A. Locate expansion joints prior to product installation.

B. Verify that substrate is ready to accept tile installation. Correct surface defects or conditions that may interfere with or prevent a satisfactory installation.

3.02 INSTALLATION

A. General:

1. Install products in accordance with manufacturer's instructions and ANSI A108.
2. Place tile in grid pattern.
3. Align tile joints on adjoining walls/floors.
4. Lay out and center tile in both directions in each space or on each wall area.
5. Avoid use of tile less than 1/2 size.
6. Adjust tile to minimize cutting.
7. Provide uniform joint widths insofar as practicable. Provide joint widths as recommended by tile manufacturer.
8. Provide leveling beds as required.
9. Grout tile joints same day tile is set.
    a. After grouting, remove surplus grout.
10. Provide edging at exposed edges where there is a change of level

B. Install expansion joints where indicated on Drawings:

1. If not indicated on Drawings, place joints 12 - 16 FT OC or on column lines each way (whichever is smaller).
2. Install over construction or expansion joints in backing.
3. Install where backing material changes.
4. Install where floors abut vertical surface.
5. Maintain nominal 1/4 IN wide joint at perimeter of tiled floor areas and calk with sealant.

C. Installation of Tile on Walls Over Combination Waterproofing and Adhesive:

1. Provide combination waterproofing and adhesive for all tile installed on walls in shower rooms full height.

3.03 CLEANING

A. After installation, clean in accordance with manufacturer's instructions.

3.04 PROTECTION

A. Permit no traffic on floors for 72 HRS after grouting and protect installed tile work with kraft paper or other non-staining covering during construction to prevent damage.

END OF SECTION

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SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. All labor, equipment and materials, for the installation of non fire-rated acoustical panel ceiling and suspension system.
2. Suspended metal grid system.
3. Acoustical panels.
4. Perimeter trim and accessories.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR, Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements

C. Division 09 - Gypsum Board Assemblies.

D. Division 23 – Mechanical: Air distribution devices in ceilings.

E. Division 26 - Electrical: Light fixtures in ceiling systems.

1.03 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 01 Specification Sections.

B. Product data for each type of product specified.

C. Submit shop drawings and show the following:

1. Grid Layout and ceiling suspension system members.
2. Indicate primary and secondary supports
3. Method of attaching suspension system hangers to building structure.
4. Related dimensioning.
5. Interrelations of mechanical and electrical items
6. Minimum Drawing Scale: 1/8 IN = 1 FT.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

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B. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:

1. Surface-burning characteristics of acoustical panels comply with ASTM E1264 for Class A materials as determined by testing identical products per ASTM E84.

C. Single-Source Responsibility for Ceiling Units: Obtain each type of acoustical ceiling panel from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

D. Single-Source Responsibility for Suspension System: Obtain each type of suspension system from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.06 PROJECT CONDITIONS

A. Space Enclosure and Environmental Limitations: Maintain uniform temperature of minimum 60 DegF and humidity of 20 to 40 percent prior to and during installation.

B. Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is completed and dry, work above ceilings is complete and ambient temperature and humidity conditions are met.

1.07 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system components with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system components (if any), and partition assemblies (if any).

1.08 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering and storage, and are identified with labels clearly describing contents.

1. Acoustical Ceiling Tile: Furnish quantity of full-size units equal to 2.0 percent of amount installed.

2. Suspension System Components: Furnish quantity of each component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products specified in each of the following sections.

2.02 ACOUSTICAL PANELS

A. Acoustical Panel Standard:

1. Basis of Design Products: Armstrong “Cirrus, Tegular”, 24 IN x 48 IN x 7/8 IN or 24 IN x 24 IN x 7/8 IN as indicated on plans.
2. Acoustical Panel Characteristics: Provide panels complying with ASTM E 1264 for characteristics described below:
3. Types: Type III, Form 1 - Nodular Cast or molded mineral-base panels with painted finish.
4. Color: White.
5. Light Reflectance Coefficient: LR 0.86.
6. Noise Reduction Coefficient: NRC 0.70.
7. Ceiling Attenuation Class: CAC 0.40.
8. Edge Detail: Angled Tegular, Reveal sized-to-fit flange of exposed suspension system member.
9. Thickness: 7/8 IN.
10. Size: 24 by 48 IN or 24 by 24 IN, per plan
11. Suspension System Type: Provide suspension system that complies with requirements in Part 2 "Non-Fire-Resistance-Rated, Direct-Hung Suspension Systems" 1-5/16 IN exposed, standard face, capped, double-web, steel suspension system.

2.03 METAL SUSPENSION SYSTEMS, GENERAL

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Basis of Design: USG Interiors, Inc.
2. Armstrong World Industries, Inc.
3. Celotex Corporation (The); Building Products Division; Architectural Ceilings Marketing Dept.
4. Chicago Metallic Corporation.

B. Metal Suspension System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C635 requirements.

C. Finishes and Colors: Provide manufacturer's standard factory-applied finish for type of system indicated.

D. Attachment Devices: Size for 5 times the design load indicated in ASTM C635, Table 1, Direct Hung unless otherwise indicated.

E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated Carbon Steel Wire: ASTM A641, Class 1 zinc coating, soft temper.

2. Size: Select wire diameter so that its stress at 3 times the hanger design load (ASTM C635, Table 1, Direct Hung) will be less than the yield stress of wire, but provide not less than 0.106 IN DIA wire.

F. Hanger Rods: Mild steel, zinc coated, or protected with rust-inhibitive paint.

G. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's product designations, complying with the following requirements:

1. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of finish indicated and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B221 (ASTM B221M) for alloy and temper 6063-T5.

H. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel according to paint manufacturer's specifications for cleaning, conversion coating, and applying organic coating.

1. Organic Coating: Manufacturer's standard thermosetting coating system with a minimum dry film thickness of 0.8 to 1.2 mil.

2. Color: As selected by Architect from manufacturer's standard colors.

I. Hold-Down Clips for Non-Fire-Resistance-Rated Ceilings: For interior ceilings composed of acoustical panels weighing less than 1 LB per SQ FT, provide hold-down clips spaced 24 IN OC on all cross tees.

J. Impact Clips: Where indicated, provide manufacturer's standard impact-clip system design to absorb impact forces against acoustical panels.

2.04 NON-FIRE-RESISTANCES-RATED, DIRECT-HUNG SUSPENSION SYSTEMS

A. Standard, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from prepainted or electrolytic zinc-coated, cold-rolled steel sheet, with prefinished 15/16 IN wide metal caps on flanges; other characteristics as follows:

1. Structural Classification: Intermediate system.

2. End Condition of Cross Runners: Override (stepped) or butt-edge type, as standard with manufacturer.

3. Cap Material and Finish: Steel sheet painted white.

B. Products: Subject to compliance with requirements, provide one of the following:

1. 15/16 IN Exposed, Standard Face, Capped, Double-Web, Steel Suspension Systems:

a. Armstrong World Industries, Inc.

b. Chicago Metallic Corporation.

c. USG Interiors, Inc.

2.05 ACOUSTICAL SEALANT

A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C834 and the following requirements:

1. Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies per ASTM E90.

B. Products: Subject to compliance with requirements, provide one of the following:

1. Acoustical Sealant for Exposed and Concealed Joints:

a. AC-20 FTR Acoustical and Insulation Sealant; Pecora Corp.

b. SHEETROCK Acoustical Sealant; United States Gypsum Company.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.

B. Measure each ceiling area and establish the layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and conform to the layout shown on reflected ceiling plans.

3.03 INSTALLATION

A. General: Install acoustical panel ceilings to comply with publications referenced below per manufacturer's instructions and CISCA "Ceiling Systems Handbook."

1. Standard for Ceiling Suspension System Installations: Comply with ASTM C636.

2. CISCA Recommendations for Acoustical Ceilings: Comply with CISCA "Recommendations for Direct-Hung Acoustical Tile and Lay-In Panel Ceilings."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of the supporting structure or of the ceiling suspension system.

2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, counters playing, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
4. Secure wire hangers to ceiling suspension members and to supports above with a screws, or other devices that are secure, that are appropriate for substrate, and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure bracing wires to ceiling suspension members and to supports with a minimum of 4 tight turns. Fasten bracing wires to concrete with cast-in-place or post installed anchors.
6. Do not support ceilings directly from permanent metal forms. Fasten hangers to cast-in-place hanger inserts, powder-actuated fasteners, or drilled-in anchors that extend through forms into concrete.
7. Do not attach hangers to steel deck tabs.
8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
9. Space hangers not more than 48 IN OC along each member supported directly from hangers, unless otherwise shown; and provide hangers not more than 8 IN from ends of each member.

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
   1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
   2. Screw attached moldings to substrate at intervals not over 16 IN OC and not more than 3 IN from ends, leveling with ceiling suspension system to a tolerance of 1/8 IN in 12 FT. Miter corners accurately and connect securely.
   3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

D. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide neat, precise fit.
   1. Install panels with pattern running in one direction parallel to long axis of space.
   2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
   3. Paint the cut panel edges remaining exposed after installation; match color of exposed panel surfaces using coating recommended for this purpose by acoustical panel manufacturer.

4. Install hold-down clips in areas indicated and in areas required by governing regulations, or for fire-resistance ratings; space as recommended by panel manufacturer, unless otherwise indicated or required.

3.04 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

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SECTION 09 65 16 - RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Providing and installing commercial resilient sheet flooring per manufacturer's installation requirements and recommendations.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR, Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for watertight application.

B. Samples: Submit representative sample of each material specified, indicating visual characteristics and finish.

1.04 QUALITY ASSURANCE

A. Contractor will assure compliance with Article 2.02 to allow for proper installation.

B. Comply with local governing codes and regulations.

C. Use PROTECT-ALL factory trained installers that are approved or recommended by manufacturer.

D. Manufacturer provides a limited 10 year product warranty against manufacturing defects.

1. Warranty does not in any way cover installation-related issues.

1.05 EXTRA MATERIALS

A. Deliver extra materials to Owner. Furnish extra materials matching products installed as described below, packaged with protective covering for storage and identified with labels clearly describing contents.

1. Furnish not less than one package for each 10 packages or fraction thereof, of each class, wearing surface, color, pattern and size of resilient flooring installed.

PART 2 - PRODUCTS

2.01 PRODUCTS

A. PROTECT-ALL Commercial Flooring as manufactured by Oscoda Plastics, Inc.

1. Sheets 5 FT x 5 FT x 1/4 IN thicknesses, in color chosen from manufacturer's samples in matte finish.

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2. Interlocking sheets 18 IN x 18 IN x 1/4 IN thickness, in color chosen from manufacturer's samples in matte finish.
3. PROTECT-ALL Flooring Adhesives.
4. PROTECT-ALL V-Rod Welding Rod.
5. Stainless Steel drain rings & Transition strips as provided by Oscoda Plastics.
    a. Oscoda Plastics stainless steel fasteners and anchors for drain rings & transition strips
6. Other installation materials as required and supplied by Oscoda Plastics, Inc.

B. Contact Information

Oscoda Plastics
5585 N. Huron Ave. P.O. Box 189
Oscoda, MI 48750

800-544-9538 Phone
989-739-1494 Fax
sales@oscodaplastics.com
www.protect-allflooring.com

2.02 VERIFICATION OF JOB CONDITIONS

A. Proper Substrate:

1. Assure that the substrate material is suitable for installation of flooring as indicated by manufacturer. Approved substrates include: marine-grade wood, cement board, and concrete (non-gypsum based only), properly cleaned and prepared per manufacturers guidelines.
    a. PROTECT-ALL is not to be installed over any existing finish, such as quarry tile, any paint, or any type of tile.
    b. PROTECT-ALL should not be installed in an “operating environment,” meaning an environment that is not prepared to close entirely for the duration of the installation.
2. Slab substrates must be dry and free of curing compounds, sealers, hardeners, and other materials whose presence would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by floor covering manufacturer.
3. Verify a clean, dry, and structurally sound surface to accept adhesive, free of cracks, ridges, depression, scales, and foreign deposits of any kind.
4. Use only cementitious patching and filling compounds (3500 PSI). Consult manufacturer for details. (ACI 302.2R-06 ch. 9.5)
5. Assure that the levelness (FL 15), and flatness (F20 5/16 in 10 FT) of surface is in compliance with manufacturer’s guidelines.
6. Verify that sub-floor surfaces (concrete, marine-grade plywood, cement board) are ready for resilient flooring installation by testing moisture emission rate and alkalinity, in accordance with ASTM F710; obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer. Reference ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
7. The following standards apply:

a. ASTM E1745-97 – Standard Specification for Water Vapor Retarders.

b. ASTM E1643 – Standard Practice for Installation of Water Vapor Retarders used in contact with Earth or Granular Fill Under Concrete Slabs.

c. ASTM E96-00 – Standard Test Method for Water Vapor Transmission of Materials.

d. ACI 302.1R-04 – Guide for Floor and Concrete Slab Construction.

e. ACI 302.2R-06 – Guide for Concrete Slabs That Receive Moisture-Sensitive Flooring Materials.

f. ASTM F710-08 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

g. ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

B. Environmental Conditions:

1. The contractor and installer of product is responsible for providing and maintaining a proper installation environment.

2. Installation area must be enclosed and watertight with all walls, wall finishes, doors, and floor penetrations in place.

3. Proper temperature acclimation of flooring material is required prior to installation. Minimum of 36 HRS.

4. Assure confinement of space during installation and curing of adhesives to prevent other trades from damaging the product or compromising the adhesion.

5. Maintain a constant temperature during the installation and throughout the curing of adhesives.

6. Provide a secure area to store materials for installation.

7. Building must be completely enclosed and water-tight. HVAC system must be on at least 7 days prior to installation beginning, keeping the interior temperature at 70 DegF. This temperature should be maintained during the installation, and an additional 8 days after completion.

   a. PROTECT-ALL cannot have any foot traffic or rolling load traffic until flooring adhesive has fully cured, 7 – 8 days.

C. Proper Drain and Other Floor Penetration Elevations.

1. All drains to be installed level and with proper slope, no more than the thickness of the PROTECT-ALL MATERIAL 1/4 IN above surface of sub floor.

2. When “dishing” of drain area is specified, the “dish” should not be less than 12 IN DIA and more than 1 IN in depth.

3. All other penetrations should be installed no more than the thickness of the PROTECT- ALL 1/4 IN above surface and provide accommodation for proper sealing.

4. Penetrations not terminating at floor surface must be a minimum of 6 IN above the surface of floor and be installed in such a way as to not interfere with the installation of the flooring and allow adequate space for sealant to be applied to the entire perimeter, and finished off with manufacturer specified detail.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General:

1. Follow manufacturer recommendations for laying sheets out.
2. Flooring must be cut tight to all penetrations.
3. Stainless steel transitions as provided by the manufacturer must be used in doorways and transition areas. Use stainless steel fasteners, and lead anchors to secure.

B. 5 FT x 5 IN sheets in Toilet and Locker Rooms:

1. Adhere the floor material using manufacturer's recommended adhesive for the particular substrate type, job conditions, and in compliance with spread rate and proper trowel size.
2. Roll floor into adhesive with 100# roller immediately and 1 hour later, as per manufacturer directions.
3. Install stainless steel drain rings around all drains and other surface penetrations. Rings are to be routed into floor surface and mounted flush with top of flooring. Secure drain rings using stainless steel fasteners and lead anchors that will properly anchor the ring to the substrate.
4. Heat-weld all field material seams using manufacturer's welding rod, proper tools, and installation methods as approved by manufacturer.
5. All exposed edges are to be sealed with manufacturer's recommended sealant to assure a watertight seal.

3.02 CLEANING

A. Sweep-clean the floor after installation and clear area of scrap materials. The floor can be saturated and then deck brushed, power washed, or power scrubbed to remove construction debris. Installer must provide two copies of manufacturer's cleaning recommendations for contractor and owner use.

END OF SECTION

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SECTION 09 65 20 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Vinyl floor tile.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

C. Division 09 - Resilient Wall Base and Accessories, for resilient wall base, reducer strips, and other accessories installed with resilient floor tiles.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: For each type of product specified.

C. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors and patterns available for each type of product indicated.

D. Samples for Verification: Full-size tiles of each different color and pattern of resilient floor tile specified, showing the full range of variations expected in these characteristics.

E. Maintenance Data: For resilient floor tile to include in the maintenance manuals specified in Division 01.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing resilient products similar to those required for this Project and with a record of successful in-service performance.

B. Source Limitations: Obtain each type, color, and pattern of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Fire-Test-Response Characteristics: Provide products with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Critical Radiant Flux: 0.45 w/SQ cm or greater when tested per ASTM E698.

2. Smoke Density: Maximum specific optical density of 450 or less when tested per ASTM E662.

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1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

B. Store products in dry spaces protected from the weather, with ambient temperatures maintained between 50 and 90 Deg. F (10 and 32 Deg. C).

C. Store tiles on flat surfaces.

D. Move products into spaces where they will be installed at least 48 HRS before installation, unless longer conditioning period is recommended in writing by manufacturer.

1.06 PROJECT CONDITIONS

A. Maintain a temperature of not less than 70 Deg. F (21 Deg. C) or more than 95 Deg. F (35 Deg. C) in spaces to receive products for at least 48 HRS before installation, during installation, and for at least 48 HRS after installation, unless manufacturer's written recommendations specify longer time periods. After post-installation period, maintain a temperature of not less than 55 Deg. F (13 Deg. C) or more than 95 Deg. F (35 Deg. C).

B. Do not install products until they are at the same temperature as the space where they are to be installed.

C. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by manufacturer.

D. Install tiles and accessories after other finishing operations, including painting, have been completed.

E. Do not install flooring over concrete slabs or toppings until slabs and toppings have cured and are sufficiently dry to bond with adhesive, as determined by flooring manufacturer's recommended bond and moisture test.

PART 2 - PRODUCTS

2.01 RESILIENT TILE FLOORING

A. General: Products complying with ASTM F1066 and with requirements specified

B. Vinyl Composition Floor Tile (VCT): Provide solid vinyl floor tile complying with the following:

1. Products: As follows:

a. Armstrong World Industries, Inc.; Imperial Texture Standard Excelon, #51899 Cool White.

b. Mannington Mills, Inc.; Essentials, #141 Cool White.

2. Wearing Surface: Smooth.

3. Thickness: 1/8 IN (3.2 mm).

4. Size: 12 by 12 IN (304.8 by 304.8 mm).

2.02 INSTALLATION ACCESSORIES

A. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

2.03 INSTALLATION MATERIALS

A. Adhesives: Water-resistant type recommended by manufacturer to suit floor tile and substrate conditions indicated.

1. Adhesives shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

a. VCT and Asphalt Tile Adhesives: Not more than 50 g/L.

b. Rubber Floor Adhesives: Not more than 60 g/L.

c. Terrazzo Floor Tile Adhesives: Not more than 65 g/L.

2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Seamless-Installation Accessories:

1. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.

a. Chemical-bonding compound shall have a VOC content of 350 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2. Chemical-bonding compound shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Trowelable Leveling and Patching Compounds: Latex-modified, Portland-cement based formulation provided or approved by flooring manufacturer for applications indicated.

2.04 PERFORMANCE REQUIREMENTS

A. FloorScore Compliance: Resilient tile flooring shall comply with requirements of FloorScore Standard.

B. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions where installation of resilient products will occur, with Installer present, for compliance with manufacturer's requirements. Verify that substrates and conditions are satisfactory for resilient product installation and comply with requirements specified.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by flooring manufacturer.

2. Subfloor finishes comply with requirements specified in Section 03 30 00 - Cast-in-Place Concrete for slabs receiving resilient flooring.

3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. General: Comply with resilient product manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

D. Broom and vacuum clean substrates to be covered immediately before product installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.03 TILE INSTALLATION

A. General: Comply with tile manufacturer's written installation instructions.

B. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half of a tile at perimeter.

1. Lay tiles square with room axis, unless otherwise indicated.

C. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain running in one direction.

D. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures, including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.

E. Extend tiles into toe spaces, door reveals, closets, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent, non-staining marking device.

G. Adhere tiles to flooring substrates using a full spread of adhesive applied to substrate to comply with tile manufacturer's written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.

H. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

I. Hand roll tiles according to tile manufacturer's written instructions.

3.04 CLEANING AND PROTECTING

A. Perform the following operations immediately after installing resilient products:

1. Remove adhesive and other surface blemishes using cleaner recommended by resilient product manufacturers.
2. Sweep or vacuum floor thoroughly.
3. Do not wash floor until after time period recommended by flooring manufacturer.
4. Damp-mop floor to remove marks and soil.

B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by flooring manufacturer.

1. Do not move heavy and sharp objects directly over floor surfaces. Place plywood or hardboard panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.
2. Apply 2 coats protective floor wax to floor surfaces that are free from soil, visible adhesive and surface blemishes as recommended in writing by manufacturer.
    a. Use commercially available product acceptable to flooring manufacturer.
3. Cover product installed on floor surfaces with undyed, untreated building paper until inspection for substantial completion.

END OF SECTION

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SECTION 09 65 73 - RESILIENT WALL BASE AND ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Resilient wall base.
2. Resilient flooring accessories.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Division 09 - For all flooring.

1.03 SUBMITTALS

A. Product Data: For each type of product specified.

B. Samples for Initial Selection: Manufacturer's standard sample sets consisting of sections of units showing the full range of colors and patterns available for each type of product indicated.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing resilient products similar to those required for this Project and with a record of successful in-service performance.

B. Source Limitations: Obtain each type and color of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

C. Fire-Test-Response Characteristics: Provide products with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.

1. Critical Radiant Flux: 0.45 W/SQ cm or greater when tested per ASTM E648.
2. Smoke Density: Maximum specific optical density of 450 or less when tested per ASTM E662.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

B. Store products in dry spaces protected from the weather, with ambient temperatures maintained between 50 and 90 DegF (10 and 32 DegC).

C. Move products into spaces where they will be installed at least 48 HRS before installation, unless longer conditioning period is recommended in writing by manufacturer.

1.06 PROJECT CONDITIONS

A. Maintain a temperature of not less than 70 DegF (21 DegC) or more than 95 DegF (35 DegC) in spaces to receive resilient products for at least 48 HRS before installation, during installation, and for at least 48 HRS after installation, unless manufacturer's written recommendations specify longer time periods. After post installation period, maintain a temperature of not less than 55 DegF (13 DegC) or more than 95 DegF (35 DegC).

B. Do not install products until they are at the same temperature as the space where they are to be installed.

C. For resilient products installed on traffic surfaces, close spaces to traffic during installation and for time period after installation recommended in writing by manufacturer.

D. Coordinate resilient product installation with other construction to minimize possibility of damage and soiling during remainder of construction period. Install resilient products after other finishing operations, including painting, have been completed.

1.07 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

1. Furnish not less than 10 linear feet (3 linear m) for each 500 linear feet (150 linear m) or fraction thereof, of each different type, color, pattern, and size of resilient product installed.

2. Deliver extra materials to Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the Resilient Wall Base and Accessory Schedule at the end of Part 3.

2.02 RESILIENT WALL BASE

A. General: Products complying with FS SS-W-40, Type II

B. Vinyl Wall Base: Provide vinyl wall base complying with the following:

1. Products:

a. Burke Mercer Flooring Products; #597 Mocha (Alternate).

b. Johnsonite; #29 Moon Rock.

2. Style: Cove with top-set toe.

3. Color: As selected by Architect from manufacturer's full range of colors

4. Minimum Thickness: 0.1250 IN.

5. Height: 4 IN (101.6 mm).

6. Lengths: Cut lengths 48 IN (1219.2 mm) long or coils in lengths standard with manufacturer), but not less than 96 FT (29.26 m).

7. Outside Corners: Premolded.

8. Inside Corners: Premolded.

9. Surface: Smooth.

C. Vinyl Accessory Molding: Where required, provide vinyl accessory molding complying with the following:

1. Products:

a. Burke Mercer Flooring Products.

b. Johnsonite.

2. Color: As selected by Architect from manufacturer's full range of colors produced for vinyl accessory molding complying with requirements indicated.

3. Product Description: Carpet bar for tackless installations. Carpet edge for glue-down applications. Reducer strip for resilient flooring and ceramic tile..

4. Provide all accessories required for complete installation.

5. Profile and Dimensions: Manufacturers standard.

2.03 RESILIENT ACCESSORIES

A. Vinyl Accessories: Products complying with requirements specified in the Resilient Wall Base and Accessory Schedule.

2.04 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by resilient product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

C. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), except that adhesive for rubber stair treads shall have a VOC content of 60 g/L or less.

2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions where installation of resilient products will occur, with Installer present, for compliance with manufacturer's requirements, including those for maximum moisture content. Verify that substrates and conditions are satisfactory for resilient product installation and comply with requirements specified. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. General: Comply with manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

D. Broom and vacuum clean substrates to be covered immediately before installing resilient products. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.03 INSTALLATION

A. General: Install resilient products according to manufacturer's written installation instructions.

B. Apply resilient wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

1. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

2. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

3. Do not stretch base during installation.

4. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.

5. Install premolded outside and inside corners before installing straight pieces.

6. Form outside corners on job, from straight pieces of maximum lengths possible, without whitening at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
7. Form inside corners on job, from straight pieces of maximum lengths possible, by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

C. Place resilient products so they are butted to adjacent materials and bond to substrates with adhesive. Install reducer strips at edges of flooring that would otherwise be exposed.

3.04 CLEANING AND PROTECTING

A. Perform the following operations immediately after installing resilient products:
1. Remove adhesive and other surface blemishes using cleaner recommended by resilient product manufacturers.
2. Sweep or vacuum horizontal surfaces thoroughly.
3. Do not wash resilient products until after time period recommended by resilient product manufacturer.
4. Damp-mop or sponge resilient products to remove marks and soil.

B. Protect resilient products against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by resilient product manufacturer.
1. Apply protective floor polish to vinyl resilient products installed on floors that are free from soil, visible adhesive, and surface blemishes, if recommended by manufacturer.
a. Use commercially available product acceptable to resilient product manufacturer.
b. Coordinate selection of floor polish with Owner's maintenance service.
2. Cover resilient products installed on floors and stairs with undyed, untreated building paper until inspection for Substantial Completion.

END OF SECTION

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SECTION 09 68 14 - CARPET TILE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Direct glue-down carpet tile.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

1.03 SUBMITTALS

A. Product Data: For each product indicated.

B. Shop Drawings: Per UPRR Division 1 and including the following (as applicable):

1. Transition and other accessory strips and transition details.

C. Samples: For each for each carpet and exposed accessory for Architect's selection.

D. Maintenance data.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer with a minimum of 5 years of successful carpet installation experience.

1.05 PROJECT CONDITIONS

A. Environmental Limitations: Do not install carpet until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Do not install carpet over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by manufacturer.

C. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

1.06 WARRANTY

A. Carpet Warranty: Manufacturer's standard form in which manufacturer agrees to replace carpet that does not comply with requirements or that fails within 10 years from date of Substantial Completion. Warranty does not include deterioration or failure of carpet from unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delaminating.

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1.07 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Carpet: Quantity equal to 5 percent of amount installed for each type indicated.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Provide Carpet Tile supplied by the following manufacturer:

1. Interface Flooring Systems, Inc.

2.02 MATERIALS

A. Basis of Design: Interface Marrakesh & Paint Box Series, See Interior Finishes "A".

B. Carpet Construction:

1. Tufted Yarn Weight: 26 OZ/SQ YD.
2. Pile Height: 0/16 IN.
3. Pile Density: 8914.
4. Machine Guage: 1/10 IN.
5. Texture: Tufted textured loop.
6. Smoke Developed: Per ASTM E662.
7. Static Rating: AATCC 134, 3.0 kv maximum.
8. Flammability: Meet NFPA Class 1.
9. Size: 19.69 x 19.69 IN (50 cm x 50 cm).
10. Yarn System: Antron Lumena / Antron Legacy Type 6,6 Nylon.

C. Leveling Compound: Cementitious, non-crumbling, non-staining type acceptable to carpet manufacturer; 'Ardex' model K-15, or equal.

D. Carpet Edging: Vinyl carpet transition reducer of same thickness as carpet.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with the manufacturer's installation instructions and recommendations.

B. Check matching of carpet before cutting to ensure there is no visible variation between dye lots.

C. Cut carpet tile using only procedures recommended by the carpet tile manufacturer. Cut from back side of carpet only. Use sharp scissors to cut loop pile after backing has been cut. All cut edges of carpet shall be coated or buttoned with seaming cement to seal edge.

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D. Maintain uniformity of carpet direction and lay of pile. At doorways, center seams under door in closed position. Bind or seal cut edges as recommended by carpet manufacturer.

E. Vacuum clean substrate. Spread adhesive in quantity recommended by manufacturer after primer application to ensure proper adhesion over full area of installation. Apply only enough adhesive to permit adhesion of carpet before initial set.

F. Install pattern parallel to walls and borders.

G. Entire carpet tile installation is to be laid tight and flat to subfloor, well fastened at edges, and present a uniform, pleasing appearance.

3.02 CLEANING AND PROTECTION

A. Install pattern parallel to walls and borders.

B. Remove yarns that protrude from carpet tile surface.

C. Clean and vacuum carpet surfaces using commercial equipment.

D. Remove soiled or damages spots.

E. Do not place heavy objects such as furniture on carpeted surfaces for a minimum of 24 HRS or until adhesive has set.

END OF SECTION

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SECTION 09 78 50 – EPOXY FLOOR COATING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Inspection of surfaces
2. Protective coating on exposed concrete surfaces as indicated on Drawings.
   a. Interior concrete floors at Maintenance Garages and other areas.
   b. Locomotive Inspection Pit Floors
   c. Narrow Aprons Adjacent to Pits
   d. Foot Traffic Walkways, etc.
   e. Truck, Crane & Forklift Traffic Areas
   f. Wear Surfaces for Other Heavy-Load Carrying Vehicles.
   g. Locomotive Inspection Pit Walls
   h. Secondary Containment Structure Walls, etc.
   i. Enclosed Concrete Containment Structures such as Manholes, Lift Stations, Grit Chambers, etc.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Division 03 - Cast-In-Place Concrete

1. Placed concrete should be moisture cured. No curing compounds or similar surface contaminants, which would impede the adhesion of the polymer coating system to the substrate, shall be used for curing the placed concrete.

D. Division 03 - Cement Finishes and Surface Treatments

E. Division 09 - Painting & Protective Coatings, for vertical surfaces, not considered heavy duty industrial use.

F. Division 09 – High Performance Coatings, for vertical surfaces, pits and non-traffic horizontal concrete.

1.03 SUBMITTALS

A. Per UPRR Division 1

B. Product Data

C. Samples:

1. Submit color chips of all available colors.

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2. After selection of color, submit samples of coating, not smaller than 6" square, on concrete.

D. Submit manufacturers' technical data, application instructions and recommended coverage rates for types of surfaces to be treated.

E. Submit sample warranty form.

1.04 QUALITY ASSURANCE

A. Qualification of Applicator: The applicator shall be qualified and certified by the coating manufacturer.

B. Certificate and Summary Statement: Prior to completion of Work, submit a certificate stating that coatings applied conform to approved submittals and all requirements specified; in the certificate, include a summary statement giving following information:

1. Number of square feet of each surface treated with coating, classified as to the kind of material treated, and open pore or closed pore type.

2. The quantity of coating, per coat, actually applied to the surface.

1.05 COMPLIANCE WITH REGULATIONS:

A. All materials shall comply with the current rule and regulations of the local air quality management district, with the rules regarding volatile organic compounds, and with FDA rules and regulations for dangerous materials in coatings.

1.06 WARRANTY

A. In addition to warranty specified in Division 1, provide manufacturer's five year written warranty against dusting of treated surfaces.

1.07 PRODUCT DELIVERY:

A. Deliver all coating materials to the site in containers bearing name and batch number of manufacturer, with seals intact.

PART 2 - PRODUCTS

2.01 MANUFACTURER:

A. These specifications are based on Thermal-Chem products. Equal products by Tnemec that comply with this specification section as judged and approved by the architect may be used.

B. All products specified in this section shall be provided by a single manufacturer.

2.02 RECOMMENDED CONCRETE COATING / TEXTURE GUIDELINES:

Orientation of Concrete Surface	Usage or Exposure Conditions	Requires Slip-Resistant Texture	Requires Heavy-Duty Wear-Surface	Subject to Constant Immersion	Examples of Concrete Surface Usage

Horizontal	Foot Traffic Only	**YES**	**NO**	**NO**	Locomotive Inspection Pit Floors Narrow Aprons Adjacent to Pits Foot Traffic Walkways, etc.
Horizontal	Vehicle Traffic or Combination of Vehicle & Foot Traffic	**YES**	**YES**	**NO**	Truck, Crane & Forklift Traffic Areas Wear Surfaces for Other Heavy-Load Carrying Vehicles.
Vertical	Exterior Weathering (e.g., rain, snow, sun, wind, etc.)	**NO**	**NO**	**NO**	Locomotive Inspection Pit Walls Secondary Containment Structure Walls, etc.
Vertical & Overhead	Frequent or Constant Immersion Involving Oily Water	**NO**	**NO**	**YES**	Enclosed Concrete Containment Structures such as Manholes, Lift Stations, Grit Chambers, etc.

2.03 COATING TYPES:

A. Interior Floor and Slab Treatment:

1. Epoxy Floor Coating: 2-part epoxy sealant (2-coat min) available from Thermal-Chem Corp (800)635-3773.
   a. ArmourClad 735 Base Coat – applied at 120 sg ft per gallon
   b. Manufacturer's Aggregate applied at ½ to ¾ lbs per square feet
   c. ArmourClad Resurfacer 736 TopCoat. – applied at 80 sf ft per gallon
2. Install per manufacturer's recommendation for slip resistance.
3. Abrasion Resistance, Taber Abrader, CS-17 wheel, 1,000 gram load: Maximum 55 mg loss in 500 cycles.
4. Flexibility: pass with 1/8" mandrel.
5. Per cent solids: clear 45, pigmented 52.
6. Film thickness 5-8 mils, wet, per coat.
7. Color and texture to be selected by Architect from the manufacturer's full range of colors and textures
8. The texture of the finished epoxy floor surface shall be chosen and approved in writing by the Architect, Owner and/or his Agent prior to commencement of work; from the manufacturer's selection series or by samples submitted by the contractor.
9. Completed coating shall have semi-gloss sheen

B. Exterior Concrete Coating / Texture Coverage Rates for UPRR:

1. Foot Traffic Areas
   a. Two-coat, single broadcast, slip-resistant protective coating system.
   b. Base Coat - Squeegee and Back Roll
   c. Top Coat - Dip and Roll Technique

EXTERIOR FOOT TRAFFIC ONLY

Inspection pit floors, adjacent aprons, walkways, etc.	Base Coat	ArmorClad #735	Approx. 60-70 sq. ft. / gal.
	Broadcast aggregate to point of rejection	Silica #A169	Approx. 2/3 to 3/4 lb. /sq. ft.
	Top Coat	ArmorClad Resurfacer # 736	Approx. 40-45 sq. ft. / gal.

2. Exterior Vehicle Traffic

   a. Three coat, double broadcast, slip-resistant protective coating system.

   b. Base and Second Coats – Squeegee and Back Roll

   c. Third Coat – Dip and Roll Technique

EXTERIOR VEHICLE TRAFFIC ONLY USAGE AREAS OR COMBINATION OF VEHICLE AND FOOT TRAFFIC USAGE			
Trucks, cranes, fork-lifts and other heavy load-carrying vehicles, etc.	Base Coat	ArmorClad #735	Approx. 100 sq. ft. / gal.
	Broadcast aggregate to point of rejection	Silica #A108	Approx. 1/2 to 3/4 lb. / sq. ft.
	Second Coat	ArmorClad #735	Approx. 75-80 sq. ft. / gal.
	Broadcast aggregate to point of rejection	Silica # A169	Approx. 0.7 lb. / sq. ft.
	Third Coat	ArmorClad Resurfacer #736	Approx. 45-50 sq. ft. / gal.

EXTERIOR TRANSVERSIBLE CURBS			
Transversible Curbs	Base Coat	WallGard E #775	Approx. 100 sq. ft. / gal.
	Broadcast aggregate to point of rejection	Silica #A108	Approx. 1/2 to 3/4 lb. / sq. ft.
	Second Coat	WallGard E #775	Approx. 75-80 sq. ft. / gal.
	Broadcast aggregate to point of rejection	Silica # A169	Approx. 0.7 lb. / sq. ft.
	Third Coat	WallGard E #775	Approx. 45-50 sq. ft. / gal.

Notes: Coating should cover entire surface of transversible curb.

PART 3 - EXECUTION

3.01 PREPARATION

A. Coordinate work of Division 3 to provide water curing only for new slabs to receive floor coating.

B. Prepare surfaces in accordance with the coating manufacturer's printed instructions. Remove contaminants including dirt, old coatings, loose mortar, rust and other products of corrosion, disintegrated concrete, and other substances that could interfere with adhesion of the coating system to the substrate

3.02 CONCRETE SURFACE PREPARATION

A. Cure concrete for a minimum of twenty-eight (28) days.

B. Verify that concrete surfaces have been cleaned and that voids have been patched.

C. Concrete surfaces shall be cleaned in accordance with ASTM D4258

D. Mechanically abrade concrete surfaces in accordance with ASTM D4259 as recommended by the coating manufacturer.

E. Brush-off abraded concrete surfaces in accordance with SSPC-SP-7 to provide profile recommended by the coatings manufacturer.

F. Test pH of surface to be painted in accordance with ASTM D4262.

G. If surface pH is not within coating manufacturers required acceptable range, use methods acceptable to coating manufacturer as required to bring pH within acceptable range.

H. Retest pH until acceptable results are obtained.

I. Verify that moisture content of surface to be painted is within coating manufacturer's recommended acceptable limits.

J. Test moisture content of surface to be coated in accordance with ASTM D4263.

K. After remedial measures have been taken to lower or raise moisture content, retest surface until acceptable results are obtained.

3.03 APPLICATION:

A. By experienced mechanics using methods and spray or roller equipment recommended by coating manufacturer, after surfaces to be treated are dry.

B. Apply coating in accordance with manufacturer's recommendations. Apply evenly over the surface in 2 coats at minimum film thickness per coat as specified above. Allow the first coat to dry not less than 24 hours prior to application of the second coat.

C. Keep traffic from treated surfaces until the material is thoroughly cured

3.04 FLOOR STRIPING/PHYSICAL HAZARDS

A. A safety yellow stripe shall be used to mark physical hazards such as striking against, stumbling, falling, tripping and "caught-between". These include building columns in areas of forklift usage, edges of elevated platforms, nosing of stair treads, equipment pits, and projection into a walk/work area or other area where a person needs to be warned of a possible hazard.

B. In an area with a moving hazard, the entire involved area should be provided with border and diagonal striping. The width of the stripe to be determined by use. Recommended is a minimum 4 IN stripe for most instances with 1 to 2 for stair tread nosing.

C. Items such as pipe bollards, handrails, building/structural columns shall be painted safety yellow.

D. For building or structural columns, it is acceptable to paint safety yellow on only the bottom 10 FT of the item.

E. Walkways shall be painted white with 4 IN border and diagonal stripes.

END OF SECTION

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SECTION 09 90 00 - PAINTING AND PROTECTIVE COATINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Requirements for surface preparation, coating systems, and methods of application for field painting of buildings and equipment, including structural steel, miscellaneous steel, piping, concrete and all other items requiring a protective or decorative coating.

2. Requirements for the application of protective coatings to equipment which has been previously painted in addition to new work.

B. In addition to painting, all piping shall be identified per Division 23.

C. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

D. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.

1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.

E. Floor Striping/Physical Hazards

1. A safety yellow stripe shall be used to mark physical hazards such as striking against, stumbling, falling, tripping and "caught-between". These include building columns in areas of forklift usage, edges of elevated platforms, nosing of stair treads, equipment pits, and projection into a walk/work area or other area where a person needs to be warned of a possible hazard.

2. In an area with a moving hazard, the entire involved area should be provided with border and diagonal stripping. The width of the stripe to be determined by use. Recommended is a minimum 4 inch stripe for most instances with 1 to 2 for stair tread nosing.

3. Items such as pipe bollards and handrails to be painted Safety Yellow.

4. Walkways shall be painted white with 4 inch border and diagonal stripes.

F. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Prefinished items include the following factory-finished components:

a. Architectural woodwork and casework.

b. Metal toilet enclosures.

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c. Metal lockers.

d. Finished mechanical and electrical equipment.

e. Light fixtures.

f. Distribution cabinets.

2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

a. Furred areas.

b. Ceiling plenums.

c. Pipe spaces.

d. Duct shafts.

3. Finished metal surfaces include the following:

a. Anodized aluminum.

b. Stainless steel.

c. Chromium plate.

d. Copper.

e. Bronze and brass.

4. Operating parts include moving parts of operating equipment and the following:

a. Valve and damper operators.

b. Linkages.

c. Sensing devices.

d. Motor and fan shafts.

G. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR, Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

C. Division 8 – shop priming steel doors and frames

D. Division 9 – surface preparation for gypsum board.

E. Division 9 – High Performance Coatings where included.

1.03 REFERENCED STANDARDS

A. ASTM International (ASTM):

1. D16, Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

2. D2016, Test Method for Moisture Content of Wood.

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3. D4258, Standard Practice for Surface Cleaning for Concrete for Coating.
4. D4259, Standard Practice for Abrading Concrete.
5. D4262, Standard Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces
6. D4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.

B. Steel Structures Painting Council (SSPC):

1. SP 1, Solvent Cleaning: Removes oil, grease, soil, etc. with other methods to remove rust, paint and mill scale.
2. SP 3, Power Tool Cleaning: Removes loose material. Not intended to remove all scale or rust.
3. SP 6, Commercial Blast Cleaning: Two-thirds of each square inch free of all visible residues; remainder only light discoloration.
4. SP 7, Brush-off Blast Cleaning: Removes only loose materials, remaining surface tight and abraded to give anchor pattern.
5. SP 10, Near-White Blast Cleaning: At least 95 percent of each square inch shall be free of all visible residues.
6. SP 11, Power Tool Cleaning to Bare Metal.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: For each paint system specified. Include block fillers and primers.

1. Schedule of products to be used for each type of surface which includes surface preparation and application methods.
2. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
3. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use
    a. If products being used are manufactured by Company other than listed in Article 2.2, provide complete individual cut sheet comparison of proposed products with specified products including application procedure, coverage rates and verification that product is designed for intended use.
4. Contractor's written plan of action for containing airborne particles created by abrasive blasting operations and location of disposal of spent contaminated blasting media.
5. Coating manufacturer's recommendation on abrasive blasting.

C. Certification by manufacturer that products supplied comply with requirements indicated that limit the amount of VOCs in coating products.

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D. Samples:

1. Manufacturer's full line of colors for Architect's color selection.
2. After initial color selection by Architect, provide two 8-1/2" x 11" samples of each color selected.

1.05 QUALITY ASSURANCE

A. Applicator: Company specializing in performing the work of this section with minimum of ten (10) years documented experience.

B. Source Limitations: Obtain primers and undercoat materials for each coating system from the same manufacturer as the finish coats.

C. Coating used in all corridors and stairways shall meet requirements of NFPA 101 and ASTM E84.

D. Deviation from specified mil thickness or product type is not allowed without written authorization of Engineer.

E. Material may not be thinned unless approved in writing, by paint manufacturer's authorized representative.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue. Protect from freezing.

C. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.07 PROJECT CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F.

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F.

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C. Do not apply coatings in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1. Allow wet surfaces to dry thoroughly and attain temperature and conditions specified before proceeding with or continuing coating operation.

2. Work may continue during inclement weather only if areas and surfaces to be coated are enclosed and temperature within the area can be maintained within limits specified by manufacturer during application and drying periods.

