SCAMMON BAY BULK FUEL UPGRADES

TECHNICAL SPECIFICATION SUBMITTAL

Prepared for:

ALASKA ENERGY AUTHORITY

813 West Northern Lights Boulevard

Anchorage, Alaska 99503

November 2023

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DIVISION 00 – BIDDING AND CONTRACT REQUIREMENTS (yellow)

(TO BE PROVIDED BY THE ALASKA ENERY AUTHORITY)

DIVISION 01 – GENERAL REQUIREMENTS

DIVISION 02 – EXISTING CONDITIONS

DIVISION 03 – CONCRETE

DIVISION 04 (NOT USED)

DIVISION 05 – METALS

DIVISION 26 – ELECTRICAL

DIVISIONS 27 – 30 (NOT USED)

DIVISION 31 – EARTHWORK

DIVISION 32 – EXTERIOR IMPROVEMENTS

DIVISION 33 – UTILITIES

DIVISIONS 34 – 39 (NOT USED)

DIVISION 40 – PROCESS INTEGRATION

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SECTION 01 11 13

WORK COVERED BY CONTRACT DOCUMENTS

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Important Site Information

B. General Requirements

C. Work This Contract

D. Description of Bid Items

E. Contract Method

F. Work by Others

G. Disruptions to Service

H. Contractor's Use of Premises

I. Coordination and Cooperation

J. Access for Testing and Inspection

1.2 NOTICE TO PROCEED

A. The Authority will issue a Notice to Proceed (NTP) authorizing construction to begin and indicating the date when Contract time will begin. The Contractor shall not begin construction before the effective date of the Notice to Proceed. The Notice to Proceed may include limits or restrictions on allowable activities. The Authority, at its sole discretion, will refuse to pay for construction begun before the effective date of the Notice to Proceed. The Contractor shall notify the Engineer at least 48 hours before construction begins at the project site.

B. It is anticipated that construction for this project will be authorized with 3 NTPs, each covering a separate portion of the work as follows:

1. NTP 1 includes construction of site civil work below the tank farm containment, as noted on the drawings. This includes but is not limited to:

   a. Mobilization of equipment and materials required for NTP 1 work

   b. Construction facilities and temporary controls required to support NTP 1 work

   c. Traffic Control and quality control for NTP 1 work

d. Clearing and grubbing

e. Top soil and seeding

f. Erosion control aggregate

g. Remove existing culvert and install new culvert

h. Structural fill to limits of NTP 1 as shown on drawings

i. Temporarily grade site to drain until tank farm is constructed under subsequent NTP 3

2. NTP 2 includes procurement of fuel tanks, dispenser enclosure, pump boxes, stairs, landings, walkways, retail sales building, and spill response equipment. This NTP includes shipment, secure storage, and protection of procured materials in Contractor-provided secure area in Scammon Bay. Mobilization of equipment and materials, construction facilities and temporary controls, Traffic Control, and quality control for NTP 2 work is included in this NTP.

3. NTP 3 includes construction of all the remaining work required by the project.

C. It is anticipated that NTP 1 and NTP 2 will be issued soon after contract award. If NTP 3 cannot be issued concurrently with NTP 1 and NTP 2, it is anticipated to be issued by September 2024. If funding for NTP 3 is not available by January 2025, NTP 3 will not be issued unless mutually agreed upon by the Authority and the Contractor. The Authority will not negotiate new pricing if the funding is not available by the expected date.

D. Failure to award NTP 2 and/or NTP 3 will not be considered a termination and will not be a basis for a claim or adjustment to the contract price for the work performed under NTP 1. By submission of a bid for this project, the Contractor agrees it can complete NTP 1 work for the NTP 1 price, even if NTP 2 and/or NTP 3 are not awarded. NTP 2 and NTP 3 may be deleted from the contract by change order at no cost to the Authority.

E. The items for NTP 1, NTP 2, and NTP 3 are shown in the bid schedule.

F. This project will be funded by a mix of Federal and State funds. If sufficient funds are not received, this project shall be canceled at no cost to the Authority. The Authority makes no guarantee that the Base Bid, the Base Bid and Additive Alternate 1, or the Base Bid and Additive Alternates 1 and 2 (as shown on the bid schedule) will be awarded.

The project will be awarded on the following basis:

1. Base Bid

2. Base Bid plus Additive Alternate 1

3. Base Bid plus Additive Alternate 1 and Additive Alternate 2

The project will be awarded up to the greatest amount of Base Bid and Additive Alternates that may be selected within the funds available.

1.3 IMPORTANT SITE INFORMATION

A. Site plan and topographical information shown on drawings is based on a field survey performed by HDL Engineering Consultants, LLC (HDL) in October 2020. Minor changes to the bulk fuel tank farm pad and material quantities should be anticipated. Contractor shall make these changes and provide all work necessary to furnish and install a functional bulk fuel tank farm, piping system, bulk fuel transfer station, dispenser station, and retail sales building at no additional cost to the Authority.

B. Contractor shall perform all surveying necessary for construction and identify and field locate all utilities within the project area. Notify the Engineer immediately if there are conflicts between the proposed improvements and existing utilities.

C. The City of Scammon Bay (City) has a WA250 Komatsu Loader and a Case CX80 Excavator available for rent. Contractor shall contact the City to confirm equipment availability and make necessary rental agreements as required if the Contractor wants to rent the equipment.

D. Contractor shall make his own arrangements for staging of construction materials and equipment and shall coordinate and pay for the use of these areas with the associated landowners and other appropriate parties. No other staging areas are provided by the Authority.

E. Do not disturb Alaska Village Electric Cooperation (AVEC) barge header and barge off-loading piping located in the vicinity of the barge landing.

F. The project site is primarily located on a gravel pad covering the old community landfill. The old landfill has been decommissioned and was capped with gravel. No waste or capping material shall be excavated at the old landfill site. Excavation is permissible in the vicinity surrounding the old landfill and indicated in the plans.

1.4 GENERAL REQUIREMENTS

A. The existing barge off-loading pipelines and tank farm shall remain in service during construction. Decommission existing tank farm, barge off-loading pipelines, and vehicle dispenser after new tank farm is constructed. Coordinate all work with the Askinuk Corporation Fuel Facility Manager.

B. Furnish all labor, materials, supervision, equipment, tools, transportation, quality control, and supplies required to complete the work in accordance with the Contract Documents.

C. Notify the AEA Project Manager immediately if any conflicts are expected to interfere with the progress of the work.

D. Install all materials and equipment in accordance with the manufacturer's written instructions.

E. Contractor is responsible for all preparatory work and operations, including but not limited to pre-construction and post-construction costs of obtaining all required bonds, insurance, and other costs Contractor must incur before beginning the Work.

F. Contractor is responsible for transportation of all materials, supplies, plant(s), equipment, and personnel to and from the jobsite.

G. Contractor is responsible for erecting and maintaining all plants, temporary structures, storage yards, erosion control measures, and other construction facilities, and for work required to remove said temporary facilities and perform cleanup of the project area in accordance with the Contract Documents.

H. Contractor shall post all OSHA required notices and establish safety programs.

I. Contractor shall prepare and submit required Project Schedules.

J. Contractor is responsible for coordinating with and obtaining approval from the City of Scammon Bay for use of the barge landing facility and/or for utilizing the area surrounding the barge landing for stored materials.

K. Mobilization and Demobilization costs for all subcontracted work shall be considered to be included.

L. Construction Standards: Perform construction work as required to meet State and Federal codes and standards and meet the minimum requirements shown on the Plans and specified in the technical specifications.

M. Contractor is responsible for coordinating with and obtaining a certificate from the State of Alaska Division of Measurement Standards & Commercial Vehicle Compliance certifying the dual product electronic dispenser. Contractor is responsible for all costs incurred to certify the dual product electronic dispenser.

1.5 WORK THIS CONTRACT

A. Work under this Contract consists of the construction of a new bulk fuel tank farm, bulk fuel transfer station, dispensing station, a retail sales building, and cleaning & decommissioning of existing fuel storage tanks & barge header pipelines in the community of Scammon Bay, Alaska.

B. Basic Bid – Provide all labor, materials, and equipment required to construct Bid Schedules A, B, and C as described in Section 1.6. Description of Bid Items below.

C. Additive Alternates – Provide all labor, materials, and equipment required to construct Additive Alternates as described in Section 1.6 Description of Bid Items below.

D. The intent of the Contract is to provide the construction and completion of every detail of work described in the Contract Documents. The Contractor shall furnish all labor, materials, supervision, equipment, tools, transportation, quality control, and supplies required to complete the work in accordance with the Contract Documents. A brief description of the work is as follows:

Construct New Bulk Fuel Tank Farm: Work consists of providing all labor, materials, and equipment required to complete the Scammon Bay Bulk Fuel Tank Farm Project as shown in the Contract Plans and Documents. This work includes site work consisting of construction survey, clearing, excavation, site grading, placement of usable excavation in fill areas; furnishing and installing structural fill, crushed aggregate surface course, drain rock, erosion control aggregate, top soil, earthen containment dike; furnishing and installing tank farm liner, geotextile fabric, sump piping and drains, bollards, concrete stabilized fill, chain-link fence and signs, cellular confinement grid, electrical ground grid system, tank foundation concrete strip footings; furnishing and installing a bulk fuel transfer station with a secondary containment and a concrete pad; furnishing and installing a vehicle dispenser station with an enclosure and a concrete pad; furnishing and installing a retail sales building; furnishing and installing fuel tanks, pumps and appurtenances; furnishing and installing above grade distribution piping, below grade contained dispensing piping, transfer pumps, fuel pumps; furnishing spill response equipment; furnishing and installing lighting and controls, and other related work as described in the Contract Documents.

Decommissioning Fuel Piping: Works consists of providing all labor, materials, and equipment to clean, decommission, cut, and store the existing barge header pipeline, vehicle dispenser, and all associated piping as shown in the Contract Plans and Documents. This work includes cleaning, decommissioning, cutting, and storing approximately 600 feet of barge header pipeline, associated tank farm distribution piping and appurtenances, and one dispenser with associated piping.

Decommissioning Fuel Storage Tanks: Works consists of providing all labor, materials, and equipment to clean and decommission twelve (12) vertical single wall tanks, five (5) horizontal single wall tanks, and one (1) horizontal double wall tank. This work includes venting each decommissioned tank by cutting a minimum of two, 12-inch by 12-inch holes in each tank, rotating the cut piece 45-degrees and welding it over the hole in the tank.

1.6 DESCRIPTION OF BID ITEMS

A. Base Bid: Schedules A, B, C — Bulk Fuel Upgrades.

1. Schedule A: NTP 1 – Construct Tank Farm Gravel Pad (Base Bid)

a. Bid Item A1: Mobilization and Demobilization.

i. The lump sum for Mobilization and Demobilization shall

include but not be limited to all work required for NTP 1 work Mobilization and Demobilization in accordance with the plans and Section 02 12 00 Mobilization and Demobilization.

ii. Items not included in Mobilization and Demobilization include, but are not limited to, any portion of the Work covered by specific bid items or incidental work which is to be included in a bid item or items; and profit, interest on borrowed money, overhead or management costs.

b. Bid Item A2: Construct Tank Farm Gravel Pad

i. The lump sum to construct site civil work below the tank farm containment as noted on the drawings. The work includes, but is not limited to:

- Temporary Erosion
- Clearing and grubbing
- Usable and Unusable Excavation
- Furnish and Install Top soil and seeding
- Furnish and install erosion control aggregate
- Remove existing culvert and install new culvert
- Furnish and install structural fill to limits of NTP 1 as shown on drawings
- Temporarily grade site to drain until tank farm is constructed under subsequent NTP 3

ii. Furnish and install miscellaneous site work to include; ditch construction, stabilize slopes, surveying, clearing, dewatering, excavation, surface preparation, hauling, stockpiling, compaction, seeding, fertilizing, erosion control aggregate, and finish grading of fill materials in accordance with the plans and specifications.

2. Schedule B: NTP 2 – Tank, Fabricated Steel, and Building Procurement (Base Bid)

a. Bid Item B1: Furnish Tanks, Fabricated Steel, and Retail Sales Building

i. The lump sum for this bid item shall include all labor, materials, equipment, third party quality control inspections, and incidentals required to furnish fuel tanks, tank appurtenances, fabricated steel items, and the retail sales

building for future installation in the tank farm. Work includes fabrication, quality control, testing, shipping, securing, and storing furnished times in a Contractor-provided storage area in Scammon Bay. Fuel tanks, tank appurtenances, fabricated steel items, and the retail sales building shall be provided as described in the Contract Documents, including the following:

- Furnish one (1) 12,000-gallon, single wall, (approx. 8'-8"x28'), horizontal, dual product (6,000-gallon diesel, 6,000-gallon gasoline) dispensing tank with submersible pumps and appurtenances in accordance with the plans and specifications.
- Furnish (3) 27,000-gallon diesel, single wall, (approx. 11'x38') horizontal, bulk fuel tanks with appurtenances in accordance with the plans and specifications.
- Furnish four (4) 27,000-gallon gasoline, single wall, (approx. 11'x38') horizontal, bulk fuel tanks with appurtenances in accordance with the plans and specifications.
- Furnish vehicle dispenser enclosure in accordance with the plans and specifications.
- Furnish retail sales building in accordance with the plans and specifications.
- Furnish pump box in accordance with the plans and specifications.
- Furnish stairs and walkways in accordance with the plans and specifications.

ii. This item includes shipment, secure storage, and protection of procured materials in Contractor-provided secure area in Scammon Bay. Mobilization of equipment and materials, construction facilities and temporary controls, traffic control, and quality control for Schedule B work is incidental to Item B2.

3. Bid Item B2: Furnish Spill Response Equipment.

a. The lump sum for this bid item shall include all labor, materials, equipment, and incidentals required to conduct the following:

i. Furnish and provide storage (conex) with required spill response equipment in accordance with the plans and Section 11 80 00 Spill Response Equipment. This item

includes shipment, secure storage, and protection of furnished materials in Contractor-provided secure area in Scammon Bay.

4. Schedule C: NTP 3 – Construct New Tank Farm (Base Bid)

a. Bid Item C1: Mobilization and Demobilization.

i. The lump sum for Mobilization and Demobilization shall include but not be limited to all work required for NTP 3 work Mobilization and Demobilization in accordance with the plans and Section 02 12 00 Mobilization and Demobilization.

ii. Items not included in Mobilization and Demobilization include, but are not limited to, any portion of the Work covered by specific bid items or incidental work which is to be included in a bid item or items; and profit, interest on borrowed money, overhead or management costs.

b. Bid Item C2: Construct New Tank Farm

i. The lump sum for this bid item shall include all labor, materials, equipment, and incidentals required to complete the bulk fuel tank farm as described in the Contract Documents, including the following:

- Furnish and install structural fill material and crushed aggregate surface course (CASC) to complete construction of gravel embankments in accordance with the plans and specifications

- Furnish and install miscellaneous site work to include any remaining ditch construction, stabilize slopes, temporary erosion and sediment control, surveying, clearing, dewatering, excavation, surface preparation, hauling, stockpiling, compaction, seeding, fertilizing, erosion control aggregate, and finish grading of fill materials in accordance with the plans and specifications.

- Furnish and install tank farm earthen secondary containment to include a grounding grid system, tank farm liner and associated non-woven geotextile, drain rock, sub-drainage system, tank foundation concrete strip footings, concrete mat erosion control, and other incidental work shown on the plans in accordance with the plans and specifications.

- Install one (1) 12,000-gallon, single wall, (approx. 8’-

8”x28’), horizontal, dual product (6,000-gallon diesel, 6,000-gallon gasoline) dispensing tank with submersible pumps and appurtenances in accordance with the plans and specifications. The tank and appurtenances are to be furnished under NTP 2.

- Install three (3) 27,000-gallon diesel, single wall, (approx. 11’x38’) horizontal, bulk fuel tanks with appurtenances in accordance with the plans and specifications. The tanks and appurtenances are to be furnished under NTP 2.

- Install four (4) 27,000-gallon gasoline, single wall, (approx. 11’x38’) horizontal, bulk fuel tanks with appurtenances in accordance with the plans and specifications. The tanks and appurtenances are to be furnished under NTP 2.

- Furnish and install bulk fuel transfer station, secondary containment, and concrete pad in accordance with the plans and specifications.

- Install vehicle dispenser enclosure and furnish and install dispenser, concrete pad, mechanical, electrical, and equipment in accordance with the plans and specifications. The dispenser enclosure are to be furnished under NTP 2.

- Furnish and install all above grade and below grade piping for the bulk fuel transfer station, bulk fuel tank farm, and vehicle dispenser in accordance with the plans and specifications.

- Install retail sales building and furnish and install all electrical and equipment required for building operations in accordance with the plans and specifications.

- Install pump box and furnish and install associated pumps, piping, and valves in pump box in accordance with the plans and specifications. The pump box is to be furnished under NTP 2.

- Install stairs, walkways and landings in accordance with the plans and specifications. The stairs, walkways, and landings are to be furnished under NTP 2.

- Furnish and install all tank farm fencing with gates in accordance with the plans and specifications.

- Furnish and install all tank farm signage in accordance with the plans and specifications.
- Install spill response equipment in accordance with in accordance with the plans and specifications. The spill response equipment is to be furnished under NTP 2.
- Furnish and install tank farm controls and lighting in accordance with the plans and specifications.
- Complete all other work not specifically listed in other bid items but required by the Plans, specifications, and other contract documents in order to provide a fully functional, tested, and code compliant tank farm that operates and functions as specified. This includes all required operator training and operations and maintenance manual preparation.

5. Bid Item C3: Transfer Fuel and Decommission Existing Tank Farm.

   a. The lump sum for this bid item shall include all labor, materials, equipment, and incidentals required to conduct the following:

      i. Remove, filter (particulate and water removal), and transfer all useable fuel from tanks and piping to the new tank farm in accordance with the plans and specifications.

      ii. Transfer accumulated sludge into appropriate container for transport from the existing fuel pipe and tanks in accordance with the plans and specifications.

      iii. Properly dispose of contaminated water and other waste materials generated during cleaning of tanks.

      iv. Clean and decommission all existing fuel storage tanks in accordance with the plans and specifications.

      v. Clean, decommission, cut, and store all existing barge header pipeline, manifold distribution piping, and dispenser piping in accordance with the plans and specifications.

      vi. Decommission and store existing vehicle dispenser in accordance with the plans and specifications.

      vii. Decommission Existing Tank Farm in accordance with the plans and Section 01 94 00 Decommission Fuel Storage Tanks and Piping.

6. Bid Item C4: Manifesting, Transport, and Disposal of RCRA Hazardous Waste.

    a. The unit price for this bid item shall include all labor, materials, equipment, and incidentals required to conduct the following:

        i. Test, label, manifest, transport, and dispose of sludge removed from the tanks and confirmed by certified testing lab to be a RCRA Hazardous Waste. Activities to complete this task shall include all sample collection, transport and laboratory testing costs, sealing the steel 55 gallon drums containing RCRA hazardous waste in approved overpack drums, labeling each overpack drum with the name of the tank owner, completion of all required forms, manifests and other applicable documentation, transportation of sealed drums to an approved disposal facility and payment of all related handling and disposal fees in accordance with the Contract Drawings and Specifications. Sludge from tanks with differing owners shall not be mixed. The volume of each drum shall be utilized to the fullest practical extent. Partially full drums shall be avoided whenever possible.

        ii. Measurement for payment shall be per full 55-gallon drum sealed within appropriate over pack drum and delivered to an approved disposal site.

7. Bid Item C5: Manifesting, Transport, and Disposal of State Regulated Non-RCRA Hazardous Waste.

    a. The unit price for this bid item shall include all labor, materials, equipment, and incidentals required to conduct the following:

        i. Test, label, transport, and dispose of sludge removed from the tanks and confirmed by certified testing lab to be State Regulated Non-RCRA Hazardous Waste. Activities to complete this task shall include all sample collection, transport and laboratory testing costs, completion of all required forms, manifests and other applicable documentation, transportation to an approved disposal facility and payment of all related handling and disposal fees in accordance with the Contract Drawings and Specifications. Sludge from tanks with differing owners shall not be mixed. The volume of each drum shall be utilized to the fullest practical extent. Partially full drums shall be avoided whenever possible.

        ii. Measurement for payment shall be per full 55-gallon drum delivered to an approved disposal site.

B. Additive Alternates: Schedules D and E — Dismantle and Remove Existing Tanks.

1. Schedule D: NTP 3 – Dismantle Decommissioned Tanks (Additive Alternate 1)

    a. Bid Item D1: Dismantle Decommissioned Tanks

        i. The lump sum for this bid item shall include all labor, materials, equipment, and incidentals required to conduct the following:

            - Cut all decommissioned tanks into a minimum of 8-foot lengths. Cut 8-foot sections further into 3 equal sections and store in accordance with the plans and specifications.

            - Contractor shall consolidate and store all decommissioned tank material in neat and organized stacks within the old tank farm fuel containment area.

2. Schedule E: NTP 3 – Remove and Dispose of Decommissioned Tanks (Additive Alternate 2)

    a. Bid Item E1: Remove and Dispose of Decommissioned Tanks, Piping, and all other associated equipment.

        i. The lump sum for this bid item shall include all labor, materials, equipment, and incidentals required to conduct the following:

            - Transport the cut pieces to an existing landfill (if approved by the local solid waste authority) or to an alternative, Contractor provided, Authority approved, offsite disposal area in accordance with the plans and this section.

1.7 CONTRACT METHOD

A. This Contract is composed of multiple lump sum items and unit-price bid items as shown on the bid schedule. This work shall be measured and paid for work complete, in place, and include all labor, materials, supervision, equipment, tools, transportation, quality control, and supplies required to complete the work in accordance with the Contract Documents.

1.8 WORK BY OTHERS

A. None.

1.9 DISRUPTIONS TO SERVICE

A. The existing facility will remain open and in use during construction. No unscheduled disruptions in services shall be allowed.

1.10 CONTRACTOR'S USE OF PREMISES

A. Coordinate with the AEA Project Manager prior to placing equipment or supplies within the Project boundary. Do not disturb areas outside of Project boundaries.

B. Do not disrupt access to adjacent areas unaffected by the Work. Keep driveways and entrances serving premises clear and available for use at all times. Cooperate with the Authority during construction operations to minimize conflicts and facilitate operations.

C. Assume full responsibility for protection and safekeeping of products under this Contract.

D. Assume full responsibility for the protection of existing facilities and contents from damage due to construction operations.

1.11 COORDINATION AND COOPERATION

A. Coordinate all work with facility manager to minimize conflicts with the facilities operations.

B. Other projects may run concurrently with this work. Coordinate and cooperate with other contractors, agencies, and the Authority to minimize conflicts.

C. Coordinate work to assure efficient and orderly sequence of installation of construction elements.

D. Sequence work to maximize worker efficiency and minimize construction time.

E. Coordinate space requirements and installation of components. Utilize spaces efficiently to maximize accessibility for other installations, maintenance, and repairs.

1.12 ACCESS FOR TESTING AND INSPECTION

A. Provide access for AEA (Authority), the AEA Project Manager, and the Engineer to the site. Provide on-site transportation, ladders, lifts, eye and ear protection, hard hats, appropriate and clean respiratory protection, etc., for inspections and testing of the work.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

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SECTION 01 11 17

INTENT OF DOCUMENTS

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Explanation of intent and terminology of the Construction Documents.

1.2 RELATED REQUIREMENTS

A. Section 00 70 00 General Conditions: Article 1 Definitions relating to 'Drawings' and 'Specifications'.

B. Section 00 70 00 General Conditions: Article 3 Contract Documents relating to Intent, Amending, and Reuse.

1.3 SPECIFICATION FORMAT AND COMPOSITION

A. Specifications are divided into Divisions and Sections for the convenience of writing and using. Titles are not intended to imply a particular trade jurisdiction. AEA (Authority) is not bound to define the limits of any subcontract, and will not enter into disputes between the Contractor and his employees, including Subcontractors.

B. Pages are numbered independently for each section. Section number is shown with the page number at the bottom of each page. The end of each section of the specifications is ended by "End of Section". It is Contractor's responsibility to verify that Contract Documents received for bidding and/or construction are complete in accordance with Table of Contents.

C. The language employed in the Contract Documents is addressed directly to the Contractor. Imperative or indicative language is generally employed throughout and requirements expressed are the mandatory responsibility of the Contractor, even though the work specified may be accomplished by specialty subcontractors engaged by the Contractor. References to third parties in this regard shall not be interpreted in any way as to relieve the Contractor of his or her responsibility under this Contract.

D. These Specifications are of the abbreviated or "streamlined" type, and may include incomplete sentences.

E. Omissions of words or phrases such as "the Contractor shall", "in conformity there with", "shall be", "as noted on the Drawings", "according to the Drawings", "a", "an", "the", and "all" are intentional.

F. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the Drawings.

1.4 DRAWINGS: CONTENT EXPLANATION

A. Drawings, Dimensions, and Measurements.

1. Contract Documents do not purport to describe in detail, absolute and complete construction information. Drawings are diagrammatic. Contractor shall provide verification of actual site conditions and shall provide complete and operational systems as specified when drawings do not provide full detail.

1.5 COMMON TERMINOLOGY

A. Certain items used generally throughout the Specifications and Drawings are used as follows:

1. Indicated: The term "indicated" is a cross reference to details, notes or schedules on the Drawings, other paragraphs or schedules in the Specifications, and similar means of recording requirements in the Contract Documents. Where terms such as "shown", "noted", "schedules", and "specified" are used in lieu of "indicate", it is for the purpose of helping the reader accomplish the cross reference, and no limitation of location is intended except as specifically noted.

2. Installer: The person or entity engaged by Contractor or subcontractors for the performance of a particular unit of Work at the Project site, including installation, erection, application, and similar required operations. It is a general requirement that installers be recognized experts in the work they are engaged to perform.

3. Furnish: Except as otherwise defined in greater detail, the term "furnish" is used to mean, "...supply and deliver to the Project site, ready for unpacking, assembly, and installation..."

4. Provide: Except to the extent further defined, the term "provide" means to furnish and install, complete and ready for the intended use.

5. Guarantee and Warranty: "Guarantee" is generally used in conjunction with units of work which require both products and substantial amounts of labor at the Project site. "Warranty" is generally used in conjunction with products manufactured or fabricated away from the Project site. The resulting difference is that warranties are frequently issued by manufacturers, and guarantees are generally issued by Contractor and frequently supported (partially) by product warranties from manufacturers.

1.6 CONFLICTS

A. Report any conflicts to the Project Manager for clarification.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

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SECTION 01 12 19

CONTRACTOR'S CERTIFICATION OF SUBCONTRACTS

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Procedures for preparing, submitting, and accepting subcontracts.

1.2 RELATED REQUIREMENTS

A. Section 00 10 00 Information to Bidders, Requirements of Apparent Low Bidder.

B. Section 00 41 00 Subcontractor List.

C. Section 00 70 00 General Conditions.

D. Section 01 33 00 Submittal Procedures.

1.3 PREPARATION

A. Certification Forms: Use forms provided by AEA (Authority).

B. Contractor to prepare certification form and submit to the Authority prior to the start of work. Multiple subcontracts may be included under a single submittal. Where required, attach additional information (cross-referenced to the appropriate subcontract) to the certification form.

C. Substitute certification forms will not be considered.

1.4 SUBMITTAL OF CERTIFICATION

A. Contractor shall submit the initial and all subsequent certification forms in accordance with the submittal requirements identified under paragraph 1.2 D of this Section.

1.5 CONSIDERATION OF CERTIFICATION

A. Following receipt of submittal and within a reasonable period of time the Authority shall review for each of the following:

1. Completeness of forms and attachments.

2. Proper execution (signatures) of forms and attachments.

B. Submittals which are not complete or not properly executed will be returned to the Contractor under a transmittal letter denoting the deficiencies found. Contractor shall correct and resubmit per paragraph 1.4 of this Section.

1. Subcontractors will be required to leave the Project site until properly executed subcontract is in place.

2. Payment will not be made for work performed by a non-certified subcontractor.

1.6 ACKNOWLEDGMENT OF CERTIFICATION

A. Submittals which have been examined by the Authority and are determined to be complete and properly executed shall be acknowledged as such by signature of designated Authority representative on the face of each certification form.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 20 13

APPLICATIONS FOR PAYMENT

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Procedures for preparation and submittal of Applications for Payment.

1.2 RELATED REQUIREMENTS

A. Section 00 70 00 General Conditions.

B. Section 01 29 73 Schedule of Values.

C. Section 01 33 00 Submittal Procedures.

D. Section 01 77 19 Closeout Requirements.

E. Section 01 78 39 Project Record Documents.

1.3 FORMAT

A. Application for Payment form as provided by the Authority or Contractor's form containing same information.

1.4 PREPARATION OF APPLICATIONS

A. Type required information on Application for Payment form approved by the Authority.

B. Execute certification by original signature of authorized officer upon each copy of the Application for Payment.

C. Submit names of individuals authorized to be responsible for information submitted on Application for Payment.

D. Indicate breakdown of costs for each item of the Work on accepted schedule of values as specified in Section 01 29 73 Schedule of Values.

E. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original item of Work.

F. Include 10% retainage on each pay request. Retainage shall be eligible for payment on Contractor's final pay request.

G. Prepare Application for Final Payment as specified in Section 01 77 19 Closeout Requirements.

1.5 SUBMITTAL PROCEDURES

A. Submit one copy of each Application for Payment at times stipulated in Contract.

B. Submit under Authority accepted transmittal letter. See Section 01 29 73 Schedule of Values. Identify Contract by the Authority contract number.

1.6 SUBSTANTIATING DATA

A. When the Authority requires substantiating information, submit data justifying line item amounts in question.

B. Provide one copy of data with cover letter for each copy of Application for Payment. Show Application for Payment number and date, and line item by number and description.

1.7 SUBMITTALS WITH APPLICATION FOR PAYMENT

A. Submit the following with each Application for Payment.

1. Updated construction schedule as required by Section 01 32 16 Construction Progress Schedule.

2. Updated Schedule of Values as required by Section 01 29 73 Schedule of Values.

3. Evidence of transmittal of certified payrolls, if required, to the Labor Department.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 25 13

PRODUCT SUBSTITUTION PROCEDURES

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Requests for substitution of products.

1.2 RELATED REQUIREMENTS

A. Section 00 02 00 Invitation to Bid.

B. Section 00 70 00 General Conditions.

C. Section 00 80 00 Supplementary Conditions.

D. Section 01 33 00 Submittal Procedures.

E. Section 01 33 23 Shop Drawings, Product Data, and Samples.

1.3 SUBSTITUTION SUBMITTAL PERIOD

A. All product substitution requests will be considered only within fifteen (15) days after date established in Notice to Proceed. Subsequent requests will be considered only in case of product unavailability or other conditions beyond control of Contractor.

1.4 OPTIONS

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

B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not specifically named.

C. Products Specified by Naming One or More Manufacturers followed by the term "No Substitutions": Use only specified manufacturers, no substitutions allowed.

1.5 PRODUCTS LIST

A. Within fifteen (15) days after date of Notice to Proceed, transmit an electronic copy of a list of products which are proposed for installation, including name of manufacturer.

B. Tabulate products by Specifications Section number, Title, and Article number.

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

D. Project Manager will reply in writing within fifteen (15) days stating whether there is reasonable objection to listed items. Failure to object to a listed item shall not constitute a waiver of requirements of Contract Documents.

E. Project Manager will contact Engineer to ascertain any extra Professional fees to assess the substitutions and shall so notify Contractor who will include payment for the professional review cost in the application for substitution.

1.6 LIMITATIONS ON SUBSTITUTIONS

A. Substitutions will not be considered when indicated on Shop Drawings or product data submittals.

B. Substitute products shall not be ordered or installed without written acceptance.

C. Project Manager will contact the Engineer to determine acceptability of substitutions.

1.7 REQUESTS FOR SUBSTITUTIONS

A. Submit separate request for each substitution. Document each request with complete data substantiating compliance of proposed substitution with requirements of Contract Documents.

B. Identify product by Specification Section and Article numbers. Provide manufacturer's name and address, trade name of product, and model or catalog number. List fabricators and Suppliers as appropriate.

C. Attach product data as specified in Section 01 33 23.

D. List similar projects using product, dates of installation, and names of design Engineer(s) and, name of the facility owner.

E. Give itemized comparison of proposed substitution with specified product, listing variations, and reference to Specification Sections and Article numbers.

F. Give quality and performance comparison between proposed substitution and the specified product.

G. Give cost data comparing proposed substitution with specified product, and amount of net change to Contract Price.

H. List availability of maintenance services and replacement materials.

I. State effect of substitution on construction schedule, and changes required in other Work or products.

1.8 CONTRACTOR REPRESENTATION

A. Request for substitution constitutes a representation that Contractor has investigated proposed product and has determined that it is equal to or superior in all respects to specified product.

B. Contractor will provide same warranty for substitution as for specified product.

C. Contractor will coordinate installation of accepted substitute, making such changes as may be required for Work to be complete in all respects.

D. Contractor certifies that cost data presented is complete and includes all related costs under this Contract.

E. Contractor waives claims for additional costs related to substitution which may later become apparent.

1.9 SUBMITTAL PROCEDURES

A. Submit an electronic copy of complete request for substitution.

B. Project Manager will review Contractor's requests for substitutions with reasonable promptness.

C. During the bidding period, the Authority will record acceptable substitutions in Addenda.

D. After Award of Contract, the Authority will notify Contractor, in writing, of decision to accept or reject requested substitution within fifteen (15) days.

E. For accepted products, submit Shop Drawings, product data, and samples under provisions of Section 01 33 23.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

This page is blank intentionally.

SECTION 01 26 57

CHANGE ORDER PROCEDURES

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Procedures for processing Change Orders.

1.2 RELATED REQUIREMENTS

A. Section 00 32 00 Bid Schedule.

B. Section 00 51 00 Construction Contract: Total amount of Contract Price, as awarded.

C. Section 00 70 00 General Conditions.

D. Section 01 20 13 Applications for Payment.

E. Section 01 29 73 Schedule of Values.

F. Section 01 33 00 Submittal Procedures.

G. Section 01 77 19 Closeout Requirements.

1.3 SUBMITTALS

A. Submit name of the individual authorized to accept changes, and to be responsible for informing others in Contractor's employ of changes in the Work.

B. Change Order forms will be prepared by the Authority.

1.4 DOCUMENTATION OF CHANGE IN CONTRACT PRICE AND CONTRACT TIME

A. Maintain detailed records of work done on a Cost of the Work basis. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the Work. Incomplete or unsubstantiated costs will be disallowed.

B. Contractor shall submit a complete, detailed, itemized cost breakdown addressing impact on Contract Time and Contract Price with each proposal.

C. On request, provide additional data to support computations:

1. Quantities of products, labor, and equipment.

2. Taxes, insurance, and bonds.

3. Justification for any change in Contract Time.

4. Credit for deletions from Contract, similarly documented.

D. Support each claim for additional costs, and for work done on a Cost of the Work basis, with additional information:

1. Origin and date of claim.

2. Dates and times work was performed and by whom.

3. Time records and wage rates paid.

4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

1.5 PRELIMINARY PROCEDURES

A. The Authority may submit a Proposal Request which includes: Detailed description of change with supplementary or revised Drawings and Specifications, the projected time for executing the change, with a stipulation of any overtime work required, and the period of time during which the requested price will be considered valid.

B. Contractor may initiate a change by submittal of a request to the Authority describing the proposed change with a statement of the reason for the change, and the effect on Contract Price and Contract Time with full documentation.

1.6 CONSTRUCTION CHANGE AUTHORIZATION

A. Shall be in accordance with Article 9 - Changes: in Section 00 70 00 - General Conditions.

1.7 LUMP SUM CHANGE ORDER

A. Contractor shall submit an itemized price proposal in sufficient detail to fully explain the basis for the proposal. Contractor and the Authority shall then negotiate an equitable price (and time adjustment if appropriate) in good faith. The Change Order will reflect the results of those negotiations. If negotiations break down, Contractor may be directed to perform the subject Work under a COST OF THE WORK CHANGE ORDER.

B. The maximum rates of cost markup (to cover both overhead and profit of the Contractor) shall be in accordance with Article 10- Contract Price, Computation and Change: in Section 00 70 00 – General Conditions.

C. These terms shall also apply to the proposals of subcontracts and allowances.

1.8 UNIT PRICE CHANGE ORDER

A. For pre-determined unit prices and quantities, Change Order will be executed on a lump sum basis.

B. For pre-determined unit prices and undetermined quantities, Change Order will be executed on an estimated quantity basis; payment will be based on actual quantities

measured as specified.

1.9 COST OF THE WORK CHANGE ORDER

A. Contractor shall submit documentation required in Paragraph 1.4 of this Section on a daily basis for certification by the Authority. The Authority will indicate by signature that the submitted documentation is acceptable. If it is not acceptable, Contractor and the Authority shall immediately meet to discuss resolution.

B. After completion of the change and within 14 calendar days, unless extended by the Authority, the Contractor shall submit in final form an itemized account with support data of all costs. Support data shall have been certified by the Authority, as required above in paragraph A.

C. The Authority will determine the change allowable in Contract Price and Contract Time as provided in provisions of the Contract Documents.

1.10 EXECUTION OF CHANGE ORDERS

A. The Authority will issue Change Orders for signatures of parties as provided in Conditions of the Contract.

1.11 CORRELATION OF CONTRACTOR SUBMITTALS

A. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Price as shown on Change Order.

B. Promptly revise progress schedules to reflect any change in Contract Time, revise subschedules to adjust times for other items of Work affected by the change, and resubmit.

1. Progress Schedule shall be updated to reflect the changed condition. It shall be identified as a unique single or multiple task activity and shall be linked to its predecessor and successor activities from the base schedule set of activities. An update to the cash flow schedule shall be made as well and to the extent possible, operational tasks shall be cross-referenced to schedule of values categories.

C. Promptly enter changes in Project Record Documents.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

This page is blank intentionally.

SECTION 01 29 73

SCHEDULE OF VALUES

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Procedures for preparation and submittal of Schedule of Values.

1.2 RELATED REQUIREMENTS

A. Section 00 70 00 General Conditions.

B. Section 01 20 13 Applications for Payment.

C. Section 01 33 00 Submittal Procedures.

1.3 FORMAT

A. Form and content must be acceptable to the Authority.

B. Contractor's standard form or media-driven printout will be considered on request.

C. Follow the table of contents of Project Manual and the Bid Schedule for listing component parts. Identify each line item by number and title of listed Specification sections.

1.4 CONTENT

A. List installed value of each major item of Work and each subcontracted item of Work as a separate line item to serve as a basis for computing values for progress payments. Round off values to nearest dollar.

B. For each major subcontract, list products and operations of that subcontract as separate line items.

C. Coordinate listings with progress schedule.

D. Component listings shall each include a directly proportional amount of Contractor's overhead and profit.

E. For items on which payments will be requested for stored products, list sub-values for cost of stored products.

F. No progress payments will be made for Substantial Completion Submittals and Closeout Submittals until **all** submittals have been submitted to and accepted by the Authority.

G. The sum of values listed shall equal total Contract Price.

1.5 SUBMITTAL

A. Submit a copy of Schedule in electronic format within fifteen (15) days after the Notice to Proceed. Subsequent updated Schedule of Values shall be presented for review ten (10) days prior to each Application for Payment.

B. Transmit on an Authority accepted form transmittal letter. Identify Project by the Authority's title and Project number; identify Contract by the Authority's Contract number.

1.6 SUBSTANTIATING DATA

A. When the Authority requires substantiating information, submit data justifying line item amounts in question.

B. Provide an electronic copy of data with cover letter for each copy of the Application for Payment. Show application number and date, and line item by number and description.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Contractor participation in preconstruction conferences.

B. Contractor administration of progress meetings and pre-installation conferences.

1.2 PRECONSTRUCTION CONFERENCES

A. AEA (Authority) will administer a preconstruction conference to be held at AEA's main office located at 813 West Northern Lights Blvd., Anchorage, Alaska, for execution of Contract and exchange of preliminary submittals. The conference will be scheduled for a mutually agreeable time for the AEA Project Manager, AEA Engineering, AEA Operations, Engineer, and Contractor following Notice-To-Proceed. During the conference, the contractor shall present his schedule, construction methodology, and other pertinent information. Contractor will be required to field questions about his operation.

1.3 PRE-INSTALLATION CONFERENCES

A. When required in individual Specification section, or directed by the Project Manager, convene a pre-installation conference prior to commencing Work of the section unless this requirement is waived or modified by AEA.

B. Require attendance of entities directly affecting, or affected by, Work of the section.

C. Review conditions of installation, preparation and installation procedures, and coordination with related Work.

1.4 PROGRESS MEETINGS

A. Contractor shall schedule and administer weekly project meetings throughout progress of the work (unless this requirement is waived by AEA).

B. Attendance: Contractor's Project Manager, job superintendent, major subcontractors and suppliers; AEA, Engineer, and relevant stakeholders as appropriate to agenda topics for each meeting.

C. At the progress meeting, the Contractor shall present a current and accurate schedule and discuss his planned operations for the coming 2 weeks.

D. The Contractor will coordinate the date, time, and location of project meetings with all parties.

E. The Contractor shall provide facilities so that people may attend the meeting in person or by telephone and distribute approved drawings by mail, fax, or email when

required.

F. Contractor shall document the meetings and shall distribute meeting minutes within two (2) working days of adjournment.

G. Meeting frequency may be reduced at the discretion of the Project Manager.

1.5 OTHER MEETINGS

A. At various times throughout the duration of the Contract, the Contractor will be required to attend meetings as requested by AEA. It is anticipated that such meetings will involve coordination with others, project schedule review, problem resolution, change order negotiations, and other topics of mutual importance.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Preliminary Schedule.

B. Construction Progress Schedule, bar Gantt chart.

1.2 RELATED REQUIREMENTS

A. Section 00 70 00 General Conditions.

B. Section 01 20 13 Applications for Payment.

C. Section 01 33 00 Submittal Procedures.

1.3 SUBMITTALS

A. Within fifteen (15) days after date established in Notice to Proceed, submit preliminary schedule.

B. Within ten (10) days after joint review, submit complete schedule.

C. Submit updated schedule with each Application for Payment.

1.4 SCHEDULE FORMAT

A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.

B. Diagram Sheet Size: Maximum 11 x 17 inches.

C. Scale and Spacing: To allow for notations and revisions.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

3.1 PRELIMINARY SCHEDULE

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

1. Include a separate bar for each major trade or operation, identifying the duration of each activity and precedent activities.

2. Complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Show each work plan and separate work area as a separate activity or group of activities.

3.2 CONSTRUCTION PROGRESS SCHEDULES

A. Submit horizontal bar Gantt chart. Schedule shall show:

1. Separate bar for each major trade or operation, identifying the duration of each activity and precedent activities.

2. Complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Show each work plan and separate work area as a separate activity or group of activities.

3. Submittal dates for Shop Drawings, product data, and samples, and product delivery dates, including any furnished by the Authority and those under allowances.

4. All required submittals and indicating the date for each required submittal.

5. Show projected percentages of completion for each item of Work and submittal as of time of each Application for Progress Payment.

6. Schedule shall be computer generated; (MS Projects, Sure-Trac, or Primavera); Gantt format with preceding and succeeding operational tasks indicated by relationship arrows. An accompanying cash flow chart shall reflect estimated monthly draw amounts. To the extent possible, operational tasks shall be cross-referenced to schedule of values categories.

3.3 REVIEW AND EVALUATION OF SCHEDULE

A. Participate in joint review and evaluation of schedule with Project Manager at each submittal.

B. Evaluate project status to determine work behind schedule and work ahead of schedule.

C. After review, revise as necessary as result of review, and resubmit within ten (10) days.

3.4 UPDATING SCHEDULE

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity.

C. Indicate changes required to maintain dates of Substantial Completion.

3.5 DISTRIBUTION OF SCHEDULE

A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Engineer, Authority, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

END OF SECTION

This page is blank intentionally.

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Procedures for the preparation, tracking, and review of submittals for the project.

B. Construction Progress Schedules.

C. Manufacturer's Instructions.

D. Manufacturer's Certificates.

1.2 RELATED REQUIREMENTS

A. Section 01 12 19 Contractor’s Certification of Subcontracts.

B. Section 01 20 13 Applications for Payment.

C. Section 01 25 13 Product Substitution Procedures.

D. Section 01 26 57 Change Order Procedures.

E. Section 01 29 73 Schedule of Values.

F. Section 01 33 23 Shop Drawings, Product Data, Samples.

G. Section 01 45 00 Quality Control.

H. Section 01 50 00 Construction Facilities and Temporary Controls.

I. Section 01 55 26 Traffic Control.

J. Section 01 71 23.16 Construction Surveying.

K. Section 01 77 19 Closeout Requirements.

L. Section 01 78 39 Project Record Documents.

M. Section 01 94 00 Decommission Fuel Storage Tanks and Piping.

N. Section 05 50 00 Metal Fabrications.

O. Section 09 91 13 Exterior Painting.

P. Section 09 91 23 Interior Painting.

Q. Section 09 96 00.01 Plant Applied Fusion Bonded Epoxy (FBE).

R. Section 09 96 00.02 Field Applied Fusion Bonded Epoxy (FBE).

S. Section 09 98 00 Hot Dip Galvanized Coatings.

T. Section 10 44 16.13 Portable Fire Extinguishers.

U. Section 11 80 00 Spill Response Equipment.

V. Section 23 11 13 Facility Fuel-Oil Piping.

W. Section 31 20 00 Earth Moving.

X. Section 33 05 26.13 Signage.

Y. Operations and Maintenance Manuals.

Z. Equipment Installation Data.

AA. Other Sections specifying materials to be used in the Work Covered by Contract Documents, including fill material and gravels.

1.3 PROCEDURES

A. Delivery of Submittals:

1. Within ten (10) days following Notice to Proceed, Contractor shall submit to Project Manager in electronic format, a Submittal Register (Section 01 33 00) as required by the Contract (by Section Number, Paragraph Number, Page Number, and time criteria if required). The schedule must be approved by the Project Manager before any submittals required by the Contract will be accepted.

2. Contractor shall provide a submittal register, broken down per specification section, for all materials and deliverables specified and provided.

3. Electronically transfer submittals directly to the Project Manager and Engineer.

4. Minimize the number of submittals. **Full divisions must be submitted together** (no partial submittals will be accepted).

B. Transmit each item on an AEA accepted form. Identify Project, Contractor, Subcontractor, and major Supplier. Identify pertinent Drawing sheet and detail number, and Specification section number, as appropriate. Identify deviations from Contract Documents by submitting a separate Substitution Request Form. Provide a minimum of 8 1/2" x 5 1/2" blank space on the front page for Contractor, and Engineer review stamps.

C. Submit initial progress schedules and Schedule of Values in electronic format as directed by the Project Manager, in accordance with Document 00 70 00 - General Conditions. Form and content shall be reviewed by AEA. After review by AEA, revise and resubmit as required. Submit subsequent updated schedules with each

Application for Payment.

D. Comply with progress schedule for submittals related to Work progress. Coordinate submittal of related items.

E. After Project Manager review of submittal, revise and resubmit as required, identifying changes made since previous submittal. The Project Manager will not return the first or revised copies of rejected submittals for re-use. DO NOT submit partial copies of submittals for incorporation into rejected submittal packages which have been kept by the Project Manager. Provide COMPLETE copies for each review.

F. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

G. If drawings, product submittals, samples, mock-ups, or other required submittals are incomplete or not properly submitted, Project Manager will not review the submittal and will immediately return submittal to Contractor. Project Manager will review a submittal no more than two times (incomplete or improper submittals count as one). Contractor shall pay all review costs associated with more than two reviews, unless a re-submittal is required due to new comments addressing previously submitted information.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Submit in accordance with Section 01 32 16 Construction Progress Schedule.

1.5 SCHEDULE OF VALUES

A. Submit in accordance with Section 01 29 73 Schedule of Values.

1.6 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

A. Submit in accordance with Section 01 33 23 Shop Drawings, Product Data, and Samples.

B. Submit signed and sealed engineering design calculations performed by a Professional Engineer licensed in the State of Alaska where the Contractor is responsible for design as required in the Contract Documents.

1.7 MANUFACTURER'S INSTRUCTIONS

A. When required in individual Specification Section, submit manufacturer's printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for product data.

1.8 QUALITY CONTROL DATA

A. Submit in accordance with Section 01 45 00 Quality Control and individual specification sections.

1.9 CONSTRUCTION PHOTOGRAPHS

A. Provide photographs of construction throughout progress of Work.

B. Submit photographs with daily work reports via email to the Engineer, Authority and Authority's representatives, not less than daily. Photographs may be sent as separate file from daily report.

C. Photographs: Digital color photographs, minimum size 2 megapixels.

D. Take site photographs from differing directions indicating relative progress of the Work on a daily basis.

E. Take photographs as evidence of daily project conditions including but not limited to:

1. Mobilization of items.

2. Tank Farm Access Road and Pad Development.

3. Limits of Excavation.

4. Placement and Compaction of Fill.

5. Construction of Earthen Dike Wall, Containment Liner, Geotextile, Sumps, and Drain Rock.

6. Placement of Tank Concrete Footings, Bulk Fuel Storage Tanks, and Appurtenances.

7. Concrete Pad Installation for Bulk Fuel Transfer Station and Vehicle Dispenser.

8. Construction of Retails Sales Building, Bulk Fuel Transfer Station, and Vehicle Dispenser.

9. Associated Mechanical and Electrical work.

10. Placement of Fencing.

11. Repair Work.

12. Decommissioning of Existing Tank Farm.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 33 23

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Procedures for submittals.

1.2 RELATED REQUIREMENTS

A. Section 00 70 00 General Conditions.

B. Section 01 25 13 Product Substitution Procedures.

C. Section 01 33 00 Submittal Procedures.

D. Section 01 45 00 Quality Control.

E. Section 01 77 19 Closeout Requirements.

1.3 SHOP DRAWINGS

A. Present drawings in a clear and thorough manner. Label each Shop Drawing with the Authority's Project name and Project number; identify each element of the Shop Drawings by reference to sheet number and detail, or schedule.

B. Identify field dimensions; show relation to adjacent or critical features or Work or products.

C. Minimum Sheet Size: 8-1/2"x11". Larger sheets may be submitted in multiples of 8-1/2"x11".

1.4 PRODUCT DATA

A. Submit only pages which are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number. Show reference standards, performance characteristics, capacities, wiring and piping diagrams and controls, component parts, finishes, dimensions, and required clearances.

B. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable.

1.5 SAMPLES

A. Submit full range of manufacturer's standard finishes except when more restrictive requirements are specified, indicating colors, textures, and patterns, for Project Manager selection.

B. Submit samples to illustrate functional characteristics of products, including parts and attachments.

C. Approved samples which may be used in the Work are indicated in the Specification section.

D. Label each sample with identification required for transmittal letter.

E. Provide field samples of finishes at Project, at location acceptable to the Project Manager, as required by individual Specification section. Install each sample complete and finished. Acceptable finishes in place may be retained in completed Work.

1.6 MANUFACTURER'S INSTRUCTIONS

A. Submit manufacturer's instructions for storage, preparation, assembly, installation, start-up, adjusting, balancing, and finishing for all manufactured products.

1.7 CONTRACTOR REVIEW

A. Review submittals prior to transmittal; determine and verify field measurements, field construction criteria, manufacturer's catalog numbers, and conformance of submittal with requirements of Contract Documents.

B. Coordinate submittals with requirements of Work and of Contract Documents.

C. Notify the Project Manager in writing at time of submittal, of any deviations from requirements of Contract Documents.

D. Do not fabricate products or begin Work which requires submittals until return of submittal with Authority acceptance.

1.8 SUBMITTAL REQUIREMENTS

A. Each submittal to be numbered by Specification Section and Paragraph. Revisions shall be identified by a hyphen after the paragraph, with a number designator. Example: 1st submittal "01 33 23 1.8A" 2nd submittal 01 33 23 1.8A - 1".

B. Transmit submittals in accordance with the required submittal schedule and in such sequence to avoid delay in the Work.

C. Provide 8 1/2" x 5 1/2" blank space on each submittal for Contractor and Engineer stamps.

D. Apply Contractor's stamp, signed or initialed, certifying to review, verification of products, field dimensions and field construction criteria, and coordination of information with requirements of Work and Contract Documents.

E. Coordinate submittals into logical groupings to facilitate interrelation of the items.

F. Submit electronic copies of shop drawings required in the Contract. Contractor may be required to submit, to the Project Manager, four opaque reproductions of full-size

shop drawings at no additional cost to the Authority.

G. Submit electronic copies of product data and manufacturer's instructions required by the contract.

H. Submit number of samples specified in individual Specifications sections.

I. Submit under Authority's accepted transmittal form letter. Identify Project by title and Authority's Project number; identify Contract by Authority's contract number. Identify Work and product by Specification section and Article number.

1.9 RESUBMITTALS

A. After the Project Manager review of submittal, revise and resubmit as required, identifying changes made since previous submittal. Project Manager will not return the first or revised copies of rejected submittals for re-use. DO NOT submit partial copies of submittals for incorporation into rejected submittal packages which have been kept by the Project Manager. Provide COMPLETE copies for each review.

1.10 REVIEW

A. The Authority or authorized agent will review Shop Drawings, product data, and samples and return submittals within fourteen (14) working days.

B. The Authority or authorized agent will examine shop drawings for general arrangement, overall dimensions and suitability, and will return to the Contractor marked as follows:

"Submit Specified Item" - denotes that the item specified in the contract documents is required and substitutions are not acceptable.

"Approved" - denotes acceptance of the submittal.

"Approved With Corrections Noted" - denotes review is conditional on compliance with notes made on the submittal.

"Revise and Resubmit" - denotes that revisions are required in the submittal in order for the submittal to be generally consistent with the requirements of the Contract Documents. Required revisions will be identified to the Contractor. Resubmittal is required.

"Rejected" - denotes that the submittal does not meet the requirements of the Contract Documents and shall not be used in the Work. Reasons for rejection will be identified to the Contractor. Resubmittal is required.

C. Review by the Authority or authorized agent of shop drawings shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is consistent with the requirements of the Contract Documents. Review of such drawings shall not relieve the Contractor of the responsibility for errors, dimensions, and detail design.

D. The Authority or authorized agent review will not extend to means, methods,

techniques, sequences, or procedures of construction (except in the case of construction specific submittals, such as erection plans) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in with the item functions.

1.11 DISTRIBUTION

A. Duplicate and distribute reproductions of Shop Drawings, copies of product data, and samples, which bear Engineer's stamp, to job site file, record documents file, Subcontractors, Suppliers, and other entities requiring information.

1.12 SCHEDULE OF SUBMITTALS

A. Submittal Register Form to be completed by Contractor and approved by Authority prior to submittal of any items.

B. Submit shop drawings, product data and samples as required for each specification section.

C. Format.

1. Submittal schedule form as provided by the Authority as outlined in Section 01 45 00 1.8.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01 42 19

REFERENCE STANDARDS

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Quality assurance.

1.2 RELATED REQUIREMENTS

A. Section 00 70 00 General Conditions.

1.3 QUALITY ASSURANCE

A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date for receiving bids, unless otherwise stated in the Contract Documents.

C. Obtain copies of standards when required by the Contract Documents.

D. Maintain copy at Project Site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from the Project Manager before proceeding. Local code requirements, where more stringent than referenced standards, shall govern.

F. Neither the contractual relationship, duties, nor responsibilities of the parties in Contract nor those of the Project Manager shall be altered by the Contract Documents by mention or inference otherwise in any reference document.

PART 2 – PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

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SECTION 01 45 00

QUALITY CONTROL

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Contractor's quality control (assurance) program and control procedures for executing the Work.

B. Contractor's technical qualifications to be able to execute the Work in accordance with the Contract Documents.

1.2 RELATED REQUIREMENTS

A. Section 00 70 00 General Conditions.

B. Section 01 33 00 Submittal Procedures.

1.3 SUBMITTALS

A. Submit a Quality Control Program for review and approval.

1.4 DESCRIPTION

A. The Contractor shall assure that all materials and completed construction conform to contract Plans, technical specifications, and other requirements, whether manufactured by the Contractor, or procured from subcontractors or vendors. When required, the Contractor shall establish, provide, and maintain an effective Quality Control Program that details the methods and procedures that will be used. Although guidelines are established and certain minimum requirements are specified herein and elsewhere in the contract technical specifications, the Contractor shall assume full responsibility for accomplishing the stated purpose.

B. The intent of this section is to enable the Contractor to establish a necessary level of control that will:

1. Adequately provide for the production of acceptable quality materials.

2. Provide sufficient information to assure both the Contractor and the Engineer that the specification requirements can be met.

3. Allow the Contractor as much latitude as possible to develop his own standard of control.

C. The Contractor shall be prepared to discuss and present, at the preconstruction conference, his understanding of the quality control requirements. The Contractor shall not begin any construction or production of materials to be incorporated into the completed work until the Quality Control Program has been reviewed by the

Engineer. No partial payment will be made for materials subject to specific quality control requirements until the Quality Control Program has been reviewed.

D. The quality control requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the acceptance testing requirements. Acceptance testing requirements are the responsibility of the Engineer.

1.5 DESCRIPTION OF PROGRAM

A. General Description

The Contractor shall establish a Quality Control Program to perform inspection and testing of each item of work for which it is required by the technical specifications, including those performed by subcontractors. This Quality Control Program shall ensure conformance to applicable parts of the contract documents (plans and specifications) with respect to materials, workmanship, construction, finish, and functional performance. The Quality Control Program shall be effective for control of all construction work performed under this Contract and shall specifically include (1) surveillance and tests required by the technical specifications, (2) other requirements of this section, and (3) any other activities deemed necessary by the Contractor to establish an effective level of quality control.

B. Quality Control Program.

The Contractor shall describe the Quality Control Program in a written document which shall be reviewed by the Engineer prior to the start of any production, construction, or off-site fabrication. The written Quality Control Program shall be submitted to the Engineer for review at least five (5) calendar days before the preconstruction conference.

C. The Quality Control Program shall be organized to address, at a minimum, the following items:

1. Quality control organization;

2. Project progress schedule;

3. Submittals schedule;

4. Inspection requirements;

5. Quality control testing plan;

6. Documentation of quality control activities; and

7. Requirements for corrective action when quality control and/or acceptance criteria are not met.

D. The Contractor is encouraged to add any additional elements to the Quality Control Program that he/she deems necessary to adequately control all production and/or construction processes required by this contract.

1.6 QUALITY CONTROL AND ORGANIZATION

A. The Contractor's Quality Control Program shall be implemented in-house or by a third party contractor. An organizational chart shall be developed to show all quality control personnel and how these personnel integrate with other management/production and construction functions and personnel.

B. The organizational chart shall identify all quality control staff by name and function, and shall indicate the total staff required to implement all elements of the Quality Control Program, including inspection and testing for each item of work. If necessary, different technicians can be utilized for specific inspection and testing functions for different items of work. If an outside organization or independent testing laboratory is used for implementation of all or part of the Quality Control Program, the personnel assigned shall be subject to the qualification requirements of this specification. The organizational chart shall indicate which personnel are Contractor employees and which are provided by an outside organization.

C. The quality control organization shall consist of the following minimum personnel:

1. Program Administrator. The Program Administrator shall be a full-time employee of the Contractor, or a consultant engaged by the Contractor. The Program Administrator shall have a minimum of ten (10) years of comparable construction experience and shall have had prior quality control experience on a project of comparable size and scope as the contract.

   The Program Administrator shall have full authority to institute any and all actions necessary for the successful implementation of the Quality Control Program to ensure compliance with the contract documents. The Program Administrator shall report directly to a responsible officer of the construction firm. The Program Administrator may supervise the Quality Control Program on more than one project provided that person can be at the job site within 12 hours after being notified of a problem.

2. Quality Control Technicians. A sufficient number of quality control technicians necessary to adequately implement the Quality Control Program shall be provided. These personnel shall be either engineers, engineering technicians with five (5) years of experience, or experienced craftsman with qualifications in the appropriate field with a minimum of two (2) years of experience in their area of expertise and National Institute for Certification in Engineering Technologies (NICET) certification.

   The quality control technicians shall report directly to the Program Administrator and shall perform the following functions:

a. Inspection of all materials, construction, plant, and equipment for conformance to the technical specifications, and as required by the contract documents.

b. Performance of all quality control tests as required by the technical specifications.

Engineer approval or certification at an equivalent level by a state or nationally recognized organization will be acceptable in lieu of NICET certification.

3. Staffing Levels. The Contractor shall provide sufficient qualified quality control personnel to monitor each work activity at all times. Where material is being produced in a plant for incorporation into the work, separate plant and field technicians shall be provided at each plant and field placement location. The scheduling and coordinating of all inspection and testing must match the type and pace of work activity. The Quality Control Program shall state where different technicians will be required for different work elements.

1.7 WORKMANSHIP AND STANDARDS

A. The Contractor's quality control program shall ensure compliance with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

B. The Contractor shall secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking

C. Contractor shall comply with manufacturer's instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from the Project Manager before proceeding.

D. When required by individual Specifications section, submit manufacturer's certificate, in duplicate, that products meet or exceed specified requirements.

1.8 SUBMITTALS SCHEDULE

A. The Contractor shall submit a detailed listing of all submittals and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include:

1. Specification item number;

2. Item description;

3. Description of submittal;

4. Specification Subsection requiring submittal; and

5. Scheduled date of submittal.

1.9 INSPECTION REQUIREMENTS

A. Quality control inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Contractor as specified by this specification.

B. Inspections shall be performed daily to ensure continuing compliance with contract requirements until completion of the particular feature of work. These shall include the following minimum requirements:

1. During fabrication of Contractor provided, shop fabricated materials and structures, plant operation for material production, quality control test results and periodic inspections shall be utilized to ensure the quality of the materials and workmanship. The Quality Control Program shall detail how these and other quality control functions will be accomplished and utilized to ensure compliance with applicable codes and standards.

2. During field operations, quality control test results and periodic inspections shall be utilized to ensure the quality of all materials and workmanship. All equipment shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within the plan dimensions, lines, grades, and tolerances specified. The Program shall document how these and other quality control functions will be accomplished and utilized.

1.10 QUALITY CONTROL TESTING PLAN

A. As a part of the overall Quality Control Program, the Contractor shall implement a quality control testing plan, as required by the technical specifications. The testing plan shall include the minimum tests and test frequencies required by the technical specification Item, as well as any additional quality control tests that the Contractor deems necessary to adequately control production and/or construction processes.

B. The testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

1. Specification item number;

2. Item description (e.g., Schedule 80 pipe);

3. Test type (e.g., NDT, pipe pressure test);

4. Test standard (e.g., ASTM or NACE test number, as applicable);

5. Test frequency (e.g., as required by technical specifications or minimum frequency);

6. Responsibility (e.g., plant or field technician); and

7. Control requirements (e.g., target, permissible deviations).

C. The Engineer shall be provided the opportunity to witness quality control sampling and testing.

D. All quality control test results shall be documented by the Contractor as required by this specification and submitted to the Engineer for approval.

E. Testing shall also include nuclear densometer testing and material testing for placed fills in accordance with Section 31 20 00, to ensure the quality of constructed embankments.

1.11 MANUFACTURERS' FIELD SERVICES

A. When required by manufacturer or when specified in respective Specification sections, require manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to make appropriate recommendations.

B. Require manufacturer's representative to submit written report to the Project Manager listing observations and recommendations.

C. Gradations for gravel material shall be performed at a rate of one per source or as required due to changes in material.

D. The frequency of field density test for compacted fill shall be as specified in Section 31 20 00 – Earth Moving.

1.12 DOCUMENTATION

A. The Contractor shall maintain current quality control records of all inspections and tests performed. These records shall include factual evidence that the required inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

B. These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the Engineer daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the Contractor's Program Administrator.

C. Specific Contractor quality control records required for the contract shall include, but are not necessarily limited to, the following records:

1. Daily Inspection Reports. Each Contractor quality control technician shall maintain a daily log of all inspections performed for both Contractor and subcontractor operations on a form acceptable to the Engineer. These

technician's daily reports shall provide factual evidence that continuous quality control inspections have been performed and shall, as a minimum, include the following:

a. Technical specification item number and description;

b. Compliance with approved submittals;

c. Proper storage of materials and equipment;

d. Proper operation of all equipment;

e. Adherence to contract documents;

f. Review of quality control tests; and

g. Safety inspection.

The daily inspection reports shall identify inspections conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed

The daily inspection reports shall be signed by the responsible quality control technician and the Program Administrator. The Engineer shall be provided at least one copy of each daily inspection report on the work day following the day of record.

2. Daily Test Reports. The Contractor shall be responsible for establishing a system which will record all quality control test results. Daily test reports shall document the following information:

a. Technical specification item number and description;

b. Test designation;

c. Location;

d. Date of test;

e. Control requirements;

f. Test results;

g. Causes for rejection;

h. Recommended remedial actions; and

i. Retests.

Test results from each day's work period shall be submitted to the Engineer prior to the start of the next day's work period. When required by the technical specifications, the Contractor shall maintain statistical

quality control charts. The daily test reports shall be signed by the responsible quality control technician and the Program Administrator.

1.13 CORRECTIVE ACTION REQUIREMENTS

A. The Quality Control Program shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the Quality Control Program as a whole, and for individual items of work contained in the technical specifications.

B. The Quality Control Program shall detail how the results of quality control inspections and tests will be used for determining the need for corrective action and shall contain clear sets of rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

C. When applicable or required by the technical specifications, the Contractor shall establish and utilize statistical quality control charts for individual quality control tests. The requirements for corrective action shall be linked to the control charts.

1.14 INSPECTION BY THE ENGINEER

A. All items of material and equipment shall be subject to inspection by the Engineer at the point of production, manufacture or shipment to determine if the Contractor, producer, manufacturer or shipper maintains an adequate quality control system in conformance with the requirements detailed herein and the applicable technical specifications and plans. In addition, all items of materials, equipment and work in place shall be subject to inspection by the Engineer at the site for the same purpose.

B. Inspection by the Engineer does not relieve the Contractor of performing quality control inspections of either on-site or off-site Contractor's or subcontractor's work.

1.15 NONCOMPLIANCE

A. The Engineer will notify the Contractor of any noncompliance with any of the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Any notice, when delivered by the Engineer or their authorized representative to the Contractor or their authorized representative at the site of the work, shall be considered sufficient notice.

B. In cases where quality control activities do not comply with either the Contractor's Quality Control Program or the contract provisions, or where the Contractor fails to properly operate and maintain an effective Quality Control Program, as determined by the Engineer, the Engineer may:

1. Require the Contractor to replace ineffective or unqualified quality control personnel or subcontractors.

2. Require the Contractor to stop operations until appropriate corrective action is taken.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

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SECTION 01 50 00

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 – GENERAL

1.1 REQUIREMENTS

A. Temporary Utilities: Water, sanitation, electrical, heating, and communication systems.

B. Temporary Construction Facilities: Field office for the use of Contractor personnel, storage yards, buildings, worker shelters, and access roads.

C. Temporary Controls: Air/water pollution controls, erosion control, and traffic control.

D. Temporary Fuel Storage and Dispensing: Fuel storage, secondary containment, and dispensing facilities.

1.2 RELATED REQUIREMENTS

A. Section 01 11 13 Work Covered by Contract Documents.

B. Section 01 33 00 Submittal Procedures.

C. Section 01 57 13 Temporary Erosion and Sediment Control.

1.3 DELIVERY, STORAGE, AND HANDLING OF TEMPORARY FACILITIES

A. Protect temporary facilities during delivery and storage operations.

B. Maintain temporary facilities in proper and safe condition throughout progress of the work.

1.4 SUBMITTALS

A. Submit an electronic copy of written Plan for providing temporary facilities. Submit plan a minimum of sixty (60) days from receipt of the “Intent to Award letter”.

1. Plan shall include written description of Contractor’s proposed methods and means of providing temporary utilities during construction activities, as described in the Specifications.

PART 2 – PRODUCTS

2.1 TEMPORARY UTILITIES CONTRACTOR FURNISHED ITEMS

A. Temporary Sanitation Systems

1. Furnish and install all necessary components and systems to provide sewer and solid waste collection services at the field office. Temporary outhouses shall be self-contained units, pit privies are not acceptable.

2. Contractor furnished items include, but are not limited to, all piping, valves, fittings, structures, insulation, pumps, tanks, fixtures, tie-ins, trash receptacles, hauling operations, and service agreements.

3. Contractor to provide and pay for all temporary sanitation system related components and fees.

B. Temporary Electrical Systems

1. Contractor shall coordinate with local utility to provide all electrical service necessary for completion of work. Complete necessary utility paperwork and provide minimum of sixty (60) days' notice to local utility for hookup.

2. Contractor furnished items include, but are not limited to, all conductor, transformers, service meters and masts, distribution panels, controls, electrical and lighting fixtures, tie-ins, and service agreements.