1.08 EXTRA MATERIALS

1. Furnish extra paint materials from the same production run as the materials applied in the quantities described below. Package paint materials in unopened, factory-sealed containers for storage and identify with label describing contents. Deliver extra materials to the Owner.

2. Quantity: Furnish the Owner with an additional 5 percent, but not less than 1 gal. or 1 case, as appropriate, of each material and color applied. Container shall be clearly marked with color, texture, room or area locations, in addition to the Manufacturer's label

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. The following manufacturers are referred to in the Paint Schedules under Part 3 by use of shortened versions of their names, which are shown in parentheses:

1. Sherwin-Williams Co. (S-W).
2. Porter Paint Company (Porter)
3. Devoe & Raynolds Co. (Devoe).
4. Glidden Co. (Glidden).
5. Benjamin Moore & Co. (Moore).
6. PPG Industries, Inc. (PPG).
7. Pratt & Lambert, Inc. (P & L).
8. Tnemec (Tnemec)
9. DuPont Company, High Performance Coatings (DuPont).
10. ICI Dulux Paints; Devoe Coatings (ICI)..
11. Pittsburgh Paint; PPG Industries, Inc. (PPG).
12. Rust-Oleum Corporation (R-O).

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2.02 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat 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.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

C. Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.

D. VOC Classification: Provide high-performance coating materials, including primers, undercoats, and finish-coat materials, that have a VOC classification of 450 g/L or less OR as required by state or local regulations or by LEED certification requirements where applicable.

E. For unspecified materials such as thinner, provide manufacturer's recommended products.

F. Colors:

1. Refer to drawings and Color Schedule "Option A" for colors.
2. Valves, manhole covers, catch basin covers, etc. painted according to code, UP standard and OSHA.
3. Handrails and bollards painted Safety Yellow.
4. Recovered Oil Tanks and 10K Oil Storage Tank painted SG Black.
5. Other piping and tanks painted SG White, unless other color indicated elsewhere.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.

1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. If a potential incompatibility of primers applied by others exists, obtain the following from the primer Applicator before proceeding:

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a. Confirmation of primer's suitability for expected service conditions.

b. Confirmation of primer's ability to be top coated with materials specified.

2. Notify Architect about anticipated problems before using the coatings specified over sub-strates primed by others

3.02 PREPARATION, GENERAL

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.

3. Use only thinners approved by paint manufacturer and only within recommended limits.

D. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.03 SURFACE PREPARATION:

A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and re-prime.

2. Cementitious Substrates: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

B. Ferrous Metals: Clean un-galvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.

1. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
2. 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 the same primer as the shop coat

C. Hollow Metal:

1. Solvent clean in accordance with SSPC SP-1.

D. Galvanized Metal:

1. Solvent clean in accordance with SSPC SP-1 followed by brush blast in accordance with SSPC SP-7 to provide 1 mil profile.
2. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

E. Gypsum Wallboard:

1. Repair minor irregularities left by finishers.
2. Avoid raising nap of paper.
3. Verify moisture content is less than 8 percent before painting.

F. Concrete.

1. Cure for minimum of 28 days.
2. Verify that concrete surfaces have been cleaned and that voids have been patched.
3. Concrete surfaces shall be cleaned in accordance with ASTM D4258.
4. Mechanically abrade concrete surfaces in accordance with ASTM D4258 as recommended by coatings manufacturer.
5. Brush-off blast concrete surfaces in accordance with SSPC SP-7 to provide profile recommended by coatings manufacturer.
6. Test pH of surface to be painted in accordance with ASTM D4262.
    a. If surface pH is not within coating manufacturer's required acceptable range, flush with clean water as required to bring pH within acceptable range.
    b. Retest pH until acceptable results are obtained.
7. Verify that moisture content of surface to be painted is within coating manufacturer's recommended acceptable limits.
    a. Test moisture content of surface to be coated in accordance with ASTM D4263.

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b. After remedial measures have been taken to lower or raise moisture content, retest surface until acceptable results are obtained.

G. Concrete Unit Masonry:

1. Allow mortar to cure for minimum of 28 days.
2. Remove all mortar spatter and protrusions.
3. Verify that concrete unit masonry surfaces have been cleaned in accordance with ASTM D4261.
4. Test pH of surface to be painted in accordance with ASTM D4262.
   a. If surface pH is not within coating manufacturer's required acceptable range, flush surface with clean water as required to bring pH within acceptable limits.
   b. Retest pH until acceptable results are obtained.
5. Verify that moisture content of surface to be painted is within coating manufacturer's recommended acceptable limits.
   a. Test moisture content of surface to be coated in accordance with ASTM D4263.
   b. After remedial measures have been taken to lower or raise moisture content, retest surface until acceptable range is obtained.

3.04 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
6. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
7. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

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1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. Omit primer on metal surfaces that have been shop primed and touchup painted.
3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brush Application: Use brushes best suited for material applied and of appropriate size for the surface or item being coated.
   a. Apply primers and first coats by brush unless manufacturer's written instructions permit using roller or mechanical applicators.
   b. Brush out and work brush coats into surfaces in an even film.
   c. Eliminate cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Neatly draw glass lines and color breaks.
2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by manufacturer for the material and texture required.
3. Spray Equipment: Use mechanical methods to apply coating if permitted by manufacturer's written instructions and governing regulations.
   a. Use spray equipment with orifice size recommended by manufacturer for material and texture required.
   b. Apply each coat to provide the equivalent hiding of brush-applied coats.
   c. Do not double back with spray equipment building-up film thickness of two coats in one pass, unless recommended by manufacturer.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturers recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

E. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

F. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.

G. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

H. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.05 MECHANICAL AND ELECTRICAL WORK:

A. Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces.

B. Mechanical items to be painted include, but are not limited to, the following:

1. Piping, pipe hangers, and supports.
2. Tanks
3. Exposed ductwork.
4. Sprinkler Piping

C. Electrical items to be painted include, but are not limited to, the following:

1. Conduit and fittings.

3.06 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.07 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA-P1.(Painting & Decorating Contractors of America)

3.08 EXTERIOR PAINT SCHEDULE

A. Concrete Masonry Units

1. Primer - Apply first coat of Porter #9203 QUICK-FILL BLOCK FILLER.

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2. Finish Coat - Apply two coats of Porter #739 Acri-Shield Satin Exterior paint at a range of 3.5-4.0 mils WFT to achieve 1.5 mils MDFT per coat.

B. Wood Substrates

1. Prime Coat - Apply one (1) coat Porter #74130 Speedy Prime H.P. Primer.
2. Finish Coat - Apply two (2) coats Porter #739 Acri-Shield Satin at a range of 3.5-4.0 mils WFT to achieve 1.5 mils MDFT per coat.

C. Unpainted Non - Ferrous Metal (galvanized & aluminum)

1. High Abrasion - handrails
    a. Pretreatment - Clean all non - ferrous metal to be coated as per SSPC-SP 1, Solvent Cleaning, using Porter #5131 (Spraying Thinner) to remove all organic oil contaminants.
2. Galvanized Steel
    a. Pretreatment - Treat all new galvanized metal with a solution of Porter #5 Galvaprep. Use a stiff nylon brush during application of solution and rinsing stage.
3. Aluminum
    a. Pretreatment - Treat all aluminum with a solution of Porter #33 Alumiprep. Use a stiff nylon brush during application of solution and rinsing stage.
    b. Primer - Apply one (1) coat Porter #215 Rust Screen Fast Drying Acrylic Metal Primer at a range of 3.5-4.0 milsWFT to achieve 1.5 mils MDFT per coat.
    c. Finish Coat - Apply two coats Porter #909 Advantage 900 Interior/Exterior Gloss Acrylic Enamel, superior bonding acrylic; applied at a range of 4.0 - 4.5 mils WFT to achieve 1.5 mils MDFT.

D. Ferrous Metal Substrates

1. High Abrasion - Handrails, Doors, Structural Steel Framing
    a. The pretreatments and primer for ferrous metal substrates shall be completed in the shop environment. To minimize primer incompatibility and/or the possibility of an inferior "shop primer" being applied, shop applications shall be enforced as well as field applications.
    b. Shop or Fabricator
        1) Cleaning / Degreasing - All surfaces shall be coated shall be cleaned free of all oil or misc. contaminants via SSPC-SP 1, Solvent Cleaning.
        2) Pretreatment - All steel substrates shall be coated shall be prepared in strict accordance with SSPC-SP10, Near-White Blast Cleaning. Surface profile shall result in a min. of 1.0 mils (25.4 microns) not to exceed 1.5 mils (38.10 microns). All abrasive residual shall be removed from the steel substrate prior to application of coating via solvent wiping unless otherwise specified.

3) Primer - Apply one coat International Interlac 298 HS, phenolic modified alkyd primer; at a range of 5.0 - 6.8 mils WFT to achieve 3.0 - 4.0 mils DFT per coat.

c. Field Application

1) Pretreatment (Field Welds) - Welded steel surfaces shall be spot primed in accordance with SSPC-SP 2 or 3, Hand or Power Tool Cleaning, to remove all weld splatter, flux, and smooth sharp edges.

2) Spot Primer - All damaged and/or tooled metal areas shall be spot primed with Porter #296 Glyptex Rust Inhibitive Primer, zinc oxide modified alkyd; at a range of 3.5 - 5.0 mils WFT to achieve 1.8 - 2.6 mils DFT per coat.

3) Finish Coat - Apply two coats Porter #909 Advantage 900 interior/Exterior Gloss Acrylic Enamel, superior bonding acrylic; applied at a range of 4.0 - 4.5 mils WFT to achieve 1.5 mils MDFT per coat.

3.09 INTERIOR PAINT SCHEDULE

A. Gypsum Wallboard or Plaster

1. Pretreatment - All mudded tape joints and/or rough, patched areas shall be sanded smooth and wiped with a clean tack cloth.

2. Primer - Apply one coat of Porter Paint #767 Painter's Friend Primer Sealer; at a range of 4.0 - 5.0 WFT to achieve a MDFT of 1.1 mils.

B. Latex Flat (Ceilings)

1. Finish Coat - Apply one coat of Porter #6019 Interior Flat Paint, vinyl acrylic; applied at 3.2 mils WFT to achieve 1.0 mils MDFT per coat.

C. Latex Eggshell (Walls)

1. Finish Coat - Apply two (2) coats Porter #6079 Painters Friend Eggshell, vinyl acrylic; applied at 3.5 mils WFT to achieve 1.4 mils MDFT per coat.

D. Concrete Masonry Unit Walls (Latex Eggshell Finish)

1. Pretreatment - all mortar/grout shall cure for a minimum 14 days

2. Pretreatment - Abrade (smooth) all mortar burs and fill large voids with a non-cementitious based patching compound.

3. Primer - Apply one heavy coat Porter #9203 Quick Fil block filler; at a range 80 square feet - 100 square feet per gallon.

4. Finish Coat - Apply two (2) coats Porter #6079 Painters Friend Eggshell, vinyl acrylic; applied at 3.5 mils WFT to achieve1.4 mils MDFT per coat.

E. Pre-primed (metal doors, frames, and misc. metals)

1. Pretreatment - Inspect the surface for damage to the primed surface. Scrapes gauge or misc. damages shall be feather sanded smooth and spot primed with Porter #296 Glyptex Rust Inhibitive Primer.

2. Primer - Apply one coat Porter #215 Rust Screen Fast Drying Acrylic Metal Primer at a range of 3.5 - 4.0 mils WFT to achieve 1.5 mils MDFT per coat.

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3. Finish Coat - Apply two (2) coats Porter #909 Advantage 900 Interior/Exterior Gloss Acrylic Enamel, superior bonding acrylic; applied at a range of 4.0 - 4.5 mils WFT to achieve 1.5 mils MDFT per coat.

F. Unpainted Non-Ferrous Metal (galvanized & aluminum)

1. High Abrasion - Handrails

   a. Pretreatment - Clean all non-ferrous metal to be coated as per SSPC-SP 1, Solvent Cleaning, using Porter #5131 (Spraying Thinner) to remove all organic oil contaminants.

2. Galvanized Steel:

   a. Pretreatment - Treat all new galvanized metal with a solution of Porter #5 Galvaprep. Use a stiff nylon brush during application of solution and rinsing stage.

3. Aluminum

   a. Pretreatment - Treat all aluminum with a solution of Porter #33 Alumiprep. Use a stiff nylon brush application of solution and rinsing stage.

   b. Primer - Apply one coat Porter #215 Rust Screen Fast Drying Acrylic Metal Primer at a range of 3.5 - 4.0 mils WFT to achieve 1.5 mils MDFT per coat.

4. Finish Coat - Apply two coats Porter #909 Advantage 900 Interior/Exterior Gloss Acrylic Enamel, superior bonding acrylic; applied at a range of 4.0 - 4.5 mils WFT to achieve 1.5 mils MDFT.

5. Not for coating structural steel, steel joist, galvanized steel, steel (hollow metal) doors, steel (hollow metal) door and window frames, and products with approved factory finishes, and ferrous metals.

6. May include bare steel handrails, guardrails, piping, stairs, pumps, and similar items.

G. Structural Steel:

1. Tnemec Series 135 Chembuild VOC=1.90 (Modified Polyamidoamine Epoxy) 1 coat, 4 mils

2. Tnemec Series 135 Chembuild (Modified Polyamidoamine Epoxy) 1 coat, 4 mils

H. Tnemec Series 74 Endura-Shield (Aliphatic VOC=2.80 Acrylic Polyurethane Enamel) 1 coat, 2.5 mils

I. Steel Joists (exposed):

1. Tnemec Series 135 Chembuild VOC=1.90 (Modified Polyamidoamine Epoxy) 1 coat, 4 mils

2. Tnemec Series 135 Chembuild (Modified Polyamidoamine Epoxy) 1 coat, 4 mils

3. Tnemec Series 74 Endura-Shield (Aliphatic VOC=2.80 Acrylic Polyurethane Enamel)1 coat, 4 mils

END OF SECTION

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SECTION 09 96 01 – HIGH PERFORMANCE COATINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

B. Requirements for surface preparation, coating systems, and methods of application for field painting of buildings and equipment, including structural steel, miscellaneous steel, piping, concrete and all other items requiring a protective, heavy duty industrial coating.

C. Requirements for the application of protective coatings to equipment which has been previously painted in addition to new work.

D. In addition to painting all piping shall be identified per Division 23.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR Bidding Requirements, Contract Forms and Conditions of the Contract.

B. Division 01 – UPRR General Requirements.

C. Division 03 - Cast-In-Place Concrete

1. Placed concrete should be moisture cured. No curing compounds or similar surface contaminants, which would impede the adhesion of the polymer coating system to the substrate, shall be used for curing the placed concrete.

D. Division 03 - Cement Finishes and Surface Treatments

E. Division 09 – Epoxy Floor Coating, for horizontal concrete surfaces

F. Division 09 - Painting & Protective Coatings, for vertical surfaces, not considered heavy duty industrial use.

1.03 REFERENCED STANDARDS

A. ASTM International (ASTM):

1. D16, Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
2. D2016, Test Method for Moisture Content of Wood.
3. D4258, Standard Practice for Surface Cleaning for Concrete for Coating.
4. D4259, Standard Practice for Abrading Concrete.
5. D4262, Standard Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces
6. D4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.

B. Steel Structures Painting Council (SSPC):

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1. SP 1, Solvent Cleaning: Removes oil, grease, soil, etc. with other methods to remove rust, paint and mill scale.
2. SP 3, Power Tool Cleaning: Removes loose material. Not intended to remove all scale or rust.
3. SP 6, Commercial Blast Cleaning: Two-thirds of each square inch free of all visible residues; remainder only light discoloration.
4. SP 7, Brush-off Blast Cleaning: Removes only loose materials, remaining surface tight and abraded to give anchor pattern.
5. SP 10, Near-White Blast Cleaning: At least 95 percent of each square inch shall be free of all visible residues.
6. SP 11, Power Tool Cleaning to Bare Metal.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Submittals required by this section include, but are not limited by, the following:

1. Schedule of products to be used for each type of surface which includes surface preparation and application methods.
2. Manufacturer coating system data sheets including color/sheen selection charts.
3. Holiday test results and measure film thickness for each coating system.

C. Samples: Submit two (2) samples, 8-1/2 IN by 11 IN in size illustrating selected colors and textures for each color selected.

1.05 QUALITY ASSURANCE

A. Applicator: Company specializing in performing the work of this section with minimum of three (3) years documented experience.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Products: Subject to compliance with requirements, provide the products in the paint schedules or one of the following of equal quality.

1. Benjamin Moore.
2. Sherwin-Williams.
3. Pratt & Lambert.
4. ICI Paint Co.
5. Pittsburgh Paint Co.
6. Tnemec Company, Inc.

2.02 EPOXY COATING:

A. System E-1:

Manufacturer	Product Designation		
	First Coat	Second Coat	Third Coat
Tnemec	Series N69 Hi-Build Epoxoline II	Series 1074 Endura-Shield II	None
DuPont	25P or 6A25P Epoxy	333 Imron	None
Sherwin-Williams	Macropoxy 646	Acrolon 218 HS	None
Rust-Oleum	9100 Series or 5281 Acrylic Primer	9700 Series or 5200 Series Acrylic	None
Engineer-Approved Equal			

B. System T-1

Manufacturer	Product Designation		
	First Coat	Second Coat	Third Coat
Tnemec	Series 90-97 Tneme-Zinc	Series N69 Hi-Build Epoxoline II	Series 1074 Endura-Shield II
DuPont	347-Y-912 Zinc	25P Epoxy	333 Imron
Sherwin-Williams	Fast Clad Zinc	Macropoxy 646	Acrolon 218 HS
Rust-Oleum	5687 Grey Zinc	9700 Series or 5200 Series Acrylic	None
Engineer-Approved Equal			

C. System T-2

Manufacturer	Product Designation		
	First Coat	Second Coat	Third Coat
Tnemec	Series 61-5002 Tneme-Liner	Series 61-5001 Tneme-Liner	None
Ameron	Amercoat 395	Same as First Coat (different color)	None
Sherwin-Williams	Shell-cote II Epoxyamine (5-6 mil DFT)	Same as First Coat (different color)	None
DuPont	Flint-Flex Tank Lining 525-8601	Flint-Flex Tank Lining 525-8603	None
Engineer-Approved Equal			

2.03 GENERAL

A. Materials furnished for each coating system must be compatible to the substrate. When shop-primed surfaces are to be coated, ascertain whether finish materials will be compatible with shop coating. Inform the Engineer of any unsuitable substrate or coating conditions.

B. System E-1:

1. Used for exterior of above-ground steel piping and equipment (not galvanized), structural and miscellaneous steel including pipe supports and hangers.

2. Surface Preparation and Painting Schedule:

a. Surface Preparation: SSPC SP6.

b. Surface Paint Adhesion Preparation using Galaxy Associates process, no or equal:

1) Clean surface with GF Prep 626 TP @ 1 percent bv between 110 and 120 degrees.

a) Surface is sufficiently cleaned when a blue hue is noticeable on the metal surface and water sheet flows off surface.

b) Galaxy Associates to provide information to purchase titration kit to test concentration.

c) Contractor to capture all run off from cleaning preparation to dispose of properly.

2) Final rinse with GF Seal Prep 639 @ .5 percent bv between 110 and 120 degrees.

a) It is important to keep surface wet with GF Prep 626TP until final rinse.

b) Galaxy Associates to provide information to purchase titration kit to test concentration.

c) Contractor to capture all run off from cleaning preparation to dispose of properly.

d) Refer to section 2.02.B.2.b.e for specifications on the chemical injection system for cleaning and rinsing.

c. Painting of metal surface to be done within 1 to 2 days after cleaning and rinsing to ensure proper bonding of paint to metal surface.

d. If metal surfaces will not be painted shortly after cleaning and rinsing, metal surfaces to be protected from weather until painted.

e. The following, at the end of this Section, is the specifications for the chemical injection system used to tie into the heated pressure washer to clean and rinse the metal surface along with a bill of materials. This chemical injection system is not provided by Galaxy Associates.

f. Galaxy Associates representative:

Bill Townsend
402-676-0809
btownsend@galaxy-associates.com

3. First Coat: High solids epoxy primer, min 3-4 mils DFT.
4. Second Coat: High build, high solids polyurethane enamel, min. 4-6 mils DFT.
5. Third Coat: None.
6. System Coat Total: 7-10 mils. DFT
   a. Piping, equipment and steel located inside buildings (not exposed to sunlight require only the First Coat, min of 4 mils.
7. Check for voids in coating with a holiday detector.

C. System T-1:
1. Used for exterior of above-ground steel storage tanks, including appurtenances, ladders, and railings.
2. Surface Preparation and Painting Schedule:
   a. Surface Preparation: SSPC SP6.
   b. First Coat: Zinc rich primer, 3-4 mils DFT.
   c. Second Coat: High solids polyamide epoxy, min. 3-4 mils DFT.
   d. Third Coat: High-Build, high-solids polyurethane enamel, min 3-4 mils DFT.
   e. System Coat Total: 9-12 mils DFT.
3. Steel storage tanks located inside buildings require only Second Coat as recommended by the manufacturer.
4. Union Pacific Shield logos on tanks shall be painted in color using the same product as the Third Coat, with a clear coat to protect from color fading as recommended by the manufacturer. Logo usage and specifications can be obtained on the Union Pacific Railroad website at http:\www.uprr.com\logos.
5. Check for voids in coating with a holiday detector.

D. System T-2:
1. Used for the interior lining of new above-ground storage tanks, both UL 142 and API 650.
2. Surface Preparation and Painting Schedule:
   a. Surface Preparation: SSPC SP10.
   b. First Coat: High-solids epoxy, min 6-8 mils DFT.
   c. Second Coat: Same as First Coat.
   d. Third Coat: None.

e. System Coat Total: 12-16 mils DFT.

3. Tank Applications:

a. API 650 Tanks:

1) Coat entire interior of above-ground steel storage tanks, including the bottom, full length side walls and all interior roof components.

2) Check for voids in coating with a holiday detector.

b. UL 142 Tanks:

1) Coat entire interior of above-ground steel storage tanks including the floor, full length sides and top interior surfaces of the interior shell wall.

2) Check for voids in coating with a holiday detector.

c. One coat P&L 38 pale trim varnish-satin.

2.04 EPOXY COATING SYSTEMS:

A. To be used for coating horizontal and vertical concrete surfaces on new installations when called for on the drawings. This coating system is NOT used on every concrete installation unless called for by the engineer.

B. General Requirements:

1. All UPRR concrete floor and wall surfaces (whether interior or exterior concrete that is older or newly cast-in-place) to be patched and/or coated receive surface preparation (which may include chemical cleaning to remove surface contaminants) but which should always include mechanical abrasion.

2. If the concrete surface is to be coated has previously been exposed to oil, grease, or other contaminates, a bond test may be necessary to determine its cleanliness and soundness prior to coating (or patching).

3. The epoxy and aggregate used must be protected from adverse weather conditions before and during use on a coating or patching project. All materials must be kept dry and in their closed containers.

4. Refer to Thermal-Chem Concrete Surface Preparation Guidelines for more information.

5. All joints to be epoxy sealed and the inside walls also to be epoxy lined and sealed.

6. Use the two-part epoxy coating for inside walls.

2.05 RECOMMENDED CONCRETE COATING / TEXTURE GUIDELINES:

Orientation of Concrete Surface	Usage or Exposure Conditions	Requires Slip-Resistant Texture	Requires Heavy-Duty Wear-Surface	Subject to Constant Immersion	Examples of Concrete Surface Usage
Horizontal	Foot Traffic Only	**YES**	**NO**	**NO**	Locomotive Inspection Pit Floors Narrow Aprons Adjacent to Pits Foot Traffic Walkways, etc.

Horizontal	Vehicle Traffic or Combination of Vehicle & Foot Traffic	**YES**	**YES**	**NO**	Truck, Crane & Forklift Traffic Areas Wear Surfaces for Other Heavy-Load Carrying Vehicles.
Vertical	Exterior Weathering (e.g., rain, snow, sun, wind, etc.)	**NO**	**NO**	**NO**	Locomotive Inspection Pit Walls Secondary Containment Structure Walls, etc.
Vertical & Overhead	Frequent or Constant Immersion Involving Oily Water	**NO**	**NO**	**YES**	Enclosed Concrete Containment Structures such as Manholes, Lift Stations, Grit Chambers, etc.

A. Non-Traffic Areas

1. Two-coat, non-textured protective coating system.

EXTERIOR WEATHER-EXPOSED CONCRETE SURFACES (NOT SUBJECT TO FREQUENT OR CONSTANT IMMERSION)			
Inspection pit walls, secondary containment walls etc.	Base Coat	WallGard E, #775	Approx. 120 sq. ft. / gal.
	Top Coat	WallGard E, #775	Approx. 120 sq. ft. / gal.

VERTICAL AND OVERHEAD CONCRETE SURFACES IN ENCLOSED CONCRETE CONTAINMENT STRUCTURES			
Manholes, lift stations and grit chambers that collect or hold oily water	Base Coat	WallGard HP #776	Approx. 120 sq. ft. / gal.
	Top Coat	WallGard HP #776	Approx. 120 sq. ft. / gal.

2.06 CONCRETE PAINT COATINGS

A. To be used for painting concrete surfaces on new or existing installations when called for on drawings. Not all concrete surfaces are to be painted unless called for by the engineer. Surfaces shall be prepared per Section 4.02.

B. Polyamidoamine Epoxy Primer with Polyamoidoamide Epoxy Top Coat.

1. Prime Coat: 4 mils, Series 113 H.B. Tneme-Tufcoat (Waterborne Acrylic Epoxy), VOC=2.03

2. Finish Coat(s): 4 mils, Series N69 Epoxoline (Polyamidoamide Epoxy)

PART 3 - EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptance. Labeling shall include manufacturer's name, type of paint, brand name and code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.

B. Store paint materials in a well ventilated area, between the temperatures of 45 - 90 Deg. F, unless otherwise required by manufacturer's instructions.

C. Take precautionary measures to prevent fire hazards and spontaneous combustion.

3.02 CONCRETE SURFACE PREPARATION

A. Cure concrete for a minimum of twenty-eight (28) days.

B. Verify that concrete surfaces have been cleaned and that voids have been patched.

1. Concrete surfaces shall be cleaned in accordance with ASTM D4258.

C. Mechanically abrade concrete surfaces in accordance with ASTM D4259 as recommended by the coating manufacturer.

D. Brush-off blast concrete surfaces in accordance with SSPC-SP-7 to provide profile recommended by the coatings manufacturer.

E. Test pH of surface to be painted in accordance with ASTM D4262.

1. If surface pH is not within coating manufacturers required acceptable range, use methods acceptable to coating manufacturer as required to bring pH within acceptable range.

2. Retest pH until acceptable results are obtained.

F. Verify that moisture content of surface to be painted is within coating manufacturer`s recommended acceptable limits.

1. Test moisture content of surface to be coated in accordance with ASTM D4263.

2. After remedial measures have been taken to lower or raise moisture content, retest surface until acceptable results are obtained.

3.03 SURFACE PREPARATION

A. Prepare surfaces as specified for each coating system conforming to Steel Structures Painting Council Specifications. If grease or oils are present, SP-1 – Solvent Cleaning must precede any other method specified.

B. Repainting on pre-painted surfaces:

1. Solvent Cleaning SP 1 for oil or grease.

2. Remove all loose paint and use Power Tool Cleaning – SP 3 to develop profile depth.

3. Prepare only those areas which will receive the first coat of the system on the same day.

C. Inspection: Verify that substrate conditions are ready to receive coating as instructed by the product manufacturer. Report any conditions that potentially affect proper application. Beginning of Work means acceptance of surface conditions.

D. Preparation:

1. Remove electrical plates, hardware, light fixture trim, fittings, and correct minor surface defects prior to preparing surfaces or finishing.

2. Shellac and seal marks which may bleed though surface finishes.

3. Impervious Surfaces – Remove mildew by scrubbing with a cleaning solution and rinse with clean water and allow surface to completely dry.

4. .

E. 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. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
2. Exterior Wood: 15 percent, measured in accordance with ASTM D2016.

3.04 APPLICATION

A. Apply coatings in accordance with manufacturer's recommendations to a dry surface.

B. Provide adequate ventilation equipment in all areas of application to ensure that at no time does the solvent content of air exceed the Threshold Limit Value given on the manufacturer's Material Safety Data Sheets (MSDS) for the specific coatings being applied.

C. Protection:

1. Cover and otherwise protect surfaces not being painted, areas not to be painted, and the work of other trades. Remove protective materials when appropriate. Contractor is responsible for repair and/or repainting all items adversely affected by painting operations (i.e. overspray).
2. Provide signs to indicate fresh paint areas.

D. Use properly designed brushes, rollers, and spray equipment for all applications.

E. Dry film thickness of each system shall meet the minimum specified, but not exceed it more than 20 percent.

F. Environmental Conditions:

1. Atmospheric temperatures must be 50 Deg. F or higher 24 HRS before, during and 24 HRS after application, unless approved by coating manufacturer. Do not apply coatings when inclement weather or freezing temperatures may occur within coating curing time requirements.
2. Minimum application temperature for interior or exterior varnish finishes shall be 65 Deg. F, unless approved by the coating manufacturer.
3. Wind velocities for exterior applications shall be at a minimum to prevent overspray or fallout and not greater than coating manufacturers' limits.
4. Relative humidity must be less than 80 percent and the temperature of the surface to be painted must be at least 5 degrees above the dewpoint.

3.05 TESTING AND INSPECTION

A. Use wet and dry film gauges to check each application of coating, and the total system when completed.

B. Contractor shall check coatings on metal systems using a non-destructive electric holiday detector operating at the proper voltage.

3.06 CLEANING

A. Provide daily cleanup of both storage and working areas and removal of all paint refuse, trash, cloths, etc.

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B. Touch up and restore damaged finishes to original condition as required.

C. Remove spilled, dripped, or splattered paint from all surfaces during and after the work.

END OF SECTION

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SECTION 09 97 50 - TANK AND PIPE COATINGS FOR FUEL AND OIL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Requirements for surface preparation, coating systems, and methods of application for field painting piping, storage tanks, and all other items requiring a protective industrial coating.
2. This section also includes the requirements for the application of protective coatings to equipment which has been previously painted in addition to new work.
3. Applicable services include, but not limited to, diesel fuel, lube oil, journal oil, used oil, and related systems.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Section 01 33 00 – Submittal Procedures

B. Section 03 05 26 – Mechanical Identification

1.03 REFERENCED STANDARDS

A. American Society of Testing and Materials (ASTM)

B. Steel Structures Painting Council (SSPC):

1. SP 1 - Solvent Cleaning. Removes oil grease, soil, etc., with other methods to remove rust, paint, and mill scale.
2. SP 3 - Power Tool Cleaning. Removes loose material. Not intended to remove all scale or rust.
3. SP 6 - Commercial Blast Cleaning. Two-thirds of each square inch free of all visible residues; remainder only light discoloration.
4. SP 7 – Brush-off Blast Cleaning. Remove only loose materials, remaining surface tight and abraded to give anchor pattern.
5. SP 10 – Near-White Blast Cleaning. At least 95% of each square inch shall be free of all visible residues.
6. SP 11 - Power Tool Cleaning to Bare Metal.
7. SSPC PA-2 – Measurement of Dry Paint Thickness with Magnetic Gauges

C. National Association of Corrosion Engineers (NACE):

1. NACE RP 0188-90 - Holiday Testing

D. National Fire Protection Association (NFPA):

E. NFPA 30 – Flammable and Combustible Liquids Code

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1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Submittals required by this Section include, but are not limited by, the following:

1. Schedule of products to be used for each type of surface which includes surface preparation and application methods.
2. Manufacturer coating system data sheets including color/sheen selection charts.
3. Holiday test results and measured film thickness for each coating system.
4. Certification(s) of experience.
5. Certificate of quality control procedures.
6. Proposed testing agency.
7. One gallon container of each color and surface texture applied.
8. Daily reports of environmental conditions.

1.05 QUALITY ASSURANCE

A. The coating applicator for field operations or for shop operations shall have a minimum of 5 years of experience in the Systems specified. The coating applicator shall certify in writing that the individual has previous experience applying all of the coating systems in this specification for which they are responsible.

B. Compliance submittals and certification of experience shall be submitted to the Engineer prior to starting the work.

C. The coating applicator shall provide a certificate of quality control procedures utilized during application of internal and external coatings. The certification shall include surface preparation, film thickness per coat, curing procedures, and holiday testing.

D. All coatings shall be applied in strict accordance with the manufacturer's recommendations including environmental conditions, surface preparation, coating method and coverage, etc.

E. Contractor shall ensure painting sequence does not contaminate or overspray existing and/or newly painted equipment. Contractor shall ensure that all newly painted surfaces remain clean and are not contaminated by subsequent blasting and painting operations. Contractor shall clean and/or recoat surfaces deemed not acceptable due to product contamination at no cost to the Owner.

F. Contractor shall employ the services of a third party testing agency to perform all dry film thickness testing on all field applied coatings. Contractor shall submit to the Engineer the proposed testing agency for approval.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Paint: All materials shall be the top quality available from each manufacturer.

1. Sherwin Williams

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2. ICI Paint Co.
3. Pittsburgh Paint Co.
4. Tnemec Company, Inc
5. Dupont
6. Approved equal.

2.02 GENERAL

A. Materials furnished for each coating system must be compatible to the substrate. When shop- primed surfaces are to be coated, ascertain whether finish materials will be compatible with shop coating. Inform the Engineer of any unsuitable substrate or coating conditions.

B. Materials furnished shall meet all requirements, including VOC limits, of the jurisdiction in which it is to be applied.

C. When two or more coats are specified, tint or use an alternate color on subsequent coats to enable visual coverage inspection.

D. Provide a one gallon container of each color and surface texture to Railroad. Container shall be clearly marked with color, texture, room or area locations, in addition to the Manufacturer's label.

E. Accessory Materials: Provide linseed oil, shellac, turpentine, paint thinners, latex fillers and other materials not specifically indicated but required to achieve the quality finishes specified.

2.03 COATING SYSTEMS:

A. Provide paint or coating system as indicated on the drawings and as specified below.

B. System E-1:

1. Exterior of aboveground steel piping, including pipe supports and hangers.
2. Surface Preparation: SSPC SP6
3. First coat: High solids epoxy primer, 3 – 5 mils DFT.
4. Second Coat: High build, high solids polyurethane enamel, 4 – 5 mils DFT.
5. Third Coat: none.
6. System Total: 7 – 10 mils DFT
7. Piping, equipment, and steel located <u>inside</u> buildings (not exposed to sunlight) require only First Coat, min. 4 mils DFT.

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System E-1	Product Designation		
Manufacturer	First Coat	Second Coat	Third Coat
Tnemec	Series 66 or 161 High-Build Epoxoline	Series 74 Endura-Shield	-
DuPont	25P or 6AL25P Epoxy	333 Imron	-
Sherwin Williams	MACROPOXY 646 Fast Cure Epoxy	ACROLON ULTRA HP POLYURETHANE	-

C. System E-2:

1. Exterior of buried steel piping and exterior of carrier pipe in double wall systems.
2. Surface Preparation: SSPC SP6
3. First Coat: Shop applied fusion bonded epoxy powder, 15-20 mils DFT. Wipe back the coating 2" from the end of the piping.
4. Second Coat: none.
5. Third Coat: none.
6. System Total: Minimum 15-20 mils DFT.
7. Buried piping is to be pressure tested prior to joint coatings being applied.

System E-2	Product Designation		
Manufacturer	First Coat	Touch Up	Fittings and Field Repairs
3M	Skotch-Kote 6233	Skotch-Kote 226P Hot Melt Patch Kit	-
Special Polymer Coatings	-	-	SP-6888

D. System T-1:

1. Exterior of aboveground steel storage tanks, including appurtenances, ladders, and railing.
2. Surface Preparation: SSPC SP6
3. First Coat: Zinc primer, 3 – 4 mils DFT.
4. Second Coat: High solids polyamide epoxy, 3 – 4 mils DFT.
5. Third Coat: High build, high solids polyurethane enamel, 3 – 4 mils DFT.
6. System Total: 9 – 12 mils DFT
7. Steel storage tanks located <u>inside</u> buildings require only Second Coat as recommended by manufacturer.

System T-1	Product Designation		
Manufacturer	First Coat	Second Coat	Third Coat
Tnemec	Series 90-97 Tneme-Zinc	Series 66 or 161 High-Build Epoxoline	Series 74 Endura-Shield (gloss)
DuPont	347-Y-912 Zinc	25P Epoxy	333 Imron
Sherwin Williams	Zinc Clad VI (water-based)	B73-100 Series Waterbased Tile Clad (water-based)	Centurion B65-700 Series (water-based)

E. System T-2:

1. Interior of aboveground steel storage tanks, including the entire floor and three (3) feet up the sides of the interior shell wall.
2. Surface Preparation: SSPC SP10.
3. First Coat: High solids epoxy, min. 6 mils DFT.
4. Second Coat: same as first coat.
5. Third Coat: none.
6. System Total: 12 – 16 mils DFT

System T-2	Product Designation		
Manufacturer	First Coat	Second Coat	Third Coat
Tnemec	Series 61-5002 Tneme-Liner	Series 61-5001 Tneme-Liner	-
Ameron	Amercoat 395	Same as First (different color)	-
Sherwin Williams	Shelcote II Epoxy amine (5-6 mil DFT)	Same as First (different color)	-
DuPont	Flint-flex tank lining 525-8601	Flint-flex tank lining 525-8603	

F. Colors: See section 33 05 26 for system colors.

PART 3 - EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptance. Labeling shall include manufacturer's name, type of paint, brand name and code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.

B. Store paint materials in a well ventilated between the temperatures of 45-90 degrees F, unless otherwise required by manufacturer's instructions.

C. Take precautionary measures to prevent fire hazards and spontaneous combustion.

3.02 SURFACE PREPARATION

A. Prepare surfaces as specified for each coating system conforming to Steel Structures Painting Council Specifications. If grease or oils are present, SP 1 - Solvent Cleaning must precede any other method specified.

B. Repainting on pre-painted surfaces:

C. Solvent Cleaning SP 1 for any oil or grease.

D. Remove all loose paint and use Power Tool Cleaning - SP 3 to develop profile depth.

E. Prepare only those areas which will receive the first coat of the system on the same day.

F. Inspection: Verify that substrate conditions are ready to receive coating as instructed by the product manufacturer. Report any conditions that potentially affect proper application. Beginning of Work means acceptance of surface conditions.

G. Preparation:

H. Remove electrical plates, hardware, light fixture trim, fittings and correct minor surface defects prior to preparing surfaces or finishing.

I. Shellac and seal marks which may bleed through surface finishes.

J. Impervious Surfaces: Remove mildew by scrubbing with a cleaning solution and rinse with clean water and allow surface to completely dry.

K. Spot prime defects after repair.

3.03 APPLICATION

A. Apply coatings in accordance with manufacturer's recommendations to a dry surface.

B. Provide adequate ventilation equipment in all areas of application to ensure that at no time does the solvent content of air exceed the Threshold Limit Value given on the manufacturer's Safety Data Sheets (SDS) for the specific coatings being applied.

3.04 PROTECTION

A. Cover or otherwise protect surfaces not being painted, areas not to be painted, and the work of other trades. Remove protective materials when appropriate. Contractor is responsible for repair and/or repainting all items adversely affected by painting operations (ie. overspray).

B. Provide signs to indicate fresh paint areas.

C. Use properly designed brushes, rollers and spray equipment for all applications.

D. Dry film thickness of each system shall meet the minimum specified, but not exceed it more than 20 percent.

E. Environmental Conditions:

1. Atmospheric temperatures must be 50 degrees F or higher 24 hours before, during, and 24 hours after application, unless approved by coating manufacturer. Do not apply coatings when inclement weather or freezing temperatures may occur within coating curing time requirements.

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2. Minimum application temperature for interior or exterior varnish finishes shall be 65 degrees F, unless approved by coating manufacturer.

3. Wind velocities for exterior applications shall be at a minimum to prevent overspray or fallout and not greater than coating manufacturer's limits.

4. Relative humidity must be less than 80 percent and the temperature of the surface to be painted must be at least 5 degrees above the dew point.

F. Buried piping is to be pressure tested prior to joint coatings being applied.

G. Repair all damage to coating systems before holiday testing.

H. Remove all protective materials when appropriate and before materials such as masking tape becomes difficult to remove. Contractor shall protect the public and the work against disfigurement by paint materials and damage caused by surface preparation. The contractor shall be responsible for damage caused by the contractor's operations to vehicles, persons or property, including plants and animals, and shall provide protective measures to prevent such damages. Paint stains that result in an unsightly appearance shall be removed or obliterated by the contractor. All damage to surfaces resulting from the work shall be cleaned, repaired, and refinished to original condition.

I. Provide signs to indicate fresh paint areas.

J. Mask, remove, or otherwise protect finish hardware, control tubing, pressure gauges, control devices, and equipment nameplates as necessary. Provide cover to prevent paints from entering orifices in electrical or mechanical equipment.

K. Provide daily cleanup of both storage and working areas and removal of all paint refuse, trash, rags, thinners, etc. Dispose of leftover containers, thinners, rags, brushes, rollers, etc. in accordance with applicable regulations.

3.05 FIELD QUALITY CONTROL

A. Field Tests:

1. Use wet film gauges to check each application about every 15 minutes in order to correct low or heavy film build immediately.

2. Use dry film gauge to check each coat when dry, and the total system when completed per SSPC PA 2.

3. Use holiday or pinhole detector per NACE to detect and correct voids.

B. Provide daily reports of environmental conditions including ambient temperature, substrate temperature, relative humidity, and wind speed and direction.

3.06 CLEANING

A. Provide daily cleanup of both storage and working areas and removal of all paint refuse, trash, cloths, etc.

B. Touch up and restore damaged finishes to original condition as required.

C. Remove spilled, dripped or splattered paint from all surfaces during and after the Work.

** END OF SECTION **

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SECTION 10 11 16 - VISUAL DISPLAY BOARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Visual display conference units.
2. Visual display bulletin boards

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Initial Selection: For each type of visual display surface indicated and as follows:

1. Samples of accessories involving color selection.

D. Maintenance Data: For visual display surfaces to include in maintenance manuals.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative of visual display unit manufacturer for installation and maintenance of units required for this Project.

B. Source Limitations: Obtain each type of visual display surface through one source from a single manufacturer.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of visual display surfaces and are based on the specific system indicated.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-built visual display boards completely assembled in one piece without joints.

B. Store visual display units vertically with packing materials between each unit.

1.06 WARRANTY

A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

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a. Surfaces lose original writing and erasing qualities.

b. Surfaces become slick or shiny.

c. Surfaces exhibit crazing, cracking, or flaking.

2. Warranty Period: Life of the building.

B. Submit a standard warranty for Bulletin Boards, stating that when installed in accordance with manufacturer's instructions, Bulletin Boards are guaranteed for one year against defects in materials and workmanship.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

1. Basis-of-Design Product: The design for each visual display surface is based on the product specified. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.02 VISUAL DISPLAY CONFERENCE UNITS

A. Basis-of-Design Product: Claridge Products & Equipment, Series 1, 120 IN by 48 IN wall- mount, natural aluminum finish, white Porcelain enamel steel LCS markerboard, with marker tray and top tack strip, 12 assorted markers, eraser, and display rail. Comparable products of one of the following manufacturers may be provided:

B. Manufacturers:

1. ADP/Lemco, Inc.

2. Claridge Products & Equipment, Inc.

3. Egan Visual Inc.

4. PolyVision Corporation.

2.03 VISUAL DISPLAY BOARD (BULLETIN BOARD)

1. Basis-of-Design Product: Claridge Products & Equipment, Series 1, Type CO, size as indicated on the drawings, wall-mount, natural aluminum finish screw-on frame, mounted Claridge cork tackboard surface

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance.