3. Contractor shall be responsible for providing temporary power to all electrical control panels to ensure that they remain heated from the time of installation to substantial completion.

4. Contractor to provide and pay for all temporary electrical system related components and fees including hookup.

C. Temporary Heating Systems

1. Furnish and install all necessary components and systems to provide heat at the field office and worker shelters as required.

2. Contractor furnished items include, but are not limited to, all heaters, fuel tanks, piping, valves, fittings, meters, insulation, pumps, fixtures, tie-ins, and fuel hauling.

3. Contractor to provide and pay for all temporary heating system related components and fees.

D. Temporary Communication Systems (Telephone, Fax, and Internet)

1. Furnish and install all necessary components and systems to provide telephone, fax, and internet service to the field office.

2. Contractor furnished items include, but are not limited to, all phone lines, phones, fax machines, tie-ins, and service agreements.

3. Contractor to provide and pay for all temporary communication system related components and fees.

2.2 TEMPORARY CONSTRUCTION FACILITIES CONTRACTOR FURNISHED ITEMS

A. Temporary Construction Facilities (Field Office, Storage Facilities, Worker Shelters)

1. Temporary field office**:** Furnish field office building for use of Contractor personnel. Field office structure shall meet all requirements of the most

current version of the IBC. Provide temporary electrical, heating, telephone, fax, and internet services at the field office.

2. Temporary storage facilities: Furnish temporary storage facilities as required to protect materials and equipment during the course of the work. Facilities shall be structurally sound and sufficiently weather tight to protect stored items in accordance with the manufacturer's recommendations.

3. Worker shelters: Worker shelters shall be provided in accordance with applicable laws and regulations.

4. Contractor to provide and pay for all temporary construction facility related components and fees.

2.3 TEMPORARY CONTROLS CONTRACTOR FURNISHED ITEMS

A. Temporary Controls

1. Furnish all gates, barricades, fences, handrails, guardrails, and security systems required for safe execution and protection of the work.

2. Furnish all Guards, markers, shields, protective clothing, hard hats, hearing protection and other equipment required by health and safety regulations for workers.

3. Furnish erosion controls in accordance with industry accepted Best Management Practices and in accordance with Section 01 57 13.

4. Furnish all required first aid and fire suppression equipment required by laws and regulations.

5. Contractor to provide and pay for all temporary controls related components and fees.

PART 3 – EXECUTION

3.1 TEMPORARY UTILITIES

A. All work relating to temporary utilities shall be arranged and implemented by the Contractor.

B. All costs associated with providing temporary utilities shall be borne solely by the Contractor including hookup.

C. Contractor shall not connect to any existing utility system unless specific written authorization from the applicable utility company is given.

1. Contractor shall provide individuals who are qualified to connect to the existing utility system and provide all necessary equipment and materials required for the connection.

2. Contractor shall remove all temporary materials and equipment upon completion of construction and repair any damage caused by installation,

and restore to like new condition.

D. Water: Provide temporary water for all construction requirements and Contractor's crews. Contractor shall maintain sanitary conditions at all times and shall not violate requirements of applicable codes.

E. Sanitation Facilities: Provide and maintain facilities for Contractor's employees, Subcontractors and all other onsite employer's employees. Service, clean, and maintain facilities and enclosures.

F. Electricity and Lighting: Provide temporary power for all construction requirements including Contractor's field office and to ensure safe work conditions and security of site. Provide temporary lighting as required to meet all applicable safety requirements to allow erection, application or installation of materials and equipment, and observation or inspection of the work.

G. Heating: Provide temporary heating systems at the field office and other temporary construction facilities as required by laws and regulations.

H. Communication Systems: Provide temporary communication systems at the field office including telephone, fax, and internet service.

3.2 TEMPORARY CONSTRUCTION FACILITIES

A. Field Office: Contractor shall maintain an on-site field office.

1. Field office shall provide sufficient working space and sanitary facilities for Contractor personnel. Provide temporary electrical, heating, water, sewer, telephone, fax, and internet services at the field office.

2. Field Office shall provide a temporary workspace with internet connections and phone for the Authority, the Project Manager, and other Authority Representatives.

B. Temporary Storage Yard:

1. A temporary storage yard within the community shall be provided by the Contractor for storage of products, equipment, and materials used in the construction of the project.

C. Temporary Storage Buildings:

1. Environmental control systems shall be provided that meet recommendations of manufacturers of equipment and materials stored.

2. Contractor shall arrange or partition to provide security of contents and ready access for inspection and inventory.

3. Combustible materials (paints, solvents, fuels, etc.) shall be stored in a well-ventilated and remote building meeting applicable safety standards.

D. Access roads:

1. Access roads, if required, shall be constructed within easements, rights-of-way, or Project limits. Alignments for new routes shall be approved by Project Manager.

2. Ground surface disturbed by access road construction shall be restored to original grade upon completion of construction.

3.3 TEMPORARY CONTROLS

A. Air Pollution Controls:

1. Minimize air pollution from construction operations.

2. Burning of waste materials, rubbish, or other debris will not be permitted on or adjacent to the site.

B. Water Pollution Controls:

1. Contractor shall not cause or permit action to occur which would cause a discharge to an existing waterway. See Section 01 57 13.

C. Erosion Control:

1. As specified in Section 01 57 13.

3.4 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain work areas free of waste materials, debris, and rubbish. Maintain work site in a clean, orderly and organized condition. Materials should be clearly identified, with products covered and labeled. Materials should be identified with generator (Contractor) name.

B. Collect and remove waste materials, debris, and rubbish from site periodically and dispose of in accordance with all Federal, State, and local regulations.

C. Contractor shall not dispose of hazardous materials such as mineral spirits, oil, chemicals, or paint thinner at the local landfill. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.

3.5 REMOVAL OF TEMPORARY FACILITIES

A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection, with the exception of temporary bulk fuel storage.

B. Clean and repair damage caused by installation or use of temporary facilities. Restore permanent facilities used during construction to pre-construction condition.

END OF SECTION

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SECTION 01 55 26

TRAFFIC CONTROL

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. This section describes the requirements, products, and methods of execution for traffic control on this Project.

1.2 GENERAL REQUIREMENTS

A. The Contractor is responsible for traffic control to ensure safe passage of pedestrians and vehicles in and around the work area. The Contractor shall prepare, submit, implement, and maintain an acceptable Traffic Control Plan (TCP). An electronic copy of the TCP shall be delivered to the Engineer within ten (10) working days of the effective date of the Notice-to-Proceed (NTP), or five (5) working days before commencement of work, whichever is the earlier date. The Engineer will review and accept or reject the plan within five (5) working days of submission. Successive submittals will also be reviewed within five (5) working days.

B. The TCP shall include a drawing or drawings indicating the method or scheme for safely and efficiently routing traffic during construction. The TCP shall include provisions for safely routing pedestrian, bicycle, and vehicle traffic through or around the construction zone.

C. All routes utilized by the Contractor shall be identified and included in the TCP. At a minimum, the TCP shall cover the route from the barge landing to the storage yard, route from the storage yard to the Project Site, and route from the Project Site to the material source.

D. The Work shall be conducted to interfere as little as possible with public access and comply with the following requirements:

1. If for any reason it is necessary to cross, close, or obstruct roads, driveways, and walks, whether public or private, Contractor shall provide and maintain suitable and safe bridges, detours, or other temporary expedients for accommodation of public and private travel.

2. Contractor shall not block off emergency vehicle access without written permission from the Project Manager. Operations shall be conducted with the least interference to fire equipment access, and at no time prevent such access. Contractor shall furnish night emergency contact numbers to the Project Manager.

3. Contractor shall not block more than one-half the thoroughfare at any time during crossings.

4. If a closure is required, Contractor shall maintain satisfactory means of exit for persons residing or having occasion to transact business along the route

of the Work.

5. If it is necessary to close off a thoroughfare or other access providing sole vehicular access to property for periods greater than two (2) hours, provide written notice to each property owner affected three (3) days prior to such closure. Maintenance of traffic is not required if Contractor obtains written permission from property owner and tenant of private property, or from AEA (Authority) having jurisdiction over public property involved, to obstruct traffic at the designated point.

6. Contractor shall not block pedestrian or vehicle access to homes or businesses.

PART 2 – PRODUCTS

2.1 EQUIPMENT

A. The TCP may include, but not be limited to, such items as signs, portable concrete barriers, barricades, traffic cones, special signs, warning lights, portable changeable message board signs, flaggers, pilot cars, temporary roadways, and all other items required to direct traffic through or around the construction zone in accordance with these specifications, the Manual on Uniform Traffic Control Devices (MUTCD), published documents by the US Department of Transportation, the State of Alaska Traffic Manual (ATM), and the Alaska Sign Design Specifications (ASDS).

PART 3 – EXECUTION

3.1 MAINTENANCE OF TRAFFIC

A. Contractor shall perform the Work in accordance with the approved TCP, and this Specification. No Work shall occur within traveled ways, rights-of-way or easements for public access until the Contractor has implemented an approved TCP for the Work proposed. The number of signs indicated on the TCP is a minimum. If unsafe conditions occur, the Engineer or Project Manager may require additional signs/devices at no additional cost to the Authority.

END OF SECTION

SECTION 01 57 13

TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 – GENERAL

1.1 RELATED REQUIREMENTS

A. This project is subject to conditions, limitations, and mitigation required by local, State, and Federal permitting agencies, building codes, and stakeholders.

B. Requirements of Federal, State, and local statutes and regulations dealing with storm water, pollution, and erosion shall be strictly adhered to by the Contractor.

C. Contractor shall comply with all laws and regulations relating to prevention and control of erosion.

1.2 GENERAL

A. The Contactor is responsible for acquiring and operating within the conditions of all permits required by Local, State, and Federal permitting agencies.

B. Contractor shall prepare an Erosion and Sediment Control Plan (ESCP) for the project. Contractor shall implement storm water and erosion control as soon as practicable to limit the potential for sediment transport and riling of disturbed slopes and/or embankment slopes.

C. Contractor shall prepare and implement a Hazardous Material Control Plan (HMCP) for prevention of pollution from storage, use, containment, cleanup, and disposal of all hazardous material, including petroleum products related to construction activities and equipment.

D. The contractor shall make their own determination if construction activity outside of the fill limits will sufficiently disturb the native ground surface to require development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). If cumulative ground disturbance of more than one acre is anticipated, Contractor shall prepare, implement, and maintain a SWPPP in accordance with the Construction General Permit (CGP) for Discharge from Large and Small Construction Activities, issued by the Alaska Department of Environmental Conservation (ADEC) under the Alaska Pollutant Discharge Elimination System (APDES).

1.3 ENVIRONMENTAL PROTECTION

A. The Contractor shall comply with the provisions of Federal, State, and local statutes, ordinances and regulations dealing with the prevention of environmental pollution and the preservation of public natural resources that may affect or may be affected by the Project. The Contractor shall familiarize himself with all such statutes, ordinances and regulations, whether listed or not.

1.4 DEFINITIONS

A. Repair. Mending or replacement of erosion and control measures to a degree as to meet the intended function as outlined in the ESCP, as determined by the Project Manager. Repairs to erosion control measure can result from, but is not limited to, any degradation to the items from flooding, sediment deposition, wind, and construction activities.

1.5 SUBMITTALS

A. Hazardous Material Control Plan.

Submit an electronic copy of the HMCP, to the Project Manager for approval. Submit these documents to the Project Manager at least twenty-one (21) days before beginning Construction Activity. After the HMCP is approved by the Authority, the Contractor must sign and certify the approved HMCP.

B. Inspection Reports.

The contractor shall submit an electronic copy of the routine inspection reports as defined in the Erosion and Sediment Control Plan. Reports shall be submitted to the Project Manager within twenty-four (24) hours after the report is recorded.

C. Approved SWPPP, if required under Section 1.2 above.

PART 2 – EROSION, SEDIMENT, AND POLLUTION CONTROL

2.1 TEMPORARY AND PERMANENT EROSION CONTROL

A. Temporary erosion and pollution control measures that are required at Contractor-furnished sites are subsidiary.

B. Perform temporary erosion and pollution control measures that are required due to Contractor negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or ordered by the Engineer, or for Contractor convenience, at Contractor’s own expense.

C. Permanent erosion and pollution control measures will be measured and paid for under other contract items, when shown on the bid schedule.

PART 3 – EXECUTION

3.1 EROSION CONTROL

A. Contractor shall obtain, implement, and update a SWPPP onsite as required by local, State, and Federal Regulations.

B. Best management practices for erosion control shall be observed to prevent construction related erosion impacts to receiving waters.

END OF SECTION

SECTION 01 60 13

MATERIAL AND EQUIPMENT

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Products.

B. Transportation and Handling.

C. Storage and Protection.

1.2 RELATED REQUIREMENTS

A. Section 01 45 00 Quality Control.

1.3 PRODUCTS

A. Products include material, equipment, and systems.

B. Comply with Specifications and referenced standards as minimum requirements.

C. Components required to be supplied in quantity within a Specification section shall be the same, and shall be interchangeable.

D. Do not use materials and equipment removed from existing structure, except as specifically required, or allowed, by Contract Documents.

1.4 TRANSPORTATION AND HANDLING

A. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer’s unopened containers or packaging, dry.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

C. Immediately on delivery, inspect shipment to assure:

1. Product complies with requirements of Contract Documents and reviewed submittals.

2. Quantities are correct.

3. Accessories and installation hardware are correct.

4. Containers and packages are intact and labels legible.

5. Products are protected and undamaged.

1.5 STORAGE AND PROTECTION

A. Handle and store materials for construction, products of demolition, and other items to avoid damage to adjacent facilities and equipment.

B. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.

C. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter. Cover such material to prevent material from being blown away.

D. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under required conditions.

E. Provide Material Safety Data Sheets (MSDS) for all products which may produce unpleasant or noxious odors. Contractor shall provide for adequate venting if needed.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 71 23.16

CONSTRUCTION SURVEYING

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. This section is intended to establish a standard minimum level of acceptable field survey specifications and procedures to properly control the construction project.

B. The Contractor shall furnish all labor and materials necessary to perform all surveying and construction staking essential for the completion of construction in conformance with the drawings, specifications, and other Contract Documents. The Contractor shall perform all the necessary calculations required to accomplish the work.

C. It is the Contractor's responsibility to ensure proper survey methods and procedures are followed. The Contractor, at no additional expense to the Authority, shall correct any errors resulting from the survey. Any method conflicting with these survey specifications shall be approved by the Project Manager prior to its use.

D. All survey work performed shall be under the direct supervision of a Professional Land Surveyor registered in the State of Alaska.

1.2 RELATED SECTIONS

A. Section 01 78 39 Project Record Documents.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

3.1 PROJECT CONTROL

A. General: Authority will provide reference horizontal and vertical control data to facilitate construction staking. It is the Contractor's responsibility to establish and check all survey control prior to any staking activity to ensure that the Project is properly located and constructed according to the Contract Documents. If discrepancies are found, Project Manager shall be notified separately and immediately. The Contractor is responsible for preserving and protecting all line stakes, grade stakes, reference points, and hubs. In the event of their loss or destruction, the Contractor shall pay all costs for their replacement. The

Contractor shall replace any monument that exists within the construction limits if it is disturbed or removed due to construction project activity. All monumentation disturbed or removed shall be replaced with the same type of monument or a monument approved by the Project Manager.

B. Horizontal Control Accuracy: The maximum permissible linear error allowed in establishing horizontal control is 1:5000 feet. The maximum error allowed in unadjusted angular closure shall be calculated by the formula “30 multiplied by the square root of N” where the term “N” signifies the number of transit setups in the traverse and “30” signifies 30 seconds.

C. Vertical Control

1. Elevations shall originate from the datum provided in the Contract Drawings. All level circuits run to establish temporary benchmarks (TBM) shall have an accuracy no less than the value computed by the equation “0.1 feet multiplied by the square root of the distance in miles.” Foresights and backsights shall be balanced. The maximum sighting distance shall not exceed 300 feet. All leveling circuits establishing TBMs shall be adjusted using recognized standard surveying adjustment methods. Side shots to establish elevations on TBMs shall not be allowed.

2. A minimum of two known bench marks shall be used, if available, when establishing TBMs to verify correct elevation information. A sufficient number of TBMs shall be set to control the Project with a maximum spacing of 800 feet. A TBM shall not be located further than 200 feet outside the construction limits of the Project. All TBMs shall be located and be comprised of sufficient material such that their integrity will not be compromised throughout the life of the Project.

3.2 FIELD NOTES

A. The Contractor shall supply uniform, hard backed, “Write in the Rain” or equal survey field books. The Project Manager has the right to inspect the field books at any time during the Project. All field books shall be identified on the outside spine. Each book shall be indexed and its contents referred to by page number. The date, weather condition, survey crew personnel, and instruments used shall be shown at the beginning of each day’s notes. All field books containing field notes shall be sealed and signed by a Registered Professional Land Surveyor on the title page of each field book. Color PDF copies of all field books used in the process of work shall be submitted to the Project Manager upon completion of the work.

B. All observations shall be recorded directly into project field books. All field books shall be in pencil. All field notes and drawings shall be completed and reduced

before acceptance by the Project Manager. Control sketches and traverse data shall be graphic and show measured and recorded distances. The source of record shall be stated. Stationing shall increase from the bottom of the page to the top. Notes shall be neat, legible, precise and sufficiently detailed. The Project Manager may stop all survey work until the notes are brought into conformance with this specification. A copy of each day's field notes shall be reduced and available to the Project Manager by 12:00 PM the following workday. The Project Manager may issue a stop work order at the Contractor's expense if the field notes are not delivered, when requested, within this timeframe.

C. Erasures of errors in field books will not be accepted. A line shall be drawn through those portions of notes in error, leaving the original note legible, and the correction shall be noted above the original entry. Corrections shall be initialed by the party chief and dated. Where appropriate, a note explaining the error shall be included.

D. Failure on the part of the Contractor to keep and maintain complete and accurate field notes as required herein shall be sufficient reason to withhold payment for those items of work where survey is required. No final Project payment will be made to the Contractor until copies of the field books have been submitted to and approved by the Project Manager.

3.3 PARTY CHIEF'S DAILY DIARY

A. The survey party chief shall keep a factual daily diary of all work performed by the survey crew on this Project. The diary shall contain the following information: date, crew, type and location of work performed, work accomplished, orders from the Project Manager and signature.

B. This record shall be kept on the Project Site and submitted to the Project Manager upon request. A copy of the diary shall be submitted to the Authority upon completion of the Project.

3.4 MISCELLANEOUS CONSTRUCTION STAKING

A. The Contractor shall provide sufficient stakes for the adequate control of all structures and incidental construction not specifically covered above. A staking diagram with respect to fuel line stations and measurements for pay quantities shall be maintained in the field notes. Other items such as horizontal and vertical control shall be shown in the field book and shall be governed by procedures established in previous articles of this specification.

3.5 SCAMMON BAY BULK FUEL STORAGE LEASE LOT STAKING

A. The Contractor's PLS shall obtain a copy of the Lease Lot document for the Scammon Bay Bulk Fuel Storage site and confirm that the bearings and distances match those shown on the Survey Control Drawing in the project plan set. Once construction has completed to the point that the lease lot corner locations will remain undisturbed for the duration of the construction, the Contractor's PLS shall set monuments at the exterior corners of the lease lot parcels consisting of 5/8" x 30" rebar with 2" aluminum cap having the PLS number stamped thereon, along with the designation "Lease Lot Corner". Provide field notes, photos, and electronic data of all points set to the Project Manager upon completion of this work.

3.6 ELECTRONIC DATA COLLECTION AND RADIAL SURVEYS

A. When electronic data collection is used for radial stakeout, the following criteria shall be maintained and submitted:

1. A standard field book containing: date, weather conditions, instrumentation used, crew, project description and sketch, listing of turning points and control points used, and other information needed to reconstruct the survey activity.

2. A printout of the unedited output from the data collector or a copy of the field book entries to include: code descriptors, horizontal circle information, vertical circle information based on zenith angle and slope distance expressed in feet. Also, a sheet containing the explanation of the codes used to identify the various shots.

3. A printout of the reduced and adjusted (ratios of error and magnitude of misclosure shown) data represented by x, y, and z coordinates, plus necessary descriptive information.

4. A plot and or line drawing showing the control points, point occupied, and the radial observations at a scale large enough to read the point number, elevation, point descriptions, and coordinates.

5. If cross sectional data is collected by radial methods a printout/plot of the following data is required:

    a. Each point identified as it relates to the centerline station of alignment.

    b. The distance offset from centerline of alignment.

    c. The elevation and description of the shot.

d. A cross section line plot of each station with the individual shots averaged out to produce the final interpolated cross section.

e. The vertical angle and distance to the TBM's used for control and the instrument height, and the height of the prisms.

3.7 AS-BUILT SURVEYS, FIELD NOTES AND PROJECT RECORD DOCUMENTS

A. As-built survey measurements shall be recorded on a clean set of blueline drawings deemed the Project Record Documents and shall show changes and improvements which vary from the dimensions, lines, grades, locations and materials as shown on the Contract Drawings. The as-builts shall also include swing ties to all pertinent existing structures, in accordance with Section 01 78 39.

B. Survey measurements shall be taken, field notes shall be kept, and accuracies shall be attained in accordance with the specifications of this section.

C. When electronic data collection is used to obtain as-built information, the following information shall be maintained and submitted:

1. A printout of the unedited, raw data from the data collector.

2. An explanation of all codes and abbreviations used.

3. A printout of the x, y, and z coordinates.

4. An electronic file, suitable for insertion into AutoCAD, with as-built features indicated by horizontal position, description, and elevation, based on Project coordinates.

   Electronic data collection used to obtain as-built information does not relieve the Contractor's obligation to maintain Project Record Documents or the obligation to obtain swing ties.

D. A copy of all survey field notes shall be submitted with each pay request. Pay requests shall not be processed until the survey notes are received by the Project Manager and the Project Manager is provided evidence that the Project Record Documents are current and in the required condition.

E. Project Record Documents shall be redlined and kept current. They shall be kept ready for review for when the Project Manager, at his/her option, requests that the Project Record Documents be submitted with the survey field notes for the pay request.

F. Project Record Documents shall be submitted along with a copy of the field notes to the Project Manager at the completion of construction activity, in accordance with Section 01 78 39 Project Record Documents.

G. A completed FEMA Elevation Certificate (EC) FEMA form 086-0-33 shall be submitted prior to the substantial completion inspection.

END OF SECTION

SECTION 01 77 19

CLOSEOUT REQUIREMENTS

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Administrative provisions for Substantial Completion and for Final Acceptance.

B. Closeout Procedures.

C. Final Cleaning.

D. Project Record Documents.

E. Warranties and Bonds.

F. Spare Parts and Maintenance Materials.

1.2 RELATED REQUIREMENTS

A. Division 00 Bidding and Contract Requirements.

B. Document 00 70 00 General Conditions: Fiscal provisions, and additional administrative requirements.

C. Section 01 29 73 Schedule of Values.

D. Section 01 33 00 Submittal Procedures.

E. Section 01 78 39 Project Record Documents.

1.3 FINAL CLEANING

A. Execute final cleaning prior to Substantial Completion inspection.

B. Use materials which will not create hazards to health or property, and which will not damage surfaces. Follow manufacturer’s recommendations.

C. Remove waste, debris, and surplus materials from the site.

1.4 ADJUSTING

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

1.5 PROJECT RECORD DOCUMENTS

A. Comply fully with the requirements of Section 01 78 39 Project Record Documents.

1.6 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance, and extra materials in quantities specified in individual Specification Sections.

B. Deliver to Project site and place in location as directed, obtain receipt prior to final payment.

1.7 WARRANTIES

A. As specified in Section 00 70 00 – General Conditions Article 12.7, Contractor shall warranty all work for a period of one (1) year after substantial completion, unless longer warranty periods are specified for individual products or pieces of work.

B. As a condition precedent to Final Payment, all guaranties and warranties as specified under various sections of the Contract Documents shall be obtained by the Contractor and delivered to the Project Manager, in duplicate giving a summary of guarantees attached and stating the following in respect to each:

1. Character of Work affected.

2. Name of Subcontractors.

3. Period of Guarantee.

4. Conditions of Guarantee.

C. Delivery of said guarantees and/or warrantees shall not relieve the Contractor from any obligations assumed under any other provision of the Contract.

D. If, within any guarantee period, repairs or changes are required in connection with the guaranteed Work, which in the opinion of the Authority is rendered necessary as the result of the use of materials, equipment or workmanship, which are defective, or inferior, or not in accordance with the terms of the Contract, the Contractor shall, upon receipt of notice from the Project Manager, and without expense to the Authority, proceed within seven (7) calendar days to:

1. Place in satisfactory conditions in every particular all of such guaranteed Work, correct all defects therein, and make good all damages to the structure or site.

2. Make good all Work or materials, or the equipment and contents of structures or site disturbed in fulfilling any such guarantee.

E. If the Contractor, after notice, fails to comply with the terms of the guarantee, the Authority may have the defects corrected and the Contractor and Contractor's Surety shall be liable for all expenses incurred in connection therewith, including Engineer's fees.

1.8 OPERATIONS AND MAINTENANCE DATA (O&M MANUALS)

A. Submit an electronic copy of draft O&M manuals ten (10) working days prior to Substantial Completion inspection. Revise and resubmit as necessary based on Engineer mark-ups.

B. The Engineer shall approve the draft O&M manuals for use in on-site facility training prior to completion of a Substantial Completion inspection.

C. Submit four (4) sets of final O&M manuals within fifteen (15) days of Substantial Completion inspection or date of approval of draft operations and maintenance manuals.

D. Submit data in bound 8-1/2 x 11 inch text pages, ring binders with durable plastic covers.

E. Prepare binder cover with printed title “OPERATIONS AND MAINTENANCE DATA”, title of project, and subject matter of binder.

F. Binder contents shall be divided with plastic page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

G. Contents: Prepare a table of contents for each volume, with each Product or system description identified, enclosed in a plastic text sheet sleeve, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of A/E, Contractor, subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions arranged by system process flow and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of suppliers. Identify the following:

    a. Significant design criteria.

    b. List of equipment.

    c. Parts list for each component.

    d. Operating instructions.

    e. Maintenance instructions for equipment and systems.

3. Part 3: Project documents and certificates, including the following:

    a. Shop drawings and Product data.

    b. Pressure test reports.

    c. Certificates.

    d. Copies of Warranties and Bonds.

1.9 ON-SITE FACILITY TRAINING

A. Contractor shall conduct on-site training of the operation of the new facilities for the facility owners and/or operators. Training must be completed prior to substantial completion inspection. Notify the Project Manager fifteen (15) working days prior to training date.

B. Facility Training shall include:

1. A thorough walk through of the facility and operational components.

2. Presentation of the O&M Manuals including:

a. Discussion of where the O&M Manuals will be kept.

b. Discussion of required facility maintenance.

c. Discussion of the product components.

d. Discussion of the operational procedures and troubleshooting alarms.

e. Discussion of emergency spill response procedures.

C. Each attendee shall demonstrate competency at transferring fuel, activating and deactivating and Emergency Shut Down, dispensing fuel, opening and closing appropriate valves for fuel delivery.

D. Training shall be approximately two (2) four (4) hour sessions. Total training duration shall be a minimum of eight (8) hours.

1.10 SUBSTANTIAL COMPLETION SUBMITTALS

Submit the following prior to requesting a Substantial Completion Inspection:

A. Project Record Documents: Under provisions of Section 01 78 39.

B. Operation and Maintenance Data (O&M Manual): Under provisions of part 1.8 of this section.

C. Spare Parts and Maintenance Materials: Under provisions of part 1.6 of this section.

1.11 SUBSTANTIAL COMPLETION

A. Substantial Completion shall be considered by the Authority when:

1. Written notice is provided seven (7) days in advance of inspection date.

2. List of items to be completed or corrected is submitted.

3. Equipment and systems have been tested, adjusted, balanced and are fully operational.

4. Operation of system has been demonstrated to the Project Manager.

5. Certificates of Inspection for required inspections have been submitted.

6. Project Record Documents for the Work or the portion of the Work being accepted are submitted and approved.

7. Spare parts and maintenance materials are turned over to the Authority.

B. Should the Authority's inspection find that the Work is not substantially complete, Project Manager will promptly notify Contractor in writing, listing observed deficiencies.

C. Contractor shall remedy deficiencies and send a second written notice of Substantial Completion.

D. When the Authority finds that the Work is substantially complete the Project Manager will prepare a certificate of Substantial Completion in accordance with provisions of General Conditions.

1.12 FINAL COMPLETION

A. When Contractor considers Work is complete, submit written certification:

1. Contract Documents have been reviewed.

2. Work has been inspected for compliance with Contract Documents.

3. Work has been completed in accordance with Contract Documents, and deficiencies listed with certificate of Substantial Completion have been corrected.

4. Work is complete and ready for final inspection.

B. Should the Authority's inspection find the Work incomplete, the Project Manager will promptly notify Contractor in writing listing observed deficiencies.

C. Contractor shall remedy deficiencies and send a second certification of Final Completion.

D. When the Authority finds that the Work is complete, the Project Manager will consider closeout submittals.

1.13 REINSPECTION FEES

A. Should status of completion of Work require more than two re-inspections by the Authority due to failure of Work to comply with Contractor's responsibility, the Authority will deduct the cost of re-inspection from final payment to Contractor as provided in the Contract Documents.

B. Re-inspection fees shall not exceed $5,000 for any one re-inspection.

1.14 CLOSEOUT SUBMITTALS

A. Project Record Documents: Under provisions of Section 01 78 39.

B. Warranties and Bonds: Under provisions of Section 01 77 19.

C. Operations and Maintenance Manuals: Under provisions of Section 01 77 19.

D. Evidence of Payment: In accordance with Conditions of the Contract.

E. Certificate of Release of Liens.

F. Contractor's Statement Concerning Claims.

G. Miscellaneous

1. As-Built Construction Schedule versus Baseline Schedule.

2. Any progress photos pertinent to substantial completion/final completion.

3. Final survey notes not previously transmitted.

1.15 STATEMENT OF ADJUSTMENT OF ACCOUNTS

A. Submit final statement reflecting adjustments to Contract Price indicating:

1. Original Contract Price.

2. Previous Change Orders.

3. Changes under allowances.

4. Changes under Unit Prices.

5. Deductions for uncorrected Work.

6. Penalties and bonuses.

7. Deductions for liquidated damages.

8. Deductions for re-inspection fees.

9. Other adjustments to Contract Price.

10. Total Contract Price as adjusted.

11. Previous payments.

12. Sum remaining due.

B. The Authority will issue a final Change Order reflecting all remaining adjustments to Contract Price not previously made by Change Orders.

C. See Section – 01 29 73 for minimum value for Contract Closeout Submittals.

1.16 APPLICATION FOR FINAL PAYMENT

A. Submit Application for Final Payment in accordance with provisions of the General Conditions of the Contract.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

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SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.1 REQUIREMENTS INCLUDED

A. Maintenance of Record Documents and Samples.

B. Submittal of Record Documents and Samples.

1.2 RELATED REQUIREMENTS

A. Section 00 70 00 General Conditions: Record Documents.

B. Section 01 33 00 Submittal Procedures.

C. Section 01 33 23 Shop Drawings, Product Data, and Samples.

D. Section 01 77 19 Closeout Requirements.

1.3 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. In addition to requirements in General Conditions, maintain at the site for the Authority one accurate record copy of:

1. Contract Drawings.

2. Specifications.

3. Addenda.

4. Change Orders and other modifications to the Contract.

5. Reviewed Shop Drawings, product data, and samples.

6. Survey and field records.

7. Field test records.

8. Inspection certificates.

9. Manufacturer's certificates.

B. Prior to Substantial Completion, provide original or legible copies of each item maintained by Contractor as listed in 1.3.A above.

C. Delegate responsibility for maintenance of Record Documents to one person on Contractor's staff.

D. Promptly following award of Contract, secure from the Authority, at no cost to the Contractor, one complete set of all Documents comprising the Contract.

E. Immediately upon receipt of job set described above, identify each Document with title "RECORD DOCUMENTS - JOB SET".

F. Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage for record documents and samples.

G. Label and file record documents and samples in accordance with section number listings in table of contents of this Project manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

H. Maintain record documents in a clean, dry and legible condition. Do not use record documents for construction purposes.

I. Use all means necessary to maintain job set of Record Documents completely protected from deterioration and from loss and damage until completion of Work and transfer of recorded data to the Authority.

J. Keep record documents and samples available for inspection by the Authority.

K. Upon request by the Authority and at time of each Application for Payment, submit complete collection of record documents to the Authority or review and duplication as desired.

L. The Authority’s approval of current status of Record Documents will be prerequisite to the Authority’s approval of requests for progress payments and request for final payment.

1. Prior to submitting each request for progress payment, secure the Authority’s approval of Record Documents as currently maintained.

2. Prior to submitting request for Final Payment, obtain the Authority’s approval of final Record Documents.

M. Do not use job set for any purpose except entry of new data and for review and copying by the Authority.

1.4 RECORDING

A. Record information on a set of black line opaque Drawings, and in a copy of a Project manual.

B. Using felt tip marking pens or colored pencil, maintaining separate colors for each major system, clearly describe changes by note and by graphic line, as required. Date all entries. Call attention to entry by a "cloud" around area or areas affected.

C. Thoroughly coordinate all changes within Record Documents, making adequate and proper entries on each Specification Section and each sheet of Drawings and other Documents where such entry is required to properly show change or selection.

D. When a change within Record Documents is referenced to another document, such as a DC/VR, Shop Drawing or Change Order, attach a copy of the referenced document to the respective Record Drawing or Record Specification where the entry is made.

E. Contract Drawings and Shop Drawings: Legibly mark each item to record actual construction, including:

1. Measured depths of elements of foundation in relation to finish first floor datum, accurate to the nearest inch.

2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements, accurate to the nearest inch.

3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of construction.

4. Field changes of dimension and detail.

5. Changes made by modifications.

6. Details not on original Contract Drawings.

7. References to related Shop Drawings and modifications.

8. Clearly label all changes and show dimensions to establish size and location. All identifications shall be sufficiently descriptive to relate reliably to Specifications.

F. Specifications: Legibly mark each item to record actual construction, including:

1. Manufacturer, trade name, and catalog number of each product actually installed, particularly optional items and substitute items.

2. Changes made by Addenda and modifications.

G. Other Documents: Maintain manufacturer's certifications, inspection certifications, and field test records required by individual Specifications sections.

1.5 SUBMITTALS

A. Upon submittal of the completed Record Documents, make changes in Record Documents as required by the Authority.

B. Transmit with cover letter in duplicate, listing:

1. Date.

2. Authority’s Project title and number.

3. Contractor's name, address, and telephone number.

4. Number and title of each record document.

5. Signature of Contractor or authorized representative.

C. Final Record Documents shall include both hard copies and digitally scanned copies in .pdf format (high quality grayscale scans, minimum 200 pixels/inch). Scans shall include front and back of drawings/documents where information occurs on both sides.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 94 00

DECOMMISSION FUEL STORAGE TANKS AND PIPING

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Procedures for Cleaning and Decommissioning Aboveground Fuel Storage Tanks and Fuel Piping System.

B. Procedures for containing tank contents.

1.2 RELATED SECTIONS

A. Section 01 11 13 Work Covered by Contract Documents.

B. Section 01 33 00 Submittal Procedures.

1.3 REFERENCES

A. 18 AAC 75 Article 3 Discharge Reporting, Cleanup, & Disposal of Oil and other Hazardous Substances.

B. 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response.

C. 40 CFR Chapter I, Subchapter I – Solid Wastes, Parts 260 through 265.

D. 49 CFR Subtitle B, Chapter I, Subchapter A – Hazardous Materials and Oil Transportation, and Subchapter C – Hazardous Material Regulations.

E. API 2015 Requirements for Safe Entry and Cleaning of Petroleum Storage Tanks.

F. API 653 Tank Inspection, Repair, Alteration, and Reconstruction.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00 Submittal Procedures.

B. Provide a Health and Safety Plan which includes the Work Plan for decommissioning of aboveground fuel storage tanks and fuel piping as required by this Section. The Work Plan shall include a detailed description of how the fuel will be removed and provide for the disposal of the residual fuel and liquid.

C. Manifests for disposal of all Resource and Recovery Conservation Act (RCRA) and non-RCRA Hazardous Wastes

D. Test results from composite testing of the drums of sludge to determine sludge characterization

1.5 DELIVERY, STORAGE, AND HANDLING

A. All tank sludge that test hazardous under 40 CFR Part 261 will be contained, stored, transported, and disposed of in accordance with all Federal, State and local Regulations, Statutes, Laws, and the Specifications.

1.6 CLEANING AND DECOMMISSIONING REQUIREMENTS

A. Works consists of providing all labor, materials, and equipment to clean, decommission, cut, and store the barge header pipeline, vehicle dispenser, and all associated piping as shown in the Contract Plans and Documents. This work includes cleaning, decommissioning, cutting, and storing approximately 600 feet of barge header pipeline, associated tank farm distribution piping and appurtenances, one vehicle dispenser with associated piping, and one vehicle dispenser shed.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Personal Protection Equipment must be appropriate for hazardous materials encountered on the work site and meet requirements in 29 CFR Subpart I, Sections 1910.132-1910.139.

B. Contractor shall maintain a site-specific Health and Safety Plan that includes, but is not limited to:

1. List of key personnel.

2. Health and Safety Risk Analysis that meets 29 CFR Subpart I, Section 1910.120(c).

3. Comprehensive Work Plan.

4. Confined Space Entry Plan.

5. Site Control Measures.

6. Health and Safety Training Requirements.

7. Standard Operating Procedures.

8. Emergency Response Procedures.

C. Overpack drums for storing tank sludge must meet US DOT and US EPA requirements for transportation.

D. Equipment to Monitor Hazardous Atmosphere – The Contractor shall use oxygen meters, combustible gas indicators, colorimetric indicator tubes, or organic vapor monitors to determine if a toxic, anoxic, or explosive environment exists.

PART 3 – EXECUTION

3.1 TANK CLEANING AND DECOMMISSIONING

A. The Contractor shall visually inspect all aboveground tanks designated on the Contract Drawings for decommissioning. Contractor shall determine if product exists within each tank. If product exists, Contractor shall pump, filter and transfer all useable product to the new tank(s) being constructed to replace the existing tanks. New tank(s) must be fuel ready prior to decommissioning existing tanks. Contractor is responsible for all permits, coordination, and approvals associated with the transfer of fuel. Fuel transfer shall be in accordance with the most current version of the International Fire Code. After all useable product and any accumulated water have been removed, Contractor shall measure the inside diameter of the tank and depth of sludge. From these measurements, the approximate volume of sludge in each tank will be calculated.

B. The Contractor shall clean the interior of each tank in accordance to API 2015 or other approved method. The Contractor shall implement a confined space entry permit system before any worker enters each tank. The Contractor shall monitor the tank atmosphere for toxicity, oxygen levels, and explosive vapors.

C. If sludge is removed from the tank, the Contractor shall place the sludge in an appropriate container and attach a label that contains the following information:

1. Container Identification number.

2. Tank ID#s (per Contract Drawings).

3. Owner of Tank.

4. Date of Removal.

The consolidation of sludge from tanks containing different products will not be allowed without written approval from the Project Manager. Should this occur without prior approval, the Contractor shall take immediate ownership of the combined waste and be fully responsible for all cost associated with the manifesting, transport, and proper disposal of the waste.

D. Appropriate Personal Protection Equipment will be used to protect workers from work site hazards.

E. All tanks shall be rendered unusable by the Contractor at the time of decommissioning. Remove nozzles and vents and cut a minimum of two, 12-inch by 12-inch square holes from each tank. Rotate cut piece 45-degrees from original orientation and weld back onto the hole on the tank to allow for venting.

3.2 PIPE DECOMMISSIONING

A. All fuel and residual liquid shall be completely removed from existing piping in accordance with the Contractors approved Work Plan.

1. Existing Fuel Piping from Barge Header to Bulk Fuel Tank Farm: The Contractor shall purge all remaining fuel and residual liquid from the existing lines.

2. Existing Tank Farm Manifold Piping and Dispenser Piping: The Contractor shall purge all remaining fuel and residual liquid from the existing lines.

B. The Contractor shall contain, filter, and transfer all useable fuel removed from piping to the new tanks. Any unusable fuel or sludge shall be assumed to be hazardous waste and disposed of by the Contractor in accordance with this Specification.

C. After fuel is removed from the piping, and the pipe is cut into maximum 20-foot sections, the pipe shall be stored in neat and organized stacks next to the old tank farm fuel containment area.

3.3 EXISTING VEHICLE DISPENSER DECOMMISSIONING

A. The existing vehicle dispenser shall be completely removed and stored in a location designated by the Askinuk Corporation. Demolish the existing fuel dispenser shed and store in a neat and organized fashion within the old tank farm fuel containment area.

3.4 HAZARDOUS WASTES

A. The hazardous nature of containerized sludge will be based upon composite testing performed by the Contractor in accordance with 40 CFR 261.

B. All waste that is deemed hazardous in accordance with 40 CFR 261 shall be manifested in accordance with 40 CFR 262 and shipped in accordance with US DOT 49 CFR parts 100-199 regulations. The Contractor shall use EPA Uniform Hazardous Waste Manifest, OMB No. 2050-0039, EPA form 8700-22.

C. All waste that is deemed non-hazardous in by a certified testing lab to be State Regulated Non-Hazardous Waste shall be transported and disposed at approved disposal facility.

3.5 FIELD QUALITY CONTROL

A. All monitoring equipment must be calibrated daily in accordance with the manufacturer’s requirements.

B. The Contractor Safety Officer is responsible for implementing the OSHA requirements for worker safety on the work site. This includes, but is not limited to, confined entry, atmospheric monitoring, and proper personal protection equipment.

PART 4 – BASIS OF MEASUREMENT AND PAYMENT

4.1 BASIS OF MEASUREMENT

A. Transfer Fuel and Decommission Existing Tank Farm: Measurement for Bid Item 3 - Transfer Fuel and Decommission Existing Tank Farm shall be lump sum and shall not be measured separately.

B. Manifesting, Transport, and Disposal of RCRA Hazardous Waste: Measurement for Bid Item 4 - Manifesting, Transport, and Disposal of RCRA Hazardous Waste shall be per full drum (55 gal), sealed with appropriate overpack drum, of waste removed from the existing tank farm and properly disposed of in accordance with this specification and State and Federal Requirements. Contractor shall provide evidence of proper transport and disposal prior to payment.

C. Manifesting, Transport, and Disposal of State Regulated Non-RCRA Hazardous Waste: Measurement for Bid Item 5 – Manifesting, Transport, and Disposal of State Regulated Non-RCRA Hazardous Waste shall be per full drum (55 gal) of waste removed from the existing tank farm and properly disposed of in accordance with this specification and State and Federal Requirements. Contractor shall provide evidence of proper transport and disposal prior to payment.

4.2 BASIS OF PAYMENT

A. Payment for this Work shall be in accordance with General Conditions.

B. Payment shall be made under the following units:

ITEM	UNIT
Transfer Fuel and Decommission Existing Tank Farm	Lump Sum
Manifesting, Transport, and Disposal of RCRA Hazardous Waste	Drum (55 gal)
Manifesting, Transport, and Disposal of State Regulated Non-RCRA Hazardous Waste	Drum (55 gal)

END OF SECTION

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SECTION 02 00 00

EXISTING CONDITIONS

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. This section describes the availability and limits of information pertaining to the existing site conditions, and as specified herein:

a. Use of Information.

b. Existing Ground Surface Conditions.

c. Subsurface Conditions.

B. Related Sections:

1. Section 31 20 00 Earth Moving.

1.2 USE OF INFORMATION

A. The site plan and topographical information shown on drawings is based on a field survey performed by HDL Engineering Consultants, LLC (HDL). HDL also conducted a site specific soils investigation and dug test holes at the project site. See Subsurface Conditions in this specification for more information.

B. The Contractor shall visit the site and acquaint himself with existing conditions prior to beginning the work.

C. Site clearing and removal of debris on undisturbed portions in the location of proposed facilities is to be performed by the Contractor.

D. The Contractor shall not excavate on any portion above the old landfill.

1.3 EXISTING GROUND SURFACE CONDITIONS

A. Old Landfill: The site includes a gravel pad covering the old community landfill. The old landfill was decommissioned and capped with soil material that is not to be disturbed or excavated. There is an access road approximately 80 feet long that connects the gravel pad to a road to the south. Excluding the access road, the gravel pad measures approximately 235 feet in length and 140 feet at it widest point (approximately 90 feet at its narrowest). There is garbage such as vehicles visibly protruding from the northern edge of the gravel pad and there may be miscellaneous garbage at the surface.

B. Cut/Fill Areas: The gravel pad generally slopes to the west and north to an undisturbed vegetative area. The gravel surface extends beyond the old landfill

toward the northeast. Along the eastern edge, the topography slopes to a plateau with residential property. The access road to the old landfill slopes down at an approximate 14 percent grade.

C. Undisturbed Areas: To the west and north of the old landfill there are undisturbed areas that are vegetated. There may be garbage and abandoned equipment and vehicles in various locations in the undisturbed areas.

1.4 SUBSURFACE CONDITIONS

HDL conducted a geotechnical engineering evaluation of the subsurface conditions at the project site in September 2020. An electronic copy of HDL's "*Geotechnical Engineering Report*" (GER) will be made available upon request.

A. General: Sinkholes may develop during or after compaction if there are voids in the underlying garbage. Contractor may need to reestablish grade prior to tank placement.

B. Old Landfill: Soil investigation encountered a gravel cap at the ground surface underlain by layers of sand with varying amounts of gravel, sand, and garbage. Garbage consisted mostly of soil mixed with household waste including plastic bags, food wrappers, aluminum cans, etc. There may be buried vehicles or equipment.

C. Cut/Fill Areas: Poorly graded sand was encountered at the surface and beneath the organic mat in cut and fill areas. The sand layers included varying amounts of gravel, silt, organics, cobbles, boulders, and garbage.

D. Undisturbed Areas: Soft soils were encountered in undisturbed areas and peat probes penetrated 0.3 feet and 1.8 feet below existing ground surface (bgs) with the exception of one to a depth of 4.2 feet bgs at the northeast corner. Test pits in undisturbed vegetative areas encountered garbage that included large metal pieces and car parts.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 02 12 00

MOBILIZATION AND DEMOBILIZATION

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. The work covered by this Section includes the furnishing of all labor, tools, equipment and materials for the following work and operations:

1. Preparatory work and operations, including but not limited to pre-construction and post-construction costs of obtaining all required bonds, insurance, and other costs Contractor must incur before beginning the Work.

2. Transportation of all materials, supplies, plant(s), equipment, and personnel to and from the jobsite.

3. Erecting and maintaining all plants, temporary structures, storage yards, erosion control measures, and other construction facilities, and for Work required to remove said temporary facilities and perform cleanup of the Project area in accordance with the Project Manual and Contract Documents.

4. Obtaining and paying for all permits required of the Contractor.

5. Posting all OSHA required notices and establishing safety programs.

6. Submittal of required Project Schedules.

B. Mobilization and Demobilization costs for all subcontracted work shall be considered to be included.

C. Items not included in Mobilization and Demobilization include, but are not limited to, any portion of the Work covered by specific bid items or incidental work which is to be included in a bid item or items; and profit, interest on borrowed money, overhead or management costs.

1.2 RELATED REQUIREMENTS

A. Section 01 50 00 Construction Facilities and Temporary Controls.

B. Section 01 60 13 Material and Equipment.

PART 2 – PAYMENT

2.1 METHOD OF MEASUREMENT

Payment for this work will be subsidiary to Bid Item 1 (Lump Sum) in partial payments as follows:

A. Up to sixty percent of the amount bid for mobilization and demobilization may be paid when equipment and supplies are landed in serviceable condition at the Project site and other necessary preparations have been completed so that work can commence on other pay items.

B. The remaining balance will be paid as Contractor facilities are dismantled and equipment is removed from the construction site, with the final increment paid upon completion of demobilization or as approved by the Engineer.

The right is reserved to require submittal of invoices, receipted bills, payrolls, and other appropriate documents to justify any or all payments under this item.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:

1. This Section specifies cast-in-place concrete, including cement, aggregates, formworks, reinforcement, joints and sealants, and miscellaneous items for footings, slabs, walls, piers, retaining structures, channels, conduit encasement, and miscellaneous structures.

B. Related Sections:

1. Section 31 00 00 Earthwork.

1.2 REFERENCES

A. American Concrete Institute:

1. ACI 301 - Specifications for Structural Concrete.

2. ACI 306.1 - Standard Specification for Cold Weather Concreting.

3. ACI 308.1 - Standard Specification for Curing Concrete.

4. ACI 318 - Building Code Requirements for Structural Concrete.

5. ACI SP-66 - ACI Detailing Manual.

B. ASTM International:

1. ASTM A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.

2. ASTM A185-07 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

3. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

4. ASTM A675 – Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical properties

5. ASTM A706 - Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

6. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.

7. ASTM C33 Standard Specification for Concrete Aggregates.

8. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

9. ASTM C94 - Standard Specification for Ready-Mixed Concrete.

10. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.

11. ASTM C150 - Standard Specification for Portland Cement.

12. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.

13. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.

14. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.

15. ASTM C685 - Standard Specification for Concrete Made By Volumetric Batching and Continuous Mixing.

16. ASTM C1017 - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.

17. ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.

18. ASTM C1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete.

19. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).

20. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

21. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.

22. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.

23. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

1.3 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures for the mechanics of the submittal process.

B. Product Data:

1. Reinforcing Steel:

a. Detailed shop drawings showing reinforcing steel placement, bending and cutting schedules, bar sizes, grades, spacing, locations and splicing and bending details. Include support details.

b. Manufacturer certified mill reports demonstrating the steel meets the requirements herein.

2. Concrete Materials and Mix Design.

a. At least 30 days before any concrete is placed, submit to the Authority the proposed mix design, together with testing results that establish the structural properties of each mix, for each class of concrete required for this portion of the work. Identify mix ingredients and proportions, including admixtures. Submit the manufacturer's data and certificate of compliance of items such as admixtures and fibers if applicable, and the name and address of the proposed concrete supplier.

C. Product data on waterstops, preformed joints and sealants.

1. Waterstops.

2. Sealants.

D. Test Reports:

1. Cylinder Compressive Strength Test Results.

2. Concrete Field Test Results.

E. Closeout Submittals.

F. Reinforcing Steel:

1. Detailed shop drawings showing reinforcing steel placement, bending and cutting schedules, bar sizes, grades, spacing, locations and splicing and bending details. Include support details.

G. Field Quality Control: Provide test reports to Authority within 24 hours of sampling or testing.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 77 19 - Closeout Requirements

B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

1.5 QUALITY CONTROL

A. Acquire cement, aggregate, and additives from one source.

B. Field Quality Control: Provide test reports to Authority within 24 hours of sampling or testing.

C. Qualification 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 trained and experienced in placing the types of concrete specified and who shall direct all work performed under this section.

2. Thoroughly trained and experienced journeyman concrete finishers shall be responsible for finishing of exposed surfaces.

D. Codes and Standards: All concrete shall meet the requirements of the latest edition of the Uniform Building Code, and ACI 318 Building Code Requirements for Reinforced Concrete and ACI 301 Specifications for Structural Concrete for Buildings of the American Concrete Institute. Where provisions of pertinent codes, standards and this specification conflict, the more stringent provisions shall govern.

E. Conform to ACI 306.1 when concreting during cold weather.

1.6 WEATHER LIMITATIONS

A. Placement of concrete shall be prohibited at an ambient air temperature of less than 40 degrees Fahrenheit or where the foundation material is frozen, unless authorized by the Authority.

PART 2 – PRODUCTS

2.1 REINFORCING STEEL

A. Concrete reinforcement shall be deformed steel bars conforming to the requirements of ASTM A615. Reinforcement shall be free from loose scales, excessive rust, and coatings of any character, which will reduce the bond between steel and concrete.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions as approved by the Authority.

C. Wire ties: Shall be 16 gauge or heavier black annealed steel wire.

2.2 WOODEN FORMS

A. Framing lumber shall be standard dimensions and of such quality as to meet the requirements of the stresses applied.

B. Plyform plywood shall be used for all exposed concrete forms. The plywood shall be exterior type without splits or knot holes and sanded smooth. The face grain of the plywood shall run perpendicular to the studs or joists. All joints in surfaces of forms used on exposed surfaces shall be vertical or horizontal. Plywood shall not be less than 1/2-inch thick.

C. Square-edged boards or tongue-and-groove sheathing may be used for forming unexposed concrete surfaces.

D. Form release agent: Forms shall be installed with a suitable bond-breaker to aid form removal with minimum damage to the concrete. Colorless mineral oil that will not stain concrete, absorb moisture, impair natural bonding, or color characteristics of coating intended for use on concrete.

E. Spreaders: Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face. Wire ties, wood spreaders, or through bolts are not permitted.

2.3 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I or II - recognized standard brand of Portland Cement conforming to the specification requirements.

B. Water: Water used for mixing of concrete shall be clean and free of oil and acid, and shall not contain salt, alkali, or organic matter.

C. Aggregates: Aggregates for Portland cement concrete shall be well graded, clean, hard gravel and coarse sand, non-frost susceptible material, and free of deleterious organic matter, and coatings of silt or clay.

1. Fine and course aggregates shall meet the quality and grading requirements of ASTM C33.

2. The maximum size of coarse aggregates shall not exceed 1-1/2 inches nor 1/5th of the narrowest dimension between the forms nor 3/4ths of the clear spacing between reinforcing bars nor 1/3 of the depth of slabs. The combined aggregates, coarse and fine, shall be of such composition of sizes that when separated on the No. 4 standard sieve, the weight passing shall not be less than 30% nor greater then 50% of the total weight.

2.4 AIR ENTRAINMENT

A. Air entrainment agents shall be used in all concrete. Entrainment shall be achieved by the addition of an improved air-entrainment mixture to the concrete mix. Air entrainment shall conform to ASTM C260 and to the requirements of this Specification.

2.5 CURING MATERIALS

A. Curing materials shall be one of the following types as approved by the Authority:

1. Mats of commercial quality and of a type used for curing concrete.

2. Burlap of commercial quality weighing not less than 14 ounces per square yard.

3. Spray on curing compound.

2.6 JOINT DEVICES AND FILLER MATERIALS

A. Pre-molded joint filler for use in expansion joints shall conform to the requirements as follows:

1. Joint Filler: Asphalt impregnated fiberboard or felt, conforming to ASTM D1751 or ASTM D994. Asphalt Expansion Joint as manufactured by W.R. Meadows or approved equal.

2. Joint Backer: Premolded polyethylene foam fully compressible with a recovery rate of a minimum of 95% and conforming to ASTM C1330, Type C. Kool-Rod as manufactured by W.R. Meadows or approved equal.

3. Joint Sealant: Cold applied two-part pourable liquid neoprene conforming to ASTM C920. Deck-O-Seal 150 as manufactured by W.R. Meadows or approved equal.

B. Expansion and Contraction Joint Devices: elastomeric filler strip to permit plus or minus 25 percent joint movement with full recovery;

C. Sealant: ASTM D6690, Type I.

2.7 CONCRETE MIX – ALL CONCRETE STRUCTURES EXCEPT STABILIZED FILL

A. Concrete mixture proportions are the responsibility of the Contractor. Select proportions for normal weight concrete in accordance with ACI 301, Method 1.

B. Mixture proportions shall include the dry weights of cementitious material(s); the nominal maximum size of the coarse aggregate; the specific gravities, absorptions, and saturated surface-dry weights of fine and coarse aggregates; the quantities, types, and names of admixtures; and quantity of water per cubic yard of concrete. Provide materials included in the mixture proportions of the same type and from the same source as will be used on the project. Specified

compressive strength shall be 4,000 psi at 28 days. The maximum nominal size coarse aggregate is 1-1/2 inch, in accordance with ACI MCP PACK Part 3. The air content shall be between 4 and 7 percent with a slump between 2 and 4 inches. The maximum water cement ratio is .45. Submit the applicable test reports and mixture proportions that will produce concrete of the quality required, ten days prior to placement of concrete. Cement content shall be 6.0 sacks per cubic yard.

2.8 CONCRETE MIX – STABILIZED FILL

A. CONTRACTOR shall furnish all Crushed Aggregate Surface Course for cement stabilized fill aggregate per Section 31 20 00 and cement for cement stabilized fill.

1. Minimum cement factor shall be 3 bags per cubic yard, Portland Cement ASTM C150, Type I or II.

2. Slump shall not be more than 4 inches.

3. The mix shall be uniform in gradation, density, moisture, and cement content.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify requirements for concrete cover over reinforcement.

B. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.2 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.

B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

C. Remove debris and ice from formwork, reinforcement, and concrete substrates.

D. Remove water from areas receiving concrete before concrete is placed.

3.3 MIXING AND DELIVERY

A. Site Mixed Concrete: Mix concrete in accordance with ACI 318. Concrete shall be mixed at the project site in a transit mixer. All mixing equipment and operations shall conform to the requirements of ASTM C94. All concrete shall be mixed to a uniform color and show uniform distribution of aggregates throughout the mixture.

B. Concrete shall be mixed only in such quantities as are required for immediate use, and shall be used while fresh before initial set has taken place. Any concrete, which has developed initial set, shall not be used. Concrete, which has partially hardened, shall not be re-tempered or re-mixed.

C. The use of non-agitating equipment for transporting concrete shall not be permitted. The mixing drums shall be thoroughly washed after discharging each load to prevent the accumulation of adherent layer of concrete. The discharge of particles of hardened concrete with any batch will be sufficient grounds for rejection of the entire batch.

D. The addition of water to the mix at the jobsite will not be permitted except with the approval of the Authority.

3.4 PLACING CONCRETE

A. Place concrete in accordance with the applicable requirements of ACI 301 and ACI 318.

1. Placing Concrete in Cold Weather: In cold weather (below 45 degrees F), concrete shall be placed in accordance with ACI 306R.

3.5 PLACING STABILIZED FILL

A. Cement stabilized fill shall be placed as a wet mix.

B. Immediately prior to placing the mix, the surface of the subgrade and the geocell shall be moistened and kept moist until covered by the mixture. Care shall be exercised to prevent softening of the subgrade by the addition of excess amounts of water. Ponding of water will not be permitted.

C. The mix shall be spread and compacted evenly in the geocell to prevent strain, and the finished surface shall be smooth and tight.

D. Finished portions of the mixture that are traveled on by equipment shall be protected in such a manner as to prevent equipment from damaging completed work.

3.6 FORMWORKS

A. Prior to placement of forms, the Authority shall inspect the subbase to ensure that it is smooth, compacted and free of soft or yielding spots and that compaction is complete.

B. Falsework and forms shall be provided and installed to contain the concrete as required to produce the finished concrete conforming to the lines and grades indicated on the drawings.

C. Prior to final setting or placing reinforcing steel, forms for exposed concrete surfaces shall be treated with a bond-breaker or parting compound. The compound shall be applied at a rate recommended by the manufacturer, which

will provide a smooth surface free of dusting action caused by the chemical reaction of the compound.

D. Exposed inside and outside corners shall be chamfered 1-inch, except as otherwise shown on the drawings. All forms shall be mortar tight. Standing water in the forms will not be permitted. The forms shall be cleaned immediately prior to placing concrete.

3.7 FABRICATION OF REINFORCING

A. All concrete reinforcement materials shall be new, free from rust, and shall comply with the following reference standards.

1. Bars for reinforcement shall comply with the requirements of “Standard Specification for Deformed Billet-Steel Bars for Concrete Reinforcement,” ASTM Designation A-615, grade 60, unless otherwise shown on the drawings.

3.8 PLACEMENT OF REINFORCING

A. Reinforcing steel shall be positioned accurately and secured against displacement by using annealed iron wire at intersections and shall be supported by concrete or metal chairs, spacers or metal hangers. Tack welding of cross bars is not acceptable. Bars shown on the drawings shall not be repositioned (buried) to act as support bars. Additional bars shall be provided as required for supports. Steel rods and pegs may be used to support reinforcing steel on rock foundations. Reinforcing steel shall be placed in such a manner as to not damage waterproofing membrane or plastic lining which has been previously applied or constructed. Reinforcing steel shall be shop-bent or slightly relocated where necessary to clear waterstop. Reinforcing steel shall not be placed on fresh concrete or forced into fresh concrete.

B. Supports for embedded items shall not be welded to the reinforcement. Additional reinforcement may be provided for this purpose.

C. Fabrication: All bars shall be bent cold to the shapes indicated on the plans. No bars partially embedded in concrete shall be field bent except as indicated on the drawings. Bends and hooks shall be made in accordance with the Concrete Reinforcing Steel Institute and SP-66 ACI Detailing Manual.

D. Placing and Fastening:

1. All steel reinforcement shall be accurately placed in the position indicated on the plans and firmly held during the placing and setting of concrete. Bars shall be tied at all intersections, except where spacing is less than one foot in each direction where alternate intersections shall be tied.

2. Provide minimum concrete covering of reinforcement in accordance with ACI 318 unless otherwise indicated on the drawings.

3. Distance from the forms shall be maintained by means of stays, blocks, ties, hangers or other approved supports. Blocks, for holding reinforcements from contact with the forms, shall be precast mortar blocks with a compressive strength of not less than 3750 psi of approved shape and dimensions or approved metal chairs. Metal chairs which are in contact with the exterior surface of the concrete shall be plastic coated or galvanized.

4. In the event conduits, piping, inserts, sleeves, or any other items interfere with placing reinforcement as indicated on the drawings or as otherwise required, immediately consult the Authority and obtain approval of new procedure before placing concrete.

5. Form ties shall be manufactured items with stress values published. Form ties shall have premeasured break-back weakened area so ties can be removed within 3/4-inch of the concrete surface.

6. Corner brackets, column clamps and other specialized accessories shall be utilized in accordance with manufacturer's recommendations.

3.9 SPLICING REINFORCING

A. All reinforcement shall be furnished in the full lengths wherever possible. Splicing of bars shall conform to ACI SP-66 and ACI 318. Splices shall be staggered as far apart as possible.

B. Unless shown otherwise, lap all reinforcing bars 40 diameters (24 inches minimum).

3.10 CLEANING REINFORCING

A. Reinforcing steel shall be cleaned of mill rust scale, dried concrete, or other coatings that may reduce bond. Reinforcement reduced in section is not acceptable. When concrete placement is delayed, reinforcement shall be cleaned by sandblasting if directed by the Authority.

3.11 CONCRETE

A. Concrete shall conform to the applicable portions of ASTM C94. Materials shall be proportioned by weighing. The Contractor shall be responsible for producing concrete of the specified characteristics.

B. Concrete shall be discharged within 1-1/2 hours after introduction of the water to the mixture.

3.12 CONCRETE FINISHING

A. Provide smooth trowel finish per ACI 301 and as detailed on the Drawings.

B. Water shall not be added to the surface while finishing.

3.13 FORM REMOVAL

A. Forms and falsework shall not be released from under the concrete, regardless of the time element, without first verifying that the concrete has gained adequate strength. Grade supported concrete with no applied loads, forms may be removed 3 days after pouring, if no damage will occur to the concrete.

3.14 CURING AND SEALING

A. Concrete curing shall be completed by water curing or by using a clear membrane-curing compound or by a combination of both methods. Repairs or treatment of concrete surfaces shall be coordinated so that interruption of the curing will not be necessary.

B. Concrete surface temperature shall be maintained between 50 degrees F and 80 degrees F for at least 5 days. Curing concrete in cold weather (below 45 degrees F) shall be in accordance with ACI 306F.

C. When water curing is used, concrete shall be kept wet continuously for a minimum of 7 days after placement. Absorptive mats or fabric may be used to retain moisture during the curing period.

D. When curing compound is used, it shall be applied as soon as the concrete has set sufficiently so as not to be marred by the application or immediately following form removal for vertical and other formed surfaces. Preparation of surfaces, quantities used, application procedures, and installation precautions shall be followed in strict compliance with the manufacturer's instructions.

3.15 PROTECTION

A. Concrete shall be protected from injurious action by sun, rain, flowing water, frost and mechanical injury.

3.16 CONSTRUCTION JOINTS

A. Construction joints shall be located and formed as shown in the Drawings.

B. Reinforcing steel and welded wire fabric shall be continued across construction joints. Waterstops shall be provided in construction joints at locations as specified.

3.17 EXPANSION JOINTS

A. Expansion joints shall be installed as detailed on the plans. Reinforcement or other embedded metal items bonded to the concrete shall not extend through expansion joints.

B. Place joint filler in patterned placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

3.18 VAPOR BARRIER

A. Install vapor retarder under interior slabs on grade in accordance with ASTM E1643. Lap joints minimum 6 inches and seal watertight by adhesive applied between overlapping edges and ends.

3.19 INSERTS AND EMBEDMENTS

A. Where pipes, castings or conduits are to pass through structures, the Contractor shall place such pipes or castings in the forms before placing the concrete, or he may provide openings in the concrete for subsequent insertion of such pipes, castings or conduits. Such openings shall be provided with waterstops and construction joint as shown and shall have a slight flare to facilitate grouting and permit the escape of entrained air during grouting.

B. Gate frames, gate thimbles, special castings, channels or other miscellaneous metal parts that are to be embedded in the concrete shall be set and secured in the forms prior to concrete placement. Unless otherwise specified, anchor bolts and inserts shall be embedded in concrete as shown. The Contractor shall provide inserts, anchors or other bolts necessary for the attachment of piping, valves, metal parts and equipment. Operators or sleeves for gate or valve stems shall be positioned to clear reinforcing steel, conduit, and other embedments, and to align accurately with equipment.

3.20 WATERTIGHTNESS, TESTING AND REPAIR

A. Concrete tanks and channels which have walls or slabs that are exposed above grade or common with areas occupied by equipment or personnel and subjected to hydrostatic pressure, shall be tested for water tightness. The tests shall be made prior to application of waterproofing coating. Testing shall consist of filling the tank with water to the maximum operating water surface for at least 24 hours. Wet spots, leakage, or seepage revealed by the test, including those caused by shrinkage of concrete, honeycombed areas, construction joints, or other sources shall be repaired by either or both of the following methods:

1. Grouting of the joint by drilling grout holes to the affected crack or honeycombed area, installing injection ports and forcing epoxy grout into the joint under pressure.

2. Cutting of a bevel groove on the waterside of the joint. The groove shall be 1/2 to 3/4 inch in width and depth and shall be caulked with epoxy joint sealer in accordance with manufacturer's instructions.

B. The Contractor shall retest tanks or channels which have been repaired to check the suitability of repairs. Water required for the testing and retesting shall be provided by the Contractor and disposed of so as not to create a nuisance.

3.21 FIELD QUALITY CONTROL

A. Concrete Inspections:

1. Continuous Placement Inspection: Inspect for proper installation procedures.

2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.

B. Strength Test Samples:

1. Sampling Procedures: ASTM C172.

2. Cylinder Molding and Curing Procedures: ASTM C31, cylinder specimens, field cured.

3. Sample concrete and make one set of three (3) cylinders for every 50 cubic yards or less of each class of concrete placed each day or a minimum of one test per day of placement.

4. Make one additional cylinder during cold weather concreting, and field cure.

C. Field Testing:

1. Slump Test Method: ASTM C143.

2. Air Content Test Method: ASTM C231.

3. Temperature Test Method: ASTM C1064.

4. Measure slump and temperature for each compressive strength concrete sample.

5. Measure air content in air entrained concrete for each compressive strength concrete sample.

D. Cylinder Compressive Strength Testing:

1. Test Method: ASTM C39.

2. Test one cylinder at 7 days.

3. Test two cylinders at 28 days.

3.22 PATCHING

A. Allow Authority to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete will be rejected. Notify Authority upon discovery.

C. Patch imperfections in accordance with ACI 301 and ACI 318.

3.23 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by Authority.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

3.24 CLEANUP

A. Upon completion of the work and prior to final inspection, the Contractor shall clean all concrete surfaces except those having curing and sealing compound.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Structural steel framing members and support members.

B. Plates and fabricated connections.

1.2 WORK INCLUDED

A. This section includes fabrication and erection of structural steel work, as shown on Contract Drawings including schedules, notes, and details showing size and location of members, typical connections, and types of steel required.

1. Structural steel is that work defined in American Institute of Steel Construction (AISC) “Code of Standard Practice” and as otherwise shown on Contract Drawings.

2. This section applies, but is not limited to, stairways, pump boxes, dispenser enclosures, truck fill areas, and other miscellaneous steel fabrications.

1.3 RELATED REQUIREMENTS

A. Section 01 33 00 Submittal Procedures.

B. Section 05 50 00 Metal Fabrications.

C. Section 09 96 00 High Performance Coatings.

D. Section 09 98 00 Hot Dip Galvanized Coatings.

1.4 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; American Institute of Steel Construction, Inc.

B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; American Institute of Steel Construction, Inc.