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3.02 INSTALLATION OF FACTORY-FABRICATED VISUAL DISPLAY UNITS

A. Visual Display Conference Units: Install units in locations and at mounting heights indicated on Drawings, or if not indicated, at height indicated below. Attach to wall surface as recommended by manufacturer.

1. Mounting Height: 36 IN above finished floor to bottom of cabinet.

3.03 CLEANING AND PROTECTION

A. Clean visual display surfaces according to manufacturer's written instructions. Attach one cleaning label to visual display surface in each room.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

C. Cover and protect visual display surfaces after installation and cleaning.

END OF SECTION

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SECTION 10 14 00 - SIGNAGE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Room Identification signs
2. Interior Toilet signs
3. Interior Changeable Building Directory
4. Interior Changeable Room Identification signs
5. Interior HVAC Instruction sign
6. Exterior UPRR Logo Building sign
7. Exterior Post and Panel Sign
8. Exterior Property Monument Sign

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

1.03 SUBMITTALS

A. Submit in accordance with the requirements of Division 1.

B. Product Data: Submit product data for specified products. Include material details for each sign specified.

1. Provide complete instructions and templates for printing and producing additional message strips.

C. Shop Drawings: The Contractor is to submit shop drawings showing layout, profiles, and product components, including dimensions, anchorage, and accessories.

D. Samples: The Contractor is to submit the suppliers standard color chart for selection purposes and selected colors for verification purposes.

E. Installation: The Contractor is to submit the supplier's installation instructions.

F. Closeout Submittals:

1. The Contractor is to submit operation and maintenance data for the installed products, including precautions against harmful cleaning materials and methods.
2. The Contractor is to submit warranty documents specified herein.

1.04 QUALITY ASSURANCE

A. Supplier: Obtain all products in this Section form a single supplier.

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B. Regulatory Requirements: Products shall meet the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and Local amendments and modifications.

C. Installer: Installation shall be performed by an installer specialized and experienced in work similar to that required for this project.

1.05 DELIVERY, STORAGE, AND HANDLING

A. The Contractor is to comply with the requirements of Division 01.

1. Comply with the manufacturer's ordering instructions and lead time requirements to avoid delays.

2. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.

3. Store products protected from weather, temperature, and other harmful conditions as recommended by the supplier.

4. Handle products in accordance with the manufacturer's instructions.

1.06 WARRANTY

A. Project Warranty: Comply with the requirements of Division 01.

B. Manufacturer's Warranty: Submit the Manufacturer's standard warranty document executed by an authorized company official.

1. Warranty Period: One year from the product ship date.

1.07 MAINTENANCE MATERIAL SUBMITTALS

A. Changeable sign inserts: Provide full-size, blank strips equal to 10 percent of amount installed for each size indicated, but no fewer than 5 strips.

B. Provide complete instructions and templates for printing and producing additional message strips in the Operations and Maintenance Manual at Closeout.

PART 2 - PRODUCTS

2.01 SIGNAGE SYSTEMS

A. Acceptable Manufacturers:

1. ASI Sign Systems, 6958 North 97th Circle, Omaha, NE. 68122, 402-572-5055, email: ASIOmaha@aol.com.

2.02 ROOM IDENTIFICATION SIGNS – SIGN TYPE 1

A. ASI Series Framed Intouch Series, ADA Sign

1. Frame: 4-3/8"x 9-3/8" molded plastic frame, 7/16" radius corners, SC-905

2. Color: Black

3. Face: 4-3/32" x 9-3/32"± Intouch photopolymer ADA face, 5/16"radius,

4. Text: 5/8"ADA Compliant Copy, Tactile, SC-905 Black

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a. 24pt. Grade II Braille, 3/8" below copy

2.03 INTERIOR TOILET SIGNS – SIGN TYPE 2

A. ASI Framed InTouch Series, ADA Sign

1. Overall Size: 9-3/8"x 9-3/8"
2. Face: 9-3/32"x 9-3/32"± Intouch photopolymer ADA face, 5/16"radius,
3. Symbols: 4"(h) tactile symbols, raised, SC-905 Black, L=R together
4. Text: 5/8" ADA Compliant tactile copy, UC, +85 tracking, SC-905
   a. Black, T=B
   b. 24pt. Grade II Braille, 3/8" below copy

2.04 INTERIOR CHANGEABLE BUILDING DIRECTORY – SIGN TYPE 3

A. ASI Series Custom SOG Window Sign Directory

1. Size: per drawings
2. Backer: Clear Acrylic Window Backer, 1/4" radius corners, painted SC-902 Light Gray, 1st surface
3. Face: Matte Acrylic Window Face, 1/4" outside radius corners, 4" Top border and (2) 1"bottom borders, painted 2nd surface, SC-902 Light Gray
4. Header: 2" logo, c/c with 3/4" Futura Bold Condensed text, UC, 3/8" interline, FL, Print on Panel (POP), PMS 186 Red, PMS 280 Blue, White and Black, 1st surface
5. Borders: 3/8" window borders, cut & painted 2nd surface, SC-905 Black. Window sizes based on overall directory size.
6. Provide complete instructions and templates for printing and producing additional message strips. See Submittals.

2.05 INTERIOR CHANGEABLE ROOM IDENTIFICATION SIGNS – SIGN TYPE 4

A. ASI Series Framed Name Plate

1. 2" x 9-3/9" molded plastic frame, black to accept clear lens and white paper insert

2.06 HVAC INSTRUCTION SIGN – SIGN TYPE 5

A. ASI Series Intouch Series

1. Color: White
2. Face: 3" x 6"± Intouch photopolymer, 5/16"radius,
3. Text: 5/8"ADA Compliant Copy, Tactile, SC-905 Black

2.07 EXTERIOR POST & PANEL SIGN – SIGN TYPE 6

A. ASI Series Legacy L200 – 1a Double post & panel

B. 4'2 x 4'2 overall size with 3-1/4" aluminum extruded 5052 round posts

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C. 25" x 4'2" x 3" deep panel from HRP 1100 aluminum extruded body with 0.090" thick aluminum sheeting painted SC-806 Light Beige and 3M black vinyl copy

D. Custom break formed aluminum top illuminated Light cap hood, 8" x 4'2", with LED lighting

1. *illuminated or non-illuminated option

2.08 EXTERIOR PROPERTY MONUMENT SIGN – SIGN TYPE 7

A. ASI Series Legacy L200 Monument Sign – E20.1, double sided with radius corners

B. 6'6" x 14'0" x 1'5" deep 2" square 5052 extruded aluminum framework with 0.125" thick aluminum sheeting

C. Logo & Copy to be CNC routed backed with 7328 White 3/16" acrylic, copy to have 3M dual film black overlay

D. Logo: translucent digital print (to match logo colors)

E. LED illumination

2.09 EXTERIOR UPRR LOGO BUILDING SIGN: – SIGN TYPE 8

A. ASI Series LF Fabricated Non-illuminated logo

B. 2" deep 0.090" thick aluminum faces with 0.063" thick aluminum returns

1. Overall sign size per Building Elevations

C. Logo graphic with frisket paint with 2 part polyurethane paint

D. Thread stud mechanical mount

PART 3 - EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions: Verify installation conditions previously established under other sections are acceptable for product installation in accordance with the Manufacturer's instructions.

B. Scheduling of installation by the Owner or their representative implies that substrate and conditions are prepared and ready for production installation. Proceeding with installation implies installer's acceptance of substrate and conditions.

3.02 INSTALLATION

A. Install product in accordance with the supplier's instructions.

B. Install product in locations indicated using mounting methods recommended by the sign manufacturer and free from distortion, warp, or defect adversely affecting appearance.

C. Install product level, plumb, and at heights indicated.

D. Install product at heights to conform to Americans with Disabilities Act Accessibility Guidelines (ADAAG) and applicable local amendments and regulations.

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E. Install signs within the following tolerances and in accordance with manufacturer's recommendation:

1. Interior Signs: Within 1/4 IN vertically and horizontally of indicated location.
2. Interior Signs: Install signs on walls adjacent to the latch side of doors using foam tape
3. Exterior Signs: Install signs on walls adjacent to the latch side of doors with stainless steel screws painted to match sign color.(minimum of two)
4. Where no adjacent wall space is available, mount signs on nearest adjacent wall.
5. Mounting of signage shall be such that a person may approach to within 3 inches of sign without encountering any protruding objects or standing in swing of door travel.
6. Mount 60 inches above finish floor to centerline of sign.

3.03 CLEANING, PROTECTION, AND REPAIR

A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye form a distance of 5 FT.

B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to the Owners acceptance. Remove construction debris from project in accordance with provisions in Division 01.

3.04 SIGN SCHEDULE

A. Schedule: Refer to Drawings for sizes, locations, and layout of signage types, sign text copy, and graphics.

END OF SECTION

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SECTION 10 14 36 - IDENTIFYING DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Signs, including their construction, sizing, lettering, etc.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

C. Division 06 - Rough Carpentry.

1.03 SUBMITTALS

A. Submit shop drawings under provisions of Section 01 33 00.

B. Submit shop drawings showing sign layout, lettering, locations, constructions details, and overall dimensions of each sign or graphic.

C. Submit samples under provisions of Section 01 33 00.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and protect products under provisions of Division 01.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Do not install signs when ambient temperature is below 70 DegF. Maintain this minimum during and after installation of signs.

PART 2 - PRODUCTS

2.01 SIGNS

A. Interior signs and associated accessories provided by Architect.

B. Provide Americans With Disabilities Act (ADA) compliant with minimum 5/8 IN cap height tactile text, raised a minimum of 1/32 IN – Full Caps, Grade 2 Braille – and contrasting background uniformly sized be of SPE unframed acrylic: Plaque face only – on backplate by ASI Sign Systems, Inc., colors as selected by The Architect. Signs shall be for exterior or interior use.

C. Signs shall be as follows ("/" indicates separate sign of each side of door):

D. Oxy-Acetylene System Signage:

1. Signage shall meet the requirements of NFPA 51.

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2. Oxygen manifold:

   a. The following sign shall be conspicuously posted at each manifold:

LOW-PRESSURE MANIFOLD
DO NOT CONNECT
HIGH-PRESSURE CYLINDERS
MAXIMUM PRESSURE — 350 PSIG

   b. Gages on oxygen regulators shall be marked "USE NO OIL."

3. Station outlets shall be clearly marked to indicate the name of the gas in the connected pipe.
4. Signs clearly establishing the location and identity of section shutoff valves shall be provided.
5. Piping shall be painted and labeled in accordance with Section 23 05 53.

2.02 ACCESSORIES

A. Provide all mounting hardware as required or as indicated on the Drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Beginning of installation means installer accepts existing surfaces.

3.02 INSTALLATION

A. Install all signage in accordance with manufacturer's instructions and the drawings. Verify all locations with the Architect.

B. Install signs after surfaces are finished, in locations indicated and as directed.

C. Level all signage.

D. Clean and Polish.

END OF SECTION

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SECTION 10 21 13 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Toilet compartments and screens and as follows:

a. Type: Metal, baked enamel finish.

b. Compartment Style: Ceiling hung.

c. Screen Style: Wall hung.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.

B. Section 05 12 00 - "Metal Fabrications" for supports that supports that attach units to overhead structural system.

C. Section 10 28 14 - "Toilet and Bath Accessories" for toilet paper holders, grab bars, purse shelves, and similar accessories.

1.03 SUBMITTALS

A. Product Data: For each type and style of toilet compartment and screen specified. Include details of construction relative to materials, fabrication, and installation. Include details of anchors, hardware and fastenings.

B. Shop Drawings: For fabrication and installation of toilet compartment and screen assemblies. Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Initial Selection: Manufacturer's color charts consisting of sections of actual units showing the full range of colors, textures, and patterns available for each type of compartment or screen indicated.

D. Samples for Verification: Of each compartment or screen color and finish required, prepared on 6 IN (150-mm) square samples of same thickness and material indicated for work.

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1.04 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions in areas of installation by field measurements before fabrication and indicate measurements of Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

1. Established Dimensions: Where field measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating units without field measurements. Coordinate supports, adjacent construction, and fixture locations to ensure actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following.

1. Accurate Partitions Corporation.
2. All American Metal Corporation.
3. American Sanitary Partition Corporation.
4. Ampco Products Inc.
5. Flush-Metal Partition Corporation.
6. General Partitions Manufacturing Corporation.
7. Global Steel Products Corporation.
8. Knickerbocker Partition Corporation.
9. Lambaton/Universal Metal Products.
10. Metpar Steel Products Corporation.
11. The Mills Company.
12. Monarch Toilet Partitions.
13. Sanymetal Products Company.
14. Weis/Robert Partitions, Inc.

2.02 MATERIALS

A. General: Provide materials that have been selected for surface flatness and smoothness. Exposed surfaces that exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or imperfections on finished units are unacceptable.

B. Steel Sheets for Color-Coated Finish: Provide mill-phosphatized steel sheet that is leveled to stretcher-leveled flatness complying with the requirements of standards indicated below:

1. Electrolytically Zinc-Coated Steel Sheet: ASTM A591 (ASTM A591M), Class C of the following minimum thicknesses:

   a. Pilasters (Overhead Braced): 0.0359 IN (0.9 mm).

   b. Pilasters (Unbraced): 0.0478 IN (1.2 mm).

   c. Panels and Screens: 0.0359 IN (0.9 mm).

   d. Panels and Screens: 0.0299 IN (0.75 mm).

   e. Doors: 0.0299 IN (0.75mm).

   f. Tapping Reinforcement: 0.0747 IN (1.9 mm).

C. Core Material for Metal-Faced Units: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 IN (25 mm) minimum for doors, panels, and screens and 1-1/4 IN (32 mm) minimum for pilasters.

D. Pilaster Shoes and Sleeves (Caps): ASTM A666. Type 302 or 304 stainless steel, not less than 0.0312 IN (0.8 mm) thick and 3 IN (75 mm) high, finished to match hardware.

1. For solid-plastic, polymer-resin pilasters, in lieu of stainless-steel pilaster shoes and sleeves, manufacturer's standard plastic pilaster shoes and sleeves may be provided.

E. Stirrup Brackets: Manufacturer's standard ear or U-brackets for attaching panels and screens to walls and pilasters of the following material:

1. Material: Chrome-plated, non-ferrous, cast zinc allow (zamac) or clear-anodized aluminum.

F. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories of the following material:

1. Material: Chrome-plated, non-ferrous, cast zinc alloy (zamac) or clear-anodized aluminum.

G. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum strip in manufacturer's standard finish.

H. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip in manufacturer's standard finish.

I. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match hardware with theft-resistant-type heads. Provide hex-type bolts for through-bolt applications. For concealed anchors, use hot-dip galvanized or other rust-resistant, protective-coated steel.

2.03 FABRICATION

A. General: Provide standard doors, panels, screens, and pilasters fabricated for compartment system. Provide units with cutouts and drilled holes to receive compartment-mounted hardware, accessories and grab bars as indicated. Provide internal reinforcement in metal units for compartment-mounted hardware, accessories and grab bars as indicated.

B. Metal-Faced Toilet Compartments and Screens: Pressure laminate seamless face sheets to core material and provide continuous, interlocking molding strip or lapped and formed edges. Seal corners by welding or clips. Grind exposed welds smooth.

C. Ceiling-Hung Compartments: Provide manufacturer's standard corrosion-resistant anchoring assemblies complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters from structure without transmittal load to finished ceiling. Provide sleeves (caps) at tops of pilasters to conceal anchorage. Provide manufacturer's standard 4 IN (100 mm) high, overhead cross bracing.

D. Wall-Hung Screens:

1. Provide units in sizes indicated of same construction and finish as compartment panels, unless otherwise indicated.

2. Provide metal-faced screens with integral full-height flanges for attachment to wall.

3. Provide V-shaped, metal faced, screens with manufacturer's standard sound-deadening core material bonded to inner surface of face sheets. Provide metal top and bottom caps. Fabricate screens to form unit that is a maximum of 6 IN (150 mm) wide at wall and 1 IN (25 mm) wide at its protruding end. Provide complete with concealed anchoring devices for attachment to wall and mechanical leveling adjustment.

E. Doors: Unless otherwise indicated, provide 24 IN (610 mm) wide in-swinging doors for standard toilet compartments and 36 IN (914 mm) wide out-swinging doors with a minimum 32 IN (813 mm) wide clear opening for compartments indicated to be handicapped accessible.

1. Hinges - Manufacturer's standard self-closing type that can be adjusted to hold door open at any angle up to 90 degrees.

2. Latch and Keeper - Manufacturer's standard surface-mounted latch unit with combination rubber-faced door strike and keeper designed for emergency access. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be handicapped accessible.

3. Coat Hook - Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.

4. Door Bumper - Manufacturer's standard rubber-tipped bumpers at out-swinging doors or entrance screen doors.

5. Door Pull - Manufacturer's standard unit that complies with accessibility requirements of authorities having jurisdiction at out-swinging doors. Provide units on both sides at doors at compartments indicated to be handicapped accessible.

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PART 3 - INSTALLATION

3.01 INSTALLATION

A. General: Comply with manufacturer's written installation instructions.

1. Install units rigid, straight, plumb and level.
2. Provide clearances of not more than 1/2 IN (13 mm) between pilasters and panels and not more than 1 IN (25 mm) between panels and walls.
3. Secure units in position with manufacturer's recommended anchoring devices. Secure panels to walls and panels with not less than 2 stirrup brackets attached near top and bottom of panel.
4. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
5. Align brackets at pilasters with brackets at walls.

B. Ceiling Hung Compartments: Secure pilasters to supporting structure and level, plumb, and tighten. Hang doors and adjust so bottoms of doors are level with bottoms of pilasters when doors are in closed position.

C. Screens: Attach with anchoring devices according to manufacturer's written instructions and to suit supporting structure. Set units level and plumb and to resist lateral impact.

3.02 ADJUSTING AND CLEANING

A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and swing doors in entrance screens to return fully closed position.

B. Provide final protection and maintain conditions that ensure toilet compartments and screens are without damage or deterioration at the time of Substantial Completion.

END OF SECTION

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SECTION 10 21 14 – STAINLESS STEEL TOILET COMPARTMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes stainless-steel toilet compartments configured as toilet enclosures and urinal screens.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

C. Division 01 - UPRR General Requirements.

D. Division 10 - Toilet and Bath Accessories.

1.03 REFERENCED STANDARDS

A. ASTM International (ASTM):

1. A385, Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip).
2. A480, General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
3. A568, Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low Alloy, Hot Rolled and Cold Rolled.
4. D2092, Standard Guide for Preparation of Zinc-Coated (Galvanized) Steel Surfaces for Painting.

1.04 SUBMITTALS

A. Product Data: For each type and style of toilet compartment and screen specified. Include details of construction relative to materials, fabrication, and installation. Include details of anchors, hardware and fasteners. Include the following:

1. Acknowledgement that products submitted meet requirements of standards referenced.
2. Manufacturer's installation instructions.
3. Manufacturer's anchorage device and structural backing recommendations.

B. Shop Drawings: For fabrication and installation of toilet compartment and screen assemblies. Include the following:

1. Scaled drawings of all areas complete with plans, elevations, sections, details, and attachments.

C. Samples for verification: Of finish required, prepared on 6 IN square samples of the same thickness and material as specified.

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PART 2 - PRODUCTS[A1][A2]

2.01 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Toilet partitions:

a. Accurate Partitions Corp.

b. American Sanitary Partition Corp.

c. Ampco Products Inc.

d. General Steel Products Corporation.

e. Global Steel Products Co.

f. Knickerbocker Partition Corporation.

g. Sanymetal Products Co.

2.02 PERFORMANCE REQUIREMENT

A. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

2.03 STAINLESS-STEEL TOILET COMPARTMENTS

A. Toilet-enclosure style: floor and ceiling anchored.

B. Urinal-screen style: wall hung with integral flanges.

C. Door, panel, and pilaster construction: seamless, metal facing sheets pressure laminated to core material; with continuous, interlocking molding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed welds ground smooth. Exposed surfaces shall be free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.

1. Core material: manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch (25 mm) for doors and panels and 1-1/4 inches (32 mm) for pilasters.

2. Grab-bar reinforcement: provide concealed internal reinforcement for grab bars mounted on units of size and material adequate for panel to withstand applied downward load on grab bar of at least 250 lbf (1112 N), when tested according to ASTM F 446, without deformation of panel.

3. Tapping reinforcement: provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.

D. Urinal-screen construction:

1. Flat-panel urinal screen: matching panel construction.

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2. Integral-flange, wall-hung urinal screen: similar to panel construction, with integral full-height flanges for wall attachment, and maximum 1-1/4 inches (32 mm) thick.

E. Facing sheets and closures: stainless-steel sheet of nominal thicknesses as follows:

1. Pilasters, braced at both ends: manufacturer's standard thickness, but not less than 0.038 inch (0.95 mm).

2. Panels: manufacturer's standard thickness, but not less than 0.031 inch (0.79 mm).

3. Doors: manufacturer's standard thickness, but not less than 0.031 inch (0.79 mm).

4. Flat-panel urinal screens: thickness matching the panels.

5. Integral-flange, wall-hung urinal screens: manufacturer's standard thickness, but not less than 0.031 inch (0.79 mm).

F. Pilaster shoes and sleeves (caps): stainless-steel sheet, not less than 0.031-inch (0.79-mm) nominal thickness and 3 inches (76 mm) high, finished to match hardware.

G. Brackets (fittings):

1. Stirrup Type: Ear or U-brackets; stainless steel

H. Stainless-steel finish: Manufacturer's standard brushed finish on exposed faces. Protect exposed surfaces from damage by application of strippable, temporary protective covering before shipment.

2.04 HARDWARE AND ACCESSORIES

A. Hardware and accessories: manufacturer's standard design, heavy-duty operating hardware and accessories.

1. Material: Stainless Steel

2. Hinges: Manufacturer’s standard continuous, cam type that swings to a closed or partially open position

3. Latch and Keeper: Manufacturer’s standard surface-mounted latch unit designed for emergency access and with combination rubeer-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designed as accessible.

4. Coat Hook: Manufacturer’s standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.

5. Door Bumper: Manufacturer’s standard rubber-tipped bumper at out-swinging doors.

6. Door Pull: Manufacturer’s standard unit at out-swinging doors at compartments designated as accessible.

B. Overhead bracing: manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.

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C. Anchorages and fasteners: manufacturer's standard exposed fasteners of stainless steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel anchors compatible with related materials

2.05 FABRICATION

A. Fabrication, general: fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories and solid blocking within panel where required for attachment of toilet accessories.

B. Floor-and-ceiling-anchored units: provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.

C. Door size and swings: unless otherwise indicated, provide 24-inch- (610-mm-) wide in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide out-swinging doors with a minimum 32-inch- (813-mm-) wide clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:
   a. Pilasters and Pamnels: ½ IN.
   b. Panels and Walls: 1 IN.
2. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel.
   a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
   b. Align brackets at pilasters with bracket at walls

B. Floor-and Ceiling-Anchored Units: Secure pilasters to supporting construction and level, plumb, and tighten. Hang doors and adjust so doors are level and aligned with panels when doors are in closed position.

C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid and secured to resist lateral impact.

3.03 ADJUSTMENT

A. Adjust and lubricate hardware for proper operation after installation.

B. Set hinges on in-swing doors to hold unlatched doors open approximately 30 degrees.

C. Set hinges on out-swing doors to return to fully closed position.

D. Repair all scratches in finish with material provided by and using application methods recommended by partition manufacturers.

END OF SECTION

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SECTION 10 22 13 – WIRE MESH PARITIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Wire mesh partitions as indicated and as specified.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR, Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

1.03 SUBMITTALS

A. Manufacturer's Data: Submit manufacturer's technical data and installation instructions.

B. Shop Drawings: Submit shop drawings for fabrication and erection. Include plan view elevations and large scale details. Show necessary items. Provide templates as required.

C. Color Card: For Architect's selection of HVLP applied shop coat of colored enamel finish.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: Company specializing in manufacturing Products specified with minimum 5 years documented experience.

2. Installer: Company specializing in performing the Work of this Section with minimum 5 years documented experience.

B. Field Measurements: Confirm field measurements before fabrication, where possible. Allow for adjustments and fittings where required.

C. Inserts and Anchorage's: Furnish devices which must be set in concrete or built into masonry. Coordinate with other work.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect products during transport, handling and storage.

B. Deliver materials to jobsite in unopened containers bearing manufacturer's name and content identification.

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PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with project requirements, manufacturer's offering, products which may be incorporated in the work include the following:

CALIFORNIA WIRE PRODUCTS, Corona, CA
PH (800) 486-7730 FAX (909) 735-1070
E-MAIL: INFO@CAWIRE.COM
http://www.cawire.com

2.02 WIRE MESH PARTITIONS

A. Partitions Frame and Wire Mesh:

1. Steel: Complies with ASTM A36/A36M.
2. Wire: #6 W&M gauge steel wire, 2" diamond intercrimp mesh, clinched and welded to channel frames.
3. Vertical Frames: 1-1/2" X 3/4" x 1/8" channel provided with holes for bolting to adjacent panel.
4. Horizontal Frames: 1-1/2" x 3/4" x 1/8" hot roll channel.
5. Stiffeners: 1" X 1/2" x 1/8" hot roll channel.
6. Top Capping Bar: Hot roll formed 'C' shaped channel C3 x 4.1.
7. Flat Bar Stiffeners: 2 1-2" x 5/16" flat bar, full height of panel to prevent telescoping of channel frames and stiffener runs. Each with base plate and (2) two anchors.
8. Corner Posts: 1-1/4" X 1-1/4" x 1/8" 90° angle.
9. All hardware and anchors are furnished for a complete installation.

B. Door and Frame:

1. Doors:
   a. Hinged: Constructed of 1-1/4" x 1/2" x 12 gauge channel frame banded with 1/8" x 1-1/4" flat bar top and sides. 1-1/2" pair butt hinges welded to door sides and jambs.
2. Floor Brace: 3-1/2" x 1-1/2" roll formed 12 gauge channel brace with base plate and mounting anchors.
3. Locks: Doors are equipped with mortise type cylinder locks operated from outside with key, and from inside with recess knob. Padlock hasps also available.

C. Finish: An HVLP applied shop coat of enamel or hot dipped galvanized.

D. Nails, Brads, and Staples: ASTM F1667.

E. Power-Driven Fasteners: CABO NER-272.

F. Wood Screws: ASME B18.6.1.

G. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which mesh partition units are to be installed. Do not proceed with the work until unsatisfactory conditions have been corrected

3.02 INSTALLATION

A. Install Work under this Section in accordance with manufacturer's printed recommendations.

B. Erect partitions plumb, rigid, properly aligned, and securely fastened in place. Adjust opening and closing units to operate freely without bind.

C. Provide additional field bracing as necessary for rigid, secure installation.

D. Install all accessories required for a completed installation.

E. Touch up paint damaged finish after completion of installation using field-applied paint to match color of shop-applied finish.

END OF SECTION

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SECTION 10 26 13 - WALL PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Corner guards.
2. Chair rails

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

C. Division 09 - Gypsum Board Assemblies.

1.03 SUBMITTALS

A. Product Data: Include construction details, material descriptions, impact strength dimensions of individual components and profiles, finishes and samples for each impact-resistant wall-protection unit.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Testing Agency Qualifications: An independent agency qualified according to ASTM E329 for testing indicated, as documented according to ASTM E548.

C. Source Limitations: Obtain impact-resistant wall-protection units through one source from a single manufacturer.

D. Product Options: Refer to Division 01 Section "Product Requirements."

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

E. Fire-Test-Response Characteristics: Provide impact-resistant, plastic wall-protection units with surface-burning characteristics as determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store impact-resistant wall-protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1. Maintain room temperature within storage area at not less than 70 DegF during the period plastic materials are stored.

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2. Store plastic wall-protection components for a minimum of 72 HRS, or until plastic material attains a minimum room temperature of 70 DegF.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install impact-resistant wall-protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 DegF for not less than 72 HRS before beginning installation and for the remainder of the construction period.

B. Field Measurements: Verify actual locations of walls, columns, and other construction contiguous with impact-resistant wall-protection units by field measurements before fabrication and indicate measurements on Shop Drawings.

1.07 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.02 MATERIALS

A. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

B. Adhesive: Type recommended by manufacturer for use with material being adhered to substrate indicated.

2.03 CORNER GUARDS

A. Surface-Mounted, Opaque-Plastic Corner Guards (see plan sheet for locations): Fabricated from PVC plastic, acrylic-modified vinyl sheet or opaque polycarbonate sheet; with formed edges; fabricated with 90- or 135-degree turn to match wall condition.

1. Manufacturer: Korogard Wall Protection Systems.
2. Style: No. G200.
3. Height: 48 IN.
4. Wing Size: Nominal 3 by 3 IN.
5. Mounting: Countersunk screws through factory-drilled mounting.

6. Color and Texture: As selected by Architect from manufacturer's full range

2.04 CHAIR RAIL

A. Surface-Mounted, Solid Wood with integrated bumper.

1. Manufacturer: Korogard Wall Protection Systems.
2. Style: BW90.
3. Material / Finish: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

1. Examine walls to which impact-resistant wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
2. For impact-resistant wall-protection units attached with adhesive or foam tape, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Complete finishing operations, including painting, before installing impact-resistant wall-protection system components.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.03 INSTALLATION

A. General: Install impact-resistant wall-protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

1. Provide splices, mounting hardware, anchors, and other accessories required for a complete installation.
    a. Provide anchoring devices to withstand imposed loads.

3.04 CLEANING

A. Immediately after completion of installation, clean plastic covers and accessories using a standard, ammonia-based, household cleaning agent.

B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION

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SECTION 10 26 24 - FIBERGLASS REINFORCED LAMINATED PANELS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Requirements for furnishing and installing fiberglass reinforced laminated plastic panels according to manufacturer's recommendations.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Section 09 21 16 - Gypsum Board Assemblies.

1.03 SUBMITTALS

A. Submit in accordance with Section 01 33 00.

1. Two samples of each type of laminated panel, each type of trim and fastener.
2. Shop Drawings: Indicate the location and dimension of joints and fastener attachment.
3. Manufacturer's Installation Guide.

1.04 QUALITY ASSURANCE

A. Provide panels and molding only from the same manufacturer to ensure warranty and color harmonization of accessories.

B. Qualifications of installers:

1. Use only thoroughly trained and experienced installers who are completely familiar with the requirements of this Work and the recommendations contained in the referenced standards.
2. In acceptance or rejection of installed work, no allowance will be made for lack of skill on the part of the installer.

C. Codes and Standards: In addition to complying with all pertinent codes and regulations:

1. Meet USDA requirements.
2. Meet ASTM E84, flame spread less than 200, smoke developed less than 450.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials: Package sheets on skids or pallets for shipment to project site.

B. Storage of Materials: Store panels indoors in a dry place at the project site.

C. Handling: Remove foreign matter from face of panel by use of a soft bristle brush, avoiding abrasive action.

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1.06 PROJECT CONDITIONS:

A. Installation shall not begin until building is enclosed, permanent heating and cooling equipment is in operation, and residual moisture from concrete work has dissipated.

B. During installation and for not less than 48 HRS before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.

C. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Laminated Panel Material:

1. Laminated panels shall be manufactured by Marlite or an approved equal.

2. Interior (face) skin shall be embossed .090 IN firerated (FRP) reinforced fiberglass. Color shall be from manufacturer's standard color selection.

3. Stabilizer sheet under face shall be 6-mm thick non-asbestos fiber reinforced cement sheet.

4. Size tolerance:

a. Width: ±1/8 IN.

b. Length: ±1/8 IN.

c. Thickness: ±1/16 IN.

B. Adhesive:

1. The adhesive used in laminating shall be polyurethane reactive (PUR), hot melt type, applied heated 250 DegF.

2. The entire composite shall be pressed with maximum pressure under controlled and consistent pressure to develop the maximum possible tensile strength.

C. Sealants: Panels to be sealed with Class A grade sealant.

D. Division Bars, Corner Trim, Moldings: Panel manufacturer's standard length extruded vinyl pieces; longest length possible - to eliminate end joints. Color to match panels.

E. Fasteners: Non-corrosive drive rivets in harmonizing colors. Refer to Manufacturer's Installation Guide for rivet pattern and installation instructions.

PART 3 - EXECUTION

3.01 PREPARATION

A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.

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B. Do not begin installation until backup surfaces are put into satisfactory condition.

3.02 APPLICATION

A. Do all cutting and drilling with carbide tipped saw blades or drill bits, or cut with snips.

B. Install laminated panels with manufacturer's recommended gap for panel field and corner joints.

C. Fastener holes in the panels must be predrilled 1/8 IN (3.2 mm) oversize.

D. Using products acceptable to manufacturer, install the FRP panel system in accordance with panel manufacturer's printed instructions.

3.03 CLEANING

A. Remove any adhesive or excessive sealant from panel face using solvent or cleaner recommended by panel manufacturer.

END OF SECTION

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SECTION 10 28 14 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Toilet and bath accessories.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

C. Division 10 – Stainless Steel Toilet Compartments

1.03 REFERENCED STANDARDS:

A. Americans with Disabilities Act (ADA):

1. Accessibility Guidelines for Buildings and Facilities.

B. ASTM International (ASTM):

1. A269, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
2. A480, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.

1.04 SUBMITTALS

A. Shop Drawings:

1. See UPRR Division 01.
2. Product technical data including:
    a. Acknowledgement that products submitted meet requirements of standards referenced.
    b. Manufacturer's installation instructions.
    c. Manufacturer's recommendation on fasteners.
3. Schedule of items being provided for each room. Reference rooms using room number designated on Drawings.
4. Catalog cut sheet of each item proposed.

B. Operation and Maintenance Manuals:

1. See UPRR Division 01.

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PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Product numbers scheduled are manufactured by Kimberly-Clark and Bradley.

B. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. American Specialties, Inc.
2. Bobrick.
3. Bradley Corp.
4. Kimberly-Clark Professional.

C. Submit requests for substitution in accordance with UPRR Division 01.

2.02 MATERIALS

A. Toilet Accessories:

1. General: ASTM A480, stainless steel.
2. Grab bars: ASTM A269, stainless steel.

B. Anchoring Devices: Manufacturer's standard.

2.03 TOILET ACCESSORIES

A. General:

1. Satin finish.
2. Items shall meet design requirements of ADA.

B. Grab bars:

1. Equal to Bradley 812-0593652.
2. Concealed mounting.
3. 3 IN DIA flange.
4. Integral non-slip gripping surface.
5. 1-1/2 IN DIA.
6. Anchoring Devices: Designed to withstand minimum concentrated load of 250 LBS applied at any point on grab bar.

C. Toilet Tissue Dispenser – Equal to Kimberly-Clark 09603.

D. Feminine Napkin Disposal – Equal to Bradley 4721-15 and 4722-1015, semi-recessed or recessed per plan.

E. Roll Towel Dispenser – Equal to Kimberly-Clark 09995

F. Waste Receptacle – Equal to Bradley 334, semi-recessed or recessed per plan.

G. Liquid Soap Dispenser – Equal to Kimberly-Clark 92144

H. Mop and Broom Rack – Equal to Bradley 9953.

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1. Mount 72" AFF above mop sink

I. Toilet Seat Cover Dispenser – Equal to Kimberly-Clark 09505.

J. Mirrors: By Glazing Contractor See Section 08 81 00.

K. Shower seat: Bradex Model 956, (if not provided with Shower)

1. Bradex Model 956, stainless steel frame with fold up plastic seat.

2. A seat shall be provided in shower stalls. The seat shall be mounted 17 IN to 19 IN from the bathroom floor and shall extend the full depth of the stall. In a 36 IN by 36 IN shower stall, the seat shall be on the wall opposite the controls. The structural strength of seats and their attachments shall comply with A.D.A. guidelines.

L. Dressing Area Bench: See Section 10 51 13 - Metal Lockers.

M. Shower Curtain and Rod. (if not provided with Shower):

1. Heavy duty institutional, commercial grade vinyl-coated nylon.

a. Stainless steel grommets every 6 IN across the top.

b. Curtain material to be: Antimicrobial protection, flame resistant, stain resistant, anti-static, odor resistant.

2. Curtain rod to be stainless steel.

N. Warm Air Hand Dryer:

1. Xlerator Hand Dryer, #XL-SF, by Excel Dryer Inc., surface mounted high speed hand dryer shall incorporate a vandal resistant design

2. Green Spec listed.

O. Surface Mounted Specimen Shelf (as indicated on drawings)

1. Bradley Model 9095, 6-1/4 IN x 20-1/2 IN stainless steel shelf with roll-formed edges.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify adequate backing has been provided in wall or toilet partition.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instruction and in accordance with ADA.

B. Mount all items with manufacturer's standard anchorage devices.

C. Install in locations indicated on Drawings.

END OF SECTION

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UP-Pirate-0005217

SECTION 10 44 00 - FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Portable fire extinguishers.
2. Fire-protection cabinets, as indicated on drawings, for the following:
   a. Portable fire extinguishers.
3. Mounting brackets for fire extinguisher, as indicated on drawings

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

C. Division 07 - "Through-Penetration Firestop Systems" for firestopping sealants at fire-rated cabinets.

1.03 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection cabinets.

1. Fire Extinguishers: Include rating and classification.
2. Fire-Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

B. Samples for Initial Selection: For fire-protection cabinets with factory-applied color finishes. Size: 6 by 6 IN square.

C. Maintenance Data: For fire extinguishers and fire-protection cabinets to include in maintenance manuals.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain fire extinguishers and fire-protection cabinets through one source from a single manufacturer.

B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

C. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FMG.

D. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements of ASTM E814 for fire-resistance rating of walls where they are installed.

UP-Pirate-0005218

1.05 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate location of fire-protection cabinets and fire extinguishers with local AHJ and to ensure fit and function.

1.06 SEQUENCNG

A. Apply vinyl lettering on field-painted fire-protection cabinets after painting is complete.

1.07 WARRANTY

A. Special Warranty: Manufacturer's Standard Form in which manufacturer agrees to repair or replace components of portable fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure or hydrostatic test according to NFPA 101.

b. Faulty operation of values or release levers.

2. Warranty period: Six years from date of substantial completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by reputable manufacturers and installed in accordance with these Specifications.

2.02 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B.

B. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:

1. Sheet: ASTM B209 (ASTM B 209M).

2. Extruded Shapes: ASTM B221 (ASTM B 221M).

C. Clear Float Glass: ASTM C1036, Type I, Class 1, Quality q3, 3 mm thick.

2.03 PORTABLE FIRE EXTINGUISHERS

A. Available Manufacturers:

1. JL Industries, Inc.

2. Larsen's Manufacturing Company.

3. Potter Roemer; Div. of Smith Industries, Inc.

B. General: Provide fire extinguishers of type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.

UP-Pirate-0005219

1. Handles and Levers: Manufacturer's standard.
2. Instruction Labels: Include pictorial marking system complying with NFPA 101, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

C. Multipurpose Dry-Chemical Type in Steel Container FE-1, UL-rated 4-A:60-B:C, 10 LB nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.04 FIRE-PROTECTION CABINETS

A. Manufacturers:
1. JL Industries, Inc. - Academy 1027 W10.
2. Larsen's Manufacturing Company. - Vertical Duo - B2712 R.
3. Potter Roemer; Div. of Smith Industries, Inc. - ALTA 7045.

B. Cabinet Type: Suitable for fire extinguisher.

C. Cabinet Construction: 1 HR fire rated.

D. Cabinet Material: Aluminum sheet.
1. Shelf: Same metal and finish as cabinet.

E. Recessed Cabinet, as indicated on drawings:
1. Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).

F. Semi-Recessed Cabinet, as indicated on drawings: Cabinet box recessed in walls of sufficient depth to suit style of trim indicated.
1. Rolled Edge Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend) of 2-1/2 IN.

G. Cabinet Trim Material: Aluminum sheet.

H. Door Material: Aluminum sheet.

I. Door Style: Vertical duo panel with frame.

J. Door Glazing: Clear float glass.

K. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
1. Provide manufacturer's standard pull handle.
2. Provide continuous hinge, of same material and finish as trim permitting door to open 180 degrees.

UP-Pirate-0005220

L. Accessories:

1. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Contracting Officer's Technical Representative.

a. Identify fire extinguisher in fire-protection cabinet with the words FIRE EXTINGUISHER.

b. Location: Applied to cabinet door.

c. Application Process: Pressure-sensitive vinyl letters.

d. Lettering Color: Red

e. Orientation: Vertical.

M. Finishes:

1. Aluminum: Color anodized.

a. Color and Texture: As selected by Architect from manufacturer's full range.

2.05 MOUNTING BRACKETS

A. Available Manufacturers:

1. JL Industries, Inc.

2. Larsen's Manufacturing Company.

3. Potter Roemer; Div. of Smith Industries, Inc.

B. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

1. Color: Black.

C. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Contracting Officer's Technical Representative.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

a. Orientation: Vertical.

2.06 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

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2.07 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.

D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.08 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed cabinets will be installed.

B. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged units.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Prepare recesses for semi-recessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.03 INSTALLATION

A. General: Install fire-protection specialties in locations and at mounting heights indicated or, if not indicated, at heights indicated below:

1. Fire-Protection Cabinets: 54 IN above finished floor to top of cabinet.

2. Mounting Brackets: 54 IN above finished floor to top of fire extinguisher.

B. Fire-Protection Cabinets: Fasten fire-protection cabinets to structure, square and plumb.

1. Provide inside latch and lock for break-glass panels.

2. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

D. Identification: Apply vinyl lettering at locations indicated.

3.04 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection specialties are installed, unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory- finished appearance. Use only materials and procedures recommended or furnished by fire- protection cabinet manufacturer.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

UP-Pirate-0005223

SECTION 10 51 13 - METAL LOCKERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Locker units with hinged doors, single or double tier as indicated on Drawings.
2. Fillers and corner filler panels.
3. Sloped tops.
4. End cover panels.
5. Hooks, recessed handle, padlock hasps at top and bottom.
6. Attachment hardware.
7. Locker Bench.
8. Handicap Accessible Bench.
9. 6 IN metal base.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

1.03 REFERENCED STANDARDS

A. ASTM International (ASTM):

1. A446, Steel Sheet, Zinc-coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

1.04 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 33 00.

B. Include locker types, sizes, configurations, layout of groups of lockers, accessories, and numbering plan.

C. Provide one sample of standard colors for initial selection.

1. After initial selection, provide (4) 1" x 3" samples of final color selection.

1.05 PROTECTION

A. Store and protect lockers under provisions of Section 01 65 50.

B. Protect locker finishes and adjacent surfaces from damage during installation.

UP-Pirate-0005224

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Accessibility Requirements: for lockers indicated to be accessible, comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC A117.1.

2.02 MANUFACTURERS

A. Basis of Design: Products specified on the Drawings are products of Republic Storage Products. Products of other approved manufacturers shall be allowed provided they meet the quality level and design intent of the specified products.

B. Manufacturer: Subject to compliance with specified requirements, provide metal lockers equal to specified, provided by the following manufacturer's;

1. Republic.
2. Lyon
3. Art Metal Products
4. Interior/Medart.
5. Substitutions: Under provisions of Section 01 65 50.

2.03 MATERIALS

A. Sheet Steel: Prime, high grade Class I mild annealed, cold-rolled steel; of the following minimum thicknesses:

1. Body and Shelf: 24 gauge.
2. Doors: 14 gauge outer.
3. Door Frames: 16 gauge.
4. Hinges: Standard heavy duty.
5. Top, Trim: 24 gauge.

2.04 ACCESSORIES

A. Provide each locker with two single prong wall hooks, one double ceiling hook, one shelf (at single tier lockers), and a metal number plate.

2.05 FABRICATION

A. Locker Units: See Note on drawings for sizes and tiers, sloped top.

B. Bodies: Formed and flanged with stiffener ribs; electrically spot welded.

C. Door Frame: Formed channel shape, welded and ground flush, welded to body.

D. Doors: Welded inner and outer faces; 1-3/16 IN thickness; channel reinforced top and bottom with intermediate stiffener ribs. Finish edges smooth.