C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

E. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings

on Iron and Steel Products.

G. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

H. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric).

I. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.

J. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts [Metric].

K. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

L. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.

M. ASTM F436 - Standard Specification for Hardened Steel Washers.

N. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105 ksi Yield Strength.

O. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society.

P. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.

1.5 SUBMITTALS

A. See Section 01 33 00 – Submittal Procedures.

B. Product data or manufacturer’s specifications and installation instructions for products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

C. Shop Drawings:

1. Indicate profiles, sizes, spacing, and locations of structural members, openings, attachments, and fasteners.

2. Connections.

3. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

D. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.

E. Mill Test Reports: Indicate structural strength, destructive test analysis, and non-destructive test analysis.

F. Welders Certificates: Certify welders employed on the Work, verifying AWS

qualification within the previous 12 months.

G. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.6 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC "Steel Construction Manual."

B. Qualifications for Welding Work: Qualify welding procedures and welding operators in accordance with AWS "Qualification" requirements.

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.

2. If recertification of welders is required, retesting will be CONTRACTOR's responsibility.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Fabricate or deliver materials to site at such intervals to ensure uninterrupted progress of work.

B. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. If bolts and nuts become dry or rusty, clean and re-lubricate before use.

1. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. At CONTRACTOR’s expense, repair or replace damaged materials or structures as directed.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Metal Surfaces, General: For fabrication of work that will be exposed to view, use only materials that are smooth and free of surface blemishes including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding, or by welding and grinding, prior to cleaning, treating, and applying surface finishes.

B. Steel Shapes, Plates, and Bars: ASTM A36, 50 ksi material is acceptable for structural shapes, if more readily available.

C. Cold-Formed Structural Tubing: ASTM A500.

D. Pipe: ASTM A53/A53M.

E. Electrodes for Welding: Comply with AWS Code.

F. High-Strength Structural Bolts, Nuts, and Washers: ASTM A325 or A325M, Type 1, medium carbon, galvanized, with matching compatible ASTM A563 or A563M nuts and ASTM F436 washers.

G. Galvanized Welded Wire Fabric: ASTM F2453/F2453M.

H. Metal Roof Deck Profiles: ASTM/Steel Deck Institute Standard RD1, Type B

I. Metal Roof Deck Galvanized Coating: ASTM A653.

2.2 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings.

1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.

2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

C. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

D. Fabricate connections for bolt, nut, and washer connectors.

E. Bolt field connections, except where welded connections or other connections are indicated. Use Hot-Dipped Galvanized or 316 Stainless Steel bolts.

F. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

G. Assemble and weld built up sections by methods that will produce true alignment of axes without warp.

H. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on final shop drawings.

I. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

J. Tolerances: Structural component tolerances shall be +/- 1/8 inch and as required to adequately support loads.

2.3 STEEL COATING

A. The Tank Farm Pump Box and all Aboveground Storage Tanks shall be coated per

Section 09 96 00.

B. The Dispenser Enclosure and all stairs, landings, ladders, pipe supports, fence components, miscellaneous hardware, and miscellaneous steel fabrication shall be hot-dipped galvanized per Section 09 98 00.

C. Piping shall be coated per Section 23 11 13 – Facility Fuel-Oil Piping.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

B. Materials and fabrication procedures are subject to inspection and tests in mill, shop, and field, conducted by a qualified inspection agency. Such inspections and tests will not relieve CONTRACTOR of responsibility for providing materials and fabrication procedures in compliance with specified requirements.

1. At CONTRACTOR'S expense, promptly remove and replace materials or fabricated components that do not comply.

C. Design of Members and Connections: Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay in the work.

1. Promptly notify Project Manager whenever design of members and connections for any portion of structure are not clearly indicated.

3.2 ERECTION

A. Erect structural steel in compliance with AISC "Code of Standard Practice for Steel Buildings and Bridges."

B. Temporary Shoring and Bracing: Allow for erection loads, and 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. Shop Welding: CONTRACTOR shall inspect and test during fabrication of structural steel assemblies, as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.

2. Perform visual inspection of all welds.

D. Field Assembly: Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming part of complete frame or structure

before permanently fastening. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

E. Level and plumb individual members of structure within specified AISC tolerances.

F. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to Project Manager. Finish gas-cut sections equal to a sheared appearance when permitted.

G. Touch-Up Repairs: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint or galvanizing.

H. Galvanizing Repair: Galvanized coating at damaged areas shall be repaired according to ASTM A 780 (Annex A1) using zinc-based alloy repair sticks commonly known as “hot sticks”.

I. Coating Repair: If underlying metal surface is exposed, wheel abrade or sandblast to clean metal and re-coat same as tanks. If damage does not fully penetrate coating then reapply top coat only to minimum DFT.

J. Field weld components indicated on shop drawings.

K. Do not field cut or alter structural members without approval of Engineer.

3.3 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

A. The AUTHORITY, or AUTHORITY’S representatives, will visually inspect welded connections.

B. The AUTHORITY reserves the right to contract an independent testing firm to test welded connections.

C. Provide access for the AUTHORITY’S inspectors or testing agency representatives to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.

D. The AUTHORITY may inspect structural steel at plant before shipment.

E. Correct deficiencies in structural steel work that inspection and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at CONTRACTOR’S expense, as necessary to reconfirm any noncompliance of original work and to show compliance of corrected work.

F. Shop Welding: CONTRACTOR shall inspect and test during fabrication of structural

steel assemblies, as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.

2. Perform visual inspection of all welds.

G. Field Welding: CONTRACTOR shall inspect and test during erection of structural steel as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.

2. Perform visual inspection of all welds.

END OF SECTION

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SECTION 05 50 00

METAL FABRICATIONS

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Shop fabricated steel items including miscellaneous metal fabrications not part of the structural building framing system.

B. Shop fabricated steel stairs, guardrails, handrails, and grating.

C. Miscellaneous metal fabrications and fasteners.

D. Hot dipped galvanized metal fabrication such as containment dike access stairs, guardrails, handrails, platform supports, tank access ladders, platforms and guardrails.

E. Other hot dipped galvanized metal fabrications where specified or indicated.

1.2 RELATED REQUIREMENTS

A. Section 01 33 00 Submittal Procedures.

B. Section 05 12 00 Structural Steel Framing.

C. Section 09 98 00 Hot Dip Galvanized Coatings.

1.3 REFERENCE STANDARDS

A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

F. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

G. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Tensile Strength (Metric).

H. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; American Welding Society.

J. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society.

K. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; International Accreditation Service, Inc.

L. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings.

M. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings.

N. SSPC-SP 2 - Hand Tool Cleaning; Society for Protective Coatings.

1.4 SUBMITTALS

A. See Section 01 33 00 – Submittal Procedures.

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.

1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

D. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Fabricator must be a firm experienced in producing metal fabrications similar to those indicated for this project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

2. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

PART 2 – PRODUCTS

2.1 MATERIALS - STEEL

A. Steel Wide Flange Shapes: ASTM A992.

B. Miscellaneous Steel Sections and Plate: ASTM A36/A36M.

C. Steel Tubing: ASTM A500, Grade B cold-formed structural tubing.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black and hot-dip galvanized finish, as indicated.

E. Bolts, Nuts, and Washers: ASTM A325 (ASTM A325M), Type 1, galvanized to ASTM A153/A153M where connecting galvanized components.

F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

H. Touch-Up of Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

I. GS Metals Corp. Product Grip Strut Safety Grating with fasteners and saddle clips by manufacturer: Galvanized finish.

2.2 FABRICATION

A. Fit and shop assemble items 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. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FABRICATED ITEMS

A. Stairs and Landings: Steel members, connections, and fasteners as detailed in Drawings; hot-dipped galvanized finish.

B. Guardrails and Handrails: Fabricate guardrails and handrails of pipe

to dimensions indicated. All transitions shall be made using smooth radius fittings. Handrails shall be fabricated continuous, without interruptions, and shall return to terminate at endposts or walls.

C. Grip Strut Grating Panels: Manufactured die stamped type, serrations facing upward, galvanized steel:

1. Profile 11-3/4" x 2", 5 diamond pattern.

2. Thickness: 12 gauge.

3. Stair Treads: Provide manufacturer's standard end plate connection.

4. Attachments: Provide manufacturer's standard saddle clips and fasteners.

2.4 FINISHES - STEEL

A. All metal fabrications not part of the Above Ground Storage Tanks, Pipelines, and Tank Farm Pump Box shall be hot-dipped galvanized as noted in the Drawings and in Section 09 98 00.

B. Tank Farm Pump Box and All Above Ground Storage Tanks shall be coated per Section 09 96 00.

C. Piping shall be coated per Section 23 11 13 – Facility Fuel-Oil Piping.

2.5 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

3.3 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Perform field welding in accordance with AWS D1.1/D1.1M.

D. Grip Strut Grating Attachment: Anchor by bolting through saddle clips.

1. Bolt Size: 5/16" carriage bolts and nuts with diamond connection clip.

2. Quantity: Minimum 2 clips at each end support location.

E. Obtain approval from Architect / Engineer prior to site cutting or making adjustments not scheduled.

3.4 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

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SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Framing with dimension lumber for retail sales building.

2. Wood blocking, cants, and nailers.

1.3 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NLGA: National Lumber Grades Authority.

2. WCLIB: West Coast Lumber Inspection Bureau.

3. WWPA: Western Wood Products Association.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.

2. Provide dressed lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with the ground.

2.3 DIMENSION LUMBER FRAMING

A. All Framing: Any species of machine stress-rated dimension lumber with a grade of not less than Douglas fir-larch No. 2 grade.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.

2. Nailers.

3. Cants.

4. Furring.

B. For items of dimension lumber size, provide No. 2 grade lumber.

C. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Hem-fir or hem-fir (north); No. 2 Common grade; NLGA, WCLIB, or WWPA.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 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, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Wood Screws: ASME B18.6.1.

D. Lag Bolts: ASME B18.2.1

2.6 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inchthick, selected from manufacturer's standard widths to suit width of sill members indicated.

PART 3 - EXECUTION

3.1 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. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Shear Wall Panels: Install shear wall panels to comply with manufacturer's written instructions.

D. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.

E. Do not splice structural members between supports unless otherwise indicated.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block concealed spaces of wood-framed walls and partitions at not more than 96 incheso.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.

H. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.

2. Use copper naphthenate for items not continuously protected from liquid water.

J. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

K. Use steel common 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. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 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.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 incheswide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 WALL FRAMING INSTALLATION

A. General: Provide single bottom plate and double top plates using members of 2-inch nominalthickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Fasten plates to supporting construction unless otherwise indicated.

1. Provide continuous horizontal blocking at mid-height of partitions more than 96 incheshigh, using members of 2-inch nominalthickness and of same width as wall or partitions.

B. Construct corners and intersections with three or more studs.

C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.

3.4 PROTECTION

A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

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SECTION 07 21 00

THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Glass-fiber blanket insulation for framed floor, ceiling, and wall assemblies of the retail sales building.

2. Vapor retarders for framed floor, ceiling, and wall assemblies of the retail sales building.

B. Related Sections:

1. Division 07 Section 07 42 13 “Metal Wall and Roof Panels” for weather barrier wrap used on exterior walls under metal wall panels.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to 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.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET

A. 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.

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. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. Johns Manville; a Berkshire Hathaway company.

b. Knauf Insulation.

c. Owens Corning.

2.2 POLYETHYLENE VAPOR RETARDERS

A. Polyethylene Vapor Retarders: ASTM D 4397, 6-mil- (0.15-mm-) thick sheet with maximum permeance rating of 0.1 perms (5.7 ng/Pa x s x sq.m.).

2.3. ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Glass-Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.

2. Spray Polyurethane Foam Insulation: ASTM C 1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.

2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

4. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).

2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.4 INSTALLATION OF VAPOR RETARDERS ON FRAMING

A. Place vapor retarders on side of construction indicated on Drawings.

B. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives, vapor retarder fasteners, or other anchorage system as recommended by manufacturer. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

C. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs and sealing with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Locate all joints over framing members or other solid substrates.

D. 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 retarders.

E. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.5 PROTECTION

A. Protect installed insulation 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

SECTION 07 42 13

METAL WALL AND ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concealed-fastener, lap-seam metal wall panels and standing seam metal roof panels for retail building.

2. Metal soffit panels.

3. Water Resistive Barrier (building wrap.)

4. Flexible flashing for building wrap.

5. Self-adhering roof underlayment.

B. Related Sections:

1. Division 07 Section 07 62 00 “Sheet Metal Flashing and Trim” for flashing used with roof and wall panels.

2. Division 09 Section 09 91 23 “Exterior Painting” for finish of exterior hollow metal door and frame.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.

2. Show details of building wrap at terminations, openings, and penetrations. Show details of flexible flashing applications.

3. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches (1:10).

C. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below:

1. Metal Panels: Metal panel manufacturer's 'key ring' sample deck of standard metal siding colors.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panels to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, 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.

D. Retain strippable protective covering on metal panels during installation.

1.8 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.9 COORDINATION

A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including rupturing, cracking, or puncturing.

b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on 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. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.

b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:

1. Wind Loads: As indicated on Drawings.

2. Other Design Loads: As indicated on Drawings.

3. Deflection Limits: For wind loads, no greater than 1/240 of the span.

B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 283 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).

C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

A. General: Provide factory-formed metal 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 in side laps. Include accessories required for weathertight installation.

B. Concealed-Fastener Metal Wall Panels: Formed with vertical panel edges and intermediate stiffening ribs symmetrically spaced between panel edges.

1. Basis of Design Product: Subject to project requirements, provide PC10-12C wall panel as manufactured by AEP Span., or a comparable product from one of the following manufacturers:

a. Morin – a Kingspan Group Company.

b. Metal Sales Manufacturing, Co.

c. Centria.

d. MBCI.

2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

a. Nominal Thickness: 24 Gauge (0.024 inch, 0.61 mm).

b. Exterior Finish: Two-coat fluoropolymer.

c. Color: As selected by Owner from manufacturer's full range.

3. Panel Coverage: 12 inches (304.8 mm).

4. Panel Height: 7/8 inch (22.225 mm).

2.3 STANDING-SEAM METAL ROOF PANELS

A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.

1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.

B. Vertical-Rib, Snap-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and a flat pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and snapping panels together.

1. Basis of Design: Subject to the requirements of the project, provide Design Span hp standing seam metal roofing panel as manufactured by AEP Span, or a comparable product by one of the following manufacturers:

a. CENTRIA Architectural Systems.

b. Firestone Metal Products, LLC.

c. Metal Sales Manufacturing Corporation.

d. Morin – A Kingspan Group Company.

2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

a. Nominal Thickness: 24 Gauge (0.024 inches, 0.61 mm).

b. Exterior Finish: Two-coat fluoropolymer.

c. Color: As selected by Owner from manufacturer's full range.

3. Clips: One-piece fixed to accommodate thermal movement.

a. Material: 0.028-inch- (0.71-mm-) nominal thickness, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.

4. Panel Coverage: 12 inches (304.8 mm).

5. Panel Height: 1.75 inches (44 mm).

2.4 METAL SOFFIT PANELS

A. General: Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

B. Flush-Profile Metal Soffit Panels: Perforated panels formed with vertical panel edges and a flat pan between panel edges; with flush joint between panels.

1. Manufacturers: Provide soffit panels from the same manufacturer providing the metal wall panels.

2. Material: Same material, finish, and color as metal wall panels.

3. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

a. Nominal Thickness: 0.022 inch (0.56 mm)

b. Exterior Finish: Two-coat fluoropolymer

c. Color: Match metal wall panels.

2.5 ROOF UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils (0.76 mm) thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.

1. Basis of Design Product: Subject to compliance with requirements, provide self-adhered Grace Ice & Water Shield roofing underlayment as manufactured by Grace Construction Products or a comparable product by one of the following:

a. Henry Company.

b. Tremco Incorporated.

2. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C) or higher.

3. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C) or lower.

2.6 WATER-RESISTIVE BARRIER (BUILDING WRAP)

A. Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.

1. Basis of Design: Subject to project requirements, provide Tyvek Commercial Wrap or a comparable product by another manufacturer.

2. Water-Vapor Permeance: Not less than 20 perms (1150 ng/Pa x s x sq. m) per ASTM E 96/E 96M, Desiccant Method (Procedure A).

3. Air Permeance: Not more than 0.004 cfm/sq. ft. at 0.3-inch wg (0.02 L/s x sq. m at 75 Pa) when tested according to ASTM E 2178.

4. Allowable UV Exposure Time: Not less than three months.

5. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

2.7 FLEXIBLE FLASHING

A. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

1. Manufacturers: Subject to project requirements, provide flexible flashing from same manufacturer as building-wrap.

2. Flame Propagation Test: Materials and construction shall be as tested according to NFPA 285.

B. Primer for Flexible Flashing: Product recommended in writing by flexible flashing manufacturer for substrate.

2.8 MISCELLANEOUS ACCESSORIES

A. Nails and Staples: Product recommended in writing by flexible flashing manufacturer and complying with ASTM F 1667.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.

2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-(25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.

3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.9 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.

4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.

5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.

a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.10 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

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 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.

C. Steel Panels and Accessories:

1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

1. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.

a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 ROOF UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (152 mm) staggered 24 inches (610 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.

1. Apply over the entire roof surface.

B. Flashings: Install flashings to cover underlayment to comply with requirements specified in Division 07 Section "Sheet Metal Flashing and Trim."

3.4 METAL PANEL INSTALLATION

A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal panels.

2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.

3. Install screw fasteners in predrilled holes.

4. Locate and space fastenings in uniform vertical and horizontal alignment.

5. Install flashing and trim as metal panel work proceeds.

6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.

7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.

8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.

1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.

2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.

3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.

4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.

5. Flash and seal panels with weather closures at perimeter of all openings.

E. Watertight Installation:

1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.

2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.

3. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.

F. Accessory Installation: 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 panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall or roof panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.

G. 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 are permanently watertight.

1. Install exposed flashing and trim that is without 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 achieve waterproof performance.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner reserves the right to engage a qualified testing agency to perform tests and inspections.

B. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

3.6 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal panels 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 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Formed steep-slope roof sheet metal fabrications.

B. Related Requirements:

1. Division 06 Section 06 10 00 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.

2. Division 07 Section 07 42 13 “Metal Wall and Roof Panels” for exterior wall and roof finish.

3. Division 09 Section 09 91 13 “Exterior Painting” for finish of hollow metal door and frame

1.3 COORDINATION

A. Coordinate sheet metal flashing, trim layout and seams with sizes and locations of penetrations to be flashed, joints, and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.

2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.

3. Include identification of material, thickness, weight, and finish for each item and location in Project.

4. Include details for forming, including profiles, shapes, seams, and dimensions.

5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.

6. Include details of termination points and assemblies.

7. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.

8. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches (1:10).

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For each type of roof edge flashing that is SPRI ES-1 tested.

C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.9 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.

b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Metallic-Coated Steel Sheet: Provide aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating

designation, Grade 40 (Grade 275); prepainted by coil-coating process to comply with ASTM A 755/A 755M.

1. Surface: Smooth, flat and with manufacturer's standard clear acrylic coating on both sides.

2. Exposed Coil-Coated Finish:

   a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

3. Color: Match color of adjacent panel.

4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

2.3 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: As specified in Section 07 42 13.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

   a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.

   b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.

   c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

3. Fasteners for Zinc Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

G. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

2. Obtain field measurements for accurate fit before shop fabrication.

3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location

lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.

2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

H. Do not use graphite pencils to mark metal surfaces.

2.6 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS

A. Eave, Rake, Ridge Flashing and Counter flashing: Fabricate from the following materials:

1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.

2.7 WALL SHEET METAL FABRICATIONS

A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings. Form head and sill flashing with 2-inch- (50-mm-) high, end dams. Fabricate from the following materials:

1. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.

2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install as specified in Section 07 42 13.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.

4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.

5. Torch cutting of sheet metal flashing and trim is not permitted.

6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of sheet metal flashing and trim with bituminous coating where flashing and trim contact wood or ferrous metal.

2. Underlayment: Where installing sheet metal flashing and trim directly on wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.

2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).

2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00.

3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

3.5 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.6 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in Manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants for use with retail sales building at window opening and door threshold.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Samples for Verification: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each kind of joint sealant, for tests performed by manufacturer and witnessed by a qualified testing agency or performed by a qualified testing agency.

B. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

A. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.6 FIELD CONDITIONS

A. 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 or are below 40 deg F.

2. When joint substrates are wet.

3. Where joint widths are less than those allowed by joint-sealant

manufacturer for applications indicated.

4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.

2. Disintegration of joint substrates from causes exceeding design specifications.

3. Mechanical damage caused by individuals, tools, or other outside agents.

4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

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 joint-sealant manufacturer, based on testing and field experience.

B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

C. Stain-Test-Response Characteristics: Where sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

D. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Single-Component, Non-sag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

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. Dow Corning Corporation; 790.

b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.

c. Pecora Corporation; 301 NS.

d. Sika Corporation, Construction Products Division; SikaSil-C990.

e. Tremco Incorporated; Spectrem 1.

2.3 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material 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, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular material with a surface skin), or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. 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. Provide self-adhesive tape where applicable.

2.4 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 to joint substrates.

C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 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 performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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 porous joint substrate surfaces by brushing, grinding, 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 after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Wood or plywood.

3. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by 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.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 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 in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce 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 sealant backings.

2. Do not stretch, twist, puncture, or tear sealant backings.

3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.

2. Completely fill recesses in each joint configuration.

3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.

2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless

otherwise indicated.

3.4 CLEANING

A. Clean off excess sealant 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.

3.5 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, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

A. Joint Sealant Application: General use wall interfaces.

1. Material: Silicone Joint Sealant.

2. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

END OF SECTION

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Exterior standard steel doors and frames.

B. Related Requirements:

1. Division 08 Section 08 71 00 “Door Hardware” for door hardware for hollow-metal and wood doors.

2. Division 09 Section 09 91 13 “Exterior Painting” for paint products to be used on exterior door and frame.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, and finishes.

B. Shop Drawings: Include the following:

1. Elevation of door type.

2. Details of door, including vertical- and horizontal-edge details and metal

thicknesses.

3. Frame details for frame type, including dimensioned profiles and metal thicknesses.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal door and frame palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.

Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- (102-mm-) high wood blocking. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Ceco Door; ASSA ABLOY.

2. Curries Company; ASSA ABLOY.

3. DCI Hollow Metal.

4. Republic Doors and Frames.

2.2 PERFORMANCE REQUIREMENTS

A. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.50 deg Btu/F x h x sq. ft. (2.84 W/K x sq. m) when tested according to ASTM C 518.

2.3 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3; SDI A250.4, Level A. At all exterior door locations.

1. Doors:

   a. Type: As indicated on the Drawings.

   b. Thickness: 1-3/4 inches (44.5 mm).

   c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A40 (ZF120) coating.

   d. Edge Construction: Model 1, Full Flush.

   e. Edge Bevel: Provide manufacturer's standard beveled or square edges.

   f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.

   g. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.

   h. Core: Manufacturer's standard insulated core.

2. Frames:

   a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A40 (ZF120) coating.

   b. Construction: Full profile welded.

3. Exposed Finish: Prime.

2.4 FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.

2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches (610 mm) of frame height above 7 feet (2.1 m).

B. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A 1008M or ASTM A1011/A 1011M; hot-dip galvanized according to ASTM A 153/A153M, Class B.

2.5 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

E. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

F. Glazing: Comply with requirements in Section 08 80 00.

2.6 FABRICATION

A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

1. Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.

2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Provide stops and moldings flush with face of door, and with beveled stops unless otherwise indicated.

2. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.

3. Coordinate rabbet width with glazing and installation types indicated.

4. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

2.7 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. General: Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Hollow-Metal Frames: Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.

a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and

make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.

b. Install frames with removable stops located on secure side of opening.

2. Solidly pack mineral-fiber insulation inside frames.

3. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:

a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.

b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.

c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.

d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with SDI A250.8 or NAAMM-HMMA 841 and NAAMM-HMMA guide specification indicated.

D. Glazing: Comply with installation requirements in Division 08 Section 08 80 00 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 CLEANING AND TOUCHUP

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

B. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION

SECTION 08 53 13

VINYL WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes vinyl-framed fixed window for retail building.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, glazing, and fabrication methods, dimensions of individual components and profiles, hardware, and finishes for vinyl windows.

B. Shop Drawings: For vinyl windows.

1. Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

C. Samples for Verification: For vinyl windows and components required, prepared on Samples of size indicated below:

1. Exposed Finishes: 2 by 4 inches (50 by 100 mm).

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Product Test Reports: For each type of vinyl window, for tests performed by a qualified testing agency.

C. Sample Warranties: For manufacturer's warranties.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating vinyl windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.

1.6 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace vinyl windows that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure to meet performance requirements.

b. Structural failures including excessive deflection, water leakage, and air infiltration.

c. Deterioration of materials and finishes beyond normal weathering.

d. Failure of insulating glass.

2. Warranty Period:

a. Window: 10 years from date of Substantial Completion.

b. Glazing Units: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain vinyl window from single source from single manufacturer.

2.2 WINDOW PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Window Certification: WDMA certified with label attached to each window.

B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

1. Minimum Performance Class: CW.

2. Minimum Performance Grade: 30.

C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of 0.30 Btu/sq. ft. x h x deg F (1.71 W/sq. m x K).

D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of 0.40.

E. Outside-Inside Transmission Class (OITC): Rated for not less than 26 OITC when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 1332.

2.3 VINYL WINDOWS

A. Basis of Design Product: Subject to project requirements, provide Fairfield 80 Series triple glazed vinyl window with ClimaTech TG2 insulated glazing as manufactured by Alside, or a comparable product by another manufacturer. Submitted vinyl window products shall comply with requirements of 'Certified Alaska Tough' certification issued by the Cold Climate Housing Research Center (CCHRC.)

B. Frames: Impact-resistant, UV-stabilized PVC complying with AAMA/WDMA/CSA 101/I.S.2/A440.

1. Finish: Integral color, almond.

2. Gypsum Board Returns: Provide at interior face of frame.

C. Insulating-Glass Units: ASTM E 2190.

1. Glass: ASTM C 1036, Type 1, Class 1, q3.

a. Kind: Fully tempered where indicated on Drawings.

2. Lites: Three.

3. Filling: Fill space between glass lites with argon.

4. Low-E Coating: Sputtered on second or third surface.

D. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

E. Fasteners: Noncorrosive and compatible with window members, trim, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.4 FABRICATION

A. Fabricate vinyl windows in sizes indicated. Include a complete system for installing and anchoring windows.

B. Glaze vinyl windows in the factory.

C. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing window, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.

B. Install window level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

3.3 ADJUSTING, CLEANING, AND PROTECTION

A. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.

1. Keep protective films and coverings in place until final cleaning.

B. Remove and replace window unit if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

C. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 – GENERAL

1.1 SUMMARY

A. Work under this section includes the complete finish hardware requirements for the project. Quantities listed are for the contractor's convenience only and are not guaranteed. Items not specifically mentioned, but necessary to complete the work shall be furnished, matching the items specified in quality and finish.

B. Related Sections:

1. Division 08 Section 08 11 13 "Hollow Metal Doors and Frames."

1.2 QUALITY ASSURANCE

A. Product Qualification:

1. To assure a uniform high quality of materials for the project, it is intended that only specified items be furnished. Comparable products may be accepted upon prior approval of architect.

2. Hardware to be new, free of defects, blemishes and excessive play. Obtain each kind of hardware (Mechanical latch and locksets, exit devices, hinges and closers) from one manufacturer except where specified.

B. Supplier Qualifications:

1. Hardware supplier will be a direct factory contract supplier who employs a certified Architectural Hardware Consultant (AHC) available at all reasonable times during the course of the work for project hardware consultation to Owner, Architect, and Contractor.

2. Supplier will be responsible for detailing, scheduling and ordering of finish hardware.

C. Installer Qualifications:

1. Installer to have not less than 3 years' experience specializing in installation of work in this section. Company must maintain qualified personnel trained and experienced in installing hardware.

1.3 REFERENCES

A. NFPA101 – Life Safety Code.

B. ANSI A117.1 - Accessible and Usable Buildings and Facilities.

C. BHMA – Builders Hardware Manufacturers Association.

D. DHI – Door Hardware Institute.

1.4 SUBMITTALS

A. Hardware schedule: Submit digital copies of schedule. Organize vertically formatted schedule into Hardware Sets with index of doors and headings, indicate complete designations of every item required for each door or opening. Include the following:

1. Type, style, function, size, quantity and finish of hardware items.

2. Name, part number and manufacture of each item.

3. Fastenings and other pertinent information.

4. Explanation of abbreviations, symbols, and codes contained in schedule.

5. Door and frame sizes, materials, and degrees of swing.

B. Product Data: Submit digital copies for each product indicated.

C. Templates: Obtain and distribute templates for doors, frames, and other works specified to be prepared for installing door hardware.

D. Keying Schedule: Prepared by or under the supervision of supplier, after receipt of the approved finish hardware schedule, detailing Owner's final keying instructions for locks.

E. Samples: Upon request submit material samples.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, handle and protect products to project site under provisions of Division 01 and as specified herein.

B. Tag each item or package separately, with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver keys to Owner by registered mail.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Years from date of Substantial Completion, for durations indicated.

a. Closers: Three (3) years mechanical

b. Locksets: Ten (10) years

1.7 MAINTENANCE

A. Maintenance tools:

1. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

PART 2 – PRODUCTS

2.1 MATERIAL AND FABRICATION

A. Provide all door hardware for complete work, in accordance with the drawings and as specified herein.

B. Provide items and quantities not specifically mentioned to ensure a proper and complete operational installation.

2.2 MANUFACTURERS

A. Approval of products from manufacturers indicated as “Acceptable Manufacturer” is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.

ITEM	SCHEDULED MANUFACTURER	ACCEPTABLE MANUFACTURER
Hinges.	Ives (IVE)	Hager, Bommer
Locksets & Deadlocks	Schlage (SCH)	Best, Sargent
Cylinders & Keying	Best (BES)	No Substitute
Door Closers	LCN (LCN)	Norton, Sargent
Door Trim	Ives (IVE)	Trimco, Burns
Protection Plates	Ives (IVE)	Trimco, Burns
Overhead Stops	Glynn-Johnson (GLY)	Rixson, Sargent
Thresholds & Weatherstrip	Zero (ZER)	NGP, Reese, Pemko

2.3 HANGING

A. Conventional Hinges: Hinge open width minimum, but of sufficient throw to permit maximum door swing. Steel or stainless steel pins:

1. Three (3) hinges per leaf to 7 feet, 6-inch height. Add one for each additional 30 inches in height or any fraction thereof.

2. Provide 4 ½ x 4 ½ for 1 ¾" thick doors up to 3'5". Provide 5 x 4 ½ on doors 36" and over.

3. Exterior outswing doors to have non removable (NRP) pins.

4. Pin tips, flat button, finish to match leaves

2.4 LOCKSETS, LATCHSETS, DEADBOLTS

A. Extra Heavy Duty Cylindrical Locks and Latches: Schlage ND Series

1. Provide cylindrical locks conforming to ANSI A156.2 Series 4000, Grade 1.

2. UL listed for A label and lesser class single doors up to 4ft x 8ft.

3. Meets A117.1 Accessibility Codes.

4. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2 inch latch throw. Provide proper latch throw for UL listing at pairs.

5. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.

6. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.

7. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.

8. Lever Trim: Solid cast levers without plastic inserts, and wrought roses on both sides.

9. Lever Design: Schlage Rhodes.

2.5 KEYS, KEYING, AND KEY CONTROL

A. See Keying Requirements in this section.

2.6 CLOSERS

A. Surface Closers: LCN 4040XP Series.

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.

2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.

3. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.

4. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.

5. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.

6. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.

7. Pressure Relief Valve (PRV) Technology: Not permitted.

8. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).

9. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.7 OTHER HARDWARE

A. Door stops: Provide stops to protect walls, casework or other hardware.

1. Except as otherwise indicated, provide stops (wall, floor or overhead) at each leaf of every swinging door leaf.

2. Where wall or floor stops are not appropriate, provide overhead holders.

B. Weatherstrip and Gasket

1. Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled.

2. Provide non-corrosive fasteners as recommended by the manufacturer for application indicated.

C. Thresholds

1. Except as otherwise indicated, provide standard metal threshold unit of type, size, and profile as detailed or scheduled.

D. Kickplates

1. Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.

2.8 HARDWARE FINISH

A. Provide the following finishes unless noted differently in hardware groups:

Hinges	630 Stainless Steel Exterior
Locksets	626 Dull Chrome
Exit Devices	626 Dull Chrome
Closers	689 Aluminum
Kickplates	630 Stainless Steel
Other Hardware	626 Dull Chrome
Thresholds	Aluminum
Weatherstrip/Sweeps	Aluminum

2.9 KEYING REQUIREMENTS

A. All keyed cylinders shall be subject to a new Schlage Masterkey system.

B. Furnish cylinders with construction cores. Following construction supply permanent keyed cores.

C. Cylinders to be furnished with visual key control with key code. Stamped on the face of the keys and marked on the back or side of the cylinders.

PART 3 – EXECUTION

3.1 PREPARATION

A. Ensure that walls and frames are square and plumb before hardware installation.

B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes. Notify Architect of any code conflicts before ordering materials.

3.2 INSTALLATION

A. Do not install surface mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation.

B. Locate floor stops not more than 4 inches from the wall.

3.3 ADJUSTING

A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.

B. Hardware damaged by improper installation or adjustment methods to be repaired or replaced to Owner's satisfaction.

3.4 PROTECTION/CLEANING

A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion. Clean adjacent wall, frame, and door surfaces soiled from installation/reinstallation process.

3.5 DOOR HARDWARE GROUPS

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1	EA	STOREROOM LOCK	ND80BD RHO	626	SCH
		PERMANENT CORE	1C7	626	BES
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	KICKPLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	DRIP CAP	16A	A	NGP
1	SET	SEALS	706A	AL	NGP
1	EA	DOOR SWEEP	C627A	CL	NGP
1	EA	THRESHOLD	8425	AL	NGP

END OF SECTION

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SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Glass for windows and doors.

2. Glazing sealants and accessories.

B. Related Requirements:

1. Division 08 Section 08 53 13 “Vinyl Windows” for exterior window unit with insulated glazing.

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches (300 mm) square.

1. Insulating glass.

C. Glazing Accessory Samples: For sealants, in 12-inch (300-mm) lengths.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

A. Product Certificates: For glass.

B. Product Test Reports: For insulating glass and glazing sealants, for tests performed by a qualified testing agency.

1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

C. Sample Warranties: For special warranties.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved by coated-glass manufacturer.

B. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

C. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.9 FIELD CONDITIONS

A. 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.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F (4.4 deg C).

1.10 WARRANTY

A. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to 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. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Hartung Glass Industries.

2. Oldcastle BuildingEnvelope™.

3. Pilkington North America.

B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.

1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.

a. Basic Wind Speed: 90 mph (40 m/s).

b. Importance Factor: 1.0.

c. Exposure Category: C.

2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.

3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.

2. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).

3. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.

4. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."

2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

1. Minimum Glass Thickness for Exterior Lites: 6 mm.

2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

B. Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.

C. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

D. Pyrolytic-Coated, Low-Maintenance Glass: Clear float glass with a coating on first surface having both photocatalytic and hydrophilic properties that act to loosen dirt and to cause water to sheet evenly over the glass instead of beading.

2.5 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.

2. Perimeter Spacer: Manufacturer's standard spacer material and construction.

3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, use NT.

1. Products: Subject to compliance with requirements, unless specifically recommended in writing by the glazing framing manufacturer, provide one of the following:

a. BASF Building Systems; Omniseal 50.

b. Dow Corning Corporation; 995.

c. GE Advanced Materials - Silicones; UltraPruf II SCS2900.

d. May National Associates, Inc.; Bondaflex Sil 295.

e. Pecora Corporation; 898.

f. Polymeric Systems, Inc.; PSI-641.

g. Sika Corporation, Construction Products Division; SikaSil-C995.

2.7 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.

2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.

2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.8 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of 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).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.9 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit 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 publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

a. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, 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 systems.

3. Minimum required face and edge clearances.

4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 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. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. 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.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

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-inch (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.

G. 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.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

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.

3.4 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. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, 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 right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks, and press firmly against tape 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.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch 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. Installation with Drive-in Wedge Gaskets: 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. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 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.

3.7 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. 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 buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 INSULATING GLASS SCHEDULE

A. Glass Type GL-1: Clear insulating glass.

1. Overall Unit Thickness: 1 inch (25 mm).

2. Minimum Thickness of Each Glass Lite: 3 mm.

3. Outdoor Lite: Fully tempered float glass.

4. Interspace Content: Argon.

5. Indoor Lite: Fully tempered float glass.

6. U-Factor: 0.30 maximum.

7. Safety glazing required.

END OF SECTION

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SECTION 09 91 13

EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following exterior substrates for the retail sales building:

1. Steel and iron.

2. Galvanized metal.

B. Related Requirements:

1. Division 05 Section 05 50 00 "Metal Fabrications" for shop priming metal fabrications.

1.3 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

2. Indicate VOC content.

B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.

2. Apply coats on Samples in steps to show each coat required for system.

3. Label each coat of each Sample.

4. Label each Sample for location and application area.

C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.

2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Behr Paint Company; Behr Process Corporation.

2. Benjamin Moore & Co.

3. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Colors: As selected by the Owner.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.

2. Testing agency will perform tests for compliance with product requirements.

3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer, but not less than the following:

1. SSPC-SP 2.

E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for paint and substrate indicated.

2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.

3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.

4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

D. Painting, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed to view:

a. Equipment, including panel boards.

b. Uninsulated metal or plastic piping.

c. Pipe hangers and supports.

d. Metal or plastic conduit.

e. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.

2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Steel and Iron Substrates:

1. Water-Based Light Industrial Coating System MPI EXT 5.1C:

a. Prime Coat: Primer, alkyd, anti-corrosive for metal, MPI #79.

b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.

c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5), MPI #163.

B. Galvanized-Metal Substrates:

1. Latex System MPI EXT 5.3H:

a. Prime Coat: Primer, galvanized, water based, MPI #134.

b. Intermediate Coat: Latex, exterior, matching topcoat.

c. Topcoat: Latex, exterior, semi-gloss (MPI Gloss Level 5), MPI #11.

END OF SECTION

SECTION 09 91 23

INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior substrates for the retail sales building:

1. Steel and iron.

2. Galvanized metal.

3. Wood.

B. Related Requirements:

1. Division 05 Section 05 50 00 "Metal Fabrications" for shop priming metal fabrications.

2. Division 09 Section 09 91 13 “Exterior Painting” for paint applied on exterior substrates.

1.3 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

2. Indicate VOC content.

B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.

2. Apply coats on Samples in steps to show each coat required for system.

3. Label each coat of each Sample.

4. Label each Sample for location and application area.

C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.

2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

1. Behr Paint Company; Behr Process Corporation.

2. Benjamin Moore & Co.

3. Dunn-Edwards Corporation (a Nippon Paint Holdings Co. Ltd. company).

4. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.

2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Colors: As selected by the Owner.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.

2. Testing agency will perform tests for compliance with product requirements.

3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will

be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer, but not less than the following:

1. SSPC-SP 2.

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.

2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms or occupied spaces:

a. Equipment, including panelboards and switch gear.

b. Uninsulated metal piping.

c. Uninsulated plastic piping.

d. Pipe hangers and supports.

e. Metal conduit.

f. Plastic conduit.

g. Tanks that do not have factory-applied final finishes.

h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.

2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.

2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Steel Substrates:

1. Institutional Low-Odor/VOC Latex System MPI INT 5.1S:

    a. Prime Coat: Primer, rust inhibitive, water based MPI #107.

    b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.

    c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.

2. Institutional Low-Odor/VOC Latex System MPI INT 5.3N:

    a. Prime Coat: Primer, galvanized, water based, MPI #134.

    b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.

    c. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5), MPI #147.

B. Wood Substrates: Wood trim and wood board paneling.

1. Latex over Latex Primer System MPI INT 6.3T:

    a. Prime Coat: Primer, latex, for interior wood, MPI #39.

    b. Intermediate Coat: Latex, interior, matching topcoat.

    c. Topcoat: Latex, interior (MPI Gloss Level 4), MPI #43.

END OF SECTION

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SECTION 09 96 00

HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This section includes surface preparation and external coating requirements for new fuel storage tanks and a pump box to be completed in the Shop after fabrication and before shipping, or to be completed in the field after shop fabrication and field erection.

B. This section includes touch up and repair of painted surfaces including existing and new tanks, pump boxes, and containment structures.

1.2 RELATED REQUIREMENTS

A. Section 01 33 00 – Submittal Procedures.

B. Section 05 12 00 – Structural Steel Framing.

C. Section 23 13 23 – Facility Aboveground Fuel-Oil Storage Tanks.

1.3 REFERENCES

A. Steel Structures Painting Council (SSPC) Specifications:

1. SSPC-PA 1 Shop, Field, and Maintenance Painting.
2. SSPC-SP 1 Solvent Cleaning.
3. SSPC-SP 3 Power Tool Cleaning.
4. SSPC-SP 6 Commercial Blast Cleaning.
5. SSPC-SP 7 Brush-off Blast Cleaning.
6. SSPC-SP 10 Near-White Blast Cleaning.
7. SSPC-SP 11 Power Tool Cleaning to Bare Metal.

B. SSPC Paint Application Specification No. 2 – Measurement of Dry Paint Thickness with Magnetic Gages.

C. National Association of Corrosion Engineers (NACE) Standards: Recommended Practice 0188-99, “Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates”.

1.4 SUBMITTALS

A. CONTRACTOR shall submit for approval the following items one (1) month prior to the start of coatings application:

1. The proposed coating system. If different manufacturers are proposed within each coating system, provide certification from manufacturers.

2. The proposed applicator, his qualifications, and experience.

3. Provide manufacturer's data, instructions, and Safety Data Sheets (SDS) for all coatings.

4. Inspection and application procedures.

5. NACE Inspector qualifications and certifications.

6. Ambient temperature, humidity, recoat window, and other application parameters relevant for proposed coating system.

B. The CONTRACTOR shall submit the following items weekly during coating application:

1. Temperature, humidity, and dew point readings during coating applications.

2. Magnetic dry film thickness readings for each coating applied.

1.5 GENERAL REQUIREMENTS

A. Coating: Coating applicator shall be a factory authorized coating company with at least five (5) years continuous experience in applying industrial coatings to tanks and utility piping. The coating applicator's main business line must be surface preparation and application of industrial coatings.

B. CONTRACTOR shall provide and maintain an effective quality control plan necessary to assure conformance to applicable Specifications and plans with respect to materials, workmanship, finish, and functional performance. Inspection shall include a third party National Association of Corrosion Engineers (NACE) Certified Coating Inspector for all work associated with surface preparation and coating application.

C. CONTRACTOR is responsible for all costs incurred for tank coating inspection completed by a third party NACE certified Coating Inspector.

D. Coatings shall be resistant to unleaded gasoline and diesel.

E. Top coat shall be compatible with an above grade exposure to direct continuous sunlight, and be UV resistant.

F. Unless specified herein, the coating manufacturer's printed recommendations and

instructions for shelf life, storing, surface preparation, mixing, thinning, handling, applying, curing, ambient conditions during application and curing, and for all other procedures relative to coating shall be strictly observed.

G. It is the applicator's responsibility to perform work to the requirements of this Specification, and to conduct inspections and tests necessary to ensure compliance.

1.6 COATING SYSTEMS

A. Coating systems shall be as specified in the Table below, unless otherwise indicated in the Contract Documents.

COATING SCHEDULE

(All mil requirements are dry film)

ITEM	EXTERIOR ABOVE GRADE	
Tanks, Above Grade Storage Tanks, and Tank Farm Pump Box	1 coat Inorganic Zinc based Primer 1 coat Epoxy Intermediate Coat 1 coat Urethane Top Coat	(3-4 mils DFT) (4-6 mils DFT) (2-3 mils DFT)
All Fuel Pipe	Factory Coated per Plant Applied Fusion Bonded Epoxy Section 09 96 00.01 and Field Applied Fusion Bonded Epoxy Section 09 96 00.02	
Dispenser Enclosure and all Stairs, Land-ings, Ladders, and Miscellaneous Steel Fabrication	Hot-dip Galvanized Coating per Section 09 98 00	

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: All products submitted shall conform to federal, state, and local requirements limiting the emission of volatile organic compounds. Specific information may be secured through the local office of the Air Pollution Control Officer.

B. Color Pigments: Pure, non-fading, applicable types to suit the substrates and service indicated.

C. Paint Coordination: Provide finish coats that are compatible with prime paints used. Review other sections of these Specifications in which prime paints are to

be provided to ensure compatibility. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify the Engineer in writing of any anticipated problems arising from using specified coating systems with substrates primed by others.

D. Material Quality:

1. Provide the best quality grade of the various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying the manufacturer's identification as a standard, best grade product will not be acceptable. Proprietary names used to designate colors or materials are not intended to imply that products of the named manufacturers are required to the exclusion of equivalent products of other manufacturers, but are used to establish the intended finish type and quality. Equivalent products of other manufacturers may be used upon proper submittal and acceptance; however, proof of replacement materials being readily available at future dates from established, nationally-recognized sources is required.

2. Provide undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only within recommended limits.

2.2 PRIMER

A. Provide a two component, chemically cured, reinforced inorganic zinc primer. Provide Devoe Catha-Coat 302H or approved equal. Apply coating 3-4 mils DFT. Coating shall be equal to or provide better performance characteristics than the following:

Specification	Test Method	Minimum Value
Solids by Volume	ASTM D2697-7 day	78%
Volatile Organic Content	EPA 24	3.6 lbs/gal
Cure Time (3 mils DFT)	ASTM D1640	Recoat 4.5hr @ 40°F Dry 13 hr @ 40°F

2.3 INTERMEDIATE COAT

A. Provide a two component, chemically cured, multi-purpose epoxy coating. Coating to be suitable for corrosive environments. Provide Devoe Bar-Rust 236 or approved equal. Apply coating 4-6 mils DFT. Coating shall be equal to or provide better performance characteristics than the following:

Specification	Test Method	Minimum Value
Solids by Volume	ASTM D2697-7 day	80%
Volatile Organic Content	EPA 24	1.41 lbs/gal
Cure Time (6 mils DFT)	ASTM D1640	Recoat 9 hr @ 40°F Dry 17 hr @ 40°F

2.4 URETHANE TOP COAT

A. Provide a two component, chemically cured, aliphatic acrylic urethane coating. Tank top coating color to be white. Provide Devoe Devthane 389 or approved equal. Apply coating 2-3 mils DFT. Coating shall be equal to or provide better performance characteristics than the following:

Specification	Test Method	Minimum Value
Solids by Volume	ASTM D2697-7 day	56%
Volatile Organic Content	EPA 24	3.23 lbs/gal
Cure Time (2 mils DFT)	ASTM D1640	Recoat 10 hr @ 40°F Dry 32 hr @ 40°F

2.5 TANK LABELING

A. Signage and placards for all tanks shall be permanently painted with stencils or shop fabricated vinyl letters on a non-reflective white vinyl adhesive background.

B. On all tanks included in the project scope, provide signage indicating product stored and shell capacity, NFPA 704 placarding, and additional signage required by the International Fire Code. For horizontal tanks, provide signage on each head-wall

1. Labeling shall be a minimum 2” lettering with 3/8” stroke on horizontal fuel tanks.

   a. Lettering shall be black for the following:

      1) Product Stored

      2) Tank Capacity

      3) Tank Number (example; “KLTD-201”)

   b. Lettering shall be red for the following:

      1) Gasoline, “Danger – Flammable – No Smoking”.

      2) Diesel, “Danger – Combustible – No Smoking”.

2. Placarding to conform to the NFPA 704 requirements for color and size for 100 foot visibility. Diesel is 2-2-0. Gasoline 2-3-0.

2.6 TOUCH-UP COATING

A. Provide four (4) one-gallon top coat kits, and four (4) one-gallon tinted epoxy intermediate coat kits for future coating maintenance by the Askinuk Corporation.

PART 3 - EXECUTION

3.1 GENERAL

A. Protect, ship, and apply paint in accordance with the manufacturer's instructions.

B. Remove all moisture, dust, loose material, and grit prior to masking.

C. Neatly mask all surfaces not required to be painted. Remove, mask, or otherwise protect hardware, lighting fixtures, switch plates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not intended to be painted. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting process. Openings in motors shall be masked to prevent paint and other materials from entering the motors.

D. Paint shall not be applied in temperatures exceeding the manufacturer's recommended maximum and minimum allowable, nor in dust, smoke-laden atmosphere, damp or humid weather.

E. Apply water-based paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F and 90 degrees F, unless otherwise permitted by the paint manufacturer's printed instructions.

F. Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 degrees F and 95 degrees F, unless otherwise permitted by the paint manufacturer's printed instructions.

G. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.

H. Painting may be continued during inclement weather, only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

I. Do not apply paint materials when temperature and humidity conditions can reasonably be predicted to change from manufacturer's application limitations prior to the elapse of adequate drying time.

3.2 PREPARATION OF SURFACES

A. General:

1. Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified for each particular substrate condition.

2. Remove all hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish painted; or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary for the complete painting of the items and adjacent surfaces. Following completion of painting of each space or area, reinstall the removed items by workers skilled in the trades involved.

3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program the cleaning and painting so that contaminants from the cleaning process will not fall onto wet, newly-painted surfaces.

B. Preparation of Surfaces to be Coated:

1. Abrasive blast clean external surfaces as follows:

2. SSPC-SP-10 Near White Blast

3. Provide a 1-1/2 to 2-1/2 mil sharp angular surface profile. Remove all abrasive residues either by blowdown or vacuum surfaces.

4. Weld spatter shall be scraped or ground before blasting.

5. All steel shall be free from surface contaminants. Spot samples will be made before blasting and coating. Surface contaminants include rust, oil, grease, salts, mil scale, water, dirt, abrasive residue, and dust.

6. Prepared steel must receive primer within four (4) hours.

7. All sharp edges shall be removed by grinding or sanding. Weld seams shall be rounded by power tool grinding.

3.3 APPLICATION OF PAINT

A. General:

1. Manufacturer's written instructions for applying each type of paint or protective coating shall be furnished to the Engineer prior to application. Cleaned surfaces and all coats shall be inspected prior to the succeeding coat. Schedule such inspection with the Engineer in advance. Apply all coatings in strict accordance with the paint manufacturer's recommendations, as reviewed by the Engineer. Sufficient time shall be allowed be- tween coats to assure thorough drying of previously applied paint.

2. Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint until the paint film is of uniform finish, color, and appearance. Give special attention to ensure that all surfaces including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

B. Application:

1. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only before final installation of equipment.

2. Paint the back sides of access panels and removable or hinged covers, locker doors, etc., to match the exposed surfaces.

3. Finish exterior doors and frames, on tops, bottoms, and side edges, the same as the exterior faces, unless otherwise indicated.

4. Use foam brushes or rollers on metal doors and frames and similar surfaces to achieve finishes that are completely void of brush stroke tracks and marks.

5. Back-brush inside surfaces of siding, trim, and miscellaneous wood prior to installation and painting when necessary to avoid material cupping or warping.

6. Units to be bolted together and to structures shall be painted prior to assembly or installation.

C. Film Thickness:

1. Coverage is listed as either total minimum dry film thickness in mils (MDFT) or the spreading rate in square feet per gallon (SFPG). Per coat determinations are listed as MDFTPC or SFPGPC. The number of coats is the minimum required irrespective of the coating thickness. Additional coats may be required to obtain the minimum required paint thickness, depending on method of application, differences in manufacturers; products, and atmospheric conditions. Maximum film build per coat shall not exceed the coating manufacturer's recommendations.

2. Metal and wood surfaces shall be visually inspected to ensure proper and complete coverage has been attained.

3. Particular attention shall be given to edges, angles, flanges, etc. Where insufficient film thicknesses are likely to be present, ensure proper millage in these areas.

D. Damaged Coatings:

1. Damaged coatings, pinholes, and holidays shall have the edges feathered and repaired in accordance with the recommendations of the paint manufacturer, as reviewed by the Engineer.

2. All finish coats, including touch-up and damage-repair coats shall be applied in a manner which will present a uniform texture and color-matched appearance.

E. Unsatisfactory Application:

1. If the item has an improper finish color, or insufficient film thickness, the surface shall be cleaned and top coated with the specified paint material to obtain the specified color and coverage. Specific surface preparation information to be secured from the coating manufacturer and the Engineer.

2. All visible areas of chipped, peeled, or abraded paint shall be hand- or power-sanded feathering the edges. The areas shall then be primed and finish coated in accordance with the Specifications. Depending on the extent of repair and its appearance, a finish sanding and topcoat may be required by the Engineer.

3. Work shall be free of runs, bridges, shiners, laps, or other imperfections. Evidence of these conditions shall be cause for rejection.

4. Any defects in the coating system shall be repaired by the CONTRACTOR per written recommendations of the coating manufacturer.

5. Leave all staging up until the Engineer has inspected the surface or coating. Staging removed prior to approval by Engineer shall be replaced.

3.4 INSPECTION

A. Inspection shall be performed by a third-party National Association of Corrosion Engineers Certified Coating Inspector who may perform additional tests deemed necessary to ensure compliance with this Specification.

B. It is the responsibility of the Prime Contractor and Coating Contractor to coordinate all surface preparation and coatings activities with the third party NACE certified Coating Inspector.

C. All quality control test results shall be documented by the Contractor as required by this specification and submitted to the Engineer for approval.

D. After surface preparation work, inspect surfaces to receive coatings and repair all defects prior to applying coatings.

E. Before blasting and applying any coating, the coatings applicator and the coatings inspector shall agree on mutually acceptable “hold points”. The CONTRACTOR shall not continue work past each hold point until the Inspector has approved the

previous work.

F. Use type 1 pull off magnetic dry film thickness gauges.

G. Compressed air for blasting and coating shall be free of oil and water. Conduct blotter tests at a minimum of every twelve (12) hours of operation.

H. If any non-coatable defects are discovered in welds, after abrasive blasting, delay their repair until after application of the first coat of coating material, at no additional cost to the Authority.

I. After the second coat has cured completely, perform a holiday inspection using a low-voltage DC holiday detector over 100% of the coated area. Use a suitable surfactant in accordance with manufacturer's instructions. Mark all holidays during the inspection with a chloride-free marker. Holiday inspection does not apply to structural framing below the dike floor.

J. The responsibility of the inspector is to approve or disapprove Work according to these Specifications. The inspector does not have authority to direct work.

3.5 REPAINTING AND TOUCH-UP

A. As directed by the Project Engineer, wire brush to bare metal, and re-paint any areas with imperfections, sags, runs, blushing, blemishes, holidays, thin spots. Surface preparation for touch-up paint of field-welded surfaces shall be in accordance with SSPC-SP 11.

B. Touch-up any minor nicks, scratches with same material following the manufacturers written instructions.

C. Repainting and touch-up shall be at no additional cost to the Authority.

END OF SECTION

SECTION 09 96 00.01

PLANT APPLIED FUSION BONDED EPOXY (FBE)

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This Specification defines the minimum requirements for the surface preparation, materials, application, and inspection of plant applied fusion bonded epoxy (FBE) for the exterior steel surfaces of the Alaska Energy Authority Scammon Bay Bulk Fuel Pipelines.

1.2 RELATED REQUIREMENTS

A. Section 01 33 00 Submittal Procedures

B. Section 09 96 00.02 Field Applied Fusion Bonded Epoxy (FBE)

C. Section 09 98 00 Hot Dip Galvanized Coatings

D. Section 23 11 13 Facility Fuel-Oil Piping

1.3 GENERAL REQUIREMENTS

A. In this Specification, the term Coating Contractor is applicable to the Coating Contractor that applies the plant FBE.

B. The Coating Contractor shall furnish all labor, materials, and equipment necessary for the heating, cleaning, abrasive blasting, ventilation, coating, curing, and inspection of surfaces to be coated. It is the responsibility of the Coating Contractor to perform all work in a manner meeting the requirements of all health and safety regulations applicable to the specific work site.

C. The Coating Contractor (company) shall specialize in performing the type of work described in this Specification. The Coating Contractor must have a minimum of five (5) years of recent documented experience in surface preparation and applying high-performance FBE coatings.

D. The Coating Contractor shall adhere to all pertinent Authority, federal, state, and local safety requirements, codes and regulations.

E. The Coating Contractor shall use the best practices of the trade, and when not in conflict with these Specifications use the applicable portions of SSPC-PA1. The Coating Contractor shall also follow NACE SP0394-2013 when not in conflict with this Specification or the Coating Manufacturer’s recommendations.

F. The Coating Contractor shall coordinate the sequence and scheduling of cleaning, coating, and inspection work to avoid conflicts with other project milestones.

G. It is the responsibility of the Coating Contractor to meet the requirements of this Specification, to use equipment capable of meeting these requirements, and to perform all inspections necessary to ensure compliance to this Specification.

H. If a conflict exists between this Specification, the referenced standards or the Coating Manufacturer's recommendations, promptly notify the Engineer in writing and the Engineer shall determine which applies. In general, the most stringent requirements will apply.

I. The Coating Contractor shall follow the safety procedures as recommended by the Coating Manufacturer and work in a well-ventilated area. The Coating Contractor shall provide, and require workers to use, impervious clothing, gloves, face shields, and all other appropriate protective clothing that is necessary to prevent eye and skin contact with the abrasive blast and coating materials.

J. The Coating Contractor shall use suitable and approved equipment for the intended purpose, the equipment shall be properly grounded and have the required safety equipment and/or devices. The equipment shall be kept in satisfactory working condition to permit proper operation.

K. The Coating Contractor shall correct any work which the Coating Inspector or Authority's Representative has determined to be non-compliant with the requirements of this Specification. Corrections for non-compliant work shall be made without additional cost to the Authority. Failure to discover or reject defective work or materials does not constitute acceptance of such work or materials.

L. The Coating Contractor shall document and maintain accurate quality control records. Records shall be kept for a minimum of five (5) years on all aspects of the coating work, including the results of all quality control testing.

M. The plant shall have an operational heater capable of removing moisture from the pipe prior to abrasive blasting and coating application.

N. Any fluidized beds must have magnets adequate to remove all iron and steel contamination from new and recycled powder.

O. The Coating Contractor shall have a laboratory with qualified personnel and the necessary equipment to perform all quality assurance tests required by this Specification and the Coating Manufacturer. Alternatively, the Coating Contractor may contract an outside laboratory to perform these tasks. All equipment must be in good working order and properly calibrated. Testing must be completed in a timely manner to avoid disrupting the production schedule.

PART 2 - PRODUCTS

2.1 PIPE

A. The Coating Contractor shall visually inspect and accept responsibility for each pipe length. Any damage, flaws, corrosion, dents, gouges, bevel damage, or other defects noted shall be recorded and reported to the Authority within twenty-four (24) hours.

B. All pipe shall be visually checked for external and internal contamination such as oil, grease, temporary coatings, salts, or other substances. Record the pipe condition and issue a non-conformance report that identifies all discrepancies, damage, concerns and non-conformance items for the Authority to address.

C. Proper equipment for unloading, handling, and temporary storage of pipe shall be used to avoid any damage to the pipe or pipe ends. Any pipe damaged by the coating contractor shall be repaired in accordance with the Authority's requirements at the Coating Contractor's expense.

D. Damaged and rejected pipe shall be stacked separately from undamaged pipe and clearly identified.

E. All internal Pipe Manufacturer's stencils shall be maintained, including but not limited to, length and joint/heat identification information. Any damaged stencils shall be identified and correctly replaced. After coating, markings per API requirements shall be marked on each pipe. At a minimum, markings shall include, pipe size and grade, date coated, coating sequence number, applicator, and Coating Manufacturer.

F. Pipe protective end caps shall be removed prior to any coating activities. Protective end caps (new or existing) shall be installed after the coating activities are completed.

2.2 PLANT APPLIED COATING MATERIALS

A. The following coating system, or Engineer approved equal, shall be applied to achieve the specified Dry Film Thickness (DFT):

Coating System - Valspar		
Coating Type	**Coating Thickness (Mils)**	
	Minimum (DFT)	**Maximum (DFT)**
Gas Pipeline		
FBE – Pipeclad 2000 (Green)	12	16
ARO – Pipeclad 2040 Flex (Black)	12	16
Total DFT	**24**	**32**

Diesel Pipeline		
FBE – Pipeclad 2000 (Green)	12	16
ARO – Pipeclad 2040 Flex (Brown)	12	16
Total DFT	**24**	**32**

B. The Coating Contractor shall, at a minimum, obtain the following data from the Coating Manufacturer to be followed including frequency of testing for each category: gel time, density, moisture analysis, particle size, shelf-life, glass transition temperatures, and heat of reaction.

C. Coating materials shall be delivered in sealed, labeled containers bearing the Coating Manufacturer's name, brand designation, specification number, batch or lot number, color, and date of manufacture.

D. Coating materials beyond manufacturer's shelf life limits shall not be used.

E. Do not tint, shade, or modify the coating in any way.

F. All coating material shall remain in unopened and in the original Coating Manufacturer's containers until required for use and shall be stored as per the Coating Manufacturer's recommendations. Any damaged containers found with seal broken or leaking shall not be used.

2.3 ABRASIVE BLASTING MEDIA

A. Use dry, neutral pH, hard abrasives of angular configuration that are free of oil, dust, clay, or other foreign material. Do not recycle blasting abrasive.

B. The abrasive blast media shall meet the following minimum requirements:

1. Contain less than 1% free silica.

2. Be free of harmful quantities of toxic materials.

3. Contain less than 20 ppm of water soluble chlorides.

4. Contain less than 200 ppm of water soluble sulfates.

5. Be of the proper size and material to provide the Coating Manufacturer's required surface profile.

C. The Blast Media Manufacturer shall provide written certification, to be submitted to the Engineer, that the blast media meets the minimum requirements of this specification.

2.4 PHOSPHORIC ACID PRE-WASH

A. The Coating Contractor shall perform a phosphoric acid pre-wash for all pipe to be coated. The minimum concentration of phosphoric acid in the pre-wash solution shall be in accordance with the Coating Manufacturer's recommendations. Deionized or reverse osmosis water shall be used. The maximum concentration shall be in accordance with the Coating Manufacturer's recommendations. The dwell time, pre-heat temperature range, pH of the mixture and the pH of the wet pipe surface after rinse, and the rinse pressure and effectiveness shall all follow the Coating Manufacturer's recommendations and NACE SP0394-2013.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. The pipe shall be uniformly pre-heated to remove all moisture, prior to abrasive blasting activities. The pipe surface shall be at least 5°F above the dew point during abrasive blast cleaning and inspection.

B. The pipe surface shall be free of all oil, grease, chlorides, and other foreign materials detrimental to the coating process. Any oil, grease, chlorides, or other contaminants shall be removed by solvent cleaning, pressure washing, and/or steam cleaning prior to abrasive blast cleaning.

C. All steel surfaces to be coated shall be prepared to a near-white metal finish by abrasive blasting, per SSPC-SP 10 standards. Cleanliness shall be determined by visual comparison with SSPC VIS-1. The compressed air that is used shall be clean and dry in accordance with ASTM D4285.

D. The anchor pattern or surface profile shall be of a sharp, jagged (angular) nature as opposed to a "peened" pattern. The surface profile shall be between 2.5-5 mils. The surface profile shall be measured in accordance with NACE SP0287-2016/ASTM D4417.

E. Following abrasive blasting, the Coating Contractor shall remove all spent abrasive, scale, dust, and debris from the surface to be coated. The external surface shall be inspected for slivers, gouges, and other surface imperfections. Imperfections shall be ground or filed. Pipe with steel defects shall be recorded and a non-conformance report shall be issued. If the anchor pattern is damaged by burnishing over an area of six square inches or a total accumulative ground area of more than two square feet, then the surface shall be re-blasted.

F. In the event corrosion occurs after the completion of the surface preparation or if the pipe has not been coated within two hours of cleaning, the surface shall be re-cleaned to a near-white metal cleanliness (SSPC-SP 10). The internal surface of the pipe shall be blown free of all foreign materials and/or blast media, into a dust collector, using clean dry air.

G. The Contractor shall legally dispose of used abrasive in accordance with all Authority, federal, state, and local requirements and regulations.

3.2 COATING APPLICATION

A. At no time during the entire coating process shall any part of the pipe be heated to a temperature in excess of 500°F. Pipe heated above this temperature shall be subject to rejection and the Coating Contractor shall be liable for the cost of pipe. Heating must be continuous and uniform. Heat temperatures shall be continuously monitored and shall follow the Coating Manufacturer's recommendations. The pipe shall be maintained at temperatures and time durations recommended by the Coating Manufacturer throughout the entire coating curing process.

B. The coatings shall be applied in accordance with SSPC-PA1, the Coating Manufacturer's recommendations, NACE SP0394-2013, and this Specification. Coatings shall not be applied to surfaces that are not cleaned as specified.

C. The coatings shall be applied in accordance with the Coating Manufacturer's recommendations and approved parameters. The Coating Contractor shall, at a minimum, obtain the following information from the Coating Manufacturer: phosphoric acid pre-wash recommendations, application temperature range, laboratory test requirements, shelf-life of the material, material storage requirements, and application temperature range to be followed.

D. The Coating Contractor shall leave a 2-inch minimum, 3-inch maximum cutback (non-coated, but abrasive blasted, pipe surface area) at each pipe end for future welding activities.

E. The coating of the weld areas shall be performed in the field per Specification 09 96 00.02 Field Applied Fusion Bonded Epoxy (FBE). During the coating of the girth welds, the plant-applied coating shall be feathered and coated to achieve the proper coating thickness.

F. The coatings shall be applied before any flash rusting or blooming occurs. If flash rusting or blooming occurs, the pipe shall be rejected and re-blasted. The Coating Contractor shall apply coatings to be free of film characteristics or defects that would adversely affect the performance or appearance of the coating system.

G. The use of recycled epoxy powder shall be permitted if the recycle system automatically and continuously blends the recycled powder with a minimum of 80% new powder in the delivery system. Recovered powder shall not be used. The system shall include fluid bed magnets, which are checked at least once per shift, and an operational filter system with no coarser than an 80-mesh screen.

H. All coated pipe shall be carefully handled, loaded, and stacked in a manner to prevent damage to the pipe and coating system during shipping.

1. The proper type and number of separators will be utilized.

2. The separators shall be evenly spaced along the pipe and in no case shall any length of pipe have fewer than three separators.

3. Coated pipe stored on wood timbers shall be free of any gravel, nails, grit, or other material that could damage the pipe and coating system.

3.3 QUALITY CONTROL AND COATING INSPECTION

A. The services of an in-house or third-party Coating Inspector(s) is required (plant and field). The Coating Inspector shall have free access to all stages of the storage, material handling, surface preparation, and coating process. The Coating Inspector shall be a certified NACE Level III Coatings Inspector. The Coating Inspector shall have a minimum of five (5) years' documented recent experience inspecting FBE coatings.

B. It is the responsibility of the Coating Contractor to coordinate all surface preparation and coatings activities with the Coating Inspector. The Coating Inspector shall be on-site 100% of the time while surface preparation or coating application work is being performed to monitor the work and to record and report on all the requirements identified in these specifications and those recommended by the Coating Manufacturer. The Coating Inspector shall audit the work at each stage of the coating/surface preparation process, perform tests at each stage of the process, and inspect the finished product. Any test not meeting the requirements specified shall be re-performed at the Coating Contractor's expense. Should test(s) yield results which do not meet the requirements of this Specification, the Coating Contractor shall re-coat deficient areas and perform additional testing as directed by the Engineer at no additional cost to the Authority.

C. The entire coating system shall be inspected to the requirements identified by this Specification, the Coating Manufacturer's recommendations, and NACE SP0394-2013. Holiday detection testing shall conform to the Coating Manufacturer's recommendations. If a conflict exists between this Specification, the referenced standard or the Coating Manufacturer's recommendations, promptly notify the Engineer in writing and the Engineer shall determine which applies. In general, the most stringent requirements will apply.

D. Conduct the following quality control inspections and tests listed below. Note: Tests and inspections recommended by the Coating Manufacturer and the referenced standards shall also be followed. Frequencies provided below are minimums; additional testing may be necessary. The Coating Inspector has the authority to increase the testing frequencies when needed.

Plant Required Inspections	**Minimum**
Air Quality	Twice Daily
Inspection Prior to Blasting	Every Joint
Verify Water Quality	Daily

Verify Acid Strength	Each Mixed Batch
pH Effectiveness After Rinse	Every Joint
Abrasive Quality	Every 4 Hours
Inspect Pipe for Contaminants Prior to Blasting (Chlorides, Oil, Grease, etc.).	Every Joint
Inspection of Pipe After Blasting	Every Joint
Verify Surface Profile	Every Joint
Verify Pre-heat Prior to Coating	Every Hour
Verify Coating Thickness	Every Joint
Holiday Testing	Every Joint

E. The cleanliness of the steel surface shall be verified by the Coating Inspector using comparators, per SSPC-VIS 1.

F. The surface profile shall be determined by the Keane-Tator Surface Profile Comparator, Clemtex Anchor Pattern Standards, or Testex Tape in accordance with NACE SP0287-2016/ASTM D4417.

G. All abrasive blast and coating materials shall be inspected for conformance to this Specification.

H. Dry film thickness measurements shall be performed in accordance with SSPC-PA2.

I. Every joint of pipe shall be inspected for holidays (coating defects), using high-voltage holiday detection equipment per the Coating Manufacturer's recommendations, prior to leaving the plant and prior to burial in the ditch. The holiday detector shall be calibrated, at a minimum, prior to each shift. Holiday testing shall not be performed while the coating temperature is above 190°F. All holidays shall be repaired in accordance with this Specification.

J. For plant applied FBE coatings, destructive testing shall be performed on production samples to test the applied coating. One production sample is required from each shift. Destructive tests and evaluations shall follow the Coating Applicators quality assurance/quality control program and test methods. At a minimum, tests shall include cathodic disbondment, flexibility, and hot water soak tests and microscopic evaluations. The test results and evaluations shall be included in the Coating Inspectors final report.

K. Daily coating inspection reports are required and shall be submitted electronically to the Authority and Engineer within 24 hours of the day they were performed.

L. The Coating Inspector shall submit an electronic final report to the Authority and Engineer within one month of completion of the coating activities (both plant and field applied coatings). The final report(s) shall be compiled of all test data, photographs, inspection checklists, daily reports, and a summary stating that the coating system was applied in accordance with this Specification.

END OF SECTION

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SECTION 09 96 00.02

FIELD APPLIED FUSION BONDED EPOXY (FBE)

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This Specification defines the minimum requirements for the surface preparation, materials, application, inspection, and repair of field applied fusion bonded epoxy (FBE) for the exterior steel surfaces of the Alaska Energy Authority Scammon Bay Bulk Fuel Pipelines, Fittings, Joints, and all other piping not plant coated. Work includes the following principal items:

1. Schedule and conduct cleaning/coating work during favorable atmospheric conditions.

2. Portable coating and abrasive blasting hooch's shall be used to perform coating/surface preparation activities. No coating or abrasive blasting materials shall be allowed to contaminate the surrounding environment. The hooch's may need to be moved along the length of the pipelines where the pipe is being installed. The locations where coating/surface preparation activities will occur shall be coordinated with the General Contractor and Authority's Representative.

3. Surface preparation by solvent cleaning and abrasive blast cleaning.

4. Maintain the prepared surface prior to coating application. This may require heaters, dehumidification, and other equipment.

5. Proper application and inspection of the specified coating materials on the exterior surfaces of the fuel pipelines.

6. It is the responsibility of the Coating Contractor to meet the requirements of this Specification, to use equipment capable of meeting these requirements, and to perform all tests and inspections necessary to ensure compliance to this Specification.

7. All surfaces to receive protective coatings shall be cleaned as specified herein prior to the application of the specified coating materials. The Authority's Representative, and Coating Contractor shall examine all surfaces to be coated and the Coating Contractor shall correct all surface defects before application of any coating materials.

8. Surfaces which are not to receive protective coatings shall be protected during surface preparation, cleaning, and coating operations. The Coating Contractor shall be responsible for and shall repair any and all damage to

adjacent work or adjoining property occurring from surface preparation or coating activities.

9. The Authority's Representative shall have the right to stop all work when it does not fully comply with the requirements of this Specification. The Authority's Representative shall make the final determination for acceptance of the finished product. Where a conflict exists between this Specification, the referenced standards, and the Coating Manufacturer's product data sheets or recommendations, promptly notify the Authority's Representative in writing and the Authority's Representative shall make a determination on which applies.

10. The Coating Contractor shall correct any work which the Authority's Representative has determined to be non-compliant with the requirements of this Specification. Corrections for non-compliant work shall be made without additional cost to the Authority. Failure to discover or reject defective work or materials does not constitute acceptance of such items.

11. The Coating Contractor shall use the best practices of the trade, and when not in conflict with these specifications use the applicable portions of SSPC-PA 1, Shop, Field, and Maintenance Painting and the Coating Manufacturer's recommendations. In general, the most stringent requirements will apply.

12. The Coating Contractor shall adhere to all pertinent Authority, federal, state, and local safety requirements, codes, and regulations.

1.2 COORDINATION OF WORK

A. Other construction activities and/or projects may be occurring simultaneously and in proximity to this project. The Coating Contractor must schedule and coordinate all work activities with the other contractors and Authority's personnel to avoid conflicts or impacts.

1.3 SAFETY

A. Adhere to all Authority location specific safety requirements.

B. Adhere to all pertinent federal, state, and local safety requirements, codes, and regulations including all applicable 29 CFR 1910 standards.

C. The Coating Contractor shall submit a project specific safety plan for approval prior to start of any work.

D. The Coating Contractor shall follow the safety procedures as recommended by the Coating Manufacturer and work in a well-ventilated area. The Coating Contractor shall provide, and require workers to use, impervious clothing, gloves, face shields, and all other appropriate protective clothing that is necessary to prevent eye and

skin contact with the abrasive blast and coating materials. Coatings shall be kept away from heat, sparks, and flames.

E. The Coating Contractor shall use suitable and approved equipment for the intended purpose, the equipment shall be properly grounded and have the required safety equipment and/or devices. The equipment shall be kept in satisfactory working condition to permit proper operation.

1.4 REFERENCES

A. The standards listed below shall govern the work, unless otherwise specified in this specification. All standards shall be the latest edition in effect:

B. Steel Structures Painting Council (SSPC):

1. SSPC Vol. 1 Good Painting Practices.

2. SSPC-SP 1 Solvent Cleaning.

3. SSPC-SP 10 Near White Blast Cleaning.

4. SSPC-VIS 1 Guide and Reference Photographs for Steel Surfaces Prepared By Dry Abrasive Blast.

5. SSPC-PA 1 Shop, Field and Maintenance Painting of Steel.

6. SSPC-PA 2 Measurement of Dry Coating Thickness with Magnetic Gauges.

C. National Association of Corrosion Engineers (NACE):

1. NACE SP-0287 Field Measurement of Surface Profile of Abrasive Blast Cleaned Steel Surfaces Using Replica Tape.

2. NACE SP-0188 Discontinuity (Holiday) Testing of Protective Coating.

D. American Society for Testing and Materials (ASTM):

1. ASTM D4285 Standard Test Method for Indicating Oil or Water in Compressed Air.

2. ASTM D4414 Practice for Measurement of Wet Film Thickness by Notch Gages.

3. ASTM D4417 Field Measurement of Surface Profile of Blast Cleaned Steel.

4. ASTM D5162 Standard Practice for Discontinuity (Holiday) Testing of Non-Conductive Protective Coating on Metallic Substrates.

E. State of Alaska Statute:

1. AS 18.63 Hazardous Painting Certification.

F. Code of Federal Regulations (CFR):

1. 29 CFR 1910 Occupational Safety and Health Standards.

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

1.5 SUBMITTALS

A. All submittals require approval from the Authority's Representative prior to initiating work (the coating inspection reports shall be submitted during and after completion of the work). The following shall be submitted for approval:

1. Submit abrasive blast media product data sheets and safety data sheets (SDS) for materials to be used at the job site.

2. Submit product data sheets and safety data sheets (SDS) for coating materials and solvents to be used at the job site in accordance with 29 CFR 1926.59.

3. Submit the Coating Manufacturer's recommendations regarding safety procedures, application temperature range, shelf-life of the materials, and material storage requirements.

4. Submit the Coating Manufacturer's recommendations concerning cure times between coats.

5. Submit the Coating Manufacturer's touch-up/repair procedures.

6. Submit documentation that the Coating Contractor has a minimum of five (5) years of recent documented experience applying high-performance industrial coatings on similar projects.

7. Submit resumes of persons performing the surface preparation and coating application. Applicators (individuals) shall have a minimum of five (5) years of recent documented experience applying similar industrial coatings on similar projects.

8. Submit a current Hazardous Painting Certification for each worker in accordance with State of Alaska statute AS18.63.

9. Submit a site-specific work plan & schedule.

10. Submit a project specific safety plan.

11. Submit proof of any necessary federal, state, or local permits or licenses necessary for the project.

12. Submit daily coating inspection reports within 24 hours of the day they were performed.

13. Submit an electronic copy and two hard copies of the final coating inspection report to the Authority's Representative within sixty (60) days of completion of the coating activities.

1.6 QUALITY ASSURANCE

A. The Coating Contractor shall conform to the Coating Manufacturer's application procedures, product data sheets, recommendations, and this Specification.

B. The Coating Contractor shall document and maintain accurate quality control records. Records shall be kept for a minimum of five (5) years on all aspects of the coating work, including the results of all quality control testing and inspections.

C. The Coating Contractor shall have qualified personnel and the necessary equipment to perform all quality assurance tests required by this Specification and the Coating Manufacturer. All equipment must be in good working order and properly calibrated. Testing must be completed in a timely manner to avoid disrupting the production schedule.

D. Coating Contractor/Applicator Qualifications:

1. The Coating Contractor (company) shall specialize in performing the type of work described in this Specification. The Coating Contractor shall have a minimum of five (5) years of recent documented experience in surface preparation and applying high-performance industrial coatings on similar projects.

2. Each applicator (individual) shall have a minimum of five (5) years of recent documented experience applying similar industrial coatings on similar projects.

3. Each applicator (individual) shall have a current Hazardous Painting Certification in accordance with State of Alaska statute AS18.63.

2.1 COATING SYSTEM

A. Use the following coating system or an Authority's Representative approved equal coating system:

Coating System - Denso		
Coating Type	**Coating Thickness (Mils)**	
	Minimum (DFT)	**Maximum (DFT)**
Gas Pipeline		
Protal 7200 (Green)	25	40
Top Coat Archco 65 (Black)	3	5
Total DFT	28	45
Diesel Pipeline		
Protal 7200 (Green)	25	40
Top Coat Archco 65 (Brown)	3	5
Total DFT	28	45

B. The Coating Manufacturer's instructions and safety precautions shall be followed.

C. All coating materials shall remain in unopened and in the original Coating Manufacturer's containers until required for use and shall be stored as per the Coating Manufacturer's recommendations. Any damaged containers found with their seal broken or leaking shall not be used.

D. Deliver all coating materials to the project in the original unopened containers with plainly marked packaging identifying the name of the Coating Manufacturer, product, date of manufacture, shelf life, and batch number.

E. Coating materials that have exceeded the Coating Manufacturer's recommended shelf life, which has jelled, or otherwise deteriorated during storage shall not be used.

F. Shelf life, temperature, and humidity limitations for each of the coating system components shall be maintained in strict accordance with the Coating Manufacturer's recommendations during shipping and storage. If the coating materials freeze or are overheated, reject the coating materials and notify the Authority's Representative.

G. Before and during the coating application, all ingredients shall be thoroughly mixed to a smooth and uniform consistency per the Coating Manufacturer's recommendations.

3.1 SURFACE PREPARATION

A. Protect all items which could be damaged during surface preparation or coating activities.

B. Solvent cleaning shall be performed, per SSPC-SP 1, as necessary to remove all foreign matter including, but not limited to, dirt, salts, tar, oil, mastics, grease, or other hydrocarbon residue prior to abrasive blasting. All solvents used for cleaning purposes must comply with the project specific safety plan and be handled in a safe manner.

C. The compressed air that is used shall be clean and dry in accordance with ASTM D4285.

D. The blast abrasive shall be sharp grit, garnet, nickel slag, or aluminum oxide. Reuse of abrasives is not permitted.

E. Abrasives shall meet the following minimum requirements:

1. Contain less than 1% free silica.

2. Be free of harmful quantities of toxic metals.

3. Contain less than 20-ppm water-soluble chlorides.

4. Contain less than 200-ppm water-soluble sulfates.

5. Be free of clay, limestone, shells, undersize and oversize particles, organic material, and other detrimental foreign material.

6. Be of the proper size and material to provide the Coating Manufacturer’s required surface profile.

F. All sharp edges, slivers, weld slag, weld spatter, and metal laminations shall be removed. Edges, including welds, shall be rounded to 1/8” radius minimum, prior to abrasive blasting.

G. All edges of the surrounding coatings shall be feathered.

H. A near-white metal finish, per SSPC-SP 10, shall be achieved on all steel surfaces to be coated. The cleanliness of the steel surface shall be verified by comparison with SSPC-VIS 1 Visual Standard for Abrasive Blast Cleaned Steel.

I. The anchor pattern or surface profile shall be of a sharp, jagged (angular) nature as opposed to a “peened” pattern. The surface profile shall be between 2.5 and 5.0 mils. The surface profile shall be determined by the Keane-Tator Surface Profile Comparator, Clemtex Anchor Pattern Standards, or Testex Tape in accordance with ASTM D4417/NACE SP-0287. Attach the surface profile test tapes to the coating inspection reports. When surfaces are re-blasted for any reason, retest the profile as specified.

J. All oil, grease, mastics, or other foreign matter deposited on the surface after the surface preparation is completed shall be removed prior to coating. In the event

corrosion occurs after the completion of the surface preparation, the surface shall be cleaned again to a near-white metal cleanliness (SSPC-SP 10).

K. All spent abrasive, scale, dust, and other debris shall be removed from the surface to be coated by blowing the surface with clean dry compressed air, by sweeping, or by vacuum cleaning prior to the coating application. All materials removed from the work site shall be identified, handled, and disposed of in accordance with local, state, and federal environmental requirements.

L. Apply the coatings to dust free surfaces in a dust free environment. To test the surfaces, apply a strip of clear adhesive tape to the surface and rub it onto the surface with a finger. When removed, the tape should show little or no dust, blast abrasive, or other contaminants. Reject contaminated surfaces, clean again, and retest.

M. For marking of cleaned surfaces, use chalk or soapstone for marking bare steel and water-based markers for marking coated surfaces. Remove marks prior to coating application. Do not use any wax or grease-based markers, or any other markers that leave a residue or stain.

N. Pinhole repairs shall be roughened a minimum of 1-inch around the pinhole using Carborundum cloth or 80 grit sandpaper and wiped clean with a cloth or brush prior to coating application.

O. Coating defect areas greater than 0.15 square inches, but less than 1 square foot can be prepared with a surface grinder or by grit blasting as long as an angular surface profile is achieved.

P. The Authority's Representative reserves the right to inspect and to approve the prepared surface prior to the coating application.

3.2 COATING APPLICATION

A. The coatings shall be applied in accordance with SSPC-PA1, the Coating Manufacturer's recommendations, and this Specification.

B. The coatings shall be applied in accordance with the Coating Manufacturer's recommendations and approved parameters. The Coating Contractor shall, at a minimum, obtain and have onsite the following information from the Coating Manufacturer: recommended safety procedures, application temperature range, shelf-life of the materials, material storage requirements, cure times between coats, holiday detection voltages, and touch-up/repair procedures.

C. Coatings shall be applied to surfaces, which are cleaned as specified, dry, at least 5 degrees F above the dew point and the metal surface temperature shall be a minimum of 50 degrees F.

D. Coating application shall not take place when the surface temperatures are below 50 degrees F or above those recommended by the Coating Manufacturer or when such temperatures are expected to fall below or rise above those temperatures within eight (8) hours of completing the coating application.

E. The coatings shall be applied as a continuous film of uniform thickness. Any thin spots or areas missed in the application shall be recoated and permitted to properly cure.

F. Blast-cleaned surfaces shall be coated prior to the occurrence of flash rusting with one complete application of coating, as soon as practical, but in no case shall the surface be coated more than eight (8) hours after blast cleaning without approval by the Authority's Representative.

G. The Coating Manufacturer's recommendations concerning cure times shall be followed. Cure times will be based on the coating products used, coating thicknesses, steel temperature, atmospheric conditions, and other criteria identified by the Coating Manufacturer.

H. The equipment used shall be suitable for the intended purpose, be capable of properly atomizing the coating to be applied and be equipped with suitable pressure regulators, gauges, properly grounded and have the required safety equipment and/or devices. The equipment shall be kept in satisfactory condition to permit proper coating application.

I. Coatings shall be kept properly mixed in the containers during application by mechanical agitation or per the Coating Manufacturer's mixing procedure.

J. Thinning of the coating materials is prohibited unless the Coating Manufacturer's printed instructions provide the amount and types to be used.

K. Coatings shall be applied in a uniform layer, with over lapping at the edge of the pattern. The spray pattern shall be adjusted so that the coating is deposited uniformly. During application, the gun shall be held perpendicular to the surface and at the optimum distance from the surface being coated.

L. During the coating application, the Coating Contractor is to check the wet film thickness (WFT) in accordance with ASTM D4414 and this Specification.

M. All welds and irregular surfaces shall receive a stripe coat prior to any coating work. Apply stripe coating by brush application, working the material into corners, crevices, pitted areas, and welds, and onto outside corners and angles.

N. All coating damage, field repairs and defects disclosed by visual or coating inspections shall be repaired by the Coating Contractor in a manner complying with this Specification and the Coating Manufacturer's recommendations.

O. The Coating Contractor shall apply coatings to be free of film characteristics or defects that would adversely affect the performance or appearance of the coating system.

P. Pinhole repairs and areas of less than 1.0 square feet may be repaired by using a Denso Protal Repair Cartridge.

Q. The coatings shall be allowed to cure per the Coating Manufacturer's recommendations prior to handling, installing, and burying the pipelines.

3.3 COATING INSPECTION

A. Prior to the start of any pipe coating repair work, the pipe shall be cleaned and the entire surface of all piping shall be visually inspected. All coating defects detected by visual observations and/or other inspections shall be marked to be coated according to this specification. All abrasive blast and coating materials shall be inspected for conformance to this Specification.

B. Inspection reports shall be filled out daily, signed by the Coating Contractor and submitted to the Authority's Representative for review. Daily coating inspection reports shall be submitted within twenty-four (24) hours of the day they were performed.

C. Daily coating inspection reports and/or testing shall include the following minimum requirements:

1. Record the coating material batch numbers and the type of blast media used.

2. Inspection of all cleaning, surface preparation, coating, and air supply equipment for the presence of oil and other contaminants.

3. Results of inspections for surface imperfections, including slivers, scabs, weld spatter, and gouges. Edges, including welds, shall be rounded to 1/8" radius, minimum.

4. Results of surface cleanliness inspections in accordance with SSPC-SP 10, Near-White metal blast cleaning, and shall be determined by comparison with SSPC-VIS 1. Dust, abrasives, and other loose contaminants shall be completely removed.

5. Anchor Profile shall be measured and recorded in accordance with NACE SP-0287/ASTM D4417.

6. Record the ambient air temperature, substrate temperature, humidity, dew point, and difference (Δ) between dew point and surface temperature. Record measurements before/during abrasive blasting and coating

operations. Indicate whether or not environmental conditions were acceptable for coating operations.

7. Prior to coating, verify the surfaces are cleaned as specified, dry, at least 5 degrees F above the dew point and the metal surface temperature is a minimum of 50 degrees F and the temperature is not expected to fall below 50 degrees F within eight (8) hours of completing the coating application.

8. Inspect DFT in accordance with SSPC-PA 2.

9. All touch-up/repair procedures shall follow the Coating Manufacturer's recommendations.

D. Verify that the coatings have cured per the Coating Manufacturer's recommendations prior to allowing the pipelines to be handled, installed, and buried.

E. The Coating Contractor shall submit an electronic copy and two hard copies of the final report to the Authority's Representative within sixty (60) days of completion of the coating activities. The final report shall be compiled of all test data, photographs, inspection checklists, daily reports, and a summary stating that the coating system was applied and inspected in accordance with the design documents.

F. The Authority's Representative shall be permitted full access, at all times, to observe coating and surface preparation activities.

END OF SECTION

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SECTION 09 98 00

HOT DIP GALVANIZED COATINGS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Work includes providing all labor, equipment, plant, transportation, supplies, materials, and engineering to provide galvanized coatings on all steel members, sections, fabricated assemblies, and hardware specified on the Plans.

B. This specification applies to but is not limited to:

1. Grip strut walkway, Tank handrails, ladders, stairs, etc. (See Section 05 12 00 Structural Steel Framing).

2. Structural Steel Fabrications.

3. Fencing components.

4. Pipe supports, clamps, and associated hardware.

5. Nuts, bolts, washers, exposed to the atmosphere.

6. All other components exposed to the atmosphere and not specified as painted.

1.2 RELATED REQUIREMENTS

A. Section 01 33 00 – Submittal Procedures.

B. Section 05 12 00 – Structural Steel Framing.

C. Section 09 96 00 – High-Performance Coatings.

D. Section 23 13 23 – Facility Aboveground Fuel-Oil Storage Tanks.

E. Section 32 31 13 – Chain Link Fence.

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. No later than three (3) weeks prior to galvanizing, submit an electronic of a Certificate of Compliance which states that all galvanizing complies with ASTM A 123 or A 153 as appropriate, and the requirements set forth herein.

1.4 QUALITY ASSURANCE

A. Inspection shall be carried out at the galvanizer's plant by the CONTRACTOR's representative, or at some other place as agreed between CONTRACTOR, fabricator and galvanizer. The Authority reserves the right to reject unacceptable galvanizing at the Project site. Inspection rights and privileges, procedures, and acceptance or rejection of galvanized steel material shall conform to ASTM A 123 or A 153 as applicable. Inspections and tests shall include the following:

1. Visual examination of samples and finished products.

2. Tests to determine weight or mass of zinc coating per square foot of metal surface.

1.5 TRANSPORT, STORAGE, AND HANDLING

A. Galvanized articles shall be loaded and stored as follows to prevent the formation of wet storage stain:

1. The articles shall be stacked or bundled to allow air between the galvanized surfaces during transport from the supplier. Additionally the material shall be loaded in such a manner that continuous drainage could occur.

2. In storage, the articles shall be raised from the ground and separated with strip spacers to provide free access of air to most parts of the surface. They shall also be inclined in a manner which will give continuous drainage. Under no circumstances shall galvanized steel be allowed to rest on cinders or clinkers; neither shall it be stored on wet soil or decaying vegetation.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

A. Structural steel to be galvanized shall conform to Section 05 12 00 Structural Steel Framing.

2.2 ZINC FOR GALVANIZING

A. Zinc for galvanizing shall conform to ASTM B 6.

PART 3 - EXECUTION

3.1 FABRICATION

A. Structural steel shall be fabricated generally in accordance with Class (I, II, or III) guidelines as shown in Recommended Details for Galvanized Structures as published by the American Hot Dip Galvanizers Association, Inc.

B. Fabrication practices for products to be galvanized shall be in accordance with the applicable portions of ASTM A 143, A 384, and A 385, except as specified herein. Care shall be taken to avoid fabrication techniques which could cause distortion or embrittlement of the steel. Before fabrication proceeds, the Project Manager shall be notified of potential warpage problems which may require modification in design.

C. All welding slag and burrs shall be removed prior to delivery to the galvanizer.

D. Holes and/or lifting lugs to facilitate handling during the galvanizing process shall be provided at positions as agreed between the designer, fabricator, and galvanizer.

E. Unsuitable marking paints shall be avoided and unwanted grease, oil, paint, and other deleterious material shall be removed prior to fabrication.

F. Surface contaminants and coatings which would not be removable by the normal chemical cleaning process in the galvanizing operation shall be removed by the fabricator using blast cleaning or some other method.

3.2 SURFACE PREPARATION

A. Surfaces to be galvanized shall be pre-cleaned utilizing a caustic bath, acid pickle and flux. Alternatively, the steel shall be near white blast cleaned to SPCC – SP10 and fluxed.

3.3 GALVANIZING

A. Steel members, fabrications, and assemblies shall be galvanized after fabrication, but prior to shipment, by the hot dip process in accordance with ASTM A 123.

B. Bolts, nuts, washers, and iron and steel hardware components shall be galvanized in accordance with ASTM A 153. Nuts and bolts shall be supplied in accordance with ASTM A 307, A 325, A 394, and A 563, as applicable.

C. Products shall be safeguarded against steel embrittlement in conformance with ASTM A 143.

D. All articles to be galvanized shall be handled in such a manner as to avoid any mechanical damage and to minimize distortion.

E. Design features which may lead to difficulties during galvanizing shall be pointed out prior to dipping.

F. The composition of metal in the galvanizing bath shall not be less than 98.0% zinc.

3.4 COATING REQUIREMENTS

A. Weight: The weight and thickness of the galvanized coating shall conform with paragraph 6.1 of ASTM A 123 or Table 1 of ASTM A 153, as appropriate.

B. Surface Finish: The galvanized coating shall be continuous, adherent, as smooth and evenly distributed as possible and free from any defect that is detrimental to the stated end use of the coated article.

C. The integrity of the coating shall be determined by visual inspection and coating thickness measurements.

D. Where slip factors are required to enable friction grip bolting, these shall be obtained after galvanizing by suitable treatment of the faying surfaces in accordance with the latest edition of the Specification for Structural Joints Using ASTM A 325 or A 490 Bolts as approved by the Research Council on Structural Connections of the Engineering Foundation.

E. Adhesion: The galvanized coating shall be sufficiently adherent to withstand normal handling during transport and erection.

3.5 WELDING

A. Where galvanized steel is to be welded, adequate ventilation shall be provided. If adequate ventilation is not available, supplementary air circulation shall be provided. In confined spaces a respirator shall be used.

B. Welding shall be performed in accordance with the American Welding Society publication D19.0-72, Welding Zinc Coated Steel.

C. All uncoated weld areas shall be touched up.

3.6 TOUCH UP AND REPAIR

A. Mechanical Damage

Areas damaged by welding, flame cutting, or during handling, transport, or erection shall be repaired by one of the following methods whenever the damage exceeds 3/16" in width:

1. Cold Galvanizing Compound

   a. Surfaces to be reconditioned with zinc-rich paint shall be clean, dry, and free of oil, grease, and corrosion products.

   b. Areas to be repaired shall be power disc sanded to bright metal. To ensure that a smooth reconditioned coating can be effected, surface preparation shall extend into the undamaged galvanized coating.

   c. Touch-up paint shall be an organic cold galvanizing compound having

a minimum of 94% zinc dust in the dry film.

d. The paint shall be spray or brush applied in multiple coats until a dry film thickness of 8 mils minimum has been achieved. A finish coat of aluminum paint shall be applied to provide a color blend with the surrounding galvanizing.

e. Coating thickness shall be verified by measurements with a magnetic or electromagnetic gauge.

2. Zinc Based Solder

a. Surfaces to be reconditioned with zinc-based solder shall be clean, dry and free of oil, grease, and corrosion products.

b. Areas to be repaired shall be wire brushed.

c. Heat shall be applied slowly and broadly close to, but not directly onto the area to be repaired. The zinc-based solder rod shall be rubbed onto the heated metal until the rod begins to melt. A flexible blade or wire brush shall be used to spread the melt over the area to be covered. The zinc based solder shall be applied in a minimum thickness of 2 mils.

d. Coating thickness shall be verified by measurements with a magnetic or electromagnetic gauge.

B. Wet Storage Stain

Any wet storage stain shall be removed by the galvanizer if formed and discovered prior to leaving the galvanizer's plant. Wet storage stain shall be removed before installation so that premature failure of the coating will not occur. Wet storage stain shall be removed as follows:

1. The objects shall be arranged so that their surfaces dry rapidly.

2. Light deposits are to be removed by means of a stiff bristle (not wire) brush. Heavier deposits are to be removed by brushing with a 5% solution of sodium or potassium dichromate with the addition of 0.1% by volume of concentrated sulfuric acid. This is to be applied with a stiff bristle brush and left for about 30 seconds before thoroughly rinsing and drying. Alternatively a proprietary product such as Oakite Highlite, or equal, which is intended for this purpose, may be used according to manufacturer’s recommendations.

3. A coating thickness check must be made in the affected areas to ensure that the zinc coating remaining after the removal of wet storage stain is sufficient to meet or exceed the requirements of the specification.

END OF SECTION

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SECTION 10 44 16.13
PORTABLE FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fire extinguishers at locations indicated in the project drawings.

1.2 REFERENCES

A. UL Building Materials Directory.

B. NFPA No. 10 Fire Extinguishers, Portable.

C. NFPA No. 30 Flammable and Combustible Liquid Code.

PART 2 - PRODUCTS

2.1 EXTINGUISHERS

A. Manufacturer: Larsen's Manufacturing Co., 7421 Commerce Lane, N.E., Minneapolis, MN 55432, (612) 571-1181, or approved equal.

B. Extinguisher shall have a minimum rating of 4-A, 40-B:C and a 20 lb. capacity. Fire rating in accordance with NFPA No. 10 and No. 30.

1. Gasoline Fires: Class III Hazard; BC.

2. Fuel Oil Fires: Class II Hazard; BC.

3. Wood, Paper and All Above: Class I, II, or III; ABC.

C. Extinguisher Brackets: Larsen's Manufacturing Co., bottom support, quick release strap-buckle type.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Mount top of extinguishers 3 to 4 feet above ground, pavement, or floor.

B. Fasten extinguisher brackets securely to structure. Provide additional brackets, uni-strut, fasteners, and components as required. All miscellaneous hardware shall be hot dip galvanized.

END OF SECTION

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SECTION 11 80 00

SPILL RESPONSE EQUIPMENT

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section includes procurement of required spill response equipment and furnishing and installing one standard size steel shipping container (conex) for storing this equipment (20’ x 8’).

1.2 RELATED REQUIREMEMTS

A. Section 01 33 00 – Submittal Procedures.

1.3 REFERENCES

A. United States Department of Labor, Occupational Safety and Health Administration (OSHA):

1. 29 Code of Federal Regulations (CFR) 1910.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Submit manufacturer's data for all spill response equipment and supplier for each item. Group item by supplier.

C. Submit standard manufacturer’s data, pictures, and standard shop drawings for each container provided. Unless otherwise indicated, alternate manufacturers will be acceptable so long as they supply similar equipment with the same quality and performance.

1.5 GENERAL

A. The CONTRACTOR is responsible for providing spill response equipment as specified and in accordance with this Section. The CONTRACTOR shall be responsible for all work and equipment associated with procuring, shipping, handling, and storing the specified equipment.

B. Place all spill response equipment inside overpack drums. Provide the required number of overpack drums to securely contain all materials. Permanently label all overpack drums with "Spill Response Equipment" with a minimum of 3" high letters. Securely attach a laminated manifest to the outside of each drum listing all of the materials contained within.

C. Place overpack drums, and any equipment and materials too large to fit in overpack drums, neatly inside the spill response container (conex) in their final position.

D. All equipment shall be new unless otherwise indicated.

PART 2 - PRODUCTS

2.1 SPILL RESPONSE EQUIPMENT

A. The following list of Spill Response Equipment shall be provided by the Contactor.

Quantity	Item/Description
Absorbent Material and Containers, as provided by Unitech of Alaska or equal	
3	95 Gallon Poly Screw Top Over-pack Spill Kit Drums to Include:
1 ea.	55 Gallon Metal Open-top Drum
2 ea.	Absorbent roll, min. 30” x 140’ or comparable
2 ea.	White, Oil Specific Sorbent Pads, 16” x 20” or comparable, 100 pieces ea.
2 ea.	Yellow, Universal Sorbent Pads, min. 16” x 20” or comparable, 100 pieces ea.
13 ea.	Absorbent Boom, min. 4” by 40’ or comparable
2 ea.	Absorbent Sweep, 19” by 100’ or comparable
Personel Protective Equipment	
4 pr.	Gloves, Nitrile AF18 Chem-Resist, Pairs
4 pr.	Tyvek Suits, XL Polyethylene Coated
4 pr.	Vented Safety Goggles
4 pr.	Hardhats
Recovery Equipment	
2	2500-Gallon Chemical Resistant Fol-Da-Tank (Bladder)
1	250-Gallon Chemical Resistant Fol-Da-Tank (Bladder)
1	2-inch portable centrifugal pump, gas-powered, UL listed petroleum pump. Marlow Petro-Guard Model 2AM32-P or equal with 2” camlocks
1	Absorbent Wringer for fuel recovery
1	Smart Ash Burner
1	Discharge Hose with 2” camlocks, 100’ total length

Quantity	Item/Description
1	Suction Hose with 2” camlocks, 50’ total length
2	Non-Sparking Shovel
2	Rake
1 roll	Garbage/Waste Disposal Bags
Fuel Storage Tank Water Removal Equipment	
1	Fuel-rated Hand Pump for water removal with 25’-50’ hose and fittings
1	55 Gallon Water Scrubber with pillows and loose media
6	Tubes of Water Finding Paste
Miscellaneous	
5	Fire Extinguishers, Portable, Type 4A-40BC
2	Padlocks, keyed-alike for storage site
10	Zip Tie
2	Caution Barricade Tape Roll
1	Emergency Response Guide

B. Product substitutions must be approved by the Engineer.

C. Absorbent material can be natural or synthetic.

PART 3 - EXECUTION

3.1 INSTALLATION.

A. Place the spill response container (conex) in a location in accordance with the plans and specifications.

PART 4 - BASIS OF MEASUREMENT AND PAYMENT

4.1 BASIS OF MEASUREMENT

A. Work under this section will not be measured separately.

4.2 BASIS OF PAYMENT

A. Payment for this work will be subsidiary to Lump Sum Bid Item 6.

END OF SECTION

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SECTION 23 11 13

FACILITY FUEL-OIL PIPING

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. This section includes fuel piping system materials, equipment, supports, and accessories. The intent of this specification, along with other specifications, and the accompanying Contract Drawings is to provide a complete and workable facility with complete systems as shown, specified, and required by applicable codes.

1.2 RELATED REQUIREMENTS

A. Section 01 33 00 – Submittals.

B. Section 01 33 23 – Shop Drawings, Product Data, and Samples.

C. Section 05 50 00 – Metal Fabrications.

D. Section 09 96 00 – High-Performance Coatings.

E. Section 09 96 00.01 – Plant Applied Fusion Bonded Epoxy (FBE).

F. Section 09 96 00.02 – Field Applied Fusion Bonded Epoxy (FBE).

G. Section 09 98 00 – Hot Dip Galvanized Coatings.

1.3 PERFORMANCE REQUIREMENTS

A. Minimum Working-Pressure Rating: Unless otherwise indicated, minimum pressure requirement for fuel piping is 150 psig.