E. Hinges: Three for doors 42 IN and higher, two for doors under 42 IN high. Weld securely to unit body and rivet to unit door.

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F. Provide recessed locking handle for padlock. Locking device supplier by Owner.

G. Provide end panels, filler panels, and sloped metal tops to close off all openings.

H. Provide ventilation openings at top and bottom of each locker.

I. Finish edges smooth without burrs.

J. Provide number plates.

2.06 LOCKER ARRANGEMENT

A. Provide lockers in sizes and arrangements as indicated on the drawings on standard 6' metal base.

2.07 FINISHES

A. Clean, degrease, and neutralize metal; prime and finish with two coats of baked enamel.

B. Paint locker doors, bodies and frames.

C. Color: as selected by Architect from deluxe colors available.

2.08 LOCKER BENCHES

A. Provide freestanding bench units with laminated clear hardwood top and tubular steel legs in sizes indicated on the drawings.

B. Provide freestanding ADA bench units with laminated clear hardwood top and tubular steel legs in sizes indicated on the drawings

PART 3 - EXECUTION

3.01 INSTALLATION

A. Set lockers on base; verify base is acceptable.

B. Install lockers secure, plumb, square, and in line.

C. Anchor lockers with appropriate anchor devices to suit materials encountered.

D. Bolt adjoining locker units together to provide rigid installation.

E. Install end panels, filler panels, tops, and bases to completely close off openings.

END OF SECTION

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SECTION 10 75 00 - FLAGPOLES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Ground-set flagpoles made from aluminum.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

C. Division 03 - "Cast-in-Place Concrete" for concrete footings for flagpoles.

D. Division 07 - "Joint Sealants" for elastomeric sealant filling the top of the foundation tube.

1.03 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide flagpole assemblies, including anchorages and supports, capable of withstanding the effects of wind loads, determined according to NAAMM FP 1001, "Guide Specifications for Design of Metal Flagpoles."

1.04 SUBMITTALS

A. Product Data: For each type of flagpole required.

B. Shop Drawings: Include elevations and details showing general arrangement, jointing, fittings and accessories, grounding, and anchoring and supporting systems.

1. Include details of foundation system for ground-set flagpoles.

C. Finish Samples for Verification: For each finished material used for flagpoles and accessories.

1.05 QUALITY ASSURANCE

A. Source Limitations: Obtain each flagpole as a complete unit, including fittings, accessories, bases, and anchorage devices, from a single manufacturer.

a. Obtain flagpoles through one source from a single manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. General: Spiral wrap flagpoles with heavy paper and enclose in a hard fiber tube or other protective container.

UP-Pirate-0005228

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. American Flagpole; a Kearney-National Inc. Company.
2. Baartol Company Inc. (The).
3. Concord Industries, Inc.
4. Eder Flag Manufacturing Company, Inc.
5. Ewing International.
6. Lingo Inc.; Acme Flagpole Division.
7. Michigan Flagpole Inc.
8. Morgan-Francis Div.; Original Tractor Cab Co., Inc.
9. PLP Composite Technologies, Inc.
10. Pole-Tech Company Inc.

2.02 FLAGPOLES

A. Flagpole Construction, General: Construct flagpoles in one piece if possible. If more than one piece is necessary, comply with the following:

1. Fabricate shop and field joints without using fasteners, screw collars, or lead calking.
2. For tapered flagpoles, provide flush hairline joints using self-aligning, snug-fitting, internal sleeves.

B. Exposed Height:

1. Center pole: 35 FT (1 total).
2. Outer poles: 30 FT (per drawings).

C. Aluminum Flagpoles: Provide tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B241, Alloy 6063, with a minimum wall thickness of 3/16 IN. Heat treat after fabrication to comply with ASTM B597, Temper T6.

D. Sleeve for Aluminum Flagpole: Foundation sleeve, made to fit flagpole, for casting into concrete foundation.

1. Provide flashing collar of same material and finish as flagpole.

2.03 FITTINGS

A. Finial Ball: Manufacturer's standard flush-seam ball, sized as indicated or, if not indicated, to match flagpole-butt diameter.

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B. Internal Halyard, Winch System: Manually operated winch with control stop device and removable handle, stainless-steel cable halyard, and concealed revolving truck assembly with plastic-coated counterweight and sling. Provide flush access door secured with cylinder lock. Finish truck assembly to match flagpole.

C. Halyard Flag Snaps: Provide two stainless-steel swivel snap hooks per halyard.

2.04 MISCELLANEOUS MATERIALS

A. Concrete: Comply with requirements in Section 03 30 00 "Cast-in-Place Concrete" for normal- weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi.

B. Sand: ASTM C33, fine aggregate.

C. Elastomeric Joint Sealant: Joint sealant complying with requirements in Section 07 92 00 - "Joint Sealants" for nontraffic use and, as applicable, to joint substrates indicated.

2.05 FINISHES

A. Metal Finishes, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Provide manufacturer's standard aluminum clear coat finish.

PART 3 - EXECUTION

3.01 FLAGPOLE INSTALLATION

A. General: Install flagpoles where shown and according to manufacturer's written instructions.

B. Foundation-Tube Installation: Install flagpole in foundation tube, seated on bottom plate between steel centering wedges. Plumb flagpole and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2 IN layer of elastomeric joint sealant and cover with flashing collar.

END OF SECTION

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UP-Pirate-0005231

SECTION 10 81 13 –BIRD NETTING

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Bird Control netting on the underside of the building structure. The bird netting shall stop sparrow, starlings and pigeons from roosting on the building structure.
2. Design Requirements: Select appropriate size net and fastening system as determined by site conditions and mounting surface.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

C. Division 13 – Metal Building Systems

1.03 SUBMITTALS

A. Submit all descriptive information on products and installation from the manufacturer.

B. Provide warranty on Material and Installation.

C. Provide samples of each type of bird netting used, including proposed fastening methods and hardware.

D. Provide statement by official indicating that they are a certified installation company.

1.04 QUALITY ASSURANCE

A. Obtain all technical information on products and installation from the manufacturer.

B. Utilize Authorized Installers who are knowledgeable in the product installation.

C. Installer shall visit the site to gather all information of existing site conditions.

D. Single Source Responsibility: All parts and accessories of the bird netting shall be from one manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Protect Bird-B-Gone products from damage before, during and after the installation.

B. Coordination: Furnish all anchorage devices required to fasten system to and around existing building structure. Coordinate installation with existing conditions and within on-site tolerances.

1.06 WARRANTY

A. Bird Netting shall carry a minimum guarantee against U.V. breakdown:

1. 3-year guarantee for White and Stone Netting.

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2. 10-yearguarantee for Black Netting.

B. Installation shall be guaranteed for 2 years.

C. Installation shall be performed by a Certified Installer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Bird-B-Gone, Inc.
2. Nixalite of America Inc.
3. An approved equal

2.02 BIRD NETTING

A. Size: 3/4" Heavy Duty

B. Color: Architect to select from Manufacturer's standard colors.

C. Material: U.V. stabilized knotted polyethylene net. Flame resistant (270 Deg. F. melting point). Rot-proof, non-conductive and stable in subzero temperatures.

D. Construction: Comprised of 6 monofilaments, each 12/1000" thick with U.V. stabilizers added. Monofilaments are twisted together to produce a strong twine with 160-200 twists per meter.

E. Breaking Strength: 52 lbs. per strand.

F. Burst Strength: ISO 1806 Mesh Test 48.54 lbs

G. Hardware: All metal hardware or products are galvanized or stainless steel.

2.03 MOUNTING SYSTEMS

A. Solid Steel: For corner attachments use manufacturer's corner bolts with lock nuts or multipurpose cable brackets with powder actuated fire-in-pins for intermediate attachments.

B. Steel I-Beams: For corner attachments, use bolts with lock nuts. For intermediate attachments, use the appropriate size manufacturer's girder clips.

C. Sheet Metal: Use manufacturer's multipurpose cable brackets with self-tapping screws for both corner and intermediate attachments.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the installation area and note any detrimental or hazardous work conditions. Notify Architect of the detrimental work conditions.

B. Do not proceed with installation until conditions are corrected.

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3.02 PREPARATION

A. Surface should be thoroughly cleaned and free of bird droppings, nesting materials, or other debris.

3.03 INSTALLATION

A. Install Bird Net as recommended by the manufacturer. Bird Net shall fit the area to be protected perfectly so pest birds cannot enter the protected area, and so the netting blends perfectly with the architecture.

B. Bird Net shall be securely attached to underside of purlins and rigid frames.

C. Bird Net correct mesh size shall be provided to ensure exclusion to the correct pest bird.

D. Bird Net shall be installed tightly and securely to ensure a long lasting installation that is visually hard to see.

3.04 INSPECTION

A. Visually inspect Bird Net for any signs of poor installation, including loose screws, fasteners or un-removed debris.

B. Immediately correct and repair as necessary.

END OF SECTION

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UP-Pirate-0005235

SECTION 11 13 00 - DOCK EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Dock bumpers; dock levelers; vehicle restraints; safety barrier; and controls.

B. Locations:

1. Carman Building & RIP Track Canopy.
2. Service Track Building.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - General Requirements.

C. Section 01 61 03 - Equipment: Basic Requirements.

1.03 REFERENCED STANDARDS:

A. National Electrical Manufacturers Association (NEMA):

1. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).

1.04 DEFINITIONS

A. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
2. Installer and applicator are synonymous.

B. Rear Impact Bar: Interstate Commerce Commission Bar (ICC Bar).

1.05 SUBMITTALS

A. Submit under provisions of section 01 33 00.

B. Shop Drawings:

1. Product technical data.
   a. Acknowledgement that products submitted meet requirements of standards referenced.
   b. Manufacturer's installation instructions.
2. Drawings showing size of all depressions, conduit, pits, trenches, etc., required in concrete work.

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3. Complete wiring diagrams and electrical requirements.
4. Complete outline and installation drawings, together with detailed specifications and data covering materials, parts, devices, and accessories forming a part of the equipment furnished and the operation and maintenance manuals shall be submitted in accordance with the submittals section.
5. Drawings shall include electrical connection diagram and schematics identifying all items requiring electrical control or power in the operation of the dock equipment, and complete details and information on the power feed system.

C. Operation and Maintenance Manuals:

1. Electronic copies of the manuals are sufficient for initial submittal to Railroad. One hard copy print should be provided to Railroad at completion of the project.

1.06 QUALITY ASSURANCE

A. Qualifications:

1. Installer shall be licensed or approved in writing by manufacturer.

B. Dock leveler shall meet ANSI MH30.1-2000 test load specifications from third party.

1.07 WARRANTY

A. Submit under provisions of section 01 78 34.

B. Provide specified manufacturer's standard warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Dock bumpers:
   a. Laminated type:
      1) Rite Hite
2. Dock levelers:
   a. Rite-Hite.
3. Vehicle restraints:
   a. Rite-Hite.
4. Safety Barrier
   a. Rite-Hite.
5. Dock System Control
   a. Rite-Hite.

B. Submit request for substitution in accordance with Specification Section 01 33 00.

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2.02 MANUFACTURED UNITS

A. Dock Bumpers:

1. Laminated tread type:

a. Fabricate from multiple plies cut from fabric-reinforced rubber truck tires, assembled under high pressure on steel supporting rods or bar with steel closures and attachment assembly.

b. Use plies cut to uniform size extending not less than 4 IN from face of dock when in place.

B. Dock Levelers:

1. Fully hydraulic with minimum capacity to support a 10,000 LB capacity forklift:

a. Size: 7 FT – 0 IN x 8 FT – 0 IN.

2. Operating range 12 IN above and 12 IN below dock level.

3. Lip extension minimum 11 IN.

4. When leveler is in stored position, the leveler lip will provide an integral and automatically-positioned, impact rated, solid barrier 5 IN above dock floor to help prevent accidental falls from vacant dock positions.

5. Platform:

a. Minimum 1/4 IN thick steel treadplate.

b. Lip extension minimum 1/4 IN thick steel treadplate.

c. Designed to accommodate canted truck beds up to 4 IN and still remain flush at rear of pit.

d. Minimum of eight interior deck beams plus external working range toe guards with no more than 8 IN spacing between beams.

e. Factory-painted with manufacturer's standard paint finish.

6. Hydraulics:

a. Pump, reservoir and manifold shall be self-contained assembly.

b. Provide all required hoses and fittings.

c. Hydraulic cylinder shall raise and lower platform and operate extended lip.

7. Electrical:

a. Totally enclosed non-ventilating motor, minimum 1 HP.

b. Operator controls mounted in gasketed NEMA 12 enclosure.

c. Fed from control panel.

d. See Part 2.02.E for additional electrical and control requirements.

8. Safety devices:

a. Free fall of platform shall be limited to 3 IN.

b. Provide unit with lip keeper, toe guards and maintenance strut supports.

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c. Leveler shall automatically return to safe, stored position if the trailer departs.

d. Provide positive acting maintenance support system to support lip and deck. System must withstand a 10,000 LB moving load and provide OSHA approved lock-out/tag out capabilities.

9. Rite-Hite RHH-4000 Series.

C. Vehicle Restraint Safety Device (Wall Mounted):

1. Low profile unit capable of accepting and locking rear impact bars as low as 9 IN above the pavement surface.
2. Unit shall be totally enclosed welded steel construction capable of receiving trailers backing into position.
   a. Zinc coating on housing, hook and all moving parts subject to weather, dirt and debris.
   b. IP66 rated motor enclosure.
3. Provide anti-theft logic in control panel which will return hook to the locked position during attempt to manually release trailer from outside building.
4. Rite-Hite SHR-5000 with Shadow Hook.
5. Warranty: Manufacturer's standard 5 YR parts and labor warranty.

D. Safety Barrier

1. Manually positioned barrier.
2. Curtain to be red PVC-coated fiberglass mesh with three heavy-duty polyester safety restraint straps.
3. Warden guards to be painted safety yellow.
4. Rating:
   a. 10,000 LBS at 4 MPH minimum.
5. Opening width: 9 FT – 2 IN.
6. Total height: 4 FT – 0 IN.
7. Curtain height: 2 FT – 11 ½ IN
8. Integrate into control system. Control box shall identify when the curtain is locked across opening.
9. Rite-Hite Dok-Guardian
10. Warranty: Manufacturer's standard warranty.

E. Controls

1. Unit shall control dock leveler and vehicle restraint device.
2. Unit shall identify position of safety barrier.
3. Enclosure shall be NEMA 4X rated.
4. Unit shall be UL approved.

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5. Flashing red and green traffic style lights inside (for dock attendant) and outside (for truck driver), one set each per dock leveler system.
    a. Provide flashing red or green lights with signs to instruct truck driver when it is safe to back in or pull out.
    b. Provide flashing red or green lights with signs to instruct dock attendant when it is safe to perform loading/unloading operations. Lights are in opposite mode from truck driver lights.
6. Provide audible alarm with acknowledge button when rear impact guard has not been properly engaged.
7. Caution signs for inside and outside with right read and reverse read text.
8. Electrical:
    a. 480 V/3/60.
    b. Power to dock leveler and vehicle restraint device shall be fed from the control panel.
9. Rite-Hite: Dok-Commander

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation, inspect and verify condition of substrate.

3.02 PREPARATION

A. Correct defects or conditions which may interfere with or prevent a satisfactory installation.

3.03 INSTALLATION

A. Install in accordance with approved shop drawings and manufacturer's instructions.

B. For laminated tread type dock bumpers, mount unit with structural steel angle closures not less than 1/4 IN thick.
    1. Size angles to allow face of tread plies to extend not less than 1 IN beyond standing legs of closure angles with other leg sized to allow for attachment.

C. Install bumpers 1 to 2 IN below dock level and in direction (horizontal or vertical) indicated on Drawings unless directed otherwise by dock leveler manufacturer.

D. All miscellaneous steel angles, channels, plates, bolts, etc., for installation of dock levelers, restraint device and combination dock leveler/lift table, and all hydraulic hoses and fittings shall be furnished by the device manufacturer.

E. Galvanized steel conduit for routing electrical and hydraulic lines shall be provided by Contractor.

F. All units shall be tested after installation and any discrepancies noted shall be repaired or replaced at Contractor expense.

G. Manufacturer's representative shall be present at the time of installation.

END OF SECTION

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SECTION 11 13 50 - IN-FLOOR JACKING SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Jacking System for the RIP facility to serve two (2) tracks.
2. Pit covers and cover supporting structure.

B. Description:

1. Jacking System Provider shall be responsible for the design, manufacture, and installation for a complete functioning system used to elevate and lower rail cars in order to facilitate repairs and as described in this specification. System shall include hydraulic jacks, hydraulic power unit (HPU) with reservoir, operator controls, support structure, and pit covers.
2. The total system shall be comprised of two (2) separate 75/150/75 ton (side frame/center sill/side frame) capacity sets of jacks located on parallel service tracks.
3. Each RIP jack is operated by positioning railcar over the jacks, reviewed for stability and proper positioning and raised to a working height by either a single center sill lifting cylinder or dual side frame lifting cylinders through the use of an associated operators console and central HPU.
4. Pit covers and supporting structure to conceal the equipment pits and provide a working surface around the RIP jacks. Also see Structural Drawings.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Division 1 - UPRR General Conditions.

B. Section 01 61 03 - Equipment: Basic Requirements.

C. Section 23 05 53 - Mechanical Identification.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Shop Drawings:

1. See Section 01 61 03 and Division 01.
2. Product technical data.
    a. Acknowledgement that products submitted meet requirements of standards referenced.
    b. Manufacturer's installation instructions.
3. Drawings showing all foundation, electrical and other installation requirements for the jacking system.

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4. Equipment loads imposed on the support structure.
5. Equipment foundation outline drawings defining the dimensions of the equipment pits and locations of the equipment, equipment anchor locations, dimensions defining the locations of the equipment pits relative to each other and the shop tracks,
6. Schedule of delivery of jacking system to site.
7. General Arrangement and Construction Drawings for all systems (may include; RAM assemblies, pit covers, hydraulic system, control system, etc.).
    a. Include all required dimensions including, but not limited, to overall equipment envelope, maximum lift elevations, and all other required dimensions to allow for the coordination of the equipment with the equipment foundation outline drawings, and rail car.
    b. Provide sufficient information for all components including RIP jacks, HPU, and pit covers required for maintenance and operation.
    c. Define on the drawings equipment capacities, hoisting and lowering speeds, assembled equipment weights and equipment identifiers including serial numbers.
8. Pit cover and cover support structure plans and details.
9. Operator's manuals.
10. Maintenance and parts manuals.
11. Electrical, Control System, Mechanical, and Hydraulic Schematic Drawings.
12. Conduit arrangement drawings defining the size and quantities of embedded and above ground electrical conduit. Include wire type and quantity, and termination locations for each wire and conduit.
13. Recommended spare parts lists.
14. Hydraulic oil specifications.
15. Manufacturer's shop testing plan and related testing results.
16. Manufacturer's field testing and commissioning plan.
17. Manufacturer's statement of proper installation and start-up.
18. Complete wiring diagrams and electrical requirements. Include interconnection diagrams and operator station push button and signal light layout.

C. Operation and Maintenance Manuals:
    1. See Division 1.
    2. Electronic copies of the manuals are sufficient for initial submittal to Railroad. One hard copy print should be provided to Railroad at completion of the project.

1.04 QUALITY ASSURANCE

A. The General Contractor shall be responsible for the coordination of all work relating to the equipment defined in this specification, work at the site and for the work of all trades.

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B. The General Contractor shall have the responsibility for the construction of the equipment foundations and to coordinate/verify the as-built equipment foundation dimensions meet the requirements defined in the Drawings and the manufacturer's equipment shop drawings. Differences shall be resolved prior to installation of the jacking equipment.

C. All material and components used in the manufacture of this equipment shall be new, selected for the intended purpose of the design. Previously used or refurbished material, equipment and components are not acceptable.

D. The RIP jack equipment shall be installed in accordance with the manufacturer's drawings. The General Contractor shall verify all equipment foundations are true and fit for the installation of the equipment prior to the installation taking place. All equipment shall be installed complete and made ready for use by the railroad. Equipment shall be level and true. Surfaces marred during the installation of the equipment shall receive a coating of manufacturers supplied touch up paint. All components requiring lubrication shall be checked and lubricant added if required. All fluids shall be added to their recommended levels. All fluids shall be supplied by the equipment provider during testing, startup, and initial operation. Components damaged or distorted during equipment installation shall be repaired or replaced prior to field testing and acceptance by the railroad.

1.05 SAFETY REQUIREMENTS

A. The equipment and all its related components must meet all applicable requirements for Federal, State, County and OSHA safety codes and regulations in effect at the date of purchase.

1. In the case of discrepancies between the requirements of this specification and applicable safety codes and regulations, the most stringent code, regulation, or standard shall govern.

2. Operator safety must be the utmost consideration in the design and construction of this machine.

1.06 WARRANTY

A. The Manufacturer shall warrant the materials and workmanship applied to the equipment and all components for a period of not less than two (2) years from the date of acceptance.

1. REPLACEMENT AND INSTALLATION OF DEFECTIVE PARTS, COMPONENTS, OR WORKMANSHIP WILL BE AT NO COST OF THE UNION PACIFIC RAILROAD DURING THE WARRANTY PERIOD INCLUDING ANY ASSOCIATED TRANSPORTATION COSTS FOR EITHER THE EQUIPMENT ITSELF OR ANY OF ITS PARTS.

a. Warranty is to include both parts and labor for the covered period.

b. The manufacturer will be expected to rectify major warranty concern by making site visit.

c. Minor warranty problems will be corrected by Union Pacific with the guidance and assistance of the manufacturer.

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d. The manufacturer will pay for all parts deemed to be defective and reimburse Union Pacific for labor a rate of $50.00 per hour.

e. The manufacturer may also assign a local, reputable Contractor to perform the warranty work on the machine in lieu of Union Pacific.

f. The placement of a Contract Representative to perform warranty work as well as other maintenance is preferred.

B. The quotation must include all warranty information and specify any variances from our indicated warranty policy. Bidders must indicate the nearest source of parts and service to the specified delivery point of the jacking system including; name, address, and phone number.

1.07 VARIANCES

A. Any and all variances from these specifications must be listed and outlined, including the reason the specification cannot be met, cost changes and alternatives.

1.08 EXCLUSIONS

A. The equipment shall not be excluded from consideration on the basis of minor variations from specifications, provided that all essential requirements are met relative to safety, operation, materials, and performance.

1.09 SHOP TESTING

A. Prior to shipment, the machine is to be fully erected, and tested at the successful Bidder's plant.

1. The jacking system must meet the requirements described in this specification.
2. Shop testing of the equipment shall conform to the manufacturer's documented plan and procedures.
3. Notice of testing shall be submitted a minimum of 10 days in advance to Union Pacific.
4. Successful completion of the test will constitute the necessary authority to ship the machine as authorized by a representative of Union Pacific.
5. Any failure to meet the specification criteria must be corrected and re-tested at no additional costs to Union Pacific.
6. Changes that must be made to meet this specification will be the responsibility of the successful Bidder.
7. Changes requested by Union Pacific above and beyond the scope of these specifications will be the responsibility of Union Pacific.
8. All changes made to the specifications for this system must be agreed upon by a representative of Union Pacific and placed in writing.
9. Records of the manufacturers shop tests and results including the acceptance criteria and certification the equipment meets the requirements of the shop testing plan shall be provided to the railroad for record.

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PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Jacking System:

a. Whiting Corporation,

1) Contact: Greg Ciecierski, Phone: 708-587-2112, email: gciecier@whitingcorp.com.

B. Submit request for substitution in accordance with Division 1.

2.02 MANUFACTURED UNITS

A. Jacking System:

1. System shall be electro-hydraulic type construction and will service two (2) tracks.

a. System shall be complete with RIP jacks, HPU, controls, structural steel supports and pit covers capable of raising and lowering railcars.

b. Each track with include three (3) RIP jacks, configured as one center sill unit and two (2) side frame units.

c. One (1) hydraulic power unit shall be provided to serve both tracks.

2. The system will be operating at a covered, open sided canopy environment with temperatures typically ranging from 27 to 101 Deg. F.

a. The pit environment of the system may be dirty, oily and greasy.

b. Water may enter the pit from rain, or washing of the RIP floor.

c. All components, including controllers, electrical equipment and hydraulic systems, if used, will be expected to operate effectively within this climate.

d. All components must be sealed and protected against damage from water, oil, and dust.

3. Capacity:

a. Side frame jack: 75 tons (each).

b. Center sill jack: 150 tons.

4. Lifting speed:

a. Side frame jack: 7 – 8 fpm.

b. Center sill jack: 6 – 7 fpm.

5. Maximum lifting height:

a. Side frame jack: 5 FT – 0 IN.

b. Center sill jack: 3 FT – 0 IN.

6. Jacking System Layout:

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a. System will include a single hydraulic power unit (HPU) to power two (2) total sets of jacks.

1) System will service two (2) tracks each with a single lifting location.

b. System to be equipped with:

1) All support and locking mechanisms.

a) Locking mechanisms may be mechanically, hydraulically, or pneumatically actuated.

2) Ram assemblies.

3) Hydraulic power system including:

a) One (1) HPU with reservoir to operate two (2) sets of jacks located on parallel tracks.

(1) The HPU shall be designed to operate either the two 75 ton side frame RIP jacks or the 150 ton center sill RIP jack.

b) Electrical control system.

c) Interconnection piping, fittings, valves, between HPU and jacking equipment.

d) Hydraulic oil.

4) Support frame and pit cover assemblies:

a) All cover surfaces of the must be equipped with anti-skid steel plates.

7. Jacking system must be equipped with all necessary pumps, motors, fittings, piping, filtration system, and hydraulic fluid tank.

8. Jacking system shall be equipped with controls that must be incorporated to stop the jacks and set the locking mechanism in the event of any hydraulic failure.

9. Jacking System Manufacturer is to furnish all necessary equipment to provide turn-key operation including, but not limited to:

a. Motors, drives, controls, piping, wiring, support systems, and all hydraulic components.

10. All machine components must be cleaned, primer coated, and painted in accordance with current OSHA colors for shop machinery.

11. Upon completion of installation, the manufacturer must demonstrate successful operation of the jacking system.

12. Electrical:

a. Single point power supply.

b. Primary voltage: 480 V/3 Ph.

c. Power: 40 HP.

d. All in-pit electrical to be in NEMA 4 enclosure.

e. Motors to be TEFC.

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f. All electrical control panels and cabinets are to be located above the jacking pit.

g. Two (2) operator control panels (primary and secondary) shall be included.

1) The primary control panel will include the single point power connection.

2) Panels must include all necessary switches or buttons to achieve all aspects of remote or manual jacking operation.

3) An emergency stop function must be included on each panel.

4) Lights or indicators must be included to indicate table operational status.

h. All electrical equipment must comply with International Building Codes, as well as all current state, county, and city wiring codes at the time of construction.

i. The table and all of its operational functions are to be Programmable Logic (PLC):

1) The controller and all related components for machine operation must be included.

2) The controller must be programmed to prevent operation of the jacking system if an unsafe operation of the jacking system if any unsafe mechanical conditions exist.

3) All programming for complete machine operation must be installed.

4) PLC must be capable of simplistic re-programming in case of memory failure.

j. All electrical enclosures must be weatherproof rated.

k. All electrical components necessary for turn-key operation must be included.

l. Provide remote controller operations.

1) Each track will include a remote control.

a) Each remote control will be labeled identifying which track it controls.

2) Provide one (1) spare remote for each track.

B. Equipment Pit Covers:

1. RIP jack system shall be supplied with fabricated welded steel pit covers. See drawings for locations / dimensions.

2. Incorporate steel diamond checkered plate as a walking surface.

3. Provide lifting eyes for each pit cover to facilitate the installation and removal of the units. The lifting eyes shall be rated for the dead weight of the pit cover and stowed below the top surface when not in use.

4. Capacity:

a. Cover shall be designed at a minimum to support a forklift with a capacity of 10,000 LBS.

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PART 3 - EXECUTION

3.01 FIELD QUALITY CONTROL

A. Employ and Pay for Services of Manufacturer's Representative to:

1. Inspect final installation.
2. Supervise startup and perform final adjustments.
3. Perform acceptance testing.
4. Manufacturer shall provide a minimum of 12 HRS on-site to conduct operation and maintenance training to Railroad employees, and verify proper installation and operation of system.
5. Provide a written statement that manufacturer's equipment has been installed properly, started up and is ready for operation by Owner's personnel.

3.02 ACCEPTANCE TESTING

A. Upon the completion of installation and prior to acceptance by the railroad, the RIP jack system shall undergo field testing per the manufacture's approved field testing plan. The railroad shall provide railcars for use in conducting the start-up, testing and commissioning of the equipment. Provide notification a minimum of 14 days prior to the acceptance testing. Manufacturer's representative shall conduct the start-up, commissioning and acceptance testing of the equipment. Upon completion of acceptance testing, the equipment shall be wiped clean and all surfaces marred during acceptance testing touched up with manufacturers supplied paint and items noted during the testing resolved. Records of the acceptance test results shall be provided to the railroad for record.

3.03 TRAINING REQUIREMENTS

A. Provide on-site training for Union Pacific employees for safe operation of this system.

1. Training must include, but not limited to, all aspects of machine motion and control; alignment with tracks; and emergency situations.
2. Safety will be the utmost concern in all aspects of operator training.
3. Upon completion of training, all operators must demonstrate their ability to safely and competently control all aspects of the operation of this equipment.

B. Training must also be provided for maintenance personnel.

1. Training in this area must include, but not limited to:
   a. All operational aspects of the system.
   b. Adjustments and lubrication.
   c. Preventative maintenance scheduling and procedures.
   d. General repairs to the equipment.

C. Safety will be the utmost concern in all aspects of maintenance training.

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1. Upon completion of training, all maintenance personnel must demonstrate a general knowledge of the operation if the machine, and competence in its proper care and maintenance.

3.04 PAINTING

A. All steel shall be primed with rust-preventative epoxy primer and painted yellow with polyurethane enamel.

   1. Apply to non-stainless, non-machined steel components and equipment one (1) prime coat and two (2) finish coats of the manufacturer's standard safety yellow paint. The total dry film thickness of the paint coating shall be a minimum of 3 mils. All fittings, valves and flexible hoses/tubing, and electrical components used in equipment shall be protected from the application of paint.

   2. All surfaces to be coated shall be cleaned of any scale, rust, oil, dirt, or grease prior to the application of paint. Surfaces to be painted shall be prepared in accordance with the paint manufacturer's recommendations.

B. The hydraulic piping shall be clearly labeled with "HYDRAULIC OIL".

   1. The lettering shall be stenciled in black paint.

   2. See Specification Section 23 05 53 for requirements.

END OF SECTION

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SECTION 11 41 10 - APPLIANCES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Microwave.
2. Commercial Reach-In Refrigerator.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Data for appliances indicated, documentation that products are ENERGY STAR rated.

1.04 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Warranties: Sample of special warranties.

1.05 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.06 WARRANTY

A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MICROWAVE OVENS

A. Microwave Oven:

1. Basis-of-Design Product: Whirlpool GT4175SPS.
2. Capacity: 1.7 CU FT.
3. Wattage: 1200.
4. Finish: Stainless Steel

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2.02 REACH-IN REFRIGERATOR

A. Refrigerator: Commercial Reach In two-door refrigerator.

1. Basis-of-Design Product: Delfield 6051XL-S Two Door.
2. Type: Freestanding with two section full height doors.
3. Finish: Stainless Steel

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

B. Utilities: Comply with plumbing and electrical requirements.

3.02 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Perform visual, mechanical, and electrical inspection and testing for each appliance according to manufacturers' written recommendations. Certify compliance with each manufacturer's appliance- performance parameters.
2. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After installation, start units to confirm proper operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and components.
5. Prepare test and inspection reports.

END OF SECTION

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SECTION 11 46 83 - ICE MACHINE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Ice machine with remote condenser as indicated on the Drawings.

1.02 RELATED REQUIREMENTS (SECTIONS)

1.03 UPRR - BIDDING REQUIREMENTS, CONTRACT FORMS, AND CONDITIONS OF THE CONTRACT.

A. Division 01 - UPRR General Requirements.

B. UPRR Section III Specifications.

C. Division 22- Plumbing.

D. Division 26 - Electrical.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated, See UPRR Division 01.

1.05 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.06 WARRANTY

A. Refrigeration Compressor Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace compressors that fail in materials or workmanship within specified warranty period.

1. Failure includes, but is not limited to, inability to maintain set temperature.
2. Warranty Period from date of Substantial Completion:
   a. Five years on compressor & condenser.
   b. Five years on evaporator.
   c. Three years on all components, including remote condenser.

PART 2 - PRODUCTS

2.01 ICE-MAKING MACHINE

A. Basis-of-Design Product: Subject to compliance with requirements, provide Scotsman #C0630- 600 LB Cube Ice Machine. Model # 616/280 with Bin #BS30S (30 X 30 X 44) or comparable product approved by the Architect.

B. Description: Freestanding unit.

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1. Capacity: 600 LBS per 24 HR period.
2. Storage Bin: Stainless Steel, 610 LB.
3. Stainless-steel stand and legs.
4. Water filter.
5. Electrical Service: Equip unit for connection to service indicated on Drawings.

2.02 AIR COOLED REMOTE CONDENSER

A. Basis-of-Design Product: Subject to compliance with requirements, provide Scotsman ERC 311 Series compatible with Ice Maker or comparable product approved by the Architect.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install equipment level and plumb, according to manufacturer's written instructions.
   1. Connect equipment to utilities.
   2. Provide cutouts in equipment, neatly formed, where required to run service lines through equipment to make final connections.

B. Install equipment with access and maintenance clearances that comply with manufacturer's written installation instructions and with requirements of authorities having jurisdiction.

END OF SECTION

SECTION 11 81 30 - FALL PROTECTION SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. The Fall Protection Contractor shall design, build, and install fall arresting systems as defined by OSHA and specified herein.

1. Provide fall protection system at RIP and Service Track Canopy as specified herein.

B. Related Specification Sections include, but are not necessarily limited to:

1. Division 00 - Bidding Requirements, Contract Forms, and Conditions of the Contract.
2. Division 01 - General Requirements.

1.02 REFERENCED STANDARDS

A. The publications listed below form a part of this section to the extent referenced:

1. ASTM International (ASTM).
2. American National Standard Institute (ANSI):
   a. Z359.1, American National Standard Safety Requirements for Personal Fall Arrest Systems and Components.
3. American Welding Society (AWS).
4. Occupational Health and Safety Administration (OSHA):
   a. 1926.502 Fall Prevention Systems and Criteria and Practices.

1.03 DEFINITIONS

A. Fall Protection Contractor: Manufacturer and installer of fall protection system.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

1. Product Data:
   a. Manufacturer's data and product information for manufactured materials and products. Manufacturer's Catalog Data indicating the sizes, descriptions, capacities, test certifications, and other descriptive data showing in sufficient detail that the product complies with the contract requirements shall be submitted. Clearly mark and identify which products in the Manufacturer's Catalog are proposed for the Project.

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2. Shop Drawings:
    a. For fabrication showing the complete fall protection system. Layout Drawings of each system in relation to the supporting structure indicating the locations of all components in the system properly labeled for identification and elevations of system components.
    b. Material, Equipment, and Fixture Lists shall be submitted for approval.
3. Systems Manual:
    a. Contractor shall furnish a manual including the following:
        1) Maintenance Procedures: Including parts list and maintenance requirements for all equipment.
        2) Operation Procedures: Indicating proper use of equipment for safe operation of the systems.
        3) Test Certificate: Indicating completion of proof load testing on installed systems.
        4) Product Certificate: Containing the manufacturer's serial number, name and part number of each individual component used in the systems. Manufacturer's catalog data indicating the sizes, descriptions, capacities, test certifications, and other descriptive data showing sufficient detail that the product complies with the contract requirements.
        5) As-Built Drawings: A copy of as-built drawings shall also be included in the systems manual.
4. Manufacturer's Instructions:
    a. Indicating the manufacturer's recommended method and sequence of installation shall be submitted for the following:
        1) Energy absorbing devices.
        2) Body harnesses.
        3) Horizontal Lifeline Cable and associated components.

1.05 SYSTEM DESCRIPTION

A. The Fall Arrest Systems shall allow the user to walk uninterrupted the entire length of the system and provide secure anchorage to arrest a fall by the users. All components shall be included, so as to provide a complete and fully operational system.

B. System Layout, Design Analysis, and Calculations shall be prepared and certified by a Licensed Professional Civil or Structural Engineer employed by the Fall Protection Contractor as a full-time fall arrest systems designer. System shall not interfere with rail traffic as indicated by the Owner's standard rail clearance diagram.

C. The Fall Protection Contractor shall maintain all appropriate insurances as applicable for the design and installation of fall protection systems including the endorsement for working within 50 FT of an active railroad. Proof of these insurance listings shall be supplied as part of Submittals from Section 1.06.

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D. The Fall Protection Contractor shall have an approved ISO: 9001 Quality Control Program and shall be fully certified by the manufacture of any pre-engineered components regarding their use. Proof of manufacture's approval shall be in the form of a copy of the Contractor's current certificate issued by the manufacture and supplied as part of Submittals from Section 1.04. The fall protection contractor shall have a minimum of 5 years full time experience in the design and installation similar systems.

1.06 PROJECT CONDITIONS

A. Field Measurements: Perform prior to preparation of drawings to ensure required fit and dimensions.

1.07 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original unopened packaging. Store materials in original protective packaging at location specified. Prevent soiling, physical damage or wetting.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design:

1. Fall protection systems as designed, supplied and installed by:

a. Flexible Lifeline Systems:

14325 West Hardy Road

Houston, TX 77060

PH: 800-778-9048

FX: 281-448-9225

Contact: Jennifer Howard

Territory Sales Manager

PH: (832) 448-2953

EM: jennifer.howard@flexiblelifeline.com

2. Flexrail System at the RIP and Service Track Canopy Structure. One over each set of tracks.

2.02 SYSTEM DESIGN

A. The Fall Arrest Systems shall be designed to fully protect the user at all times while in the area of potential fall hazard. The Fall Arrest Systems shall be rated for three (3) simultaneous users per system. A user shall consist of a 400 LB weight including both user and tool weight.

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B. Deceleration Device: Provide three (3) appropriate length self-retracting lifelines per system that meet or exceed applicable standards of ANSI Z359.1 and OSHA 1926.104. Self-retracting lifelines shall be 30 FT Protecta Rebel.

C. Harnesses: Provide three (3) full body harnesses per system with single back D-ring that meet or exceed applicable standards of ANSI Z359.1 and OSHA 1926.104.

D. Clearances:

1. RIP Track:

a. Install fall protection Flexrail at a minimum elevation of 25'-6".

2. Service Track:

a. See Drawings.

2.03 SYSTEM DESCRIPTION – FLEXRAIL BASED

A. Systems to consist of enclosed tracks with a sealed bearing trolley, which provides 1:100 movement- to - weight ratio. Trolley to incorporate sealed ball bearings for ease of movement. Systems are to be totally hands free for the user and allow the user to work with both hands as if normally traveling along the walking surface. Systems are to impose no horizontal end loads on structure.

B. Fasteners: The Fall Arrest Systems shall be attached to the supporting structure with appropriate fasteners. The fasteners shall be designed to support a load on the system of 2 times the maximum design load without failure.

C. Other Components: Corner Assemblies, Turnbuckles and other components shall be 316 stainless steel.

D. System components shall be of same material unless otherwise indicated. Exposed work shall be true to line and level with accurate angles, surfaces and with straight square edges. Coordinate anchorage system connection and loads with supporting structure. Fabricate anchoring devices as recommended by the manufacturer to provide adequate support for intended use.

E. Fabricate joints in a manner to discourage water accumulation. Provide weep holes to drain any water which could accumulate in the exposed joints. Exposed work shall be true to line and level with accurate angles, surfaces and with straight square edges

F. Structural Attachments: The Fall Arrest Systems will be designed to be supported by new structural attachments mounted to the underside of the overhead roof support structure. The Fall Protection Contractor will fabricate the required structural attachments using steel tubing with material test certificates for full material traceability. All fabrication will be performed at the Fall Protection Contractor's in-house fabrication facility in accordance with AWS D1.1 by certified welders and inspected by an AWS certified welding inspector. Unless otherwise noted, all structural attachments shall be hot-dipped galvanized.

1. Coordination is required with metal building supplier for loading requirements and connection possibilities. Brace Flexrail as required back to structure to perform as designed.

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2.04 MATERIALS

A. All materials shall be new, and completed Fall Protection System shall be the product of one manufacturer or the manufacture`s authorized installer regularly engaged in the design, production and installation of such equipment.

B. Fall Arrest Systems and Components:

1. All system connectors, cables and bolts shall be manufactured from stainless steel:

a. ASTM A666, Type 316.

b. All connectors shall comply with OSHA regulation 1926.502. Fabricated supports required for additional support shall be carbon steel with a corrosion resistant finish.

C. Material Control: All system components shall contain serial numbers, permanently stamped or engraved, identifying the specific job and system they are used for. These serial numbers shall be recorded in the system manual as described in Article 1.04 and submitted to the owner upon completion of the project.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install according to the approved Shop Drawings and manufacturer's instructions.

B. Fall Protection Systems shall be installed by manufacturer's authorized, trained and certified personnel.

C. Install anchorage and fasteners in accordance with manufacturer's recommendations to obtain the allowable working loads published in the product literature and in accordance with this Specification.

D. Do not load or stress Fall Arrest Systems until all materials and fasteners are properly installed and ready for service.

3.02 OPERATOR TRAINING

A. Provide a minimum of 4 HRS of operator training after system has been installed and proof tested. Training is to be for the users of the system conducted at the installation site.

3.03 CLEANING

A. Remove all loose materials, crating and packing materials from premises.

END OF SECTION

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SECTION 11 82 40 - TOILET WASTE VACUUM SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Performance specifications for materials, equipment, and manufacturer's startup services for locomotive waste vacuum systems located at or near service tracks.

B. System shall be completely self-contained skid-mounted unit requiring only field connection of waste inlet, waste outlet, and electrical power.

C. Unit shall be designed to operate outdoors between the temperatures of -20 DegF and 120 DegF. Process product includes sanitary waste and toilet chemical/water and antifreeze properties. All components shall be compatible with sewage and sewage vapors.

D. Summary of operation: Unit shall be designed to assist in emptying locomotive toilet compartments through an underground pipe network and transferring collected product into a sanitary force main.

E. Design parameters:

1. Capable of evacuating 5 GAL locomotive toilet compartments in less than 15 seconds.

2. Maximum frequency shall be one compartment every two minutes (1 minute, 45 second recharge time).

1.02 SUBMITTALS

A. The following information shall be submitted along with bid:

1. Equipment descriptions and performance, connection locations, system schematic.

2. Power requirements, overall system dimensions, weight and anchoring requirements.

B. The following shall be submitted to the Engineer for approval within 45 calendar days after order has been placed:

1. Manufacturer's shop drawings showing construction, connections, controls, and complete erection / installation details.

2. Data sheets for all furnished equipment.

3. Operation and Maintenance manual, warranty provider, contact names and numbers.

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C. Engineer's Mailing Address:

1. Ryan Gottch
   Union Pacific Railroad
   1400 Douglas St. 9th Floor
   Omaha, Nebraska 68179

1.03 DELIVERY, STORAGE AND HANDING

A. Manufacturer shall assume responsibility for packaging and shipment to prevent damage to the system during normal transit and handling.

B. Flange faces and equipment shall be protected from damage. All openings are to be securely covered to prevent the entrance of dirt, water and debris.

C. Instructions shall be provided with delivery for unloading and installation. System shall require only positioning of skid and connection of waste inlet / outlet piping and power. Individual components shall be pre-assembled by the manufacturer.

1.04 WARRANTY

A. All components of the system shall be supplied with a one (1) year warranty. Warranty provider shall make onsite service call within 72 HRS after being notified by the Railroad.

PART 2 - PRODUCTS

2.01 COMPONENTS

A. Pumps: Provide two (2) vacuum generating pumps that are designed to alternate duty to promote even wear. Each vacuum pump shall be capable of generating a minimum vacuum of 18 IN Hg and 15 CFM of free air.

B. Sewage pumps: Provide two (2) corrosion resistant sewage grinder pumps with alternating duty that automatically empty the sewage collector tank when it is full or at timed intervals. Minimum pump performance shall be 20 GPM and 40 FT of discharge head.

C. Control panel: The control panel shall be the electrical control center for the entire system and shall have the following minimum requirements:

1. Main power disconnect switch, motor overload protection
2. Three position H-O-A selector switch for each pump.
3. Indicating lights for power and alarm indications.
4. NEMA 3 waterproof enclosure or better.

D. Reservoir/tank: Steel vacuum-rated tank shall have a minimum capacity of 100 GAL and be used for waste storage or designed for additional vacuum capacity. At a minimum, the tank shall have a 3 IN flanged inlet connection, 12 IN minimum diameter manhole for cleaning, outlet, gauge connection, and other fittings as required.

E. Valves: Provide sufficient material and automatic valves (metallic) to effectively operate the system and allow for maintenance of pumps.

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F. Vacuum gauge: Corrosion resistant gauge with 2-1/2 IN DIA minimum face.

2.02 OPERATION

A. System shall be capable of maintaining a vacuum within the tank and piping system between 14 - 18 IN Hg.

B. Automatic mode: The system shall alternatively start a vacuum pump when the system pressure rises to 14 IN Hg vacuum. Vacuum pump shall continue to operate until system pressure is reduced to 18 IN Hg vacuum. When waste level rises to the set point (or at preset time periods), the system shall relieve vacuum in the tank and alternatively start the sewage ejector pump to discharge into the sewer force main.

C. Manual Mode:

1. Each pump is turned on and off by selector switch.

2.03 ALTERNATE CONFIGURATIONS

A. The manufacturer is allowed to prepare and submit alternate configurations to essentially accomplish the systems intended task as determined by the Railroad.

PART 3 - EXECUTION

3.01 FIELD STARTUP

A. Manufacturer shall provide a minimum of 8 HRS on-site to conduct operation and maintenance training to Railroad employees, and verify proper installation and operation of system.

B. After installation by the Railroad according to the manufacturer's installation instructions, the complete system shall be field tested by the manufacturer to ensure proper operation of equipment and adjustment of pressure set points.

3.02 PAINTING

A. All steel shall be primed with rust-preventative epoxy primer and painted yellow with polyurethane enamel. Interior of tank shall be painted with paint manufacturer's recommended system for sewage tank linings.

B. The vacuum system shall be clearly labeled with TOILET WASTE VACUUM SYSTEM. The lettering shall be stenciled in black paint, 6 IN in height.

END OF SECTION

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SECTION 12 21 13 - WINDOW TREATMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Window treatments.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

C. Division 09 - Paint and Protective Coatings.

1.03 REFERENCED STANDARDS:

A. American Architectural Manufacturer's Association (AAMA):

1. 2604, Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.

1.04 SUBMITTALS

A. Shop Drawings:

1. See UPRR Division 01.

2. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.

b. Manufacturer's installation instructions.

c. Color chart for Architect's color selection.

d. Window schedule using window numbers established on Drawings showing window treatment utilized.

B. Operation and Maintenance Manuals:

1. See UPRR Division 01.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Horizontal louver blinds:

a. Hunter Douglas.

b. Levelor.

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c. Bali.

B. Submit requests for substitutions in accordance with UPRR Division 01.

2.02 MANUFACTURED UNITS

A. Horizontal Louver Blinds:

1. Adjustable blinds with head rail, blades, bottom rail, lift cord, cord lock, tilter, all hardware and installation brackets:

a. Blades tiltable to any angle.

b. Blades capable of being fully raised and fully lowered.

c. Blades capable of being locked in any intermediate position.

d. Provide with tilter at left, lift cord at right.

e. Headrail and bottom rail.

f. 1", 8-gauge aluminum.

g. Operating hardware: Manufacturer's standard.

h. Units similar to Levelor Riviera.

2.03 FABRICATION

A. Fabricate such that all components do not require lubrication during normal expected life.

B. Fabricate units to completely fill openings indicated on Drawings.

C. For continuous window wall installations, fabricate units so that ends occur only over mullions or other defined vertical separations.

D. Space louver blades to provide minimum overlap of 3/8 IN when in fully closed position.

E. Gear all operating equipment so that blinds will operate easily and can be set accurately and smoothly.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify actual opening dimensions by site measurements.

3.02 INSTALLATION

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

B. Position units plumb and true.

C. Anchor securely in place.

D. Provide adequate clearance between sash and blinds.

END OF SECTION

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SECTION 12 48 13 - FLOOR MATS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Recessed floor mats and frames.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements.

C. Division 03 - Concrete.

1.03 REFERENCED STANDARDS:

A. American Society for Testing and Materials (ASTM);

1. B221, Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.

1.04 SUBMITTALS

A. Shop Drawings:

1. See UPRR Division 01.

2. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.

b. Manufacturer's installation instructions.

B. Samples:

1. Manufacturer's full range of grid inserts and exposed aluminum colors, textures, finishes, and patterns available.

2. Minimum 12 IN long sample of each color and type selected.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Reese.

2. Construction Specialties.

3. Or approved equal.

B. Submit requests for substitution in accordance with UPRR Division 01.

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2.02 MANUFACTURED UNITS

A. Recessed Foot Grid System:

1. Unit shall be similar to PEDIGRID Series DP, as manufactured by C/S Group.
2. Framing members shall be straight frame or ledged frame style.
    a. Aluminum, minimum 16 GA, 6063-T52 alloy.
3. Grids:
    a. Tread rails shall be aluminum 6063-T52.
    b. Lock bars shall be aluminum 6061-T6.
        1) Maximum 10 IN OC spacing.
    c. Grid inserts shall be carpet.
        1) Color of carpet grid insert shall be chosen by Architect.
    d. Tread spacing shall be between 1-1/4 and 1-3/4 IN OC.
    e. Finish: All exposed aluminum surfaces shall receive mill finish. Concealed aluminum surfaces shall have mill finish.
4. Structural loading: All grid and framing sections, when completely installed, shall be capable of supporting a minimum of 200 LB/SF uniform loading.
5. All aluminum members that will come in contact with concrete or masonry shall receive dissimilar materials protection.
6. Unit shall be completely prefabricated and preassembled at the factory and shall be provided with watertight minimum 16 GA aluminum pan. Pan shall be attached to bottom surface of the frame.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify substrate and correct all unsatisfactory conditions. Installation of unit indicates acceptance of substrate.

3.02 INSTALLATION

A. Follow manufacturer's printed instruction for installation.

B. Set units flush with surrounding floor finish level if unit is recessed.

C. Provide all trim, fillers, inserts, anchors or other miscellaneous items required for complete installation.

D. Provide temporary wood filler in recess and cover frames with minimum 1/2 IN plywood or fiberglass.

E. Protect installed unit from damage until acceptance by Owner.

END OF SECTION

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SECTION 13 34 19 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Metal building systems that consist of integrated sets of mutually dependent components including structural framing, roof panels, wall panels, soffit panels, including gutters and downspouts, roof mounted equip curbs, insulation and accessories.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements

C. Section 03 30 00 - Cast-in-Place Concrete, for concrete foundations, slabs, and anchor-bolt installation.

D. Division 7 - Joint Sealants.

E. Division 9 - Paint and Protective Coatings.

F. Division 23 - Mechanical rough-in utilities.

G. Division 26 - Electrical rough-in utilities.

1.03 SYSTEM PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal building systems capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Engineer metal building systems according to procedures in MBMA's "Metal Building Systems Manual."

2. Design Loads: As indicated on Drawings.

3. Design Loads: As required by MBMA's "Metal Building Systems Manual", ASCE 7, "Minimum Design Loads for Buildings and Other Structures", and local building codes, whichever is more stringent.

4. Wall panels shall not be used in diaphragm action to resist any lateral loadings.

B. Seismic Performance: Design and engineer metal building systems capable of withstanding the effects of earthquake motions determined according to ASCE 7, “Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."

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C. Thermal Movements: Provide metal panel systems that allow for thermal movements resulting from the following: maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

D. Thermal Performance: Provide insulated metal panel assemblies with the following maximum U- factors and minimum R-values for opaque elements when tested according to ASTM C1363 or ASTM C518:

1. Metal Roof Panel Assemblies:

   a. R-Value: R-30.

2. Metal Wall Panel Assemblies:

   a. R-Value: R-19.

3. Skylight light panels:

   a. U-factor: 1.

E. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for Class 90.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: For each type of metal building system component indicated.

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

2. Anchor-Bolt Plans: Submit anchor-bolt plans before foundation work begins. Include location, diameter, and projection of anchor bolts required to attach metal building to foundation. Indicate column reactions at each location.

3. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.

4. Metal Roof and Wall Panel Layout Drawings: Show layouts of metal panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.

D. Samples: Submit samples of each type of building component and for each color and texture required from manufacturer's standard colors.

1. Provide 4 samples of final color selections to the Architect.

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E. Submittals for Building Permit

1. It is the responsibility of the manufacturer to submit to the Architect manufacturer's required drawings, specifications, and engineering design calculations conforming to all applicable building code requirements, sealed by a registered professional engineer licensed in the State where the Site is located and shall make available a trained design engineer to answer any questions of design by the Governing Review Agency in order to obtain a building permit.
2. The certified drawings and calculations shall be submitted to the Governing Review Agency in quantities as necessary in order to obtain a building permit.
3. Three (3) copies of certified drawings and calculations as submitted to obtain a building permit shall be submitted to the Architect for record file.

F. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:

1. Name and location of Project.
2. Order number.
3. Name of manufacturer.
4. Name of Contractor.
5. Building dimensions including width, length, height, and roof slope.
6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold- rolled steel, including edition dates of each standard.
7. Governing building code and year of edition.
8. Design loads and load combinations.
9. Building-use category.
10. AISC Certification for Category MB: Include statement that metal building system and components were designed and produced in an AISC-Certified Facility by an AISC- Certified Manufacturer.

G. Welding certificates.

H. Erector Certificate: Signed by manufacturer certifying that erector complies with requirements.

I. Manufacturer certificate.

J. Surveys: Show final elevations and locations of major members. Have surveyor who performed surveys certify their accuracy.

1.05 QUALITY ASSURANCE

A. Erector Qualifications: An experienced erector who has specialized in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

B. Manufacturer Qualifications: A qualified manufacturer and member of MBMA.

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1. AISC Certification for Category MB: An AISC-Certified Manufacturer that designs and produces metal building systems and components in an AISC-Certified Facility.
2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code-- Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

D. Structural Steel: Comply with AISC's "Specification for Structural Steel Buildings--Allowable Stress Design, Plastic Design," or AISC's "Load and Resistance Factor Design Specification for Structural Steel Buildings," for design requirements and allowable stresses.

E. Cold-Formed Steel: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members," or AISI's "Load and Resistance Factor Design Specification for Steel Structural Members," for design requirements and allowable stresses.

F. Pre-Erection Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to metal building systems including, but not limited to, the following:

1. Inspect and discuss condition of foundations and other preparatory work performed by other trades.
2. Review structural load limitations.
3. Review required testing, inspecting, and certifying procedures.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness and with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

1.07 PROJECT CONDITIONS

A. Established Dimensions for Foundations: Comply with established dimensions on approved anchor-bolt plans, establishing foundation dimensions and proceeding with fabricating structural framing without field measurements. Coordinate anchor-bolt installation to ensure that actual anchorage dimensions correspond to established dimensions.

1.08 COORDINATION

A. Coordinate size and location of concrete foundations and casting of anchor-bolt inserts into foundation walls and footings. Concrete, reinforcement, and formwork requirements are specified in Section 03 30 00 - "Cast-in-Place Concrete."

B. Coordinate installation of roof accessories specified in Division 7.

C. Coordinate installation of roof curbs equipment supports and roof penetrations specified in Division 23 – Heating, Ventilating, and Air Conditioning.

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1.09 WARRANTY

A. Special Warranty on Metal Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory- applied finishes within specified warranty period.

1. Siliconized Polyester Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 15 Hunter units when tested according to ASTM D2244.

b. Chalking in excess of a No. 2 rating when tested according to ASTM D4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D2244.

b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

3. Finish Warranty Period: 20 years from date of Substantial Completion.

4. Standing-Seam Roof Panel Weathertightness: Written warranty, signed by manufacturer agreeing to repair or replace standing-seam roof panel assemblies that fail to remain weathertight within 20 years from date of Substantial Completion.

5. Provide a 3 year warranty of the completed installation of the prefabricated structures against all defects in materials and workmanship including roof, building trim and sidewall panel leaks.

6. Provide a 20 year warranty to include coverage for exterior pre-finished surfaces to cover pre-finished color coat against chipping, cracking or crazing, blistering, peeling, chalking or fading.

7. Provide a 20 year warranty for weather tightness of building enclosure elements after installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Products specified on the Drawings are products of Butler Manufacturing. Products of other approved manufacturers shall be allowed provided they meet the quality level and design intent of the specified products.

B. Manufacturer: Subject to compliance with specified requirements, provide metal building systems provided by the following manufacturer's;

1. Butler Manufacturing Co.

2. Varco Pruden Building Systems

3. Ceco Building Systems

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4. American Buildings
5. Nucor Building Systems
6. or approved equal.

2.02 STRUCTURAL FRAMING MATERIALS

A. W-Shapes: ASTM A992/A992M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.

B. Channels, Angles, M-Shapes, and S-Shapes: ASTM A36/A36M; ASTM A572/A572M, Grade 50 or 55 ; or ASTM A529/A529M, Grade 50 or 55.

C. Plate and Bar: ASTM A36/A36M; ASTM A572/A572M, Grade 50 or 55; or ASTM A529/A529M, Grade 50 or 55.

D. Steel Pipe: ASTM A53/A53M, Type E or S, Grade B.

E. Cold-Formed Hollow Structural Sections: ASTM A500, Grade B or C, structural tubing.

F. Structural-Steel Sheet: Hot-rolled, ASTM A1011/A1011M, Structural Steel (SS), Grades 30 through 55, or High-Strength Low Alloy Steel (HSLAS), Grades 45 through 70; or cold-rolled, ASTM A1008/A1008M, Structural Steel (SS), Grades 25 through 80, or High-Strength Low Alloy Steel (HSLAS), Grades 45 through 70.

G. Metallic-Coated Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grades 33 through 80 or High-Strength Low Alloy Steel (HSLAS), Grades 50 through 80; with G60 coating designation; mill phosphatized.

H. Metallic-Coated Steel Sheet Pre-painted with Coil Coating: Steel sheet metallic coated by the hot- dip process and pre-painted by the coil-coating process to comply with ASTM A755/A755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grades 33 through 80 or High-Strength Low Alloy Steel (HSLAS), Grades 50 through 80; with G90 coating designation.
2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, Structural Steel (SS), Grade 50 or 80; with Class AZ50 (AZM150) coating.

I. Non-High-Strength Bolts, Nuts, and Washers: ASTM A307, Grade A, carbon-steel, hex-head bolts; ASTM A563 carbon-steel hex nuts; and ASTM F844 plain (flat) steel washers.

1. Finish: Plain.

J. High-Strength Bolts, Nuts, and Washers: ASTM A325, Type 1, heavy hex steel structural bolts; ASTM A563 heavy hex carbon-steel nuts; and ASTM F436 hardened carbon-steel washers.

1. Finish: Plain.
2. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex-head steel structural bolts with splined ends.

a. Finish: Plain.

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K. High-Strength Bolts, Nuts, and Washers: ASTM A490, Type 1, heavy hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A563 heavy hex carbon- steel nuts; and ASTM F436 hardened carbon-steel washers, plain.

L. Unheaded Anchor Rods: ASTM A307, Grade A.

1. Configuration: Straight.
2. Nuts: ASTM A563 heavy hex carbon steel.
3. Plate Washers: ASTM A36/A36M carbon steel.
4. Washers: ASTM F436 hardened carbon steel.
5. Finish: Galvanized.

M. Headed Anchor Rods: ASTM A307, Grade A, straight.

1. Nuts: ASTM A563 heavy hex carbon steel.
2. Plate Washers: ASTM A36/A36M carbon steel.
3. Washers: ASTM F436 hardened carbon steel.
4. Finish: Galvanized.

N. Threaded Rods: ASTM A307, Grade A.

1. Nuts: ASTM A563 heavy hex carbon steel.
2. Washers: ASTM A36/A36M carbon steel.
3. Finish: Galvanized.

O. Primer: SSPC-Paint 15, Type I, red oxide.

2.03 MISCELLANEOUS MATERIALS

A. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating.

1. Fasteners for Metal Roof Panels: Self-drilling or self-tapping, zinc-plated, hex-head carbon-steel screws, with a stainless-steel cap or zinc-aluminum-alloy head and EPDM or neoprene sealing washer.
2. Fasteners for Metal Wall Panels: Self-drilling or self-tapping, zinc-plated, hex-head carbon-steel screws, with nylon or polypropylene washer.
3. Fasteners for Metal Roof and Wall Panels: Self-drilling Type 410 stainless-steel or self-tapping Type 304 stainless-steel or zinc-alloy-steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal panels.

B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4- mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

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C. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, non-staining, mixed with water to consistency suitable for application and a 30- minute working time.

D. Metal Panel Sealants:

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing.

2. Joint Sealant: ASTM C920; one-part elastomeric polyurethane, polysulfide, or silicone- rubber sealant.

2.04 FABRICATION, GENERAL

A. Tolerances: Comply with MBMA's "Metal Building Systems Manual": Chapter IV, Section 9, "Fabrication and Erection Tolerances."

B. Metal Panels: Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

2.05 STRUCTURAL FRAMING

A. General:

1. Primary Framing: Shop fabricated framing components to indicated size and section with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.

a. Make shop connections by welding or by using high-strength bolts.

b. Join flanges to webs of built-up members by a continuous submerged arc-welding process.

c. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin or girt web, so flange compressive strength is within allowable limits for any combination of loadings.

d. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary structural members with specified primer after fabrication.

2. Secondary Framing: Shop fabricate framing components to indicated size and section by roll-forming or break-forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

a. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC- SP 2. Shop prime uncoated secondary structural members with specified primer after fabrication.

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B. Primary Framing: Manufacturer's standard structural primary framing system, designed to withstand required loads and specified requirements. Primary framing includes rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing. Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.

1. Rigid Modular Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Provide interior columns fabricated from round steel pipe or tube, or shop-welded, built-up steel plates.
2. Frame Configuration: Single gable.
3. Exterior Column Type: Uniform depth or Tapered, as indicated on drawings
4. Rafter Type: Uniform depth and Tapered.

C. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:

1. End-Wall and Corner Columns: I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet; with minimum thickness of 0.0598 IN.
2. End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; with minimum thickness of 0.0598 IN; or I-shaped sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.

D. Secondary Framing: Manufacturer's standard secondary framing members, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Fabricate framing from cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet pre-painted with coil coating, unless otherwise indicated, to comply with the following:

1. Purlins: C- or Z-shaped sections; fabricated from minimum 0.0598 IN thick steel sheet, built-up steel plates, or structural-steel shapes; minimum 2-1/2 IN wide flanges.
   a. Depth: As indicated on the Drawings.
2. Girts: C- or Z-shaped sections; fabricated from minimum 0.0598 IN thick steel sheet, built-up steel plates, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees to flange and with minimum 2-1/2 IN wide flanges.
   a. Depth: As indicated on the Drawings.
3. Eave Struts: Unequal-flange, C-shaped sections; fabricated from 0.0598 IN thick steel sheet, built-up steel plates, or structural-steel shapes; to provide adequate backup for metal panels.
4. Flange Bracing: Minimum 2 x 2 x 1/8 IN structural-steel angles or 1 IN DIA, cold-formed structural tubing to stiffen primary frame flanges.
5. Sag Bracing: Minimum 1 x 1 x 1/8 IN structural-steel angles.
6. Base or Sill Angles: Minimum 3 x 2 x 0.0598 IN zinc-coated (galvanized) steel sheet.

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7. Purlin and Girt Clips: Minimum 0.0598 IN thick, steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
8. Secondary End-Wall Framing: Manufacturer's standard sections fabricated from minimum 0.0598 IN thick, zinc-coated (galvanized) steel sheet.
9. Framing for Openings: Channel shapes; fabricated from minimum 0.0598 IN thick, cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings, and head, jamb, and sill of other openings.
10. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.

E. Bracing: Provide adjustable wind bracing as follows:
1. Rods: ASTM A36/A36M; ASTM A572/A572M, Grade 50; or ASTM A529/A529M, Grade 50 ; minimum 1/2 IN DIA steel; threaded full length or threaded a minimum of 6 IN at each end.
2. Cable: ASTM A475, 1/4 IN DIA, extra-high-strength grade, Class B zinc-coated, 7-strand steel; with threaded end anchors.
3. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.
4. Rigid Portal Frames: Fabricate from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
5. Fixed-Base Columns: Fabricate from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
6. Diaphragm Action of Metal Panels: Design metal building to resist wind forces through diaphragm action of metal panels.
7. Bracing: Provide wind bracing using any method specified above, at manufacturer's option.

F. Bolts: Provide plain finish bolts for structural-framing components that are primed or finish painted. Provide hot-dipped galvanized bolts for structural-framing components that are galvanized.

G. Factory-Primed Finish: Apply specified primer immediately after cleaning and pretreating.
1. Prime primary, secondary, and end-wall structural-framing members to a minimum dry film thickness of 1 mil.
a. Prime secondary steel framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil on each side.
2. Prime galvanized members with specified primer, after phosphoric acid pretreatment.

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2.06 METAL ROOF PANELS

A. Butler "MR-24" Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and flat pan between ribs containing cross flutes; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels.

B. 24 gage galvanized (G-90 coating), per ASTM A653 (G90), and painted with a full strength, 70 percent Kynar® 500 or Hylar 5000® fluoropolymer coating. Manufacturer shall warrant that coating shall not peel, crack or chip for 25 years. For a period of 25 years chalking shall not exceed ASTM D4214 #8 rating and will not fade more than 5 color difference units per ASTM D2244.

C. Panels of maximum possible lengths shall be used to minimize endlaps, eave panels shall extend beyond the structural line of the sidewall.

D. Panels shall be factory punched at panel end to match factory punched holes in the eave structural member. Panel end splices shall be factory punched and factory notched. The panel end laps shall be located directly over, but not fastened to, a supporting secondary roof structural member and be staggered, so as to avoid a four panel lap splice condition. End laps shall be floating which allows the roof panels to expand and contract with roof panel temperature changes.

E. Ridge assembly shall be designed to allow roof panels to move lengthwise with expansion/contraction as the roof panel temperature changes. Parts shall be factory punched for correct field assembly. Panel closures and interior reinforcing straps shall be installed to seal the panel ends at the ridge. The attachment fasteners shall not be exposed on the weather side. A lock seam plug shall be used to seal the lock seam portion of the panel. A hi-tensile steel ridge cover shall span from panel closure to panel closure and flex as the roof system expands and contracts

2.07 CONCEALED FASTERNER METAL WALL PANELS

A. Butler "Stylwall" Concealed-Fastener Embossed Finish Metal Wall Panels: Panels shall be 16 IN wide with interlocking joints and embossed finish. Panels shall be roll formed to provide a flat panel with a hidden joint concealing the fasteners between panels. The flat of panel shall be laminated to Thermax® insulation board to provide rigidity, maintain flatness, and improve thermal performance.

B. Panels shall be one piece from base to top of wall with a maximum length of 40 FT-0 IN.

C. Both ends of each panel shall be square cut and unpunched.

D. Panel design shall be in accordance with the 2004 edition of the AISI "North American Specification for the Design of Cold-Formed Steel Structural Members", and in accordance with sound engineering methods and practices.

E. The flat wall panel material as specified shall be a minimum 26 gage galvanized steel conforming to ASTM A653 (G90) latest issue.

F. The panel exterior shall be pre-finished in a full strength, 70 percent Kynar® 500 or Hylar 5000® fluoropolymer coating. Manufacturer warrants that coating shall not peel, crack or chip for 25 years. For a period of 25 years chalking shall not exceed ASTM D4214 #8 rating and will not fade more than 5 color difference units per ASTM D2244.

2.08 METAL SOFFIT PANELS

A. General: Provide factory-formed metal soffit panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.

B. Metal Soffit Panels: Match material of metal wall panels.

1. Color and Finish: As selected by Architect from manufacturer's full range.

C. Concealed-Fastener Metal Soffit Panels: Formed with vertical panel edges and flush surface; with flush joint between panels; with 1 IN wide flange for attaching interior finish; designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps.

1. Material: Zinc-coated (galvanized) steel sheet, 24 GA.

a. Exterior Finish: Fluoropolymer.

b. Color: As selected by Architect from manufacturer's full range.

2. Panel Coverage: 16 IN.

3. Panel Height: 1.5 IN.

2.09 ACCESSORIES

A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.

B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels, unless otherwise indicated.

1. Closures: Provide closures at eaves, ridges and any other openings, fabricated of same material as metal roof panels.

2. Clips: Manufacturer's standard, formed from stainless-steel sheet, designed to withstand negative-load requirements.

3. Cleats: Manufacturer's standard, mechanically seamed cleats formed from stainless-steel sheet or nylon-coated aluminum sheet.

4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1 IN thick, flexible closure strips; cut or pre-molded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels, unless otherwise indicated.

1. Closures: Provide closures at top, bottom and all openings, fabricated of same material as metal wall panels.

2. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1 IN thick, flexible closure strips; cut or pre-molded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

D. Flashing and Trim: Formed from minimum 0.0159 IN thick, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet pre-painted with coil coating; finished to match adjacent metal panels.

1. Opening Trim: Minimum 0.0269 IN thick, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet pre-painted with coil coating. Trim head and jamb of door openings, and head, jamb, and sill of other openings.

E. Gutters and Downspouts: Fabricate of 22 GA aluminum-zinc alloy-coated steel, finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required.

1. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.

2. Fabricate, support straps of same material and finish as gutters and-downspouts, color to match fascia.

3. Gutter Supports: Fabricated from same material and finish as gutters; spaced 36 IN OC.

4. Downspout Mounting Straps: Fabricated from same material and finish as gutters; spaced 10 FT OC.

F. Roof Curbs: Fabricated from minimum 0.0428 IN thick, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet pre-painted with coil coating; finished to match metal roof panels; with welded top box and bottom skirt, and integral full-length cricket; capable of withstanding indicated loads and of size and height indicated.

1. Insulation: 1 IN thick, rigid type.

2. Pipe Flashing: Pre-molded, EPDM pipe collar with flexible aluminum ring bonded to base.

2.10 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform the following tests and inspections and to submit reports.

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B. Special Inspector: Owner will engage a qualified special inspector to perform the following tests and inspections and to submit reports. Special Inspector will verify that manufacturer maintains detailed fabrication and quality-control procedures and will review the completeness and adequacy of those procedures to perform the Work.

1. Special inspections will not be required if fabrication is performed by a manufacturer registered and approved by authorities having jurisdiction to perform such Work without special inspection.

a. After fabrication, submit certificate of compliance with copy to authorities having jurisdiction certifying that Work was performed according to Contract requirements.

C. Tests and Inspections:

1. Bolted Connections: Shop-bolted connections shall be inspected according to RCSC's "Specification for Structural Joints Using ASTM A325 or A 490 Bolts."

2. Welded Connections: In addition to visual inspection, shop-welded connections shall be tested and inspected according to AWS D1.1.

PART 3 - EXECUTION

3.01 ERECTION

A. Before erection proceeds, engage land surveyor to survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with Erector present, for compliance with requirements and metal building system manufacturer's tolerances.

B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place, unless otherwise indicated.

C. Erect metal building system according to manufacturer's written erection instructions and erection drawings.

D. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.

E. Set structural framing accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.

F. Base and Bearing 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. Tighten 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.

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3. 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.

G. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment. Level and plumb individual members of structure.

H. Primary Framing and End Walls: Erect framing true to line, level, plumb, rigid, and secure. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist cure grout for not less than seven days after placement.

1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using ASTM A325 or A 490 Bolts" for type of bolt and snug-tightened or pre-tensioned joints.

I. Secondary Framing: Erect framing true to line, level, plumb, rigid, and secure. Fasten secondary framing to primary framing using clips with field connections using non-high-strength bolts.

1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.

2. Locate and space wall girts to suit openings such as doors and windows.

3. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.

J. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.

1. Tighten rod and cable bracing to avoid sag.

2. Locate interior end-bay bracing only where indicated.

K. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.

L. Erection Tolerances: Maintain erection tolerances of structural framing within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.02 METAL PANEL INSTALLATION, GENERAL

A. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.

2. Install metal panels perpendicular to structural supports, unless otherwise indicated.

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3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.

4. Locate metal panel splices over, but not attached to, structural supports with end laps in alignment. Stagger panel splices and end laps to avoid a four-panel lap splice condition.

5. Lap metal flashing over metal panels to allow moisture to run over and off the material.

B. Lap-Seam Metal Panels: Install screw fasteners with power tools having controlled torque adjusted to compress neoprene washer tightly without damage to washer, screw threads, or metal panels. Install screws in predrilled holes. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation.

C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

D. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal panel manufacturer.

3.03 METAL ROOF PANEL INSTALLATION

A. General: Provide metal roof panels of full length from eave to ridge, unless otherwise indicated or restricted by shipping limitations. Install ridge and hip caps as metal roof panel work proceeds.

B. Field-Assembled, Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended by manufacturer.

1. Install clips to supports with self-tapping fasteners.

2. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.

3. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.

4. Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction. Predrill panels for fasteners.

5. Provide metal closures at peaks, rake edges, rake walls, and each side of ridge and hip caps.

C. Field-Assembled, Lap-Seam Metal Roof Panels: Fasten metal roof panels to supports with exposed fasteners at each lapped joint at location and spacing recommended by manufacturer.

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1. Provide sealant tape at lapped joints of metal roof panels and between panels and protruding equipment, vents, and accessories.
2. Apply a continuous ribbon of sealant tape to weather-side surface of fastenings on end laps and on side laps of nesting-type metal panels; on side laps of ribbed or fluted metal panels; and elsewhere as needed to make metal panels weatherproof to driving rains.
3. At metal panel splices, nest panels with minimum 6 IN end lap, sealed with butyl-rubber sealant and fastened together by interlocking clamping plates.

D. Metal Fascia Panels: Align bottom of metal panels and fasten with blind rivets, bolts, or self- tapping screws. Flash and seal metal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

3.04 METAL WALL PANEL INSTALLATION

A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
1. When two rows of metal panels are required, lap panels 4 IN minimum.
2. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
3. Rigidly fasten base end of metal wall panels and allow eave end free movement due to thermal expansion and contraction. Predrill panels.
4. Flash and seal metal wall panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.
5. Install screw fasteners in predrilled holes.
6. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated, or if not indicated, as necessary for waterproofing.
7. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-tapping screws.
8. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

B. Field-Assembled, Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.

3.05 METAL SOFFIT PANEL INSTALLATION

A. Provide metal soffit panels full width of soffits. Install panels perpendicular to support framing.

B. Flash and seal metal soffit panels with weather closures where panels meet walls and at perimeter of all openings.

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3.06 THERMAL INSULATION INSTALLATION FOR FIELD-ASSEMBLED METAL PANELS

A. General: Install insulation concurrently with metal wall panel installation, in thickness indicated to cover entire wall, according to manufacturer's written instructions.

1. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.

2. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

3. Install factory-laminated, vapor-retarder-faced blankets straight and true in one-piece lengths with both sets of facing tabs sealed to provide a complete vapor retarder.

4. Install blankets straight and true in one-piece lengths. Install vapor retarder over insulation with both sets of facing tabs sealed to provide a complete vapor retarder.

B. Blanket Roof Insulation: Comply with the following installation method:

1. Over-Framing Installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing members. Hold in place by metal roof panels fastened to secondary framing.

a. Between-Purlin Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder facing tabs up and over purlin, overlapping adjoining facing of next insulation course maintaining continuity of retarder. Hold in place with bands and crossbands below insulation.

2. Over-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing members. Install layer of filler insulation over first layer to fill space formed by metal roof panel standoffs. Hold in place by panels fastened to standoffs.

3. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

C. Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing members. Hold in place by metal wall panels fastened to secondary framing.

1. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

3.07 DOOR AND FRAME INSTALLATION

A. General: Seal perimeter of each door frame with elastomeric sealant used for metal wall panels.

B. Personnel Doors and Frames: Install doors and frames according to ANSI A250.8. Shim as necessary to comply with DHI A115.IG. Fit non-fire-rated doors accurately in their respective frames.

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1. At fire-rated openings, install frames according to, and doors with clearances specified in, NFPA 80.

C. Field Glazing: Comply with installation requirements in Section 08 81 00 - Glazing.

3.08 WINDOW INSTALLATION

A. Seal perimeter of each window frame with elastomeric sealant used for metal wall panels.

B. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.

C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

D. Field Glazing: Comply with installation requirements in Section 08 81 00 - Glazing.

3.09 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

2. Install components for a complete metal wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed 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 weather resistant.

1. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 FT with no joints allowed within 24 IN of corner or intersection.

C. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 4 FT OC using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

D. Downspouts: Join sections with 1-1/2 IN telescoping joints. Provide fasteners designed to hold downspouts securely 1 IN away from walls; locate fasteners at top and bottom and at approximately 60 IN OC in between.

1. Provide elbows at base of downspouts to direct water away from building.

2. Tie downspouts to underground drainage system indicated.

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E. Circular Roof Ventilators: Set ventilators complete with necessary hardware, anchors, dampers, weather guards, rain caps, and equipment supports. Mount ventilators on flat level base. Install preformed filler strips at base to seal ventilator to metal roof panels.

F. Continuous Roof Ventilators: Set ventilators complete with necessary hardware, anchors, dampers, weather guards, rain caps, and equipment supports. Join sections with splice plates and end-cap skirt assemblies where required to achieve indicated length. Install preformed filler strips at base to seal ventilator to metal roof panels.

G. Roof Curbs: Install curbs at locations indicated on Drawings. Install flashing around bases where they meet metal roof panels.

H. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

I. Doors: After completing installation, test and adjust doors to operate easily, free of warp, twist, or distortion.

J. Windows: Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.

K. Roof Ventilators: After completing installation, including work by other trades, lubricate, test, and adjust units to operate easily, free of warp, twist, or distortion as needed to provide fully functioning units.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform the following tests and inspections and to submit reports.

B. Special Inspector: Owner will engage a qualified special inspector to perform the following tests and inspections and to submit reports.

C. Tests and Inspections:

1. High-Strength, Field-Bolted Connections: Connections shall be inspected during installation according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts."

2. Welded Connections: In addition to visual inspection, field-welded connections shall be tested and inspected according to AWS D1.1.

D. Metal Building Roof Inspection: Engage a certified inspector to perform an examination of standing-seam roof panel assemblies, all roof penetrations and roof curbs for weather tightness and compliance with manufacturer's standards and details.

1. Provide a written report to the Owner indicating satisfactory installation and condition, at a minimum, areas listed below:

a. Panel end laps

b. Ridge flashing

c. Rack trim

d. Eave trim

e. Exterior gutter

f. Valley gutter

g. Hip flashing

h. Penetrations

i. Exhaust fan curbs

j. Snow guard attachment

3.11 CLEANING AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A780 and manufacturer's written instructions.

B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

C. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing, bearing plates, and accessories.

1. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or SSPC-SP 3, "Power Tool Cleaning."

2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

END OF SECTION

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SECTION 13 34 23 – PORTABLE AND MOBILE BUILDINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Prefabricated Modular Switch Crew Building
2. Prefabricated Modular Guard House building

1.02 RELATED REQUIREMENTS (SECTIONS)

A. UPRR - Bidding Requirements, Contract Forms, and Conditions of the Contract.

B. Division 01 - UPRR General Requirements

1.03 SUBMITTALS FOR REVIEW

A. Delegated-Design Submittal: For pre-fabricated building indicated to comply with performance requirements, including permit submittal signed and sealed by the qualified professional engineer responsible for their preparation.

B. Design Calculations: Calculate requirements for seismic restraints.

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

D. Certification: That prefabricated unit meets all California Code requirements for this type unit.

E. Finish Samples: For each type of exposed finish in manufacturer's standards.

F. Warranty: Sample of special warranty

1.04 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer

1.05 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace materials or workmanship that fail within specified warranty period.

B. Warranty Period: Five years from date of Substantial Completion.

1.06 PRE-INSTALLATION CONFERENCE

A. Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to installation of modular building including, but not limited to, the following:

B. Inspect and discuss condition of foundations and other preparatory work performed by other trades including Utilities.

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C. Inspect site access and discuss installation and delivery plan.

D. Review required testing, inspecting, and certifying procedures.

PART 2 - PRODUCTS

2.01 MANUFACTUERS

A. Subject to compliance with requirements, manufacturers offering Prefabricated Modular units that may be incorporated in the Work include, but are not limited to, the following:

1. Amtex
2. William Scotsman.

2.02 PERFORMANCE REQUIREMENTS

A. Structural Performance: Prefabricated Modular Unit shall withstand loads and stresses within limits and under conditions indicated according to requirements of the State Code, where the unit will be installed and ASCE/SEI 7.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Regulatory Requirements: Comply with applicable provisions of the Federal and State Code for Accessibility for Persons with Disabilities and all other applicable Codes as stated on the drawings.

2.03 PREFABRICATED MODULAR BUILDING

A. Basis-of-Design Product: Provide a complete, integrated set of mutually dependent components that form a completely assembled, prefabricated modular building, ready for installation on Project site.

1. Prefabricated Modular Switch Crew Building
    a. Subject to compliance with requirements, provide "William Scotsman Modular Office" or comparable. Size as indicated on the drawings.
    b. Subject to compliance with requirements, provide a ramp and stair for access to the modular. Size as indicated on the drawings.
    c. Provide a canopy over the entrance doors as indicated on the drawings.
    d. See attached UPRR Prefabricated Modular Building Specification
2. Prefabricated Modular Guard House building
    a. Subject to compliance with requirements, provide "William Scotsman Modular Office" or comparable. Size as indicated on the drawings.
    b. See attached UPRR Prefabricated Guard House Building Specification

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2.04 FABRICATION, GENERAL

A. Fabricate unit completely in factory.

B. Preglaze windows and doors at factory.

C. Prewire unit at factory, ready for connection to service at Project site.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install unit according to manufacturer's written instructions.

B. Set unit plumb and aligned. Level baseplates true to plane with full bearing on concrete bases.

C. Fasten unit securely to cast-in anchor bolts.

D. Connect electrical power service to power distribution system according to requirements specified in Division 16 Sections.

E. Connect plumbing according to requirements specified in Division 15 Sections.

F. Perform startup-checks of all mechanical and electrical systems.

G. Adjust doors, operable windows, and hardware to operate smoothly, easily, properly, and without binding. Confirm that locks engage accurately and securely without forcing or binding.

H. Lubricate hardware and other moving parts.

I. After completing installation, inspect exposed finishes and repair damaged finishes.

END OF SECTION

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UNION PACIFIC MODULAR BUILDING SPECIFICATIONS Revision: August 2016	
FOUNDATION	
Design	Foundation design is site-specific based on soil conditions and local requirements
STEEL FRAME	
Type - Single Wide	Outrigger frame
Type - Double, Triple Wide	Perimeter frame
Size	Based on size of site-specific building
Base Pads	Concrete or ABS Pier Pads
FLOOR SYSTEM	
Bottom Board	Treated 3/8" plywood or 30 GA. metal belly pan R-30
Insulation	R-30, use two layers R-15 unfaced fiberglass batt
Decking (1st)	3/4" plywood T&G, or 1 1/8" T&G full width of module
Decking (2nd)	3/4" plywood T&G, or 1 1/8" T&G held back 6" from marriage line
Notes	12" high moisture barrier installed on perimeter at floor rim and end joists
Notes	Ship loose 12" 3/4" T&G plywood for filler strip at marriage line (standard)
Notes	Ship loose 24" 3/4" T&G plywood for filler strip at marriage line
INTERIOR WALLS	
Framing Typical	2x4 at 16" o/c, to above ceiling grid
Framing Restrooms	2x6 or 2x8 at 16"o/c, full height to rafters
Insulation	R-11 unfaced at restroom walls, full height
Plenum Walls	Full width of modules, lined with 5/8" sheetrock for sound attenuation
INTERIOR FINISHES	
Floor Covering (1) Standard - Non-Wet Areas	1/8" x 12" x 12" VCT, Off-set Layout, Hold back at marriage line.
Floor Covering (2) Standard - Wet Areas	Commercial Grade Sheet Vinyl, 0.080 in. minimum, Heat Welded Seams w/ Self Coved Wall Base (Restrooms, Locker Rooms, and Shower Areas)
Floor Covering (3) Alternate Option - Non-Wet Areas	Flexi-Tile Interlocking Floor Tiles: 20 x 20 x 7mm, Industrial Coin Pattern, Color: Black or Dark Grey
Floor Covering (4) Alternate Option - Non-Wet Areas	PROTECT-ALL Commercial Flooring as manufactured by Oscoda Plastics, Inc. Interlocking sheets 18” x 18” x 1/4” thickness, in color chosen from manufacturer's. Stainless Steel drain rings & Transition strips as provided by Oscoda Plastics.
Floor Covering (5) Alternate Option - Wet Areas	PROTECT-ALL Commercial Flooring as manufactured by Oscoda Plastics, Inc. Seam welded sheets 60" x 60" x 1/4" , in color chosen from manufacturer's. Stainless Steel drain rings & Transition strips as provided by Oscoda Plastics.

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Wall Base (1) Typical	4" Rubber Base, Roppe
Wall Base (2) Wet Areas	Self Coved Sheet Vinyl
Interior Trim (1) Typical	Vinyl covered corner trim
Interior Wall Covering (1) Typical	3 5/8" Sound Batt Insulation, Vinyl wrapped Hard Board/Particle Board (Supply UPRR with colors)
Interior Wall Covering (2) Telecom	3/4" A-C plywood (A surface facing room interior), painted, fire retardant plywood wood full height on two walls
Interior Wall Covering (3) Wet Areas	Wainscot - Fiberglass reinforced panel per code, behind & beside mop sink to 48" AFF. Full height FRP on all plumbing walls with plumbing fixtures.
Adhesive	Low Volatile Organic Compound (VOC) Adhesive
EXTERIOR WALLS	
Framing	2x6 construction, 30# felt waterproofing membrane to extend up under the final 2x6 that caps the wall siding and/or the flat metal trim
Sheathing	7/16" OSB or 3/8" CDX plywood
Insulation	R-19
ROOF STRUCTURE	
Roof Insulation	R-30
Roof Treatment	60 mil. TPO or PVC Membrane , fully adhered to the decking (Color to be white), FM90 wind rating
Roof Decking	1/2" (15/32") Exterior Grade Plywood with H-clips
Gutters & Downspouts	Color matched aluminum gutters with downspouts each corner (4 total) to grade with splash blocks. .032" Thickness
EXTERIOR FINISHES	
Siding	(.0149) 26 GA R-Panel (Color - Ash Gray)
Trims/Fascia	(.0149) 26 GA R-Panel (Color - Ash Gray)
Skirting	(.0149) 26 GA R-Panel & Perforated R-Panel (Color - Ash Gray)
Entry Canopy	Install a "Mitchell Metals" (770) 431-7305, or UPRR approved equal canopy at each entry door the size of the platform (See photos "F" & "G"). Submit designs to UPRR for review and approval. Stamped drawings are required for permitting. Provide weatherproof lighting on photocell at each entry. Canopy gutter & downspout to be incorporated into the canopy. Canopy to be secured to pavement or concrete footing (See photo "O" attached).
Ramp and Stair Assembly	HC Accessible - Aluminum slip resistant platforms, stairs and ramps, guardrail and handrails. Ramp and stair designs to be submitted to to UPRR for review and approval. Stamped drawings are required for permitting. Platforms, stairs and ramps to be secured to pavement or concrete footings (See photos "D" & "E" attached).
Step Assembly	HC Accessible - Aluminum slip resistant platform and steps, guardrail and handrails (See photo "F" attached). Stair Assembly to be secured to pavement or concrete footings.
DOORS	

Exterior Door	Insulated Steel Door and Frame (18 Gauge Min) w/ Commercial Grade Hardware, Markar continuous Hinge 16 GA. Galvanneal.
Frame	Steelcraft 16 gauge steel frames with mitered corners, continuously welded construction
Hinges	Tell 4545 Stainless steel, ball bearing, non-removable pin or equivalent
Finish	Painted
Hardware Exterior Doors	Exterior - Kaba PowerPlex 2000 10 Key Push Buttom Lock, Satin Chrome Finish, Lever (ADA) Compliant. Interior - Compatable Panic Bar Exit Device . (See Photo "Q" attached)
Hardware Interior	Commercial grade.
Telecom Closet	Arrow ML Series: (1) Arrow Lockset Lever ML11-26D-ACY406N: Lock, Gr 2 MD Cyl Lever Lockset, Entry Fnct, ML11-26D-ACY406N Locking Systems, Protec Cylinder CY406N-3, No Keys, Telecom Only.
Closer - Exterior	Lcn4041 RW/PA AL Hydraulic door closer (See photo "A" attached).
Interior Door	Solid core with commercial grade hardware (See photo "B" attached).
Door Stops	Floor mounted (See photo "C" attached).
WINDOWS	
Exterior Window (1)	Mfr. Standard, 36" x 48", aluminum framed, dual glazed, Low E, horizontal slider
Exterior Window (2)	Mfr. Standard, 36" x 36", aluminum framed, dual glazed, Low E, horizontal slider
Notes	Window manufacturers vary by region, specify manufacturer standard
Window Covering	1" metal horizontal blinds, color to be selected.
Window Security	Security Shield Window Barriers, interior side hinged mount, Impact Level 1 (See photos "H" & "I" attached).
PLUMBING	
HC Toilet	Handicap height, elongated bowl, flush valve if adequate water pressure is available
Std. Toilet	Standard height, elongated bowl, flush valve if adequate water pressure is available
HC Urinal	Handicap height, wall mounted, flush valve operated
Urinal	Standard height, wall mounted, flush valve operated
Flush Valve	1 gallon flush cycle, handicap handle
Lavatory	Lavatory & Faucet: 22" x 19" Wall Hung; One Piece Wall Hanger; ADA (See photo "L" attached). (Kohler Hampton K-2703-EH Lav; Kohler K-8046-5A Sink Faucet w/ Grid Drain and Wristblade Handles)
Lavatory Faucet	Ceramic disc, hot limit stop, ADA lever handle
Wash-Up Sink (ADA) - Alternate Option	ADA Wash-Up Hand Sink, Stainless Steel w/ Electronic Faucets. Manufacturer: Best Sheet Metal, Inc. See design submittals for size and model number. (See Photo "P" Attached)
Sink - Crew Room	ADA compliant stainless steel, 18 GA, to install with garbage disposall. Additional information on bid detail sheet.
Sink Faucet - Crew Room	Kohler ADA single handle, swing spout with sprayer
Mop Sink	24" x 24" x 10" molded stone, floor mount, 2" drain
Mop Faucet	830-AA Faucet
HC Shower Stall	One piece, gel coat finish, grab bars and seat ADA approved (white)
Shower Valve	Ceramic disc, hot limit stop, ADA handle, P.B. Adjustable height
HC Hose Kit	Commercial Grade

Water Heater	Electric Water Heater - Size based on Occupancy w/ H.D. Fusible Disconnect
Floor Drains	PVC body, polished nickel ring & grate, set in webcrete; accessible trap primers
Trap Primer	Automatically activated at pressure drops
Ice Maker/ Ref Water Valve	Recessed in wall with valve 1/2 x 1/4
Floor Sink	Porcelain with 1/2 grate and dome strainer
Sewer Lines	PVC DWV Schedule 40 plastic
Water Lines	Type L Copper Only
Backflow Preventer	Conbraco Series 40-200, RPZ, Reduced Pressure Principle Backflow Preventer - Size to match Modular Water Lines. A discharge line to be piped from the air gap at the relief valve connection thru the floor to the modular building perimeter. Backflow Preventer to be located in the Janitor Closet.
Hose Bibs	Frost Free, Qnty. 2 min. per building (See Floor Plan for Location)
ELECTRICAL	
Shower Light	Provide a shower light. Fixtures: (Damp Location Listed - Area that encompasses 8 feet above shower curb and 3 ft horizontally on all sides) (Wet Location listed - Subject to shower spray)
Restroom Power at Lavatory	Provide GFI outlet, one for each wall mount lavatory. (No GFI Main panel breakers)
Pipe Heating System	Braided Frostex pipe freeze protection system with a 9800 FlexFit Plug Kit. Provide outlets under Modular.
Panelboard	All panelboards must use: bolt-on circuit breakers and manufactured by Square D; short circuit rating appropriate for available fault current; and 30% spare capacity and breaker space. When modular is furnished with 1 panelboard or 1 main breaker, provide a main circuit breaker panelbard (may feed sub-panelboard). When modular is furnished with multiple panelboards, provide main lug only panelboards.
Special Purpose Receptacle	Exterior must be GFCI type with weather proof while-in-use cover; individual circuit with 20A duplex receptacle for each of the following: photocopy machine, in communications room, for each vending maching, in restroom/changing area, for use with microwave or coffee pot. Individual 30A duplex receptacle GFCI receptacle for each ice machine. Exterior Ice machine receptacle to have metallic, weather proof while-in-use cover and GFCI receptacle for each ice machine. For each crew computer & printer need Individual 20A duplex receptacle with a counter height duplex receptacle and communication outlet.
Wiring	Minimum branch circuit wire no. 12 AWG copper. Pilot and control can be no. 14 AWG copper. Wire needs to be THW, THWN, or THWN insulation.
Raceways	Inside walls need electrical metallic tubing with compression couplings
Service Conduits/Conduits	Underground and exposed conduit must be rigid galvanized steel.
Communication/Signaling Cable	Two (2) four-inch diameter conduit to room, terminating in insulating bushing. One (1) two-inch diameter conduit for TMGB grounding.
Communication Data Outlet	One (1) one-inch conduit (pull wire, communication outlet boxes, and grounding required by code)
Lighting (Electrical)	Dual level switching or motion sensor control when required by Federal, State, and Local requirements; heavy duty fusible disconnect switches for electric water heaters.

Fixtures	Linear fluorescent fixtures w/T-8, 32 Watt lamps, 10% THD electronic ballasts; exterior, cut off lighting fixtures controlled by photo electric cells for each exit; 2 level switch for all rooms; dimming lights only for conference rooms. Exit signs with self-contained, battery operated back up units; all lighting must comply with Illuminating Engineering Society (IES)
Electrical Note	See UPRR Modular Electrical Standards.pdf for further information on modular design requirements.
HVAC	
Combo Heat/AC	Bard Unit - wall hung air conditioners or heat pump-depending on region. Provide condensation hose, extend to exterior building surface or storm drain.
Size	Sized based on region. Minimum 2.5 ton with 10 kw heat strip. One per module.
Testing & Balancing	HVAC System to be test and balanced by a qualified third party agency. Report to be provide to UPRR for review.
Supply Ducting	Mfr. Standard overhead with insulated flex duct with flex duct sound isolation sleeves and flow controls at supply plenums.
Return Ducting	Overhead insulated flex duct
Diffusers	24" x 24" t-bar with manual dampers
Thermostat	7 Day programmable
Duct Detectors	Duct smoke detectors installed at return plenums
Return Air	Through return air grills in ceiling ducted back to plenum walls
Outside Air	At machines
HVAC Vibration	Provide boot at plenum/duct connections
Exhaust Fan (1)	180 CFM, switched with lights
Exhaust Fan (2)	400 CFM, switched with lights
Exhaust Fan (3)	180 CFM, on thermostat in telecom room
SPECIALTIES	
Restroom Accessories	Kimberly-Clark - Paper Towel Dispenser, Toilet Tissue Dispenser, Soap Dispenser, Toilet Seat Cover Dispenser (See Union Pacific Standard Dispenser Reference Information)
Mirror	Bobrick B-165, 18" x 36"
Waste Receptacle	Bobrick B-3645
Feminine Hygiene Products	Bobrick B-270 - Surface Mounted - Sanitary Napkin Disposal
Grab Bars	36" and 42" Horizontal, 18" Vertical
Shower Rod & Curtain	3' with PVC Curtain
Toilet Partitions	Metal, Floor Mounted, Standard Colors
ADA Dressing Table/Bench (If shown on drawing)	ADA dressing table to be 24"d by 48" w, wall mounted, folding with padded naugahyde seat located across or near the ADA shower (See photo "N" attached). (http://www.wheelsunlimited.com/benches.html)
Lockers	Installed metal lockers to be louvered with number plates, continuous sloped metal top, finished end panels, zee bases and recessed locks, see project floor plan for size and configuration. Lockers to be welded (not riveted or bolted) Republic Storage Systems or Equivalent.
Benches	10" maple tops with painted steel pedestals, see project floor plan for size and quantity. Republic Storage Systems or Equivalent.

CABINETS	
Coffee Bar	Base and Upper Cabinets (Wilsonart or Formica) plastic laminate finish, recessed hinges. Satin Nickel Arch Bar Cabinet Drawer Pulls.
Countertop	Countertop (Wilsonart or Formica) plastic laminate with plastic laminate backsplash and self edge
Key Storage Cabinet	Wall mounted metal cabinet, locking with Key Tags. Compact Locking Key Cabinet # 11-01155 or Equal Shipped Loose: Location to be determined by owner during turnover.
TELECOM	
Cable Tray	Provide and install 6" in-ceiling cable tray, see UP Telecom Specs for further detail and how to install.
Communications Conduit	1" conduit run from designated communications closet to all offices and computer locations with pull lines included 1" conduit from all communication wall j-boxes to cable tray above ceiling.
Telecommunications Closet	1) Hardware: Arrow ML Series 2) One, (see print) or more, wall of the closet shall be lined with rigidly installed, wall-to-wall framing of Trade Size ¾ -inch A-C plywood, 8-ft. (2.4-m) high painted white. 3) The closet shall include dedicated 3-wire 120V AC – 20 ampere quad outlets on separate branch circuits. (see UPRR drawing for location and quanity) 4) The closet shall also include dedicated 20amp 110V female twist lock on 20amp circuits, Mounted at ceiling tile level, pendent mounted, supported from roof structure. (see UPRR drawing for location and quanity). 5) GND bar (TMGB) should have be connected to electrical MGB. Bonding conductor should be sized to UP Telecom Standards, a minimum 2awg.
Communications Closet Doors	Louvered doors with lockset
Communications Room Lighting	Flourescent - Lights should be positioned so that there is plenty of light behind and in front of racks. Lighting equivalent to 540 lux (50 foot-candles). Do not mount on rear wall.
Terminating Space	1) The terminating space for the service entrance shall have a ¾ -inch trade size (20 mm) A-C plywood backboard, 8-ft. (2.4-m) high. 2) The terminating space shall include a 120V, 20-amp. AC power outlet 1 m (3 ft.) above the floor. Do not center on back wall.
Office Outlets	1) Private offices should have a 1” telecom conduit in the two side walls as well as the back wall of enclosed offices. 2) Larger private offices for Supt.’s, Gen. Managers, etc should have a 1” telecom conduit on the front wall. 3) (If Noted on power plan) Conference Rooms will require one 1” conduits under the finished floor for telecom data and one 1.5" conduit for AV cables, to the center of the room, as well as the wall conduits. See telecom standards.
Grounding, Bonding, Electrical Protection	Multiple buss-bars placed in a building shall be directly bonded with, minimally, a 2-AWG copper conductor.
Pathways	1) Flex tray is recommend for overhead installation in office buildings. 2) Flex Trays-2"x12"x10', CF54/300-10 GS METALS 3) Flex tray hardware GS METALS 4) For in floor raceway systems recommend: (slab concrete floor) 5) Walkerduct DD22430 No. 2 Duct for power and D42430 No.4 Duct for voice and cabling. http://www.wiremold.com/product_catalog/walker/index.html

Firestop Equipment	EX Path Firestop Equipment: (QTY. 1) EZP544W Mounting Plate, (QTY. 1) EZD44S Pathways and (QTY .1) EZRCM44S Module.(See photo "R" attached)
Telecom Note	See UPRR Telecom Standards_Rev K.pdf for further information on modular design requirements.
OTHER	
Payment Terms and Conditions	Supplier may invoice for 100% of project cost upon completion of site setup. UPRR will release 90% of payment, and hold 10% in retainage. Once modular has been delivered and walk through has been completed, Supplier must submit a retainage invoice (for the outstanding 10%) along with a notorized release of liens indicating that all subcontractors have been paid to the Railroad Architect.
Floor Cleaning and Sealing	Perform the following operations immediately after completion of unit: 1. Remove visible adhesive and other surface blemishes using cleaner recommended by tile manufacturers. 2. Sweep or vacuum floor thoroughly 3. Do not wash floor until after time period recommended by resilient floor tile manufacturer 4. Damp-mop tile to remove black marks and soil. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by tile manufacturer 5. Apply protective floor polish to tile surfaces, no more than 4 days prior to inspection, that are free from soil, visible adhesive, and surface blemishes. Use commercially available, tile manufacturer approved protective floor polish and sealer after cleaning.
Turnover Meeting - General	Turnover meeting - onsite meeting will be held between the modular building company representative and the local customer to review all mechanical and electrical system operations, warranties and warranty service contacts with the customer. This includes fire alarm system operations if installed. The modular building company shall provide copies of all warranties, guarantees and O&M manuals for all equipment and building components installed. All building keys to be turned over to the customer.
Turnover Meeting - Testing & Cleaning	Testing and cleaning - upon completion of the work involved, the modular building company shall clean the interior and exterior of the modular building and surrounding grounds occupied in connection with the work and shall remove all rubbish (to a location off-site), excess materials, and equipment, leaving the location of the work clean to the satisfaction of the Railroad Project Manager. The exterior of the modular building to be power washed if the project engineer deems it necessary. All floors to be cleaned and sealed. HVAC system to be tested and balanced by qualified third party, report to be provided for UPRR for review.
Turnover Meeting - Operation & Maintenance (O&M) Manuals	Operation and Maintenance Manuals - The contractor shall provide two sets of O&M manuals w/ CD copies for all equipment provided in the work. One set to be given to the new occupant of the modular building and the other to be sent to the Railroad Project Manager.



Photo A



Photo B



Photo C



Photo D



Photo E



Photo F



Photo G



Photo H



Photo I



Photo J



Photo K



Photo L



Photo M

D-101 - Dressing Table



Dressing Table
Measures 48" W x 24" D
ADA compliant adult dressing table to allow room for undressing/redressing in public rooms
Mounts to wall with mounting flanges
Folds down to allow **safe transfer to and from wheelchair**
Holds up to 420 pounds
Available with phenolic tops or padded naughahyde (shown) that are seam-sealed to prevent any water or bacteria penetration
Stainless steel frame
Folds up easily when not in use
Meets and **exceeds A.D.A. compliance**
5 year warranty!!

Photo N

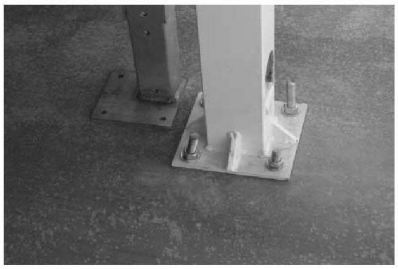


Photo O





Photo P



Photo Q

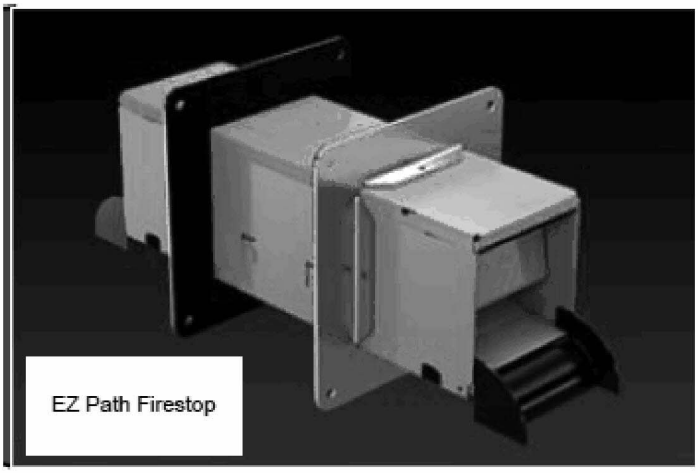


Photo R

END OF SECTION

SECTION 13 47 13 - CATHODIC PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Cathodic protection.

B. Contractor shall design and install Cathodic protection system to conform to NACE SP0169 (formerly RP0169), Current Edition - Recommended Practice, Control of External Corrosion on Underground or Submerged Metallic Piping Systems. Design and installation shall be by individuals certified by NACE.

1.02 RELATED SECTIONS

A. 40 46 50 Cathodic Protection-Impress Current

B. 40 46 51 Cathodic Protection-Galvanic

1.03 REFERENCED STANDARDS

A. National Association of Corrosion Engineers (NACE) International Standard Practice (SP) 0169.

1.04 SUBMITTALS

A. Shop Drawings:

1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
2. Product technical data.
   a. Provide submittal data for all products specified in this Specification Section.
   b. See Specification Section 26 05 00 for additional requirements.

PART 2 - PRODUCTS - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

PART 3 - EXECUTION - (NOT APPLICABLE TO THIS SPECIFICATION SECTION)

END OF SECTION

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SECTION 21 05 00 - FIRE PROTECTION AND ALARM SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Fire detection and alarm system, including all associated equipment, devices, and controls necessary for proper operation.

B. Coordinate this Section with 21 13 13 -Sprinkler Systems.

C. The Contractor shall furnish all installation drawings, tools, equipment, materials, and supplies and shall perform all labor to complete the work as specified and in compliance with the codes, standards and regulations listed below.

D. The design of the system shall consist of, but not limited to:

1. A determination of the applicable fire and safety codes.
2. Analysis of the various plant ambient temperatures, noise levels and environments (wet, dusty, oily, corrosive, hazardous, etc.).
3. Establishing the number of and type of detectors, alarm detectors, and manual stations required.
4. Identifying the proper wiring and mounting configurations.

1.02 REFERENCED STANDARDS

A. Authority having jurisdiction's regulations for Safety to Life from Fire and Emergencies in Buildings and Structures, and General Fire Protection.

B. National Fire Protection Association, NFPA 71, 72, 90A, and 101.

C. National Electrical Code (NFPA 70)

D. The system shall be listed by Underwriters Laboratories and Factory Mutual.

1.03 GENERAL

A. Nameplates: Each component of equipment shall be identified with a permanently affixed nameplate bearing the manufacturer's name and address, and type or style and catalog number of the item.

B. Tags: Keys and locks shall be furnished with tags bearing stamped identification numbers. Cable and conduit runs, wiring circuits, and all spare parts supplied to maintain the system shall be furnished with hard phenolic or stainless steel tags.

C. Power Requirements:

1. Power supply to the fire alarm control panel (FACP) will be 120 Volts, 60 Hz, Single phase.

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2. The alarm system shall include an automatically recharged back-up power supply with sufficient battery capacity to operate the entire system in the normal supervisory mode for 24 HRS and then sound all alarms for five (5) minutes. In the event of power failure, the system shall automatically transfer to the standby batteries.

3. All external circuits requiring system operating power shall be suitable for 24 Volt DC service and shall be individually fused at the control panel.

D. Supplier's Qualifications:

1. The system design, equipment installation, and installation supervision furnished under this section shall be provided by a manufacturer who has been engaged in the production of this type of equipment for at least 10 years and has a fully-equipped service organization within fifty (50) miles of this installation.

2. All panels and peripheral devices shall be the standard products of a single manufacturer, and the manufacturer's name shall be displayed on each component. The system shall be manufactured by Cerberus Pyrotronics or Simplex Time Recorder Company.

E. Spare Parts: The following spare parts shall be supplied with the fire detection and alarm system. Spare parts shall be suitably packaged for shipment.

1. One each type of smoke detector and heat detector.

2. One each type of manual pull station and audiovisual alarm.

1.04 SUBMITTALS

A. Submit as specified in Section 01 33 00.

B. Complete electrical wiring diagrams, assembly and installation drawings, detailed specifications, and data covering the materials used and the parts, devices, and other accessories forming a part of the equipment furnished shall be submitted in accordance with the Submittals Section.

C. In addition to the submittals to the Engineer, the Contractor shall submit complete plans and information to the local fire department for review. The equipment submittals shall include the following:

1. A complete description of all system components, including certification of listing by Underwriters Laboratories (UL) and Factory Mutual Insurance Company Global (FM).

2. Complete sequence of operation for all functions of the system.

3. Complete system wiring diagram for all components and interfaces to equipment supplied under other sections.

4. Location drawings for all controls, alarm actuating devices, and audiovisual alarm signaling devices.

5. A listing of the manufacturer's representatives responsible for installation and service.

6. Operation and maintenance manuals.

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1.05 SYSTEM DESCRIPTION

A. The fire alarm system shall be operated and monitored by a fire alarm control panel (FACP) as indicated on the drawings located in the Planner's office (Room 110). The system shall automatically initiate fire alarm signals whenever any manual or automatic fire detection device is place in an alarm mode. The system shall identify the devices and their locations and simultaneously transmit a signal to the municipal alarm connection and activate the building elevator control panel and FACP. The FACP shall annunciate and sound local alarms for detection device alarm conditions, system trouble, or circuit failure. Alarm signals shall be consistent throughout the building or site. The operation of any alarm initiating device shall cause audible and visual alarms to sound and to be displayed throughout the building as required. A key-accessible reset function shall reset the alarm system after alarm initiating conditions have been cleared.

B. Fire Alarm System:

1. The system shall be composed of supervised mulitplex data communications circuits, closed loop initiation circuits with individual zone supervision, and supervised individual notification circuits as required. The system shall monitor incoming power. In addition to the FACP, the system shall include heat detectors, smoke detectors, audio-visual alarm units, end of line devices, manual pull stations, alarm horns, water flow switches, sprinkler valve anti-tamper switches, wiring (including conduit), connections to devices, outlet boxes, junction boxes, and all other necessary equipment for a complete operating system.

2. System trouble, including grounded or open supervised circuit, power failure, system battery low voltage, or system failure, shall cause the system to enter a trouble mode, and display visual and audible alarms. The visual alarm shall be displayed until the initiating trouble has been cleared.

3. The alarm sequence initiated by the activation of any manual station, automatic detection device, or sprinkler flow shall be as follows:

a. Selected audible alarm initiating devices sound a march time code until silenced by the alarm silence switch at the FACP.

b. Selected visual alarm indicating devices display a continuous strobe pattern until the system is reset.

c. A supervised signal to notify the local fire department or the central processing unit is activated.

1.06 SYSTEM COMPONENTS

A. All fire alarm equipment and materials, devices and assemblies shall be listed and/or labeled by UL another accepted testing laboratory for the intended purpose. The equipment shall not be altered, installed, or modified in any way that would void the label or listing.

B. All control equipment shall have transient voltage protection devices in compliance with UL 864.

C. The system controls shall be UL listed for Power Limited Applications according to NEC 760. All circuits shall be marked in accordance with NEC 760-23.

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D. Peripheral components as specified shall be provided in sufficient number and located as required to meet all applicable codes.

PART 2 - PRODUCTS

2.01 REMOTE SENSORS

A. Fire Alarm Pull Stations:

1. Addressable pull stations shall communicate the station's status (alarm, normal) over two (2) wires that also supply power the pull station. The address shall be set on each station. The stations shall be manufactured from high-impact red Lexan. Lettering shall be raised and painted white. When activated, the stations shall mechanically latch and remain latched until they are manually reset using a key common to all locks.

2. The location "address" of the pull stations shall be field programmable form the FACP over the signaling line circuit.

B. Smoke Detectors:

1. Analog addressable smoke detectors shall be of the photoelectric type and shall communicate actual smoke chamber values to the system control panel. The sensors shall be solid-state, containing no radioactive material, and shall be capable of detecting up to seven (7) sensitivity levels between 0.5 and 3.7 percent.

2. The sensors shall be plug-in units mounted on a twist-lock base. Smoke detector bases shall be common with the heat detector bases and shall be compatible with other addressable detectors and addressable manual stations on the same circuit. The detectors shall be suitable for both ceiling and wall mounting and shall have a 30-mesh insect screen. Detector bases shall contain a light emitting diode that will flash each time it is scanned by the control panel. When the sensor detects smoke or fails, the diode shall illuminate to indicate the abnormal condition. When required, detector bases shall be provided with a relay driver output that may be controlled either automatically or manually from the control panel.

3. Each detector shall contain a magnetically actuated test switch for alarm testing at the sensor location.

4. Smoke detectors for installations in ducts shall be as specified above, furnished and installed under the HVAC section and shall be provided with auxiliary DPDT (Double Pole, Double Throw) relays, remote LED (Light Emitting Diode) alarm indicators, and key-operated test stations.

C. Heat Detectors:

1. Addressable heat detectors shall be ambient compensated combination rate-of-rise and fixed temperature type. The fixed temperature operation of the sensor shall be selectable for either 117 or 135 DegF. Rate-of-rise operation shall be selectable for either 15 or 20 DegF per minute and shall be self-restoring.

2. The thermal type sensor shall be a plug-in unit that mounts on a twist-lock base. Bases shall be as described for smoke detectors.

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D. Audiovisual Alarm Units:

1. Alarm units shall consist of horn and A Xenon flashtube installed in a surface or semi-flush wall or ceiling-mounted enclosure. The horn shall have polarized connections with separate leads for in/out wiring for each leg of the associated signal circuit. Sound levels shall be ninety decibels (90 dB) at 10 FT.

2. The visual unit shall operate on twenty-four volts direct current (24V DC) and shall have a white translucent pyramidal lens with the word "FIRE imprinted in red lettering. The flash rate shall be 1 to 1.5 times per second.

E. Auxiliary Relays: Auxiliary relays shall be supplied where required. The relays shall be of high quality and shall be fitted with dust-tight plastic covers. The contacts shall be at least 1/8 IN DIA, of gold-plated silver cadmium oxide, rated for 5 amperes at 115 volts alternating current (AC).

2.02 PANELS

A. Fire Alarm Control Panel:

1. The control panel shall be constructed from steel, in compliance with UL 864, with front access door, and shall be surface wall-mounted.

2. The control panel shall be of modular construction, with solid-state, microprocessor-based electronics, and shall display only the primary controls and functions essential to operation during a fire alarm condition. Keyboards or keypads shall not be required to operate the system during fire alarm conditions. The sound that identifies each condition shall be readily distinguishable without having to view the panel. The audible device shall also sound during each keypress to indicate that the key is pressed.

3. The following primary controls shall be visible through a front access panel:

a. Eighty-character liquid crystal display.

b. Red system alarm LED.

c. Yellow supervisory service LED.

d. Yellow trouble LED.

e. Green "Power On" LED.

f. Alarm acknowledge key.

g. Supervisory acknowledge key.

h. Trouble acknowledge key.

i. Alarm system key.

j. System reset key.

4. The following secondary control switches and LEDs shall be available behind an access door:

a. Autodialer disconnect switch.

b. Door holder release bypass.

c. Manual evacuation (drill).

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d. Future expansion.

5. The control panel shall include the following functions:
   a. Setting of time and date.
   b. LED testing.
   c. Listing of alarm, trouble, and abnormal conditions.
   d. Separate enabling and disabling of each monitor point.
   e. Separate activation and deactivations of each control point.
   f. Changing operator access levels.
   g. Walk-test enable.
   h. Running dianostic functions.
   i. Displacing software revision level.
   j. Displaying historical logs.
   k. Displaying card status.
   l. Point listing.
6. The following lists from the points list menu shall be available for maintenance purposes:
   a. All points by address.
   b. Monitor points.
   c. Auxiliary controls.
   d. Feedback points.
   e. Pseudo points.
   f. LED/switch status.
7. Scrolling through menu options or lists shall proceed in a self-directing manner, guiding by prompting messages. The controls for the points list menu shall be located behind an access door.
8. The control panel shall contain a backlit two (2) line by forty (40) character liquid crystal display. To conserve standby battery power in the event of an AC power failure, the display shall be lit only during keypad activity.
9. The display shall consist of both upper and lower case letters. Lower case letters shall be used for softkey titles and for prompting the user. Upper case letters shall be used for system status information. A cursor shall be visible when information is being entered.
10. All wiring shall be brought to terminal strips for field connections.
11. Front Panel Operation and Capabilities:
    a. Under normal conditions, the front panel shall display a "SYSTEM IS NORMAL" message and the current time and date.

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b. Should an abnormal condition be detected, the appropriate alarm, supervisory, or trouble LED shall flash. The audible signal shall pulse for alarm conditions sound steady for trouble or supervisory conditions.

c. The LCD shall display the following information pertaining to abnormal condition:

1) Location label (40 characters available)

2) Type of alarm device – smoke detector, pull station, water flow sensor.

3) Point status – alarm, trouble.

d. Buttons shall be provided to acknowledge alarm conditions and to silence audible alarms in compliance with NFPA 72.

12. Alarm Silencing: When the "ALARM SILENCE" button is pressed, all alarm signals shall cease. Alarm signals shall not b silenced during "alarm silence inhibit" mode.

13. System Reset:

a. Using the "SYSTEM RESET" button shall restore the system to its normal state after an alarm condition has been remedied.

b. The LCD display shall step the user through the resetting procedure with simple printed messages. "SYSTEM RESET IN PROGRESS", will be displayed first, followed by, "SYSTEM RESET COMPLETED" and finally "SYSTEM IS NORMAL" after all alarm conditions are cleared.

c. If an alarm condition persists, "SYSTEM RESET IN PROGRESS" will be followed by, "SYSTEM RESET ABORTED" and the system will remain in the abnormal state. System control relays will not reset. The audible alarm and alarm LED will remain on. The display will indicate the total number of alarms and troubles in the system, along with a prompt to use the proper keys to review the alarm points. These points will not require acknowledgement if they are previously acknowledged.

d. Should the "ALARM SILENCE INHIBIT" function be active, the "SYSTEM RESET" key press will be ignored. The message, "SYSTEM RESET INHIBITED" will be briefly displayed to indicate the action was not taken. As feedback to the operator, "SYSTEM RESET NO LONGER INHIBITED" will be displayed when the "inhibit" function times out.

14. Function Keys:

a. Additional function keys shall be provided to access status data for the following points:

1) Initiating device circuits.

2) Indicating appliance circuits.

3) Auxiliary relays

4) Feedback points.

5) All other input/output points.

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b. The following status data shall be available.

1) Primary state of point.

2) Zone, PAD and card type.

3) Class "A" status.

4) Current priority of outputs.

5) Disable/enable status.

6) Verification tallies of initiating devices.

7) Automatic/manual control status of output points.

8) Acknowledge status.

9) Relay status.

15. History Logging:

a. The system shall be capable of logging and storing 300 events in an alarm log and 300 events in a trouble log. These events shall be stored in a battery-protected random access memory. Each recorded event shall include the time and date of the occurrence.

b. The following historical alarm log events shall be stored:

1) Alarms.

2) Alarm acknowledgement.

3) Alarm silence.

4) System reset.

5) Alarm verification tallies.

6) Walk test results.

7) Trouble historical log cleared.

16. Silent Walk Test with History Logging:

a. The system shall be capable of being tested by one person. While in testing mode, the alarm activation of an initiating device circuit shall be silently logged as an alarm condition in the historical data file. After logging the alarm, the panel shall automatically reset.

b. The momentary disconnection of an initiating or indicating device circuit shall be silently logged in the historical data file as a trouble condition. After logging the trouble condition, the panel shall automatically reset.

c. Should the walk test feature be on for an inappropriate length of time, it shall automatically revert to the normal mode.

d. The control panel shall be capable of supporting up to eight (8) separate testing groups, one of which may be in a testing mode while the other (non-testing) groups may be active and operating as normally programmed. After testing is completed, testing data may be retrieved from the system in chronological order to ensure device/circuit activation.

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e. Should an alarm condition occur from an active point that is not in walk mode, it shall initiate the normal alarm sequence.

17. LED Supervision: All LEDs shall be supervised for burnout or disarrangement. Should a problem occur, the LCD shall display the location numbers of the module and the LED to facilitate location of the affected LED.

18. System Trouble Reminders: In the event of a trouble condition within the system, with the audible signal silenced the trouble signal shall resound a 24 HR intervals as a reminder that the fire alarm system is not 100 percent operational. Both the time interval and the trouble reminder signal shall be programmable to adapt to the application.

19. Operational Access Levels:

a. Four access levels shall be provided, with level four (4) being the highest. Level one (1) actions shall not require a pass code. Pass codes shall consist of up to ten (10) digits.

b. The following keys/switches shall have access levels:

1) Alarm Silence.

2) System Reset.

3) Set Time/Date.

4) Manual Control.

5) On/Off/Auto Control.

6) Disable/Enable.

7) Clear Historical Alarm Log.

8) Clear Historical Trouble Log.

9) Walk Test.

10) Change Alarm Verification.

c. Acknowledge keys shall also require privileged access to acknowledge points. If the operator presses an acknowledge key with insufficient access, an error message will be displayed. The points shall scroll with acknowledge key presses to view the points on the list, but the points will not be acknowledged in the database.

B. Enclosures: A cabinet of sufficient size shall be provided to accommodate all equipment required. The door of the cabinet shall be equipped with locks and a continuous hinge, providing protection from tampering, yet allowing full view of the various lights and controls. Indoor enclosures shall have a NEMA type designation as required by the location. Outdoor NEMA Type 4X enclosures shall be stainless steel.

2.03 WIRING

A. Intermodule wiring for common system functions shall be installed in a supervised cable bus. Disarrangement of the bus shall cause a distinctive “Cable Supervisory” LED to be illuminated in addition to activating the common trouble indicators.

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PART 3 - EXECUTION

3.01 GENERAL

A. All work shall be installed as indicated on the drawings and in accordance with the manufacturer's diagrams and recommendations except where otherwise indicated.

B. Conduit and interconnecting wiring for system components shall be furnished and installed under this section.

C. All junction boxes furnished hereunder shall be painted red and permanently labeled "FIRE ALARM". A consistent wiring color code shall be maintained throughout the installation.

D. Installation of equipment and devices that connect to equipment furnished under other sections shall be closely coordinated with the suppliers of the equipment.

E. After completion of the installation, the Contractor shall clean the inside and the outside of the fire alarm equipment and shall remove all dirt and debris from the site.

3.02 WIRING

A. Above-grade wiring shall be installed in electrical metallic tubing as specified in the electrical section. The system conductors shall not be installed in conduits or junction boxes in common with conductors of other systems. Conduit fill shall conform to NEC.

3.03 TESTING

A. The Contractor shall notify the Engineer at least thirty (30) days in advance of conducting the performance and acceptance tests. The tests shall be performed in the presence of the Engineer, the Owner, and the local fire marshal, or their representatives. The Contractor shall furnish all instruments and personnel required for tests. A complete test report and letter of completion shall be submitted to the Engineer. The tests shall be performed by, or under the supervision of, a qualified representative of the fire alarm manufacturer and shall include the following:

1. Verify that the system is free of grounds or open circuits. The FACP shall indicate when a ground or an open circuit exists.
2. Verify that all alarm signal devices, stations, transmitters, automatic detectors, and supervisory devices are functioning as specified.
3. Test each fire alarm device and circuit. Individually activate each manual initiating station and verify correct alarm operation and control panel response. Individually test each automatic initiating device and verify correct alarm operation and control panel response. Individually test each automatic initiating device and verify correct alarm operation, control panel response, and remote equipment operation.
4. Test battery backup systems for specified capacity.
5. Reconduct test to verify correction of any defect found in initial testing.

END OF SECTION

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SECTION 21 11 10 - FIRE PROTECTION PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Pipe.
2. Fittings.
3. Valves.
4. Hydrants.
5. Connections.

1.02 SUBMITTALS

A. Submit under provisions of Division 01.

B. Shop Drawings: Indicate installation, layout, weights, floor and wall penetrations, mounting and support details, and piping connections.

C. Product Data: Provide manufacturers catalog data on pipe materials, pipe fittings, joining materials, valves, and accessories. Indicate valve data and ratings.

1.03 PROJECT RECORD DRAWINGS

A. Submit under provisions of Division 01.

B. Record actual locations of piping and valves.

1.04 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Division.

B. Maintenance Data: Include installation instructions, spare parts lists, procedures, and treatment programs.

1.05 QUALITY ASSURANCE

A. Sprinkler Systems: Perform work to NFPA 13.

B. Standpipe and Hose Systems: Perform to NFPA 14.

C. Water Service for Fire Protection: Perform to NFPA 24.

D. Welding Materials and Procedures: Perform to ASME Code and applicable state labor regulations.

E. Valves, Hydrants, and Connections: Shall be UL listed and FM approved. Provide manufacturer's name and pressure rating marked on valve body. Pressure ratings shall be suitable for operating conditions.

F. Maintain one copy of each document on site.

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1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to site under provisions of Division 01.

B. Deliver and store valves in shipping containers, with labelling in place. Inspect for damage.

C. Provide temporary protective coating on cast iron and steel valves.

D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

PART 2 - PRODUCTS

2.01 SPRINKLER AND STANDPIPE PIPING, BURIED

A. Ductile Iron Pipe: AWWA C151, pressure class determined using AWWA C150, exterior bituminous coating, cement lined.

1. Fittings: Ductile iron AWWA C110 or C153, exterior bituminous coating, cement lined.

2. Joints: AWWA C111, mechanical joint ,or push joint.

3. Mechanical Joint Restraint Device: In lieu of concrete blocking. Shall be incorporated in the design of the follower gland and shall include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. Restraint device shall be ductile iron, minimum 250 psi with minimum safety factor of 2:1.

B. Polyvinyl Chloride Pipe (PVC): AWWA C900, Class 150; Furnish in ductile iron pipe equivalent outside diameters.

1. Fittings: Ductile iron AWWA C110 or C153, exterior bituminous coating, cement lined.

2. Joints: AWWA C111, mechanical joint.

2.02 SPRINKLER AND STANDPIPE PIPING, ABOVE GROUND

A. Wet Sprinkler Pipe and Fittings:

1. Pipe: NFPA 13; Steel, or copper.

2. Fittings: NFPA 13; Cast iron, malleable iron, steel, or copper.

B. Standpipe Pipe and Fittings:

1. Pipe: NFPA 13; Steel, or copper.

2. Fittings: NFPA 13; Cast iron, malleable iron, steel, or copper.

2.03 GATE VALVES (BURIED)

A. Iron body, 175 psi WOG, bronze trim, non-rising stem, 2 IN square wrench nut, AWWA style stuffing box, parallel seat, double disc, UL/FM approved.

1. Valve Box: Heavy duty cast iron body, 2-piece screw type, flanged base, heavy duty cast iron drop lid with letters "WATER" cast into lid.

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2.04 GATE VALVES

A. Up to and including 2 IN (50 mm): 150 psi SWP, bronze body, bronze trim, rising stem, handwheel, inside screw, single wedge or disc, threaded or solder ends.

B. Over 2 IN (50 mm): 175 psi WOG, iron body, bronze trim, handwheel, OS&Y, double wedge disc, flanged ends, UL/FM approved.

2.05 GLOBE (OR ANGLE) VALVES

A. Up to 2 IN (50 mm): 150 psi SWP, bronze body, bronze trim, rising stem and handwheel, inside screw, renewable composition disc, threaded or solder ends, with backseating capacity, repackable under pressure.

B. Over 2 IN (50 mm): 125 psi SWP, iron body, bronze trim, rising stem, handwheel, OS&Y, plug-type disc, flanged ends, renewable seat and disc.

2.06 BALL VALVES

A. Up to and including 2 IN (50 mm): 400 psi WOG, bronze two piece body, stainless steel ball, PTFE seats and stuffing box ring, lever handle, threaded or solder ends.

B. Over 2 IN (50 mm): 125 psi SWP, cast iron body, stainless steel ball, PTFE seat and stuffing box seals, lever handle, or gear drive handwheel for sizes 10 IN (250 mm) and over, flanged, UL/FM approved.

2.07 BUTTERFLY VALVES

A. Bronze body, 174 psi WOG, stainless steel disc, resilient replaceable seat, threaded ends, extended neck, handwheel and gear drive and integral indicating device.

B. Cast or ductile iron body, 175 psi WOG, chrome plated ductile iron disc, resilient replaceable EPDM seat, wafer or lug ends, extended neck, handwheel and gear drive and integral indicating device.

2.08 CHECK VALVES

A. Up to and including 2 IN (50 mm): 150 psi SWP, bronze swing disc, threaded or solder ends.

B. Over 2 IN (50 mm): 175 psi WOG, iron body, bronze trim, rubber faced swing disc, renewable disc and seat, flanged ends.

2.09 DRAIN VALVES

A. Threaded bronze angle, globe, ball, or butterfly, 150 psi SWP, with hose thread nipple and cap.

2.10 INDICATOR POST VALVE

A. Iron body, 175 psi WOG, bronze trim, non-rising stem, 2 IN square wrench nut, AWWA style stuffing box, indicator post flange, parallel seat, double disc.

1. Indicator Post: Adjustable type, cast iron flanged and drilled base, two height adjustment set screws, adjustable length steel stem with 2 IN square socket, cast iron L-type operating handle, clear plexiglass indicator window, aluminum sign plates.

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2.11 WALL INDICATOR POST

A. Iron body, one piece, flanged and drilled base, steel stem with 2 IN square socket, clear plexiglass indicator window, aluminum sign plates, cast iron handwheel.

2.12 FIRE HYDRANTS

A. AWWA C502, 5.25 IN dry barrel type, equipped with two 2.5 IN hose connections and one 4.5 IN pumper connection, 6 IN mechanical joint inlet connection, 175 psig working pressure

B. Style of hydrant to match existing City standard.

C. Model Centurion manufactured by Mueller, or approved equal.

PART 3 - EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and foreign material, from inside and outside, before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.02 INSTALLATION

A. Install piping in accordance with NFPA 13 for sprinkler systems, NFPA 14 for standpipe and hose systems, NFPA 24 for service mains. Refer to Section 40 05 07 for hanger and support requirements for fire protection piping.

B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.

C. Install piping to conserve building space, and not interfere with use of space and other work. Coordinate installation with all other trades.

D. Group piping whenever practical at common elevations.

E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

F. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level.

G. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding. Refer to Section 09 90 00.

H. Do not penetrate building structural members unless indicated.

I. Provide sleeves when penetrating footings floors and walls. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required. Refer to Section 40 05 07.

J. Die cut screw joints with full cut standard taper pipe threads with red lead and linseed oil or other non-toxic joint compound applied to male threads only.

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K. Install valves with stems upright or horizontal, not inverted. Remove protective coatings prior to placing in service.

L. Provide gate, ball or butterfly valves for shut-off or isolating service.

M. Provide drain valves at main shut-off valves, low points of piping and apparatus.

END OF SECTION

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SECTION 21 13 13 - SPRINKLER SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. SECTION INCLUDES

1. Wet-pipe sprinkler system.
2. System design, installation, and certification.
3. Fire department connections.

1.02 SYSTEM DESCRIPTION

A. Provide hydraulically designed wet-pipe system to provide coverage for building areas noted on drawings. Provide all components necessary to provide a complete working system(s).

B. Provide system to meet NFPA 13 hazard requirements as noted on drawings or as required by code.

C. Water Supply: Contractor to field verify and incorporate into the design, as required, the existing water flow test data:

1. Elevation of static and elevation of residual pressure test gauge.
2. Static pressure: psig.
3. Residual pressure: psig.
4. Flow: gpm.
5. Date:
6. Location of hydrants and hydrant identification number(s):
7. Hydraulic Calculations: No more than 90 percent of the available pressure at the connection to the standpipe and/or sprinkler riser shall be used.

D. Interface system with building control system and building Fire Alarm.

E. Provide fire department connections as indicated or as required by code.

1.03 SUBMITTALS

A. Submit under provisions of Division 01.

B. Shop Drawings: Indicate hydraulic calculations, water flow test data, detailed pipe layout, hangers and supports, components and accessories. Indicate system controls.

C. Product Data: Provide data on sprinkler heads, valves, air compressor, pumps, and all accessories and specialties, including manufacturers catalog information. Submit performance ratings, temperature ratings, rough-in details, weights, support requirements, and piping connections.

D. Submit shop drawings, product data, and hydraulic calculations to authority having jurisdiction for approval. Submit proof of approval to Architect/Engineer.

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E. Certificate of Compliance: Certificate indicating system has been tested and meets or exceeds specified requirements and code requirements.

1.04 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Division 01.

B. Record actual locations of sprinkler heads, piping, valves, and accessories on drawings. Indicate drain and test locations.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Division 01.

B. Maintenance Data: Include all components of system, servicing requirements, Record Drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.

1.06 QUALITY ASSURANCE

A. The design, materials, equipment, installation, inspection, and testing of the automatic sprinkler system(s) and combination standpipe and sprinkler system shall be in strict accordance with the required and advisory provisions of NFPA 13.

B. Equipment and Components: All equipment and components shall be UL listed and FM approved for the appropriate service.

C. Maintain one copy of document on site.

1.07 QUALIFICATIONS

A. Installer: Company specializing in performing work of this Section with minimum three years experience.

B. Design sprinkler system under direct supervision of a Professional Engineer experienced in design of this work, and licensed in the State of Iowa.

1.08 REGULATORY REQUIREMENTS

A. Hydraulic Calculations, Product Data, and Shop Drawings: Bear stamp of approval of authority having jurisdiction and the local Fire Marshall.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products to site, and protect under provisions of Division 01.

B. Store products in shipping containers and maintain in place until installation. Inspect for damage.

C. Provide temporary end caps and closures. Maintain caps in place until installation.

1.10 EXTRA MATERIALS

A. Furnish under provisions of Division 01.

B. Provide extra sprinkler heads under provisions of NFPA 13.

C. Provide one suitable wrench(s) for each head type.

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D. Provide metal storage cabinet in a janitor's closet.

PART 2 - PRODUCTS

2.01 SPRINKLER HEADS

A. Suspended Ceiling:

1. Type: Recessed pendant type with matching push on escutcheon plate.
2. Head Finish: Chrome plated.
3. Escutcheon Plate Finish: Chrome plated.
4. Fusible Link: Glass bulb type, temperature rated for specific area hazard as indicated in Sprinkler System Schedule.
5. Model: M manufactured by Viking.

B. Exposed Area Type:

1. Type: Standard upright type or pendant type .
2. Head Finish: Brass.
3. Fusible Link: Glass bulb type temperature rated for specific area hazard.
4. Model: M manufactured by Viking.

2.02 PIPING SPECIALTIES

A. Wet Pipe Sprinkler Alarm Valve (Single Zone Systems): Iron body, bronze seat, check type valve with divided seat ring, rubber faced clapper to automatically actuate electrically or hydraulically operated alarm(s), with pressure retard chamber, pressure gauges, and variable pressure trim. Provide pressure sensitive alarm switch to activate fire alarm system.

B. Electric Alarm: Electrically operated red enamelled gong with pressure alarm switch.

C. Optional Water Motor Alarm: Hydraulically operated impeller type alarm with aluminum alloy red enamelled gong and motor housing, nylon bearings, and inlet strainer.

D. Water Flow Switch: (Multi-zone Systems):

1. Integral, vane type, non-accumulative retard type, for horizontal or vertical mounting, with two sets of SPDT auxiliary contacts and adjustable from 0 to 60 seconds. Set flow switches at an initial setting between 20 and 30 seconds.
2. Provide with two contacts rated 10 amps at 125 volt AC.

E. Valve Supervisory Switches:

1. Switch shall be contained in a weatherproof housing, which shall provide a 3/4 IN tapped conduit entrance and incorporate the necessary facilities for attachment to the valves.

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2. Provide two sets of SPDT contacts, tamperproof, and arranged to cause a switch operation if the housing cover is removed, or if the unit is removed from its mounting.

3. Switch housing to be finished in red enamel.

4. Supervisory switches for ball and butterfly valves may be integral with the valve.

F. Pressure Switches:

1. Provide with 1/2 IN NPT male pressure connection. Switch shall be activated by any flow of water equal to or in excess of the discharge from one sprinkler.

2. Maximum service rating of 175 psig, factory adjusted to operate at a pressure of 4 to 8 psi. Provide unit with two sets of SPDT contacts.

3. Furnish switch in red baked enamel, weatherproof, oil resistant housing with tamper resistant screws.

G. Automatic Ball Drips: Cast brass 3/4 IN in-line automatic ball drip with both ends threaded with iron pipe threads.

H. Fire Department Connection:

1. Type: Flush mounted wall type with brass finish.

2. Fire Department connection: One 5 IN Storz hydrant port with coupling size to suit fire department hardware; dust cap and chain of matching material and finish.

3. Drain: 3/4 IN (19 mm) automatic drip, connected to drain.

4. Label: Provide escutcheon with integral raised letters "Auto-sprinkler" connection.

I. Identification Signs: Provide control valves, drain valves, test and drain connections, and alarm devices with identification signs (enamel on metal) in accordance.

J. Self-Contained Test and Drain Assembly:

1. Bronze body, with chrome plated bronze ball, brass stem, steel handle, PTFE seat, and site glass. Provide valve with three position indicator plate (off, test, drain), 1/4 IN tapping for pressure gauge and various sized orifice inserts to simulate flow through each size diameter sprinkler heads.

2.03 DOUBLE CHECK BACKFLOW PREVENTION ASSEMBLY

A. ASSE 1015, epoxy coated cast iron check valve bodies with bronze seats. Provide two independent check valves with shut off valves and ball type test cocks. Maximum friction loss through assembly shall not exceed 5 psig at design flow.

PART 3 - EXECUTION

3.01 PREPARATION

A. Coordinate work of this Section with other affected work.

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3.02 INSTALLATION

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

B. Install buried shut-off valves in valve box. Provide post indicator.

C. Provide double check valve assembly at sprinkler system water source connection. Install above a floor drain.

D. Locate fire department connection with sufficient clearance from walls, obstructions, or adjacent siamese connectors to allow full swing of fire department wrench handle.

E. Locate outside alarm gong on building wall as directed by the owner.

F. Place pipe runs to minimize obstruction to other work.

G. Place piping in concealed spaces above finished ceilings. Locate piping in stairways as near ceiling as possible to prevent tampering by unauthorized personnel, and to provide a minimum of 7 FT of headroom.

H. Center heads one direction only in ceiling tile with location in other direction variable, dependent upon spacing and coordination with ceiling elements.

I. Apply masking tape or paper cover to ensure concealed sprinkler head cover plates do not receive field paint finish.

J. Flush entire piping system of foreign matter.

K. Hydrostatically test entire system.

L. Require test be witnessed by authority having jurisdiction.

M. Mount valve supervisory switches so as not to interfere with normal operation of the valve and adjust to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.

N. Do not use quick response sprinklers in the same sprinkler zone with other sprinkler types. If quick response sprinklers are required in renovated areas, change existing sprinklers to match new.

O. Cutout disks, which are created by cutting holes in the walls of pipe for flow switches and non-threaded pipe connections, shall be wired next to the point of removal.

P. For each sprinkler zone provide a control valve, flow switch, and a self contained test and drain assemble with pressure gauge.

Q. For control valves at each indicating sprinkler system riser, sprinkler zone, standpipe system riser, main entrance service, and PIV (post indicator valve), provide a supervisory switch that is connected to the fire alarm system. Standpipe hose valves and test and drain valves shall not be provided with supervisory switches.

R. Provide a waterflow switch for each sprinkler zone and where indicated on drawings. Install waterflow switch and adjacent valves in easily accessible locations.

S. Each sprinkler zone shall coincide with each fire alarm zone.

T. Provide a drain at base of risers, drain connection on valved sections, and drains at other locations for complete drainage of system. Provide valve in drain lines and connect to the central drain riser. Discharge riser outside over splash block, indirectly over standpipe drain connected to storm sewer, or as indicated. The main drain shall be capable of full discharge test without allowing water to flow onto the floor.

U. Provide test pipes in accordance with NFPA 13. Test pipes shall be valved and piped to discharge through proper orifice as specified above for drains.

V. Provide pressure gauge at each waterflow switch location, at the top of each standpipe, and at each main drain connection.

3.03 TEST

A. Automatic Sprinkler System - NFPA 13

3.04 INSTRUCTIONS

A. Furnish the services of a competent instructor for not less than two four-hour periods for instructing facility personnel in the operation and maintenance of the system(s), on the dates requested by the Owner.

END OF SECTION

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SECTION 21 22 00 –CLEAN AGGENT FIRE SUPPRESSION SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Design and installation of Clean Agent Fire Suppression System with an addressable detection and control system for the following areas:

   a. Communications Room

1.02 SCOPE

A. This specification outlines the requirements for a Total Flood Ecaro-25 clean agent fire suppression system utilizing HFC-125 as the extinguishing agent, and with an addressable detection and control system. The work includes all engineering, labor, materials, equipment, and services necessary, and required, to complete and test the suppression and detection system

B. Exclusions: The work listed below shall be provided by other, or under different section of this specification:

1. Power supply to the system control panel.
2. Interlock wiring and conduit for shutdown of HVAC system components and electric power supply.
3. Connection to fire alarm system

1.03 RELATED REQUIREMENTS (SECTIONS)

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Related Sections include the following:

1. Section 07 84 13 - Through-Penetration Firestop Systems" for fire-stopping sealants.
2. Division 23 - Mechanical HVAC actuators and system operation controlled shutdown.
3. Division 26 - Electrical Power wiring interlock and connection to fire alarm system.

1.04 SUBMITTALS

A. Product Data: Submit drawings, calculations and system data sheets for approval prior to starting work:

1. Field installation layout drawings at 1/8" = 1'-0" detailing the location of all agent storage tanks, pipe runs and pipe sizes, detector locations, control devices, pull stations, audible and visual alarms.

2. Auxiliary details and information pertaining to the system and components.
3. Electrical layout drawings.
4. Internal control wiring diagrams.
5. Hydraulic flow calculations.
6. Sequence of operation.

B. Maintenance Data: For fire-protection components to include in maintenance manuals

1.05 QUALITY ASSURANCE

A. The design, equipment, installation, testing, and maintenance of the system shall be in conformance with the following standards.
1. NFPA No. 2001 - Clean Agent Fire Extinguishing System
2. NFPA No. 70 - National Electric Code.
3. NFPA No. 72 - National Fire Alarm Code
4. Factory Mutual and Underwriters Laboratory.
5. Requirements of the Authority Having Jurisdiction (AHJ)

B. NFPA Compliance: Fabricate and label components to comply with NFPA 2001PRODUCTS

1.06 INSTALLER QUALIFICATIONS

A. Installing Contractor shall be trained by the supplier to design, install, test and maintain a clean agent system.

B. Installing Contractor shall be an experienced firm regularly engaged in the installation of automatic clean agent, or similar, fire suppression systems.

C. Installing Contractor shall maintain or have access to a clean agent recharging station, and be an authorized stocking distributor of clean agent equipment.

1.07 WARRANTY

A. Special Warranty: Manufacturer's Standard Form in which manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.
1. Warranty period. Five years from date of substantial completion.

1.08 INSPECTIONS AND MAINTENANCE

A. Provide (2) Inspections during the first year of service to insure system is operating correctly and to provide maintenance service to system and all components.
1. Inspections shall be made at 6 month intervals.

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PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. System shall be a Fike Ecaro-25 clean agent system as manufactured by Fike Fire Protection Systems, Blue Springs, MO

2.02 SYSTEM DESCRIPTION

A. Total flooding ECARO-25 fire extinguishing system. The system shall include the necessary mechanical and electrical installation, required detection and control equipment, agent storage containers, agent, system actuation equipment, discharge nozzles, pipe and fittings, manual release and abort stations, audible and visual alarm devices, auxiliary devices and controls, shutdowns, functional checkout and testing, training and other operations necessary for a fully functional UL Listed and./or FM Approved clean agent system.

2.03 SYSTEM DESIGN REQUIREMENTS

A. Extinguishing Agent: System shall a Clean Agent System utilizing HFC-125.

B. Design Criteria: System shall provide a minimum design concentration of 8.0%, by volume, in all areas or protected spaces, at the minimum anticipated temperature. Per NFPA 2001, the system design shall not exceed a maximum exposure limit concentration level of 11.5% by volume.

1. System will be designed in accordance with manufacturer's guidelines.
2. Locate clean agent storage tank within the same space it is to service.
3. Coordinate location of piping and discharge devices with other trades including HVAC and Electrical devices.

C. Components: The system shall be complete in all ways. It shall include all mechanical and electrical installation, all detection and control equipment, agent storage containers, ENCARO-25 agent, system actuation equipment, discharge nozzles, pipes and fittings, manual release and abort stations, and alarm interface devices.

1. The Encaro-25 clean agent system materials and equipment shall be standard products of the supplier's latest design and suitable to perform the functions intended. Components which perform similar function shall be provided by one manufacturer.
2. Clean Agent shall be stored in Fike P/N 70-XXX Series Agent Storage Containers. Containers shall be super-pressurized, with dry Nitrogen, to an operating pressure of 360 psi @ 70 degrees F. Containers shall be of high-strength allow steel construction and shall conform to NFPA 2001.
3. Containers shall be actuated by parallel wired Gas Cartridge Actuators through a Fike P/N 10-1832 Agent Release Module (ARM), located at each agent storage container.

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4. Each container shall have a pressure gauge and low pressure switch to provide visual and electrical supervision of the container pressure. The low pressure switch shall be wired to the control panel to provide an audible and visual "Trouble" alarm in the event the container pressure drops below 288 psi. Pressure gauge shall be color coded to provide an easy visual indication of container pressure.
5. Each container shall have a pressure relief provision automatically actuated if the internal temperature exceeds 150 degree F.
6. Discharge nozzles shall be Fike P/N 80-XXX in NPT sizes 3/8" - 2". Each size shall be available in 180 and 360 degree distribution patterns.
7. Distribution piping shall be reamed, blown clear and swabbed to remove burrs, mill varnish and cutting oils prior to assembly.
8. All pipe threads shall be sealed with Teflon tape pipe sealant.
9.

D. Control Panel: Control Panel shall be Cheetah Xi 50 as manufactured by Fike Fire Protections Systems, Blue Springs, MO
   1. Provide battery stand-by power supply to power complete discharge in the absence of building power, taking into considerations the power requirements of alarms, initiating devices and auxiliary components under full load conditions.
   2. Accessible Devices

E. Sensors, Releasing Module, Releasing Module, Control Module, Relay monitors, Manual Release and Discharge Abort devices shall be manufactured by Fike Corporation.

F. Audible and Visual Alarms:
   1. Provide Audible and Visual Signal Devices operated by Cheetah Control Panel.
   2. Alarm bell, horn and horn/strobe devices shall be Fike P/N's 20-XXX, or equal.
   3. A strobe device shall be placed outside and above each exit door from the protected space. Provide advisory signage at each light location.

G. Dual Action - Manual Release
   1. Locate (1) Manual Release Switch adjacent to each exit door of the protected area.
   2. Manual Release Switch shall be Fike P/N 10-1638.
   3. Shall be dual action requiring two distinct operations to initiate a system actuation.
   4. Manual actuation shall bypass the time delay and abort functions, shall cause the system to discharge in and shall cause all release and shutdown devices to operate in the same manner as if the system had operated automatically.

H. Abort Station:
   1. Abort station shall be Fike P/N-10-1639.

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2. Abort station shall be supervised and shall indicate a trouble condition at the Control Panel if depressed, and no alarm condition exists.
3. Abort station shall be located adjacent to the manual discharge switch at the room exit.
4. Locate digital countdown timer above Abort Station.

I. Advisory Signage:

1. Provide signage as required to comply with NFPA 2001.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas where system will be installed. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General: Install clean agent fire suppression system components including control panel, piping, discharge devices, and alarm devices in locations as indicated on the system design drawings and per manufacturer's recommendations.

1. All wiring shall be installed in a neat and workmanlike manner and shall conformance with the National Electric Code. Wiring shall meet all applicable local and state codes.

3.03 SYSTEM ACTUATION

A. System Actuation: System shall be actuated by a combination of ionization and/or photoelectric detectors installed at a maximum spacing of 250 square feet per detector. There shall be a minimum of 2 detectors per individual enclosed space. Detectors shall be wired in sequential detection method of operation. Automatic operation shall be as follows:

1. Actuation of one (1) detector within the system shall:
   a. Illuminate "Alarm" lamp on the control panel face.
   b. Energize alarm bell and visual indicator.
   c. Transmit a signal to the fire alarm panel.
   d. Shut down HVAC system for Communications Room.
2. Actuation of a second (2nd) detector within the system shall:
   a. Illuminate the "Pre Discharge" lamp on the control panel face.
   b. Energize a re-energize horn and strobe devices.
   c. Start time delay sequence of 60 seconds.
   d. System abort sequence is enabled.

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3. System Abort Procedure: System discharge may be aborted by depressing the "Dead Man" mushroom switch located adjacent to the manual discharge switch at room exit point. Depressing the abort switch shall re-set the discharge delay to 30 seconds each time it is depressed.
4. After completion of the time-delay sequence, system shall activate and the following shall occur:
    a. Illuminate "System Fired" lamp on the control panel face.
    b. Energize a visual indicator outside the hazard area in which the discharge has occurred.
    c. Clean agent is discharged.

3.04 INSPECTION

A. After the system installation has been completed, the entire system shall be inspected and functionally tested by qualified, trained personnel in accordance with NFPA and manufacturer standards

3.05 TESTING

A. Testing and Training: Contractor shall provide testing, training and all other operations for a fully functional and approved system.
    1. Seal and secure protected spaces against agent loss and/or leakage during the 10 minute "hold" period

1.1 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection specialties are installed, unless otherwise indicated in manufacturer's written installation instructions.

B. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet manufacturer.

C. Replace fire-protection items that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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SECTION 22 05 19 - METERS AND GAGES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Meters, gages, switches and accessories used by the Railroad in mechanical systems.
2. Meters and gages furnished as part of factory fabricated equipment are specified with specific equipment.

1.02 SUBMITTALS

A. Submit as specified in Section 01 33 00.

B. Product Data: Submit manufacturer's technical product data, including installation instructions for each type of meter and gage. Product shall be suitable for intended service.

C. Shop drawings required by this Section include, but are not limited by, the following:

1. Manufacturer's product data for all components, drawings, operation and maintenance manuals and testing results if required.
2. Piping diagrams for new or modified control valves.

1.03 REFERENCED STANDARDS

A. American National Standards Institute (ANSI).

B. Instrument Society of America (ISA).

C. Manufacturers Standardization Society of the Valve and Fittings Industry (MSS).

1.04 QUALITY ASSURANCE

A. UL Compliance: Comply with applicable UL standards pertaining to meters and gages.

B. ANSI and ISA Compliance: Comply with applicable portions of ANSI and Instrument Society of America (ISA) standards pertaining to construction and installation of meters and gages.

PART 2 - PRODUCTS

2.01 TURBINE FLOW METERS

A. Provide Smith Guardsman Series model K2B or equal meter for Fuel Management System. Meter shall have the following minimum specifications:

1. 150# RF flanges with upstream flow straightening device as recommended by manufacturer.
2. Fuel flow range: 40 gpm to 600 gpm.

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3. Uunidirectional flow with stainless steel blades.
4. One pickup coil and preamplifier.
5. +-0.25 percent linearity and +-0.02 percent repeatability.

B. Meter electronics shall be taped and protected for future connection by others.

2.02 PRESSURE GAGES

A. Provide pressure gages of materials, capacities, and ranges indicated, designed and constructed for use in service indicated.

B. Type: General use, 1 percent accuracy, ANSI B40.1 grade A, phosphor bronze bourdon type, bottom connection.

C. Range: Conform to the following:

1. Potable (Domestic) Water: 0-100 psig.
2. Diesel Fuel dispense: 0-100 psig.
3. Lube oil recirculation: 0-75 psig.
4. All others not specifically listed here shall be determined by engineer on shop drawings.

D. Manufacturer: Subject to compliance with service requirements, provide pressure gages of one of the following:

1. Ametek/U.S. Gauge.
2. Ashcroft.
3. Marsh Instrument Co.; Unit of General Signal.
4. Marshalltown Instruments, Inc.
5. Weiss Instruments, Inc.

2.03 PRESSURE GAGE COCKS

A. General: Provide pressure gage cocks between pressure gages and gage tees on piping systems. Construct gage cock of brass with 1/4 IN female NPT on each end, and "T" handle brass plug.

B. Syphon: 1/4 IN straight coil constructed of brass tubing with 1/4 IN male NPT on each end.

C. Snubber: 1/4 IN brass bushing with corrosion resistant porous metal disc, through which pressure fluid is filtered. Select disc material for fluid served and pressure rating.

D. Manufacturer: Same as for pressure gages.

2.04 PRESSURE SWITCHES

A. Provide Square D type GDW-4 pressure switch, SPDT, NEMA 4, 0 - 75 psig range, with 1/4 IN isolating gage cock or equal.

B. Initial switch settings per Engineer.

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PART 3 - EXECUTION

3.01 INSTALLATION OF GAGES AND SWITCHES

A. General: Install pressure gages in piping tee with pressure gage cock, located on pipe at most readable position.

B. Install switches as required in Division 16 and as recommended by manufacturer.

3.02 ADJUSTING AND CLEANING

A. Adjusting: Adjust faces of gages to proper angle for best visibility.

B. Cleaning: Clean windows of gages and factory-finished surfaces. Replace cracked or broken windows, repair any scratched or marred surfaces with manufacturer's touch-up paint.

END OF SECTION

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SECTION 22 05 28 - HOSE REELS AND ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Locomotive and rail car servicing hose reels, oxygen and acetylene manifold systems, accessories, and associated equipment.

B. The Contractor shall perform all labor and services necessary for proper installation and operation of the systems and work described in this section of the specifications and/or indicated on the drawings, or reasonably implied.

C. The Contractor shall include the necessary equipment, specialties, tests, electrical, etc., for the complete installation of the locomotive servicing hose reels.

1.02 REFERENCED STANDARDS

A. American National Standards Institute (ANSI):

1. B1.20.1 – General Purpose Pipe Threads.

B. Society of Automotive Engineers (SAE):

1.03 SUBMITTALS

A. Submit as specified in Section 01 33 00.

B. Provide shop drawings and manufacturers literature information for the following:

1. Hose reels, hose, and end equipment.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Spring-driven Hose Reels for servicing fluids:

1. Hannay.
2. Reelcraft Series 9000 (Series TW-7000 for oxy/acetelyne).
3. Approved equal.

B. Electric Cord Reels:

1. Reelcraft Series 4000.
2. Approved equal.

C. Oil Dispensing Reels

1. Snyder 445-23-K1 Hose Reel Assembly, LH or RH, complete
2. Approved equal

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2.02 HOSE REELS

A. The hose reels shall be located as shown on the Drawings for dispensing maintenance fluids from a number of permanent delivery points located throughout the facility. The hose reels will supply the following services:

1. Lube Oil (LO).
2. Untreated Water (CW).

B. The hose reels shall be the open type and spring-driven, complete with the following:

1. Ratchet locking assemblies to maintain the service hose at the operator-selected extension.
2. Roller guide assemblies for the hoses.
3. Adjustable ball stop or bumper devices to maintain the stated pendant length of hose outside the hose reel.
4. Stainless steel or plastic tags affixed to the hose reel unit by stainless steel wire or rivets identifying the reel type as listed in the hose reel schedule. Also provide identification tags at control handles.
5. Permanently lubricated bearing assemblies.
6. Containerized spring motor with weatherproof gasketing.
7. Steel construction with heavy-duty brackets.
8. Factory-applied paint or coating systems.
9. Flexible inlet hose assemblies at least 2 FT long for connecting the hose reels to the fixed supply piping.
10. All components (swivels, O-rings, etc.) compatible with the fluid handled and rated for the fluid pressures and temperatures stated.

C. The hose supplied for use with the hose reels shall be SAE rated for the stated service. Fabric reinforced hoses 1/2 IN inside diameter and smaller shall have at least one reinforcing braid. Fabric reinforced hoses larger than 1/2 IN inside diameter shall have two reinforcing braids. The outside hose cover shall be abrasion resistant. One end of the hose shall have a hose fitting compatible with the connection on the hose reel. The other (service) end of the hose shall have a fitting with pipe threads in accordance with ANSI B1.20.1. The nominal pipe size of the service end hose fitting shall be the same size as the inside diameter of the hose and shall be a male fitting.

D. Electric cord reels shall be complete with an incandescent lamp.

2.03 HOSE REEL ACCESSORIES

A. The Contractor shall install a nondripping (when fully closed) ball valve at the end of the pendant length of hose outside each hose reel housing. These ball valves shall be "Clincher Type 2000", manufactured by Jamesbury Corporation. Valves shall have brass bodies with stainless steel trim and TFE seats

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B. The Contractor shall install nozzles for the lube oil hose reels downstream of the ball valves. The nozzles shall be right angle type, permitting at least four positions of the hold-open clip. Each nozzle shall have a 1 IN DIA spout and shall be OPW "190" or equal.

2.04 OXYGEN-ACETYLENE MANIFOLD SYSTEM

A. An oxygen-acetylene welding manifold system shall be provided, installed, and placed in proper working order to provide an uninterrupted service supply with no downtime. The manifold system shall be semi-automatic type, so that as the primary supply is depleted, a reserve supply is available to automatically begin service.

B. The manifold system shall be suitably sized for 8 cylinders of oxygen and 8 cylinders of acetylene. The manifold system shall be complete and include, but not be limited to, the following items: Single stage regulators, adjustable line regulator, master shutoff valves, flash arresters, pressure switch port, single outlet connection, and wall mounting brackets. All valving and pressure regulation shall be provided such that, through pressure differential, the switch- over from the primary bank takes place without interruption of service. Once depleted, the primary bank can be replaced and becomes the new reserve bank.

1. Line pressure regulators (included with automatic manifold system) connected between the cylinders and the piping system shall be set at the following pressures:

   a. Oxygen system pressure: 35 PSIG (maximum).

   b. Acetylene system pressure: 15 PSIG (maximum).

C. The manifold system shall be Victor "Automatic - VM" or equal.

D. A suitably sized metal storage frame with safety chains shall be provided for storing the cylinders on the outside of the building, as indicated on the drawings.

E. Suitable medium-heavy flow station regulators shall be provided on each oxygen and acetylene line at each hose reel as indicated on the drawings.

2.05 QUICK COUPLINGS

A. Quick couplings shall be provided on the journal oil and drain oil connections as indicated on the drawings. The journal oil couplings shall be brass, 3/4 IN size, and shall include the socket, plug, and dust cap. The quick couplings shall be Hanson "Series 6-HK", with socket number B6-HP31 and plug number B6-KT31 or equal.

B. The drain oil couplings shall be steel, 1-1/2 IN size, and shall include the socket, plug, and dust cap, Hanson "Series 12-HK", with socket number 12-H46 and plug number 12-K46 or equal.

C. Compressed Air: The service end of the hose shall have a 1/2 IN quick disconnect fitting for air operated tools.

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PART 3 - EXECUTION

3.01 INSTALLATION

A. The Contractor shall install equipment and accessories in accordance with equipment manufacturer's recommendations and applicable codes and standards, using accepted industry methods and materials. Installation of servicing system pipe, pipe fittings, and piping accessories is specified in the piping sections.

3.02 SYSTEM SEQUENCE OF OPERATIONS

A. Locomotive servicing system sequences shall be provided to establish brief system descriptions and control sequences for the specific location as applicable.

B. Non-Potable Water Systems. Non-potable water (NPW) will be distributed from a process water supply line, which originates in the office building basement, to various hose reel service points located in the maintenance shop. In addition, the non-potable water system is the supply source for the treated water system.

C. Journal Oil System. Journal oil (JO) will be unloaded from tanker trucks at the fill box location on the south side of the pumphouse. Positive displacement rotary vane pump shall pump the journal oil to the 10,000 GAL storage tank. The journal oil will be distributed from the storage tank to various hose reels and trackside service points located in the locomotive shop and on the service platform, by a rotary vane positive displacement pump. The dispensing pumps will be operated by a HAND-OFF-AUTO (HOA) switch located at the motor control center. With the switch set to the AUTO position, the pump will be energized when the discharge line pressure drops below the set point. With the switch in the HAND position, the pump will run continuously until manually shut off. The pump will be de-energized with the switch in the OFF position.

D. Compressor Oil System. Compressor oil (CO) will be unloaded from tanker trucks at the fill box location on the south side of the pumphouse. Positive displacement rotary vane pumps will transfer the compressor oil to the 10,000 GAL storage tank. The compressor oil will be distributed from the storage tank to various hose reels located in the locomotive shop, by a rotary vane positive displacement pump. The dispensing pumps will be operated by a HAND-OFF-AUTO (HOA) switch located at the motor control center. With the switch set to the AUTO position, the pump will be energized when the discharge line pressure drops below the set point. With the switch in the HAND position, the pump will run continuously until manually shut off. The pump will be de-energized with the switch in the OFF position.

E. Lube Oil System. Lube oil (LO) shall be unloaded from tanker trucks at the fill box location on the south side of the pumphouse. Positive displacement rotary vane pumps will transfer the lube oil to the 20,000 GAL storage tank. The lube oil will be distributed from the storage tank to various hose reels located in the locomotive shop and on the service platform, by a rotary vane positive displacement pump (P-11 or P-12). The pumps will be operated by a HAND-OFF-AUTO (HOA) switch located at the motor control center. With the switch set to the AUTO position, the pump will be energized when the discharge line pressure drops below the set point. With the switch in the HAND position, the pump will run continuously until manually shut off. The pump will be de-energized with the switch in the OFF position.

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F. Drain Oil (Used Lube) System. Drain oil (DO) is removed from the locomotives at various trackside locations in the locomotive shop and on the service platform. The oil will be drawn from the locomotives by air powered diaphragm pumps (P-22, P-23, P-24) located in the west end of the locomotive shop, and transferred to the 20,000 GAL storage tank. The pumps will be operated using HAND-OFF (HO) switches at various trackside locations. (See description in Phase 1 for service platform waste oil system operation.) An air powered diaphragm pump located in the pumphouse will be used for unloading trucks or barrels of waste oil. This is not expected to occur frequently; therefore, no fill box will be provided. A rotary vane positive displacement pump (P-17 or P-18) will be used to transfer the waste oil from the storage tank to a tanker truck. A HAND-OFF switch will be located at the motor control center. With the switch in the HAND position, a remote switch located on the fill box control panel will be energized. With the switch in the OFF position, the remote switch will be de-energized. The pumps will be energized only when both the switch at the motor control panel and the remote switch are in the HAND position.

G. Radiator Water System. City water will be conditioned with a water softener. A metering pump, provided by the Owner, shall be installed down- stream of the water softener. The metering pump will inject sodium borate solution from one of two available 330 GAL totes located adjacent to the pump. Piping and valving from the totes to the pump will be such that an empty tote can be replaced without interruption to the distribution system. The treated water will be distributed to various hose reel stations in the locomotive shop and on the service platform. The treated water metering pump will be operated by an ON-OFF switch located at the motor. When the switch is set to the ON position, metering pump start/stop functions will be controlled by a water flowmeter provided by the Owner. When the switch is in the OFF position, the metering pump will be de-energized.

H. Toilet Chemical System. Toilet chemical (TC) will be unloaded from tanker trucks at the fill box location on the south side of the pumphouse. Centrifugal pumps will transfer the toilet chemical to the 10,000 GAL storage tank. The toilet chemical will be distributed from the storage tank to the service platform by a horizontal, single stage turbine pump (P-15 or P-16). The dispensing pumps will be operated by a HAND-OFF-AUTO (HOA) switch located at the motor control center. With the switch set to the AUTO position, the pump will be energized when the discharge line pressure drops below the set point. With the switch in the HAND position, the pump will run continuously until manually shut off. The pump will be de-energized with the switch in the OFF position.

I. Soap System. A pre-mixed soap solution (SP) will be unloaded from tanker trucks at the fill box location on the south side of the pumphouse. Centrifugal pumps will transfer the soap solution to the 10,000 GAL storage tank. The soap solution will be distributed from the storage tank to various hose reels located in the locomotive shop and on the service platform, as well as the automatic wash facility, by a horizontal, single stage turbine pump (P-14). The pump will be operated by a HAND-OFF-AUTO (HOA) switch located at the motor control center. With the switch set to the AUTO position, the pump will be energized when the discharge line pressure drops below the set point. With the switch in the HAND position, the pump will run continuously until manually shut off. The pump will be de-energized with the switch in the OFF position.

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3.03 HOSE REEL SCHEDULE

A. For each project location, provide a Hose Reel Schedule to identify the requirements and parameters of the hose reels to be installed for the project. A typical schedule should include the information as shown in the following example:

EXAMPLE – HOSE REEL SCHEDULE – EXAMPLE

				Hose Length - Feet					
Application	Temp, °F	Pressure, psig	Hose ID Inches	On Reel	As Pendant	Total Length	Mounting Position	Roller Position	No. Req'd
Journal Oil	100	100	1/2	60	2	62	Wall	C	9
Lube Oil	100	100	1	50	2	52	Wall	C	10
Compressor Oil	100	100	1/2	60	2	62	Wall	C	10
Non Potable Water	60	50	3/4	60	2	62	Wall	C	19
Soap/Water Mix	60	100	3/4	60	2	62	Wall	C	19
Compressed Air	60	100	1/2	60	2	62	Wall	C	19
Radiator Water	60	50	3/4	60	2	62	Wall	C	10
Oxygen/Acetylene	60	100	1/2 dual	60	2	62	Wall	C	19
Trouble Light	NA	NA	NA	NA	NA	NA	Wall	C	19

END OF SECTION

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SECTION 22 10 00 - PLUMBING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Furnishing and installation of materials, appliances, fixtures, equipment, and appurtenances associated with the plumbing systems as indicated herein and on the drawings. Suitable connections shall be provided for each fixture, piece of equipment, and appurtenance as required.

B. Requirements for plumbing systems, including, but not limited to, pipe materials, valves, thermal insulation, and pipe supports which are not an integral part of the fixture or piece of equipment and are not specified herein, are covered in other sections.

C. Refer to Section 01 61 02 for additional requirements.

1.02 GENERAL

A. Coordination: Appliances, fixtures, equipment, and appurtenances furnished and installed under this section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with the drawings, specifications, engineering data, instructions, and recommendations furnished by the manufacturer unless exceptions are approved by the Owner.

B. The Contractor shall verify that each component of the plumbing system is compatible with all other parts of the system; that all piping, fixtures, and appurtenances are appropriate for the intended function; and that all devices necessary for a properly functioning system have been provided.

C. Appliances, fixtures, equipment, and appurtenances furnished under this section shall be the standard product of the manufacturer. Where two or more units of the same class of equipment are required, they shall be the product of a single manufacturer; however, all the component parts of the system need not be the products of one manufacturer.

D. The Contractor shall become familiar with details of the work, shall verify dimensions in the field, and shall notify the Owner of any discrepancy before performing the work.

E. Where several manufacturers' names have been listed as possible suppliers, only the products of the first manufacturer listed have been checked for size, functions, and features.

F. Metal Gages: Metal thicknesses and gages specified herein are minimum requirements. Gages refer to US Standard gage.

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1.03 GOVERNING STANDARDS

A. Except as modified or supplemented herein, all work covered by this section shall be performed in accordance with the applicable national, state, and local codes and ordinances, laws, and regulations which pertain to such work. In case of a conflict between these specifications and any applicable national, state, or local code, ordinance, law, or regulation, the latter shall govern.

B. The plumbing work shall conform to the latest edition Plumbing Code of the Authority having jurisdiction.

C. All work shall comply with American Gas Association (AGA), American Society for Testing and Materials (ASTM), National Fire Protection Association (NFPA), Uniform Building Code (UBC) and Underwriters' Laboratories (UL) safety requirements.

1.04 SUBMITTALS

A. Submit as specified in Section 01 61 02 and Section 01 33 00.

B. Drawings and Data: Complete assembly and installation drawings, wiring and schematic diagrams, together with detailed specifications and data covering materials used, parts, devices and other accessories forming a part of the fixtures and equipment furnished, shall be submitted in accordance with the submittals section. Device tag numbers indicated on the contract drawings shall be referenced on the submittals where applicable. The data and specifications for each unit shall include, but shall not be limited to, the following:

1. Equipment, Piping Accessories, and Appurtenances:
    a. Name of manufacturer.
    b. Type and model.
    c. Construction materials, thicknesses, and finishes.
    d. Capacities.
    e. Pressure and temperature ratings.
    f. Overall dimensions.
    g. Piping connection size and location.
    h. Net weight.
    i. Wiring diagrams.
2. Plumbing Fixtures:
    a. Name of manufacturer.
    b. Type and model.
    c. Construction materials, thicknesses, and finishes.
    d. Water consumption data.
    e. Overall dimensions
    f. Rough-in dimensions.

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g. Piping connection size and location.

h. Net weight.

C. Certificates of Compliance: Certificates of compliance shall be submitted as indicated in the equipment schedule and submittals sections.

D. Operation and Maintenance Manuals: Operation and maintenance instructions shall be provided for the equipment indicated in the equipment schedule and submittals sections.

1.05 QUALITY ASSURANCE

A. Plumbing fixtures shall be constructed in accordance with the following standards:

1.	Enameled Cast Iron	ANSI/ASME A112.19.1M
2.	Vitreous China	ANSI/ASME A112.19.2M
3.	Stainless Steel	ANSI/ASME A112.19.3M
4.	Enameled Steel	ANSI/ASME A112.19.4M
5.	Emergency/Safety Fixtures	ANSI Z358.1

B. Electric water coolers shall be UL listed and certified in accordance with the Air Conditioning and Refrigeration Institute (ARI) Standard 1010. All water-bearing materials shall comply with the Safe Drinking Water Act of 1986 and the Lead Contamination Control Act of 1988.

1.06 EXTRA MATERIALS

A. The following extra materials shall be furnished for each type and size of plumbing fixture or equipment:

Part Description	**Number Required**
Flushometer valve repair kits	1 per 5 fixtures
Water closet seats	1 per 10 fixtures
Faucet washer and O-ring kits	1 per 5 fixtures
Faucet cartridge and O-ring kits	1 per 5 fixtures
Water heater relief valves	1 per heater

B. Extra materials shall be suitably packaged in accordance with the General Equipment Stipulations, with labels indicating the contents of each package. Each label shall indicate manufacturer's name, equipment identification, part nomenclature, part number, address of nearest distributor, and current list price. Extra materials shall be delivered to the Owner as directed.

PART 2 - PRODUCTS

2.01 PERFORMANCE AND DESIGN REQUIREMENTS

A. All fixtures and equipment shall be designed to meet the performance and design conditions as specified herein and on the drawings.

2.02 MATERIALS

A. Anchor Bolts and Expansion Anchors: All anchor bolts, expansion anchors, nuts, and washers shall comply with the requirements of the anchor bolts and expansion anchors section.

B. Piping Systems: Unless otherwise specified herein, piping system materials shall conform to the miscellaneous piping and ductile iron pipe sections.

C. Valves: Unless otherwise specified herein, valves indicated to be a part of the plumbing systems shall conform to the miscellaneous valves section.

2.03 PLUMBING EQUIPMENT

A. General: Plumbing equipment shall be provided will all required supports, fasteners, fittings, and escutcheons required for a complete installation.

B. Automatic Water Softener: The water softener shall have a capacity and dimensions as indicated on the drawings. The system shall consist of two softener tanks, one brine tank, a metered recycle controller with alternator mechanism, motor-driven regeneration valve, and automatic brine control system. Brine tank shall be polyester. Softener tanks shall be fiberglass reinforced polyester. System size, manufacturer, and model number shall be as indicated on the drawings. Softener system shall be manufactured by Culligan, Bruner, or Rainsoft.

2.04 CONSTRUCTION

A. Shop Painting: Unless otherwise indicated, shop painting shall be as specified in the General Equipment Stipulations. Surface finish damaged during installation shall be repaired to the satisfaction of the Owner. Field painting shall conform to the requirements of the painting section.

B. Color: The color of vitreous china, cast iron, enameled steel, and acrylic plumbing fixtures shall be white unless otherwise indicated. The color of other plumbing fixtures shall be the manufacturers' standard. The finish and color of plumbing equipment shall be the manufacturers' standard unless otherwise indicated.

PART 3 - EXECUTION

3.01 INSPECTION

A. The Contractor shall field verify all existing conditions prior to submitting a bid proposal.

3.02 INSTALLATION

A. Piping, fixtures, equipment, and materials furnished under this section shall be installed in proper operating condition in full conformity with the drawings, specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are approved by the Owner.

B. Water Supply Piping and Accessories: Water supply piping shall not be routed over or in front of electrical switchboards or panels unless acceptable to the Owner.

1. Water hammer arresters shall be provided in the hot and cold water supply piping at all quick-closing valves, solenoid valves, and plumbing fixtures. Arresters shall be located and sized as indicated on the drawings. Water hammer arresters shall be installed in an accessible location when possible.

C. Drainage and Vent Piping and Accessories: Drainage and vent piping shall not be routed over or in front of electrical switchboards or panels unless acceptable to the Owner.

1. Unless otherwise indicated or required by code, horizontal sanitary drainage piping 3 IN or less in diameter shall be installed at a uniform slope of 1/4 IN/FT(2 percent); horizontal sanitary drainage piping larger than 3 IN in diameter shall be installed at a uniform slope of 1/8 IN/FT (1 percent); horizontal storm drainage piping shall be installed at a uniform slope of 1/8 IN/FT (1 percent).

2. All sanitary and storm drainage piping which is required to be buried beneath floors shall be cast iron.

3. Drainage fittings shall be installed to guide sewage, wastewater, and storm water in the intended direction of flow. Change in direction shall be made by sweep type fittings whenever possible. Quarter bends and sanitary tee fittings shall not be installed for vertical to horizontal or horizontal to horizontal change of direction.

4. Plumbing vents passing through roofs shall be located at least 12 IN from a parapet or the intersection of a cant with the roof deck, and shall be adequately flashed watertight. Plumbing vents shall not be located closer to operable windows or outside air intakes than is allowed by the applicable code.

5. Floor drains shall be carefully adjusted to the correct elevation for proper drainage. Floor cleanouts shall be installed flush with the finished floor. Heads of fastening screws shall not project above the cover or grate surface.

6. Unless otherwise indicated, floor cleanouts shall be line size for 4 IN and smaller drainage piping, and shall be 4 IN for drains larger than 4 IN. Proper clearance shall be provided for access to cleanouts.

7. Floor drains, trench drains, floor sinks, and bell-up drains indicated to be trapped shall be provided with a deep seal "P" trap located as close to the drain as possible.

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D. Plumbing Fixtures and Accessories: Plumbing fixtures shall be set level and plumb, and shall be securely attached to the floor or wall as appropriate. Unless a fixture height is indicated on the drawings, each fixture shall be mounted at the manufacturer's recommended height. Where indicated to be ADA compliant, fixtures shall be mounted at the heights established by the Federal Government.

1. Fixtures shall be sealed to the floor or wall with a sealant as specified in the caulking section. The color of caulking shall match the fixture.
2. Fixture traps shall be installed to be easily removed for servicing and cleaning. Escutcheons shall be provided at all locations where fixture supply or drain piping penetrates walls, floors, or ceilings.
3. Water piping at stop valves, shower heads, and flush valves shall be rigidly secured to blocking. Drop-ear elbows shall be used whenever possible. All water supply piping shall be cleaned and flushed prior to installing the plumbing fixtures.

E. Plumbing Equipment: Plumbing equipment shall be installed in accordance with manufacturer's recommendations. Adequate clearance shall be provided for access to all components which may require adjustment, servicing, or replacement.

1. Water heaters shall be installed in accordance with AGA, NSF, NFPA, and UL requirements. Storage type water heaters shall be cleaned and flushed prior to connection to the potable water system. Water heater relief valves shall be piped to the nearest floor drain or bell-up drain, and shall terminate the appropriate air gap distance above the drain within 6 IN of the floor.
2. Fuel gas pressure regulator vents and fuel train vent valves shall be piped to the exterior of the building.

3.03 FIELD TESTING

A. Field testing of the plumbing systems shall conform to the requirements of the miscellaneous piping section and the pipeline pressure and leakage testing section.

3.04 ADJUSTING

A. All flush valves and other devices shall be adjusted for proper flow and quiet operation. Faucet and supply assemblies shall be adjusted or repaired to prevent leaks. All drains shall be checked for proper operation.

3.05 PROTECTION

A. Plumbing fixtures, equipment, and appurtenances shall be adequately protected from damage immediately after installation. Plumbing fixtures shall not be used during the construction period.

3.06 CLEANING

A. Immediately prior to the final inspection, plumbing fixtures, equipment, piping, and appurtenances shall be thoroughly cleaned. Cleaning solutions and cleaning method shall be as recommended by the manufacturer. All faucet aerators shall be removed, cleaned, and replaced

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3.07 SCHEDULES

A. Schedules relating to the plumbing work are indicated on the drawings.

END OF SECTION

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SECTION 22 11 13 - WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Water distribution piping system, including potable cold and hot water piping, fittings, and specialties within the building.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

1.03 SUBMITTALS

A. Submit as specified in Section 01 33 00.

B. Product data for each piping specialty, and valve specified.

C. Test reports as specified in Part 3 of this Section.

1.04 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with the provisions of the following:

1. ASME B 31.9: "Building Services Piping" for materials, products and installation. Safety valves and pressure vessels shall bear the appropriate ASME label.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Relief Valves:
   a. Cash (A.W.) Valve Mfg. Corp.
   b. Watts Regulator Co.
   c. Conbraco Industries Inc.
   d. Zurn Industries, Inc.; Wilkins-Regulator Div.
2. Y-Pattern Strainers:
   a. Armstrong Machine Works.
   b. Trane Co.
   c. Hoffman Specialty ITT; Fluid Handling Div.
   d. Victaulic Co. of America (low pressure applications only).

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e. Metraflex Co.

f. Watts Regulator Co.

g. Spirax Sarco.

3. Dielectric Waterway Fittings:

a. Victaulic Company of America.

4. Dielectric Unions:

a. Perfection Corp.

b. Watts Regulator Co.

2.02 PIPE AND TUBE MATERIALS

A. General: Refer to Part 3, Article "PIPE APPLICATIONS" for identification of systems where the below materials are used.

B. Drawn Temper Copper Tubing: ASTM B88, Type L.

2.03 FITTINGS

A. Wrought-Copper Fittings: ANSI B16.22, streamlined pattern.

2.04 JOINING MATERIALS

A. Solder Filler Metals: ASTM B 32, 95-5 tin-antimony.

2.05 GENERAL DUTY VALVES

A. General Duty Valves (i.e., grate, globe, check, ball, and butterfly valves) are specified in Division 15 Section "General Duty Valves." Special duty valves are specified below by their generic name; refer to Part 3 Article "VALVE APPLICATION" for specific uses and applications for each valve specified.

2.06 PIPING SPECIALTIES

A. Unions: ANSI B16.39, malleable iron, Class 150, hexagonal stock, with ball-and-socket joints, metal-to-metal bronze seating surfaces; female threaded ends. Threads shall conform to ANSI B1.20.1.

B. Dielectric Unions: Threaded or soldered end connections as required to suit application; constructed to isolate dissimilar metals, prevent galvanic action, and prevent corrosion.

C. Relief Valves: Provide proper size for relief valve, in accordance with ASME Boiler and Pressure Vessel Codes, for indicated capacity of the appliance for which installed.

D. Combined Pressure-Temperature Relief Valves: Bronze body, test lever, thermostat, complying with ANSI Z21.22 listing requirements for temperature discharge capacity. Provide temperature relief at 210 DEG F, and pressure relief at 150 psi.

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PART 3 - EXECUTION

3.01 PIPE APPLICATIONS

A. Install Type L, drawn copper tubing with wrought copper fittings, above ground, within building.

B. Install Type K, seamless copper tubing with no joints below ground or within slabs.

3.02 PIPING INSTALLATION

A. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate the general location and arrangement of the piping systems. Location and arrangement of piping layout take into consideration pipe sizing and friction loss, expansion, and other design considerations. So far as practical, install piping as indicated.

3.03 HANGERS AND SUPPORTS

A. Hanger, supports, and anchor devices are specified in Division 15 Section "SUPPORTS AND ANCHORS." Conform to the table below for maximum spacing of supports.

B. Install hangers with the following minimum rod sizes and maximum spacing:

Nom. Pipe Size	Max. Span-Ft.	Min. Rod Size-Inches
1/2 to 1-1/4	7	3/8
1-1/2 to 2	10	3/8
2-1/2 to 3	10	1/2

3.04 FIELD QUALITY CONTROL

A. Test water distribution piping as follows:

1. Test for leaks and defects all new distribution piping systems.

2. Cap and subject the piping system to a static water pressure of 50 psig above the operating pressure without exceeding the pressure rating of the piping system materials. Isolate the test source and allow to stand for a period of 4 HRS. Leaks and loss in test pressure constitute defects which must be repaired.

3. Repair all leaks and defects using new materials and retest system or portion thereof until satisfactory results are obtained. Operate all plumbing to the satisfaction of the Owner.

4. Prepare reports for all tests and required corrective action.

3.05 ADJUSTING AND CLEANING

A. Clean and Disinfect water distribution piping as follows:

1. Purge all new water distribution piping systems and parts of existing systems, which have been altered, extended, or repaired prior to use.

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2. Use the purging and disinfecting procedure prescribed by the authority having jurisdiction, or in case a method is not prescribed by that authority, the procedure described in either AWWA C601, or AWWA D105, or as described below:
3. Flush the piping system with clean, potable water until dirty water does not appear at the points of outlet.
4. Fill the system or part thereof, with a water/chlorine solution containing at least 50 parts per million of chlorine. Isolate (valve off) the system, or part thereof, and allow to stand for 24 HRS.
5. Drain the system, or part thereof, of the previous solution, and refill with a water/chlorine solution containing at least 200 parts per million of chlorine and isolate and allow to stand for 3 HRS.
6. Following the allowed standing time, flush the system with clean potable water until chlorine does not remain in the water coming from the system.
7. Submit water samples in sterile bottles to the authority having jurisdiction. Repeat the procedure if the biological examination made by the authority shows evidence of contamination.

B. Prepare reports for all purging and disinfecting activities.

END OF SECTION

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SECTION 22 11 23 - DOMESTIC WATER CIRCULATING PUMPS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Pumps for domestic hot water circulating systems applications.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 22 10 00 - Plumbing.

C. Section 22 42 00 - Plumbing Fixtures.

D. Section 23 07 19 - Piping Insulation.

E. Section 22 10 00 “Plumbing Equipment”

1.03 SUBMITTALS

A. Product data including certified performance curves and rated capacities of selected models, weights (shipping, installed, and operating), furnished specialties, and accessories. Indicate pump's operating point on curves.

B. Wiring diagrams detailing wiring for power, signal, and control systems and differentiating between manufacturer-installed wiring and field-installed wiring.

C. Maintenance data for pumps to include in the operation and maintenance manual specified in Division.

1. Include startup instructions.

1.04 REFERENCED STANDARDS

A. Regulatory Requirements: Comply with provisions of the following:

1. ASME B31.9 "Building Services Piping" for piping materials and installation.
2. Hydraulic Institute's "Standards for Centrifugal, Rotary & Reciprocating Pumps" for pump design, manufacture, testing, and installation.
3. UL 778 "Standard for Motor Operated Water Pumps" for construction requirements. Include UL listing and labeling.
4. NEMA MG 1 "Standard for Motors and Generators" for electric motors. Include NEMA listing and labeling.
5. NFPA 70 "National Electrical Code" for electrical components and installation.

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PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Vertical In-Line Pumps:

a. Allis-Chalmers Fluid Products Co.; Industrial Pump Div.

b. Armstrong Pumps, Inc.

c. Dunham-Bush, Inc.

d. General Signal; Aurora Pump.

e. ITT Fluid Technology Corp.; Bell & Gossett Div.

f. Patterson Pump Co.

g. Peerless Pump Co.

h. Taco, Inc.

i. PACO.

2.02 GENERAL

A. System circulating pump shall be centrifugal type, close-coupled single stage; with a cast bronze enclosed dynamically balanced impeller, internally flushed mechanical seal suitable for continuous operation up to 225 DegF, minimum working pressure of 125 psi, cast iron case with gauge tappings and vent and drain ports, and a single speed continuous duty NEMA MG 1 motor. Pumps shall be factory tested, cleaned and painted prior to shipping.

2.03 HORIZONTAL IN-LINE PUMPS

A. Description: Horizontal, in-line, centrifugal, flexible-coupled, single-stage, radially split case design. Include vertical-mounting, bronze-fitted design and mechanical seals rated for 125 psig (860-kPa) minimum working pressure and a continuous water temperature of 225 DegF (107 DegC).

1. Casing: Cast iron, with threaded companion flanges for piping connections. Pump motor, coupling and impeller shall be removable from casing without removing the casing from the piping.

2. Impeller: ASTM B584, cast bronze, statically and dynamically balanced, closed, single suction, and keyed to shaft.

3. Wear Rings: Replaceable, bronze casing ring.

4. Shaft and Sleeve: Ground and polished stainless-steel shaft with bronze sleeve.

5. Shaft: Ground and polished stainless-steel shaft with axially split spacer coupling.

6. Seals: Mechanical, with carbon-steel rotating ring, stainless-steel spring, ceramic seat, and flexible bellows and gasket.

7. Motor: Directly mounted to pump casing.

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PART 3 - EXECUTION

3.01 INSTALLATION

A. Install pumps according to manufacturer's written installation and alignment instructions.

B. Install pumps in locations indicated and arranged to provide access for periodic maintenance, including removal of motors, impellers, couplings, and accessories.

3.02 CONNECTIONS

A. General: Install shutoff valve and strainer on pump suction and check valve and balancing valve with memory stop on pump discharge.

B. Connect piping to pumps as indicated. Install reducers at the pump flange and install valves that are the same size as piping connecting to pumps.

C. Install temperature and pressure gage test in suction and discharge piping around each pump.

D. Install electrical connections for power, controls, and devices.

E. Electrical power and control wiring and connections are specified in Division 26 Sections.

3.03 FIELD QUALITY CONTROL

A. Check suction piping connections for tightness to avoid drawing air into pumps.

B. Clean strainers.

C. Set pump controls.

3.04 COMMISSIONING

A. Final Checks Before Startup: Perform the following preventive maintenance operations and checks before startup:

1. Lubricate bearings.
2. Check motor for proper rotation that matches direction marked on pump casing.
3. Check that pumps are free to rotate by hand. Pumps for handling hot liquids shall be free to rotate with pump hot and cold. Do not operate pump if it is bound or even drags slightly until cause of trouble is determined and corrected.
4. Check that pump controls are correct for required application.

3.05 PUMP CONTROLS

A. Pump shall be scheduled through the DDC system. When the pump is scheduled to be operation through the DDC system, the pump shall be turned on/off through a line voltage adjusted to maintain heating water piping at 118 DegF (adj.).

B. Pump shall run continuously.

END OF SECTION

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SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Sanitary drainage and vent piping, inside building and to outdoor locations indicated.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 22 42 00 - Plumbing Fixtures.

C. Section 22 48 00 - Plumbing Specialties.

D. Section 31 23 10 - Excavation and Fill.

E. Division 33 - Utilities.

F. Section 40 50 02 - Basic Mechanical Materials and Methods.

G. Section 40 05 07 - Hangers and Supports.

1.03 SUBMITTALS

A. Test Results and Reports: Specified in "Field Quality Control" Article.

B. Provide submittals for all sanitary sewer materials including manufacturer data for piping, fittings, and joining materials.

1.04 QUALITY ASSURANCE

A. Provide stamp, label, or other marking on piping made to specified standards.

B. Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation.

PART 2 - PRODUCTS

2.01 PIPES AND TUBES

A. Hub-and-Spigot, Cast-Iron Soil Pipe: ASTM A74, Service class. Include ASTM C564 rubber gasket, with dimensions required for pipe class, for each hub.

B. Hubless, Cast-Iron Soil Pipe: ASTM A888 or CISPI 301.

2.02 PIPE AND TUBE FITTINGS

A. General: Applications of the following pipe and tube fitting materials are indicated in Part 3 "Piping Applications" Article.

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B. Threaded-Fitting, End Connections: ASME B1.20.1.

C. Hub-and-Spigot, Cast-Iron, Soil-Pipe Fittings: ASTM A 74, Service and Extra Heavy classes, hub and spigot. Include ASTM C 564 rubber gasket, with dimensions required for pipe class, for each hub.

D. Hubless, Cast-Iron, Soil-Pipe Fittings: CISPI 301.

E. Cast-Iron Solvent Fittings: ASME B16.45 drainage-pattern aerator and deaerator.

F. Cast-Iron, Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.

G. Cast-Iron, Threaded Drainage Fittings: ASME B16.12, galvanized, drainage pattern.

H. Cast-Iron, Threaded Flanges: ASME B16.1, Class 125.

I. Ductile-Iron, Push-on-Joint Fittings: AWWA C110, ductile- or gray-iron standard pattern; or AWWA C153, ductile-iron compact pattern. Include AWWA C111 ductile- or gray-iron glands, rubber gaskets, and steel bolts with mechanical-joint fittings. Include AWWA C111 rubber gaskets with push-on joint fittings.

2.03 JOINING MATERIALS

A. Refer to Section 40 50 02 "Basic Mechanical Materials and Methods" for commonly used joining materials.

B. Solder: ASTM B32, Alloy Sn95, Sn94, or E; lead free.

C. Hubless, Cast-Iron, Soil-Piping Couplings: ASTM C1277 assembly of metal housing, corrosion resistant fasteners, and ASTM C564 rubber sleeve or gasket with integral, center pipe stop. Include the following:

1. Heavy-Duty, Stainless-Steel Couplings: ASTM A666, Type 304, stainless-steel housing or shield; and stainless-steel clamps. Include gasket.

a. Clamp Width: 3 IN (75 mm) wide with 4 clamps.

PART 3 - EXECUTION

3.01 EXCAVATION

A. Refer to Section 31 00 00 "Earthwork" and Section 31 23 10 "Excavation and Fill" for excavating, trenching, and backfilling.

3.02 PIPING APPLICATIONS

A. Aboveground, Soil, Waste, and Vent Piping: Use the following:

1. 1-1/2 IN NPS (DN40): Hubless, cast-iron soil pipe; hubless, cast-iron, soil-pipe fittings; and heavy duty Type 304 stainless steel soil pipe couplings.

2. 2 through 6 IN NPS (DN50 to DN100): Hubless, cast-iron soil pipe; hubless, cast-iron, soil-pipe fittings; and soil-pipe couplings. Heavy duty Type 304 stainless steel.

B. Underground, Soil, Waste, and Vent Piping: Use the following below floor slabs:

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a. 2 through 6 IN NPS (DN50 to DN100): Hub-and-spigot, cast-iron soil pipe, Service class; hub-and-spigot, cast-iron, soil-pipe fittings, Service class; and push joints.

3.03 PIPING INSTALLATION, GENERAL

A. Refer to Section 40 50 02 "Basic Mechanical Materials and Methods" for basic piping installation.

3.04 SERVICE ENTRANCE PIPING INSTALLATION

A. Extend building sanitary drain piping and connect to sanitary sewer piping in sizes and locations indicated for service entrances into building. Install cleanout and extension to grade at connections to the building sanitary sewers.

B. Install wall penetration system at each service entrance pipe penetration through foundation wall. Make installation watertight. Refer to Section 40 50 02 “Basic Mechanical Materials and Methods” for wall penetration systems.

3.05 DRAINAGE AND VENT PIPING INSTALLATION

A. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

B. Make changes in direction for drainage and vent piping using appropriate branches, bends, and long sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not make change in direction of flow greater than 90 degrees. Use proper size of standard increasers and reducers if different sizes of piping are connected. Reducing size of drainage piping in direction of flow is prohibited.

C. Lay buried building drain piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

D. Install drainage and vent piping at the following minimum slopes, unless otherwise indicated:

1. Sanitary Building Drain: 2 percent downward in direction of flow for piping 4 IN and smaller.

2. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

E. Sleeves are not required for cast-iron soil piping passing through concrete slab on grade if slab is without membrane waterproofing.

3.06 JOINT CONSTRUCTION

A. Refer to Section 40 50 02 "Basic Mechanical Materials and Methods" for basic piping joint construction.

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B. Cast-Iron, Soil-Piping Joints: Make joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Compression (Push) Joints: Rubber gasket matching class of pipe and fittings.
2. Hubless Joints: Rubber gasket and sleeve or clamp.

3.07 HANGER AND SUPPORT INSTALLATION

A. Refer to Section 40 05 07 "Hangers and Supports" for pipe hanger and support devices. Install the following:

1. Riser clamps, MSS Type 8 or Type 42, for vertical runs.
2. Adjustable steel clevis hangers, MSS Type 1, for individual, straight, horizontal runs 100 FT (30 m) and less.

B. Install supports according to Section 40 05 07 "Hangers and Supports."

C. Support vertical piping at base and at ceiling.

D. Rod diameter may be reduced one size for double-rod hangers, with 3/8 IN (10-mm) minimum rods.

E. Install hangers for cast-iron soil piping with the following maximum spacing and minimum rod diameters:

1. 1-1/2 and 2 IN NPS (DN40 and DN50): Maximum horizontal spacing, 60 IN (1500 mm) with 3/8 IN (10-mm) minimum rod diameter; maximum vertical spacing, 15 FT (4.5 m).
2. 3 IN NPS (DN80): Maximum horizontal spacing, 60 IN (1500 mm) with 1/2 IN (13- mm) minimum rod diameter; maximum vertical spacing, 15 FT (4.5 m).
3. 4 IN NPS (DN100 and DN125): Maximum horizontal spacing, 60 IN (1500 mm) with 5/8 IN (16-mm) minimum rod diameter; maximum vertical spacing, 15 FT (4.5 m).

F. Install hangers for ductile-iron piping with the following maximum spacing and minimum rod diameters:

1. 1-1/4 IN NPS (DN32): Maximum horizontal spacing, 84 IN (2100 mm); 3/8 IN (10- mm) minimum rod diameter; maximum vertical spacing, 15 FT (4.5 m).
2. 1-1/2 IN NPS (DN40): Maximum horizontal spacing, 108 IN (2700 mm) with 3/8 IN (10-mm) minimum rod diameter; maximum vertical spacing, 15 FT (4.5 m).
3. 2 IN NPS (DN50): Maximum horizontal spacing, 10 FT (3 m) with 3/8 IN (10-mm) minimum rod diameter; maximum vertical spacing, 15 FT (4.5 m).
4. 2-1/2 IN NPS (DN65): Maximum horizontal spacing, 11 FT (3.4 m) with 1/2 IN (13-mm) minimum rod diameter; maximum vertical spacing, 15 FT (4.5 m).
5. 3 IN NPS (DN80): Maximum horizontal spacing, 12 FT (3.7 m) with 1/2 IN (13-mm) minimum rod diameter; maximum vertical spacing, 15 FT (4.5 m).

G. Support piping not listed above according to MSS SP-69 and manufacturer's written instructions.

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3.08 CONNECTIONS

A. Connect service entrance piping to exterior sewerage and drainage piping. Use transition fitting to join dissimilar piping materials.

B. Connect drainage piping to service entrance piping, and extend to and connect to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.

2. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code. Refer Section 22 48 00 - "Plumbing Specialties."

3.09 FIELD QUALITY CONTROL

A. Inspect drainage and vent piping as follows:

1. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

2. During installation, notify authorities having jurisdiction at least 24 HRS before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

a. Roughing-In Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.

b. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

3. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

B. Test drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedure, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that has been covered or concealed before it has been tested and approved.

3. Roughing-In Plumbing Test Procedure: Test drainage and vent piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10 FT of head (30 kPa). Water level must not drop from 15 minutes before inspection starts through completion of inspection. Inspect joints for leaks.

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4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1 IN WG (250 Pa). Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
5. Repair leaks and defects using new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

3.10 CLEANING AND PROTECTING

A. Clean interior of piping system. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION

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SECTION 22 14 29 - SUMP PUMPS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Sump pumps.

1.02 RELATED REQUIREMENTS (SECTIONS)

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to this section.

1.03 REFERENCED STANDARDS

A. UL and NEMA Compliance – Provide electric motors and components which are listed and labeled by Underwriters Laboratories and comply with NEMA Standards.

1.04 SYSTEM DESCRIPTION

A. Provide single source coordination responsibility through the pump manufacturer for the entire system including but not limited to the following:

1. Pumps.
2. Motors.
3. Float switches.
4. Control panel.
5. Guiderails.

1.05 SUBMITTALS

A. Submit as specified in Section 01 61 02 and Section 01 33 00.

B. Product Data – Submit manufacturer's pump specifications, installation and start-up instructions, and current accurate pump characteristic performance curves with selection points clearly indicated.

C. Wiring Diagrams – Submit manufacturer's electrical requirements for power supply wiring to pumps. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field installed.

D. Maintenance Data – Submit maintenance data and parts lists of each type of pump, control and accessory; including "trouble-shooting" maintenance guide. Include this data, product data, and wiring diagrams in maintenance manual; in accordance with the requirements of Division 01.

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PART 2 - PRODUCTS

2.01 SUBMERSABLE SUMP PUMPS

A. General – Provide complete equipment and incidentals required for a non-clog submersible centrifugal sump pump(s) specified herein.

B. Operating Conditions – The pumps(s) shall be rated at 2HP, 460V, 3 PH, 60Hz, running at 1750 RPM. The units shall produce 100 GPM at 35 FT TDH. The pump shall be capable of handing a 2-1/2 IN spherical solid. The pump shall be non-overloading throughout the entire range of operation without employing service factor. The pump shall reserve a minimum service factor of 1.20.

C. Construction – The pump shall be centrifugal, non-clog, submersible, waste water type. The pump volute, motor, and seal housing shall be a high quality gray cast iron, ASTM A48, Class 30. All external mating parts shall be machined and Buna N Rubber square-rings sealed. All fasteners exposed to the pumped liquids shall be 300 series stainless steel.

D. Electrical Power Cord – The motor power cord shall be SJTW/SJTW-A type. The cord shall have a molded compression grommet to insulate electrical connections. The grommet shall be threaded into the motor housing to provide a positive seal and to prevent leaking of liquid into the motor housing. The sealing grommet shall provide strain relief for the power cord.

E. Motor – The stator, motor, and bearings shall be mounted in a sealed submersible type housing. The stator windings shall have Class F insulation, 311 DegF and a dielectric oil filled motor, NEMA B design. Further protection shall be provided by on-winding thermal sensors. Heat sensors shall be low resistance, bi-metal disc that is temperature sensitive. It shall be mounted directly on the stator windings and sized to open at 120 DegF and automatically reset at 30 DegF to 35 DegF differential. The pump and motor shall be specifically designed so that they may be operated partially or completely submerged in the liquid being pumped.

F. Bearings and Shaft – An upper radial bearing and lower thrust bearing shall be required. These shall be heavy-duty bearings which are permanently lubricated by the dielectric oil which fills the motor housing. The shaft shall be machined from a solid 303 stainless steel forging of a large diameter to reduce shaft deflection.

G. Seals – The pump shall have two (2) mechanical seals, mounted in tandem, with an oil chamber between the seals. The seals shall have carbon and ceramic faces. Replacement seals shall be readily available.

H. Impeller – The impeller shall be of the enclosed non-clogging design and have pump-out vanes on the front and backside to prevent grit and other materials from collecting in the seal area. The impeller shall be dynamically balanced.

I. Casing – The casing shall be of the end suction volute type having sufficient strength and thickness to withstand all stress and from service at full operating pressure and load.

J. Painting – The pump shall be painted after assembly with a zinc chromate base enamel.

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K. Control Panel – Furnish and install on complete pump control panel in a NEMA 3R rated enclosure. The panel to provide short circuit protection and line disconnect. The panel shall incorporate circuit breakers with through inner door operating handles, tamper proof door, inner door, run lights, start relays and magnetic starters with ambient compensated quick trip overloads, alternator and HOA selector switches, and high level alarm light and alarm bell with silencer.

L. Available Manufacturers – Subject to compliance with requirements, manufacturers offering submersible type sump pumps which may be incorporated in the work include, but are not limited to, the following:

1. ABS, Inc.
2. Barnes Pump, Inc.
3. Myers Pumps, Inc.
4. Weil Pump Co.
5. Weinman Pump LFE Corp.; Fluids Control Division.

PART 3 - EXECUTION

3.01 INSTALLATION OF PUMPS

A. General – Install pumps which are indicated on drawings, in accordance with the manufacturer's published installation instructions, complying with recognized industry practices to ensure pumps comply with requirements and serve intended purposes.

B. Electrical Wiring – Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagrams submittal to Electrical Installer.

END OF SECTION

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SECTION 22 15 10 - COMPRESSED AIR STATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Standard Union Pacific Railroad compressed air stations. All of the air supply stations shall be similar in design, but actual CFM requirements may vary by location.

B. These Packages must be completely assembled, wired and plumbed stations designated to operate in ambient conditions between –20 DegF to +110 DegF without experiencing freezing and overheating problems.

C. This entire system will be designed for, and installed in a standard ICC container or an UPRR approved container sizes as listed below. All modifications to the container that will be required for the appropriate air flows, ambient temperatures, heat rejection, lighting, flooring, equipment spacing, maintenance access, etc., will be the responsibility of the vendor.

COMPRESSOR	CONTAINER SIZE
All singles	8 FT-6 IN (Nominal)W x 7 FT-0 IN H x 20'LG
Duals (up to 40hp)	8 FT-6 IN (Nominal)W x 7 FT-0 IN H x 20'LG
Duals (over 40hp)	8 FT-6 IN (Nominal)W x 7 FT-0 IN H x 40'LG

1.02 REFERENCED STANDARDS

A. ANSI/CAGI B19.1 Safety Standards for Compressors for Processor Industry

B. American Petroleum Institute (API):

1. 5L, Line Piping

C. ASTM International (ASTM):

1. A234, Specification for Piping Fittings of Wrought Carbon Steel for Moderated and Elevated Temperatures

D. American National Standards Institute (ANSI):

1. B16.9, Factory Made Wrought Steel Buttwelding Fittings

E. American Society of Mechanical Engineers – Boiler and Pressure Vessel Code.

F. National Electrical Code (NEC) – Latest Published Edition.

G. Uniform Building Code and applicable local building codes.

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1.03 SUBMITTALS

A. Provide detailed literature describing the furnished equipment with bid. This information includes dimensional information concerning the overall dimensions, proposed container modifications inclusive to inlets, outlets, venting, personnel egress, anchor bolts and electrical connection of the assembled package unit. Failure to provide a complete description will result in rejection of the bid.

B. Vendor shall provide accurate layout drawings in electronic format for approval, prior to construction.

C. Vendor shall provide copies of each installation, operation, and maintenance manuals and repair parts list for all equipment with each compressed air station in electronic format. One hard copy is to be stored in a metal holder securely fastened to the building interior structure.

D. Supply submittals as listed in the project specifications.

1.04 QUALITY ASSURANCE

A. Vendor shall have a minimum of 5 years experience in design and construction of compressed air stations of similar size and components.

PART 2 - PRODUCTS

2.01 COMPRESSED AIR STATION

A. The compressed air station shall be one complete unit. The complete Compressed Air Station shall consist of, but not limited to, the following components:

1. Air Compressor.
2. Air Dryer.
3. Inline Filter.
4. Oil / Water Separator.
5. Demand Controller.
6. Dry Air Receiver (if applicable).
7. Piping as needed.
8. Valves – 5 gph, no air loss. Valves shall be “Manual” or “On-Demand” depending on location, as needed if not supplied:
    a. Examples, but not limited to, compressor moisture separator, receiver tank, and inline filter.
9. Heating/Ventilation (as needed per region).

B. Electrical Supply: Two (2) 7.5 HP Air Compressors (120/240V, 1 Phase, 3 Wire).

1. Compressed air station shall have Square D heavy duty fusible, pad-lockable, NEMA 3R, 600V switch, for a 3-wire system. This disconnect shall be 200A rated with a 200A Class R fuse for single point electrical connection located outside the container, approved and labeled for service entry to feed all equipment and lighting. All fuses shall be Class "R" Bussman Fusetrons, unless otherwise noted. Provide three spare fuses for each size used. All necessary accessories to make a complete electrical system are required. This includes equipment grounding kit, rainproof bolt-on hub, neutral assembly kit, and the lock off guard kit.
2. Inside the container, provide a Square D NQ MLO 225A main panel with separate breakers for each air compressor (100A, 240V, 2 pole), lighting (20A, 120V, 1 pole), receptacles (20A, 120V, 1 pole) and appropriately sized breakers per the National Electrical Code (NEC) for any additional loads (ie. heater, air conditioner, etc.).
3. All conductors for interior wiring shall be 98 percent conductivity copper. Insulation shall be 600V THW or THWN thermoplastic, unless otherwise specified. No wire shall be smaller than #12 unless otherwise noted. Conductors shall be continuous from outlet to outlet. No splices shall be made except within outlet or junction boxes. All exposed interior raceways shall be galvanized rigid steel (RGS). Minimum size conduit shall be 3/4 IN nominal trade size. All panels, wire and conduit shall comply with NEC. All panels shall provide at least 25 percent spare breaker capacity. Panelboards and disconnects shall be marked with permanently attached, engraved, plastic or phenolic nameplate. The nameplate shall have a white background with contrasting black lettering not smaller than 3/8 IN in height. Indicate panel name, or designation and voltage, phase, and wire characteristics (ie, 120/240V, 1P, 3W).

C. Electrical Supply: Two (2) 7.5hp Air Compressors (**277480V, 3 Phase, 4 Wire**).

1. Compressed air station shall have a Square D, heavy duty, fusible, pad-lockable, NEMA 3R, 600V switch, for a 4-wire system. This disconnect shall be 100A rated with a 100A Class R fuse for single point electrical connection located outside the container, approved and labeled for service entry to feed all equipment and lighting. All fuses shall be Class "R" Bussman Fusetrons, unless otherwise noted. Provide three spare fuses for each size used. All necessary accessories to make a complete electrical system are required. This includes equipment grounding kit, rainproof bolt-on hub, neutral assembly kit, and the lock off guard kit.
2. Inside the container, provide 125A Square D NF, MLO, 480Y/277V panelboard with 30 spaces, with separate circuit breakers for each air compressor (30A, 480V, 3 pole) and Mini-Power Zone (25A, 480V, 2 pole). Provide appropriately sized breakers per the National Electrical Code (NEC) for any other loads (ie. heater, air conditioner, etc.). Balance load across phases. Also provide a 5kVA Square D Mini-Power Zone, 480V input to 120/240 volt, with separate breakers to service lighting (20A, 120V, 1 pole) and receptacles (20A, 120V, 1 pole).

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3. All conductors for interior wiring shall be 98% conductivity copper. Insulation shall be 600V THW or THWN thermoplastic, unless otherwise specified. No wire shall be smaller than #10 unless otherwise noted. Conductors shall be continuous from outlet to outlet. No splices shall be made except within outlet or junction boxes. All exposed interior raceways shall be galvanized rigid steel (RGS). Minimum size conduit shall be 3/4 IN nominal trade size. All panels, wire and conduit shall comply with NEC. All panels shall provide at least 25 percent spare breaker capacity. Panelboards and disconnects shall be marked with permanently attached, engraved, plastic or phenolic nameplate. The nameplate shall have a white background with contrasting black lettering not smaller than 3/8 IN in height. Indicate panel name, or designation and voltage, phase, and wire characteristics (ie, 120/240V, 1P, 3W).

D. Electrical Supply: Two (2) **10hp** Air Compressors (120/**208V,** 3 Phase, 4 Wire).

1. Compressed air station shall have a Square D, heavy duty, fusible, pad-lockable, NEMA 3R, 600V switch, for a 4-wire system. This disconnect shall be 200A rated with a 200A Class R fuse for single point electrical connection located outside the container, approved and labeled for service entry to feed all equipment and lighting. All fuses shall be Class "R" Bussman Fusetrons, unless otherwise noted. Provide three spare fuses for each size used. All necessary accessories to make a complete electrical system are required. This includes equipment grounding kit, rainproof bolt-on hub, neutral assembly kit, and the lock off guard kit.

2. Inside the container, provide 225A Square D NQ, MLO, 120/208V panelboard with 30 spaces, with separate circuit breakers for each air compressor (70A, 208V, 3 pole), lighting (20A, 120V, 1 pole), and receptacles (20A, 120V, 1 pole). Provide appropriately sized breakers per the National Electrical Code (NEC) for any other loads (ie. heater, air conditioner, etc.).

3. All conductors for interior wiring shall be 98 percent conductivity copper. Insulation shall be 600V THW or THWN thermoplastic, unless otherwise specified. No wire shall be smaller than #10 unless otherwise noted. Conductors shall be continuous from outlet to outlet. No splices shall be made except within outlet or junction boxes. All exposed interior raceways shall be galvanized rigid steel (RGS). Minimum size conduit shall be 3/4 IN nominal trade size. All panels, wire and conduit shall comply with NEC. All panels shall provide at least 25 percent spare breaker capacity. Panelboards and disconnects shall be marked with permanently attached, engraved, plastic or phenolic nameplate. The nameplate shall have a white background with contrasting black lettering not smaller than 3/8 IN in height. Indicate panel name, or designation and voltage, phase, and wire characteristics (ie, 120/208V, 3P, 4W).

E. Electrical Supply: Two (2) **15hp** Air Compressors (120/**208V,** 3 Phase, 4 Wire).

1. Compressed air station shall have a Square D, heavy duty, fusible, pad-lockable, NEMA 3R, 600V switch, for a 4-wire system. This disconnect shall be 200A rated with a 200A Class R fuse for single point electrical connection located outside the container, approved and labeled for service entry to feed all equipment and lighting. All fuses shall be Class "R" Bussman Fusetrons, unless otherwise noted. Provide three spare fuses for each size used. All necessary accessories to make a complete electrical system are required. This includes equipment grounding kit, rainproof bolt-on hub, neutral assembly kit, and the lock off guard kit.
2. Inside the container, provide 225A Square D NQ, MLO, 120/208V panelboard with 30 spaces, with separate circuit breakers for each air compressor (100A, 208V, 3 pole), lighting (20A, 120V, 1 pole), and receptacles (20A, 120V, 1 pole). Provide appropriately sized breakers per the National Electrical Code (NEC) for any other loads (i.e. heater, air conditioner, etc.).
3. All conductors for interior wiring shall be 98 percent conductivity copper. Insulation shall be 600V THW or THWN thermoplastic, unless otherwise specified. No wire shall be smaller than #10 unless otherwise noted. Conductors shall be continuous from outlet to outlet. No splices shall be made except within outlet or junction boxes. All exposed interior raceways shall be galvanized rigid steel (RGS). Minimum size conduit shall be 3/4 IN nominal trade size. All panels, wire and conduit shall comply with NEC. All panels shall provide at least 25 percent spare breaker capacity. Panelboards and disconnects shall be marked with permanently attached, engraved, plastic or phenolic nameplate. The nameplate shall have a white background with contrasting black lettering not smaller than 3/8 IN in height. Indicate panel name, or designation and voltage, phase, and wire characteristics (ie, 120/208V, 3P, 4W).

F. Electrical Supply: Two (2) **10hp** Air Compressors (120/**240V,** 3 Phase, 4 Wire).

1. Compressed air station shall have a Square D, heavy duty, fusible, pad-lockable, NEMA 3R, 600V switch, for a 4-wire system. This disconnect shall be 200A rated with a 200A Class R fuse for single point electrical connection located outside the container, approved and labeled for service entry to feed all equipment and lighting. All fuses shall be Class "R" Bussman Fusetrons, unless otherwise noted. Provide three spare fuses for each size used. All necessary accessories to make a complete electrical system are required. This includes equipment grounding kit, rainproof bolt-on hub, neutral assembly kit, and the lock off guard kit.
2. Inside the container, provide 225A Square D NQ, MLO, 120/240V panelboard with 30 spaces, with separate circuit breakers for each air compressor (70A, 240V, 3 pole), lighting (20A, 120V, 1 pole), receptacles (20A, 120V, 1 pole). Provide appropriately sized breakers per the National Electrical Code (NEC) for any other loads (ie. heater, air conditioner, etc.). Balance load across phases.

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3. All conductors for interior wiring shall be 98 percent conductivity copper. Insulation shall be 600V THW or THWN thermoplastic, unless otherwise specified. No wire shall be smaller than #10 unless otherwise noted. Conductors shall be continuous from outlet to outlet. No splices shall be made except within outlet or junction boxes. All exposed interior raceways shall be galvanized rigid steel (RGS). Minimum size conduit shall be 3/4 IN nominal trade size. All panels, wire and conduit shall comply with NEC. All panels shall provide at least 25 percent spare breaker capacity. Panelboards and disconnects shall be marked with permanently attached, engraved, plastic or phenolic nameplate. The nameplate shall have a white background with contrasting black lettering not smaller than 3/8 IN in height. Indicate panel name, or designation and voltage, phase, and wire characteristics (ie, 120/208V, 3P, 4W).

G. Electrical Supply: Two (2) **15hp** Air Compressors (120/**240V**, 3 Phase, 4 Wire).

1. Compressed air station shall have a Square D, heavy duty, fusible, pad-lockable, NEMA 3R, 600V switch, for a 4-wire system. This disconnect shall be 400A rated with a 225A Class R fuse for single point electrical connection located outside the container, approved and labeled for service entry to feed all equipment and lighting. All fuses shall be Class "R" Bussman Fusetrons, unless otherwise noted. Provide three spare fuses for each size used. All necessary accessories to make a complete electrical system are required. This includes equipment grounding kit, rainproof bolt-on hub, neutral assembly kit, and the lock off guard kit.

2. Inside the container, provide 225A Square D NQ, MLO, 120/240V panelboard with 30 spaces, with separate circuit breakers for each air compressor (100A, 240V, 3 pole), lighting (20A, 120V, 1 pole), receptacles (20A, 120V, 1 pole). Provide appropriately sized breakers per the National Electrical Code (NEC) for any other loads (ie. heater, air conditioner, etc.). Balance load across phases.

3. All conductors for interior wiring shall be 98 percent conductivity copper. Insulation shall be 600V THW or THWN thermoplastic, unless otherwise specified. No wire shall be smaller than #10 unless otherwise noted. Conductors shall be continuous from outlet to outlet. No splices shall be made except within outlet or junction boxes. All exposed interior raceways shall be galvanized rigid steel (RGS). Minimum size conduit shall be 3/4 IN nominal trade size. All panels, wire and conduit shall comply with NEC. All panels shall provide at least 25 percent spare breaker capacity. Panelboards and disconnects shall be marked with permanently attached, engraved, plastic or phenolic nameplate. The nameplate shall have a white background with contrasting black lettering not smaller than 3/8 IN in height. Indicate panel name, or designation and voltage, phase, and wire characteristics (ie, 120/208V, 3P, 4W).

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H. Electrical Supply: Two (2) **10hp** Air Compressors (**277/480V**, 3 Phase, 4 Wire).

1. Compressed air station shall have a Square D, heavy duty, fusible, pad-lockable, NEMA 3R, 600V switch, for a 4-wire system. This disconnect shall be 200A rated with a 125A Class R fuse for single point electrical connection located outside the container, approved and labeled for service entry to feed all equipment and lighting. All fuses shall be Class "R" Bussman Fusetrons, unless otherwise noted. Provide three spare fuses for each size used. All necessary accessories to make a complete electrical system are required. This includes equipment grounding kit, rainproof bolt-on hub, neutral assembly kit, and the lock off guard kit.

2. Inside the container, provide 125A Square D NF, MLO, 480Y/277V panelboard with 30 spaces, with separate circuit breakers for each air compressor (35A, 480V, 3 pole) and Mini-Power Zone (25A, 480V, 2 pole). Provide appropriately sized breakers per the National Electrical Code (NEC) for any other loads (ie. heater, air conditioner, etc.). Balance load across phases. Also provide a 5kVA Square D Mini-Power Zone, 480V input to 120/240 volt, with separate breakers to service lighting (20A, 120V, 1 pole) and receptacles (20A, 120V, 1 pole).

3. All conductors for interior wiring shall be 98 percent conductivity copper. Insulation shall be 600V THW or THWN thermoplastic, unless otherwise specified. No wire shall be smaller than #10 unless otherwise noted. Conductors shall be continuous from outlet to outlet. No splices shall be made except within outlet or junction boxes. All exposed interior raceways shall be galvanized rigid steel (RGS). Minimum size conduit shall be 3/4 IN nominal trade size. All panels, wire and conduit shall comply with NEC. All panels shall provide at least 25 percent spare breaker capacity. Panelboards and disconnects shall be marked with permanently attached, engraved, plastic or phenolic nameplate. The nameplate shall have a white background with contrasting black lettering not smaller than 3/8 IN in height. Indicate panel name, or designation and voltage, phase, and wire characteristics (ie, 120/208V, 3P, 4W).

I. Electrical Supply: Two (2) **15hp** Air Compressors (**277/480V**, 3 Phase, 4 Wire).

1. Compressed air station shall have a Square D, heavy duty, fusible, pad-lockable, NEMA 3R, 600V switch, for a 4-wire system. This disconnect shall be 200A rated with a 125A Class R fuse for single point electrical connection located outside the container, approved and labeled for service entry to feed all equipment and lighting. All fuses shall be Class "R" Bussman Fusetrons, unless otherwise noted. Provide three spare fuses for each size used. All necessary accessories to make a complete electrical system are required. This includes equipment grounding kit, rainproof bolt-on hub, neutral assembly kit, and the lock off guard kit.

2. Inside the container, provide 125A Square D NF, MLO, 480Y/277V panelboard with 30 spaces, with separate circuit breakers for each air compressor (50A, 480V, 3 pole) and Mini-Power Zone (25A, 480V, 2 pole). Provide appropriately sized breakers per the National Electrical Code (NEC) for any other loads (ie. heater, air conditioner, etc.). Balance load across phases. Also provide a 5kVA Square D Mini-Power Zone, 480V input to 120/240 volt, with separate breakers to service lighting (20A, 120V, 1 pole) and receptacles (20A, 120V, 1 pole).

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