B. Design Service Conditions: All pipeline system components shall be rated for the following service conditions:

1. Fluids: Gasoline and Diesel fuel.

2. Operating temperature range: -30° F to 120° F.

C. Any referenced standards that do not comply with these service conditions shall be brought to the Engineer's attention immediately.

1.4 REFERENCED STANDARDS

A. The standards listed below form a part of this specification to the extent referenced.

ASME B16.5 Flanges and Flanged Fittings.

ASME B16.9 Factory-Made Wrought Steel Butt welding Fittings.

ASME B16.11	Forged Fittings, Socket-Welding and Threaded.
ASME B31.3	Chemical Plant and Petroleum Refinery Piping.
ASME BPV IX	Boiler and Pressure Vessel Code; Section IX, Welding and Brazing Qualifications.
ASTM A53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
ASTM A105	Forgings, Carbon Steel, for Piping Components.
ASTM A106	Seamless Carbon Steel Pipe for High-Temperature Service.
ASTM A234	Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures.
ASTM D3035	Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
ASTM A320	Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service.
ASTM D3350	Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.

C. Product Data: Provide manufacturer's literature and data indicating rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

D. Manufacturer's Installation Instructions: Indicate rigging, assembly, and installation instructions.

E. Welding Procedure Qualification Records (PQRs) and Welding Procedure Specification.

F. Pipe coating process and schedule.

G. Inspection and Testing Procedures and Results.

1.6 QUALITY ASSURANCE

A. Perform Work according to NFPA 30.

B. List and label flexible connectors and hoses according to UL 536.

C. Perform Work according to ASME B31.9 code for installation of piping systems and ASME Section IX for welding materials and procedures.

1.7 DELIVERY, STORAGE AND HANDLING

A. CONTRACTOR is responsible for protection of all material, equipment, and apparatus provided from damage during transportation, storage, and installation processes.

B. Material, equipment, or apparatus damaged because of improper storage or protection will be rejected and replaced at CONTRACTOR's expense.

PART 2 – PRODUCTS

2.1 GENERAL

A. Materials shall be new unless otherwise specified. All items of the same type shall be of the same manufacturer.

2.2 PIPE

A. Steel Pipe: All steel pipe shall be Schedule 80, Black, Seamless, ASTM A53 or ASTM A106. 2" and 3" pipe shall be provided in double random lengths (42' nominal).

B. Steel Pipe nipples: ASTM A53 carbon steel, threaded schedule to match adjoining piping.

C. High Density Polyethylene (HDPE) Pipe:

1. HDPE pipe and fittings shall have a standard dimension ratio (SDR) of 17 in accordance with ASTM D3035.

2. HDPE pipe and fittings shall have a cell classification of 445574C in accordance with ASTM D3350.

3. The material must exceed 1000 hours when tested in accordance with the Ring Environmental Stress Crack Resistance Test (Radar Ring Test) with fewer than twenty percent (20%) failures.

4. The extruded pipe shall have impact strength greater than three (3) cubic feet per inch when tested in accordance with the ASTM D256 (Izod Pendulum Impact Test).

5. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, or other injurious defects. It shall be uniform in color, opacity, density, and other physical properties.

2.3 PIPE FITTINGS

A. Steel Pipe

1. Elbows, tees, and reducers shall be Schedule 80, ASTM A234 wrought carbon steel butt welding type, except where noted.

2. Flanges shall be ANSI class 150 lbs., ASTM A105 weld neck type. Bore shall match the pipe in which the flange is installed.

3. Gaskets shall be spiral wound fuel resistant and rated for -50°F service.

4. All flanged fittings, including valves, shall have flange nuts and bolts meeting the requirements of ASTM A320, B8, Class 2, Stainless Steel (Low Temperature ANSI 304 Strain Hardened).

5. Pipe and Fittings shall be full penetration butt welded. Fittings smaller than 2" may be ASTM A105 forged steel socket weld fittings, 3000 pound minimum. Threaded fittings are not allowed except where shown on the drawings, or required for connection to specified equipment.

6. Provide flanged connections or unions to allow removal of individual components.

B. HDPE Pipe

1. Fittings shall conform to the requirements of section 2.2 paragraph C of this specification.

2. Where indicated on the contract drawings or where approved by the engineer, flanged fittings shall be installed with HDPE flange adaptors and stainless steel back up rings. Products shall be submitted to the engineer for approval and shall be suitable for the service conditions.

2.4 PLANT APPLIED STEEL PIPE COATING SYSTEM

A. Coating processes shall be submitted to the engineer for approval prior to pipe coating. Steel pipe shall be coated in accordance with specification 09 96 00.01 Plant Applied Fusion Bonded Epoxy (FBE).

2.5 FIELD APPLIED STEEL PIPE COATING SYSTEM

A. Coating processes shall be submitted to the engineer for approval prior to pipe coating. Steel pipe, fittings, valves, joints, coating repairs and any steel pipe sections not factory coated shall be coated in accordance with specification 09 96 00.02 Field Applied Fusion Bonded Epoxy (FBE).

2.6 PIPE LABELING

A. Label all above-grade piping to identifying contents and flow direction in accordance with ASME A13.1. Label contents and flow direction every 10 feet minimum, 20 feet maximum, at all branches, entrances to tank farm, buildings, structures, and at major valves. Lettering height shall be 0.75 times the outside diameter of the pipe. Labeling shall consist of permanent reflective painted lettering

or high quality printed stickers which contrasts with pipe color. Labeling shall be compatible with pipe coating system.

2.7 VALVES

A. All valves shall be factory coated with approved epoxy coating for corrosion resistance.

B. Check Valves: Carbon steel, ANSI Class 150 lbs., raised face flanged, swing check valve suitable for the service conditions. Crane No. 147, no substitutes. Smaller than 2", Bonney Forge Fig. No. 1 1/2" HL-41-SW and Fig. No. 1" HL-41-SW piston check valve or equal.

C. Ball Valves (Flanged): ANSI class 150 lbs., Cast carbon steel body, stainless steel ball, Teflon seat and stuffing box seals, lockable lever handle, raised faced flanged. All materials shall be suitable for the service conditions. NACE MR-01-75 Conformance and fire safe per API 607. PBV C-5410-31-2236-FT-NL, no substitutes.

D. Ball Valves (Threaded): ASME class 900, Stainless steel body, stainless steel ball, 20% C 5% Graph filled TFE seat, threaded. All materials shall be suitable for the service conditions. NACE MR-01-75 Conformance and fire safe per API 607. PBV S-5333-38-36-00-ML-NL-, no substitutes.

E. Pressure Relief Valves: Flanged, carbon steel body pressure relief valve. 2-inch valves set at 95 psi. 1-inch valves set at 75 psi. Hydro-seal Model No. 30FL1CV-00 for 2" and 1FLAXV-00- for 1", or approved equal.

F. Motorized Valves: ASME Class 150 2-inch flanged ball valves with ASTM A350 grade LF2 body, Teflon seats and seals with maximum 360 in-lbs operating torque at minus 50 degrees F. Reduced Port for 2": Nutron Model T3-R20R01L ball valve with factory mounted actuator as specified below, no substitutes.

1. Actuators: NEMA 7 enclosure without manual override shaft extension, PTC self-regulating heater, Exxon Beacon 325 severe cold grease, 780 in-lbs. output torque for 2", 10 second stroke time. Rated for operation to minus 40 degrees F. 115 VAC, single phase. Set automatic control to the closed position when power is lost or shut-off. GE Energy RCS Sure 65 for 2". No substitutions.

2.8 EQUIPMENT NAME AND OPERATIONAL TAGS

A. Material: 2-inch diameter brass plate with 3/16-inch diameter hole drilled to secure to component as described in Part 3 – Installation.

B. Lettering shall be stamped with the following information:

1. Name and Operational Tags: Provide name and operational tags for all pumps and valves in accordance with the pump and valve schedules in the Contract Drawings.

2. Tags shall include component ID (e.g. TP-1, BV-15), normal operating condition (normally open or closed), component owner and any additional information required for proper operation.

2.9 MISCELLANEOUS PIPING ACCESSORIES

A. Quick Connect Couplings: Aluminum body cam and groove fitting with dust cap. Male fitting with ANSI 150-pound class flanged, MPT, or FPT connection, as shown, 150 psig minimum working pressure. PT Coupling or approved equal.

B. Cam Lock Couplings: Aluminum body cam and groove male fittings with FPT connection, 150 psi minimum working pressure. Provide dust cap with Buna-N seal for each fitting provided. PT couplings or equal.

C. Dry Break Coupling: Aluminum body cam and groove fitting with dust cap with ANSI 150-pound class flanged, MPT, or FPT connection as shown on the Contract Drawings. 150 psig minimum working pressure. Each dry break coupling to include dust caps and appropriate adapters to connect to standard camlock fittings of the same size. PT Coupling Maxi-Dry Series MD20A or approved equal.

D. Strainers: Flanged, carbon steel body, bottom clean-out Y-strainer with #10 mesh and blow-off tapping plug. Mueller Fig. 781, or approved equal. Epoxy exterior coating.

E. Flex Fitting: ANSI class 150 lbs., stainless steel annular corrugated inner hose with stainless steel double braided cover, MPT ends with 18" live length, unless shown otherwise. Pressure test at 110 psi and provide certification for each flex. Metraflex SST, or approved equal.

F. Utility Markers: Continuous glass fiber and resin reinforced marker, one-piece, vandal and vehicle impact resistant. Provide Carsonite CUM 375 or approved equal.

G. Fuel Containment Piping Casing Spacer: Casing spacer shall be Allied Corrosion Industries Model SSI or approved equal. Provide spacers for 6 inch SDR 17 with 2 inch schedule 80 steel carrier pipe.

2.10 PIPE SUPPORTS

A. All pipe supports shall be concrete as shown in the Drawings. Clamps, fittings, and hardware shall be Hot Dip Galvanized in accordance with Section 09 98 00.

B. Support strut: Cold formed mild steel channel strut, hot dipped galvanized finish, and slotted back unless specifically indicated otherwise.

1. Standard strut: 12 gauge, 1-5/8 inch by 1-5/8 inch, Unistrut P1000T (HG), or approved equal.

2. Double strut: 12 gauge, 1-5/8 inch by 3-1/4 inch, Unistrut P1001 (HG), or approved equal.

3. Post Base: 1-5/8 inch by 1-5/8 inch, Unistrut P1887 (HG), or approved equal.

4. Single Strut: 12 gauge, 1-5/8 inch by 1-3/8 inch, Unistrut P3000 (HG), or approved equal.

5. Deep Strut: 12 gauge, 3-1/4 inch by 1-5/8 inch, Unistrut P5000 (HG), or approved equal.

6. Shallow strut: 14 gauge, 1-5/8 inch by 13/16 inch, Unistrut P4100T (HG) or approved equal.

7. Solid back strut: For welding to tanks or structures, 12 gauge, 1-5/8 inch by 1-5/8 inch, unfinished black steel, Unistrut P1000 (PL), or approved equal.

C. Provide galvanized carbon steel fitting, brackets, channel nuts, and accessories designed specifically for use with supplied strut.

D. Pipe Clamps: Galvanized carbon steel two-piece pipe clamp designed to support pipe to strut. Unistrut 040N046 and 058N064 or approved equals.

E. Fasteners:

1. Bolts, nuts, and washers: Galvanized or zinc plated carbon steel unless stainless steel is specifically shown. Stainless steel shall be: Type 316L.

2. Lags: Hot dipped galvanized steel unless stainless steel is specifically shown. Stainless steel shall be: Type 316L.

PART 3 – EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions as shown in the Contract Drawings.

D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.2 INSTALLATION

A. Steel Pipe

1. Install in accordance with manufacturer’s instructions and applicable codes and standards.

2. Route piping in an orderly manner and maintain gradient.

3. Group piping whenever practical at common elevations.

4. Install piping to allow for expansion and contraction without stressing pipe, joints or connected equipment. Install valves to allow full operation without obstruction of operating handle.

5. Perform welding in accordance with ASME BPV, IX and API 1104. Welding procedures shall be submitted and approved. Visually inspect weld joints in accordance with API 1104. Welder shall be certified for the approved procedure and welder certification shall be submitted and approved.

6. Make threaded joints using pipe joint compound applied to the male threads. Hercules Grip, no substitution.

7. Coat flange gaskets with anti-seize compound prior to assembly.

8. Provide non-conducting dielectric connections wherever jointing dissimilar metals. Provide dielectric flange kits at all transitions between aboveground and buried piping.

9. Support piping and equipment as shown on the drawings using specified supports and fasteners. If not detailed on the drawings, support from structural members with pipe hangers, clamps or pipe straps specifically intended for the application. Do not support piping from connections to equipment. Provide piping supports spaced per the following table.

Pipe Size	Maximum Support spacing
1-1/2 inch	9 ft
2 inch	10 ft
2-1/2 inch	11 ft
3 inch	12 ft
4 inch	14 ft

10. Provide piping supports as shown and as required to adequately support piping. Touch up all cut ends and damaged surfaces of galvanized steel and zinc plated supports and fasteners with spray-on cold galvanizing compound. ZRC, or approved equal.

11. Do not use stainless steel in contact with galvanized supports.

12. Provide clearance for installation of insulation and access to valves and fittings.

13. Label contents of all piping in accordance with ASTM A13.1.

14. Fasten name and operational tags on or adjacent to component with double safety wire or other approved means.

B. HDPE Pipe

1. Install HDPE pipe outside of buried steel pipeline in the locations indicated in the contract drawings.

2. Permanent piping joints shall be performed by butt fusion welding unless otherwise indicated in the contract drawings or as approved by the Engineer. Any request to consider an alternate coupling method in the Work and/or approval of its use, should it be accepted, shall not cause an increase in the cost of the Work.

3. Butt fusion of pipe and fittings shall be in accordance with the procedures and methods established by the pipe manufacturer, and as specified on the contract drawings.

4. For joining the HDPE piping, welding will only be performed by a Certified Fusion Operator. The CONTRACTOR shall provide a copy of HDPE Welder Certification(s) to the Engineer prior to the commencement of any HDPE pipe joining performed. The use of electro-fusion coupling shall be only be permitted where shown on the drawings and when approved by the engineer. Where specified, provide electro-fusion coupling in accordance with the Plans and submit product data to the Engineer for approval.

5. Pipe welding shall not be conducted in water or when trench conditions are unsuitable for the Work. Keep water out of the trench until joining is completed. Secure open ends of pipe and close valves when Work is not in progress, so that no trench water, earth, or other substance will enter the pipe or fittings.

6. Only where shown on the contract drawings or when approved by the Engineer, flanged connections as described in paragraph 2.3B2 of this specification may be used. Provide for pressure tight performance as required.

3.3 TESTING

A. Before operating any equipment or systems, make thorough check to determine that systems have been flushed and cleaned as required and equipment has been properly installed, lubricated and serviced in accordance with factory instructions.

B. Steel Pipe:

1. When pressure testing take steps to protect pumps, dispensers, meters, filters, hoses, and all other components rated for lesser pressures so as not to damage them. Close isolation valves and blind flange piping as required.

2. Isolate and perform a hydrostatic pressure test on each piping system after all equipment is installed at 150 psi for a minimum of one (1) hour, or the maximum rated pressure of the weakest component, whichever is less. Test 100% of welds and pipe joints for leaks. Piping system shall maintain pressure for one hour minimum.

3. Notify Project Manager in writing seven (7) days in advance of pressure tests. Project Manager shall be present at all testing. Pressure testing performed without Project Manager present will be rejected, unless prior written approval is received from Project Manager.

4. Pressure shall be maintained for sufficient time to complete the visual inspection of all joints but shall be not be less than one (1) hour.

5. Care shall be taken to ensure that these pressures are not applied to vented tanks.

6. Submit written procedures for testing, including test pressures, equipment to be used and items to be tested.

7. Cut out, reweld, and retest all leaking welded joints. Repair any leakage found and retest until system proves leak-free. Retesting after the repair of defects shall be performed at no cost to the Authority.

8. Certified test results shall be submitted to the Project Manager for approval.

9. Test certification shall include gauge pressure, air temperature, time, date, witness, and pipeline identification.

END OF SECTION

SECTION 23 12 00

FUEL TANK APPURTENANCES

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. This section includes furnishing and installing fuel tank appurtenances. The intent of this specification, along with other specifications, and the accompanying Contract Drawings is to provide a complete and workable facility with complete systems as shown, specified, and required by applicable codes.

1.2 PERFORMANCE REQUIREMENTS

A. Design Service Conditions: All fuel tank appurtenances shall be rated for the following service conditions:

1. Fluid: Diesel fuel and Gasoline fuel.

2. Operating temperature range: -50° F to 120° F.

B. Any referenced standards that do not comply with these service conditions shall be brought to the Engineer's attention immediately.

1.3 SUBMITTALS

A. Shop Drawings:

1. Fuel Storage Tank: Indicate tank construction and dimensions, including tappings.

B. Product Data:

1. Product Data: Manufacturer's catalog information including capacity, rough-in requirements, and service sizes.

1.4 QUALITY ASSURANCE

A. Perform Work according to NFPA 30.

B. List and label flexible connectors and hoses according to UL 536.

1.5 DELIVERY, STORAGE, AND HANDLING

A. CONTRACTOR is responsible for protection of all material, equipment, and apparatus provided from damage during transportation, storage, and installation processes.

B. Material, equipment or apparatus damaged because of improper storage or protection will be rejected and replaced at CONTRACTOR's expense.

1.6 OPERATION AND MAINTENANCE DATA

A. Submit in accordance with Section 01 77 19 Closeout Requirements.

PART 2 – PRODUCTS

2.1 GENERAL

A. Furnish and install tank accessories as required and as shown on the drawings.

2.2 TANK ACCESSORIES & APPURTENANCES

A. The following tank accessories and appurtenances shall be provided by the CONTRACTOR for delivery to the site and installation.

1. 8” or 10” MPT Primary Emergency Vent: Provide heavy emergency vent, cast iron body, and flanged connection emergency vent with internal screen, set to open at 16 oz /sq-in pressure. Emergency vents shall be sized in accordance with UL 142, or as shown on drawings. Loose manholes not permitted. Morrison Bros., Co model no. 2440F with flanged adapter, or approved equal.

2. Pressure/Vacuum Vent: Combination vent / overfill alarm shall be a threaded 2" pressure/vacuum vent with integral whistle overfill alarm. Set vent to open at 8 oz/sq-in pressure and 1 oz/sq-in vacuum. Set whistle to start at 85% of tank capacity unless otherwise indicated. Provide Morrison Bros. Model 922 or approved equal.

3. Manhole: Provide 24-inch manhole with 5/16" steel lid (single punch), 1/4" mild steel ring with 7" riser height. Provide a complete set of bolts and buna-n gasket for lid. 24" manhole nominal size. Clay & Bailey model no. MR820-0600 or approved equal.

4. Level Switch: Provide level switch for the 12,000-gallon fuel tank as shown in the Contract Drawings. Switches shall be suitable for fuel service and shall be hazardous location rated for Class 1, Division 1 Group C&D environments. All wetted parts shall be 316L stainless steel. Each level switch assembly shall be capable of having up to six SPDT switch points. The switch points shall be triggered by a single float. Switch points shall be field adjustable and replicable without removing the assembly from the tank vessel. Switches shall have the following properties:

   a. Housing: Explosion proof, Class 1, Division 1, Groups C&D, IP67, 1/2” NPT connection.

   b. Sensor: 5/8” OD, length 8” to 20 feet.

   c. Switch Type: Magnetically actuated, hermetically sealed, reed switch each contact, make before break.

d. Maximum Deadband: 3/4 inch.

e. Contact Ratings: AC Rating (max): 250V or 1 amp resistive, 125V or 0.5 amp resistive, single pole, double throw (Form C).

f. Operating Temperature: -50°F to 150°F.

g. 4” Threaded process connection.

h. Manufacturer: ABB, K-TEK part # MS50-A1-SS6-N3-SR43-FXX-HT-MF3, or approved equal.

(1) Refer to Civil Drawings for sensor lengths and switch point elevations.

5. Fill Limiter: Provide 2-inch FPT fill limiting valve, float type, mechanical shut-off valve, aluminum body, closed cell buna-N float, brass plunger, stainless steel trim, 100 PSI shut-off pressure. Provide valve with drop tube capable of being installed through 4-inch coupling for a 2-inch unit, valves shall be set as shown on drawings. Morrison Co. model 9095AA with model 419 drop tube, or approved equal.

6. Clock Gauge: 2-inch liquid level gauge shall be stainless steel float operated clock gauge with readout in feet and inches, in 1/4 inch increments up to 12 feet. Aluminum body. 2-inch mpt connection, float shall be sized to fit through a 2-inch bung opening and operate in a 2” stilling well. Morrison Bros., Co. model no. 818, or approved equal.

7. Water Draw: Provide 1” water draw on 2” bung per drawings.

8. Gauge Hatch: 2” FTP gauge hatch on 2”x4” nipple, lockable brass cap, brass adapter, and brass chain, Buna-N gasket, 2-inch FPT connection. Morrison Bros., Co. Model No. 178, or approved equal.

2.3 PIPE

A. Steel Pipe: Tank appurtenance steel pipe shall be Schedule 80, Black, Seamless, ASTM A53 or ASTM A106. 1” and 2” pipe shall be provided in double random lengths (42’ nominal).

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install tank appurtenances in accordance with applicable codes and per the manufacturer’s installation instructions.

3.2 TESTING

A. Calibrate level gauges to the tank and verify correct readings.

B. Check operation of fill alarms and overfill protection valves prior to completion of the work.

END OF SECTION

SECTION 23 12 13

PUMPS AND EQUIPMENT

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. This section includes fuel pumps and associated equipment. The intent of this specification, along with other specifications, and the accompanying Contract Drawings is to provide a complete and workable facility with complete systems as shown, specified, and required by applicable codes.

1.2 PERFORMANCE REQUIREMENTS

A. Design Service Conditions: All pumps and equipment components shall be rated for following service conditions:

1. Fluids: Gasoline and Diesel fuel.

2. Operating temperature range: 0° F to 100° F.

B. Any referenced standards that do not comply with these service conditions shall be brought to the Engineer’s attention immediately.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

1. Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.

2. Product Data: Provide manufacturer's literature and data indicating rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

3. Manufacturer's Installation Instructions: Indicate rigging, assembly, and installation instructions.

1.4 DELIVERY, STORAGE AND HANDLING

A. CONTRACTOR is responsible for protection of all material, equipment, and apparatus provided from damage during transportation, storage, and installation processes.

B. Material, equipment, or apparatus damaged because of improper storage or protection will be rejected and replaced at CONTRACTOR’s expense.

1.5 OPERATION AND MAINTENANCE DATA

A. Submit in accordance with Section 01 77 19, Closeout Requirements.

PART 2 – PRODUCTS

2.1 PUMPS

A. Transfer Pumps: Ductile iron, self-priming, centrifugal pump for petroleum service. Capable of pumping of gasoline or diesel fuel at an operating temperature of 0° F to 100° F. 1-1/2" NPT inlet & outlet, bronze impeller and self-lubricated, Buna-N mechanical seal. Close coupled to 3,450 rpm, explosion proof 1 HP, 230V, single phase, 60hz, motor. Gorman-Rupp 81 1/2D-X1-1, no substitutes.

B. Submersible Pumps: Submersible centrifugal type which installs through a standard 4" threaded tank opening. Designed for pumping of gasoline or diesel fuel at an operating temperature of 0° F to 100° F. All components shall be designed and assembled to facilitate disassembly and servicing from above without disrupting the discharge piping, leak detection equipment, and vacuum sensor siphon systems. Pumps shall be assembled with the pump inlet and impellers at the bottom for maximum liquid draw. The motor shall be mounted above the pump inlet for both cooled and lubrication by the liquid flow through and past the motor. Complete pump assembly shall meet the standards of UL 79 and shall be listed by UL, cUL, and ATEX.

1. Materials of Construction:

    a. Packer/Manifold Head: Grey Cast Iron

    b. Elastomers (o-rings): Fluorocarbon

    c. Check Valve Seat: Bronze

    d. Column Pipe: Schedule 40 black steel pipe

    e. Motor outer shell: Aluminum

    f. Stator shell: Type 301 Stainless Steel

    g. Rotor shaft: Stainless Steel

    h. Impellers & diffusers: Acetel (Celcon) plastic

    i. Motor bearings: Carbon

2. Mechanical Features:

    a. Multi-stage, dependent upon required flow rate, self-lubricating and easily removed from storage tank without disconnecting discharge piping, mechanical or electronic leak detectors or siphon systems. The pump and motor assembly shall be readily separable from the pump column pipe to allow for simple field replacement of the pump and motor.

b. Impellers shall be splined to the pump shaft to provide positive, non-slip rotation. Diffusers shall be tightly secured to prevent rotation

c. Pump inlet shall be horizontal to prevent drawing sediment from the tank bottom into the pump inlet. The inlet shall be provided with a particulate “Trapper” to prevent particulate from being ingested into the motor.

d. Manifold Head assembly shall consist of a manifold and extractable packer assembly and shall be completely sealed against product leakage into the ground and exterior water leakage into the storage tank. The discharge outlet shall be standard 2" NPT opening. The manifold shall have a built-in air purge screw, line check valve, pressure relief valve, and shall support dual vacuum sensor siphon systems when required. The extractable packer shall incorporate industrial die springs to break loose the o-ring seals when the flange nuts holding the extractable packer in place are removed. No physical lifting effort or special equipment shall be required to break the extractable packer seals.

e. The contractors box shall be built into the manifold head assembly and be completely isolated from the fuel path. The extractable packer assembly shall incorporate a lifting eye for safe extraction of the pump motor.

f. The electrical disconnect shall be an integral part of the manifold assembly. The electrical disconnect shall automatically disconnect and sever electrical connection to the pump motor, without a swing joint, when the extractable packer assembly is removed. Re-insertion of the extractable packer and tightening of the flange nuts shall remake the electrical connection.

g. The check valve shall incorporate a “Lock-n-Lift” feature that mechanically locks the check valve and lifts to provide a larger path to depressurize the line and manifold head assembly, returning fuel to the tank preventing service spills. The check valve shall provide pressure relief of the product line and be compatible with Veeder-Root PLLD systems.

h. The pump length shall be adjustable to fit various tank sizes, incorporating a collet gripping mechanism and setscrew as a locking mechanism allowing future resizing.

3. Electrical Features:

a. Motors shall be 208/230 volt, 60 cycle, single phase, 3450 RPM, permanent split capacitor type, continuous duty rated explosion proof in Class 1, Division 1, Group D locations. The motor windings shall be sealed against leakage of product or moisture and shall have a thermal overload device with automatic reset

built into the motor cutoff when motor temperature reaches a level which may cause damage to the motor.

b. Motors shall have a quick-disconnect type male/female connector readily separable for servicing without cutting or splicing of conducting wires. Wiring connections to the motor shall be disconnected by the quick-disconnect. Reconnecting motor to column pipe shall use an alignment dowel pin for positive realignment of electrical male/female connector.

4. Performance

a. Submersible Pump SP-1 – Gasoline

(1) Red Jacket model P75S1-RJ2 or equal. 25 gallons per minute at 25 feet total dynamic head, 3/4 HP.

(2) Mechanical line leak detection (MLLD), Red Jacket model FX1V or equivalent.

b. Submersible Pump SP-2 – Diesel

(1) Red Jacket model P75S1-RJ2 or equal. 25 gallons per minute at 25 feet total dynamic head, 3/4 HP.

(2) Mechanical line leak detection (MLLD), Red Jacket model FX1DV or equivalent.

C. Portable Drainage Pump

1. Provide one portable self-priming centrifugal pump. Aluminum construction, 1” NPT suction and discharge ports, self-cleaning impeller, Viton mechanical seal, 1/3 HP ODP 120V motor with 8 ft power cord. Carrying handle and base. 20 GPM at 18 feet total dynamic head, 15 ft. suction lift capacity. AMT/Gorman Rupp Model 2851-96 or equal. Provide a placard on each side of the pump with minimum 1/2” black letters on yellow background reading: “DO NOT USE TO PUMP FUEL”.

2. Provide 1” NPT x cam and groove adapters for pump inlet and outlet, one 10 ft length of 1” ID hose with matching cam and groove couplers fitted to each end, one 10 ft length of 1” ID hose with cam and groove coupler fitted to one end, and one 25 ft length of 1” ID hose with cam and groove coupler fitted to one end. Hoses shall be reinforced synthetic rubber and shall be flexible to temperatures down to 0° F.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Check equipment for damage that may have occurred during shipment. Repair damaged equipment as approved or replace with new equipment.

3.2 PREPARATION

A. Protect bright finished shafts, bearing housings, and similar items until in service. No rust will be permitted.

3.3 INSTALLATION

A. Install pumps and associated equipment in accordance with applicable codes and per manufacturer's installation instructions.

B. Electrical installation shall be in accordance with NEC and Division 16 Specifications.

3.4 TESTING

A. At completion of installation, demonstrate that pumps will deliver specified capacity.

END OF SECTION

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SECTION 23 12 16

FUEL DISPENSERS AND APPURTENANCES

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. This Section includes procurement and installation of gasoline and diesel fuel dispensers as shown on the drawings including notes and details.

1.2 RELATED REQUIREMENTS

A. Section 09 96 00 – High-Performance Coatings.

1.3 GENERAL REQUIREMENTS

A. Contractor is responsible for coordinating with and obtaining a certificate from the State of Alaska Division of Measurement Standards & Commercial Vehicle Compliance certifying the dual product electronic dispenser. Contractor is responsible for all costs incurred to certify the dual product electronic dispenser.

1.4 PERFORMANCE REQUIREMENTS

A. Design Service Conditions: All fuel dispensers and components shall be rated for the following service conditions:

1. Fluids: Gasoline and Diesel fuel.

2. Operating temperature range: -22° F to 131° F.

B. Any referenced standards that do not comply with these service conditions shall be brought to the Engineer's attention immediately.

1.5 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

1. Provide a product list which identifies the products intended to satisfy the requirements of this specification. Catalog cuts for each product shall be included with the product list.

2. Provide product certifications stating that the products intended for use meet the standards of this specification.

1.6 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of following (latest addition), except as otherwise indicated:

1. American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges."

2. AISC "Specifications for Structural Steel Buildings," including "Commentary."

3. American Welding Society (AWS) D1.1 "Structural Welding Code - Steel."

B. Qualifications for Welding Work: Qualify welding procedures and welding operators in accordance with AWS "Qualification" requirements.

1. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests.

2. If recertification of welders is required, retesting will be CONTRACTOR's responsibility.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit in accordance with Section 01 77 19, Closeout Requirements.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Dual Product Electronic dispenser: Provide dual product electronic dispenser for fleet style operation. Dual Product Dispenser shall be UL listed electronic, single sided display, two hose, dual (gasoline/diesel), pressure delivery dispensing unit. Provide 30 micron internal spin-on filters and 12 spare elements. Dispenser cabinet shall be stainless steel with generic graphics for Diesel and Unleaded Gasoline. Provide EMV compatible credit card readers – one desktop type in the retail sales building and one wall-mount inside weatherproof enclosure on outside of retail sales building. Both credit card readers shall be compatible with the dispenser and Point-of-Sale system. Dispenser shall be certifiable for retail fuel sales and shall be compatible with the specified Point-Of-Sale System for preset and prepay sales capabilities. Gilbarco Encore 700S series dispenser or approved equal.

B. Point-Of-Sale System

1. Provide an EMV compliant Point-Of-Sale system capable of locally controlling the dispenser. The system shall be self-contained without the need for permanent connection to a remote computer. The system shall be compatible with the dispenser credit card readers and shall control the dispenser and authorize transactions through the owner’s credit card service. Provide capability for connection of a laptop computer for download of records and update of the database. Point-of-Sale system shall be Gilbarco Passport POS or approved equal.

2. Provide any gateways or hardware required by the credit card network provider.

3. Provide system with network switches, routers, and firewall as required for a secure internet connection.

C. Miscellaneous Dispensing Components

1. Retail Dispensing Facility Arctic Hose: 3/4 inch diameter, fuel-rated, hose with static wire and brass male Scovill style fittings each end, Goodyear Arctic Softwall or equal. Length = 18 ft. Provide multi-plane swivels at each end, Husky 0350 or equal. Provide double valve safety break, 250# maximum separation pull force, Husky 3360 with 2274 breakaway hose or approved equal.

2. Dry-disconnect Coupler: Aluminum body cam and groove coupling female fitting with lever actuated positive shutoff valve 1-1/2" FNTP connection, Buna-N seals, and 150 psi minimum working pressure. PT maxi-dry coupler or equal.

3. Dry-disconnect Adapter: Aluminum body cam and groove male fitting with dust cap. Spring loaded automatic shutoff poppet valve with 1-1/2" FNTP connection, Buna-N seals and 150 psi minimum working pressure. PT maxi-dry adapter or equal.

4. Retail Dispensing Facility Breakaway Connection: UL listed 3/4 inch NPT x 3/4 inch NPT re-connectable breakaway designed to stop fuel flow when disconnected. OPW 66REC-1000 or approved equal.

5. Retail Dispensing Emergency Shutoff Breakaway Valve: UL Standard 842 listed dispenser shear valve with fusible link. OPW 10 Series, or approved equal.

6. Retail Dispensing Facility Hose Swivel: UL listed 3/4 inch NPT x 3/4 inch NPT swivel. OPW model No. 45-5060 or approved equal.

7. Retail Dispensing Hose Nozzle: UL listed automatic shut off, automotive fueling nozzle with hold open latch and color coded handle, red for gasoline and green for diesel. OPW 11BP-0300, or approved equal.

8. Static Grounding Reel: Enamel coated steel frame and reel with permanently sealed spring return. Provide with 50 feet of 1/8 inch galvanized carbon steel cable, minimum 100 ampere grounding clip, and stop ball. Hannay GR75 OAE.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install equipment per manufacturer’s instructions.

END OF SECTION

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SECTION 23 13 23

FACILITY ABOVEGROUND FUEL-OIL STORAGE TANKS

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. This section includes the furnishing of all labor, tools, equipment, and materials necessary to fabricate, coat, and package for shipment the appropriate number of the following tanks in accordance with the awarded Contract schedule(s):

1. One (1) qty - Twelve thousand (12,000) nominal gallon, single-wall, horizontal, dual product, steel, skid mounted, aboveground intermediate storage tank for diesel (6,000-gallon) and gasoline (6,000-gallon). Outer tank dimensions shall be in accordance with the Contract Drawings (UL 142).

2. Seven (7) qty - Twenty-seven thousand (27,000) nominal gallon, single-wall, horizontal, steel, skid mounted, aboveground intermediate storage tank for diesel (3 qty) and gasoline (4 qty). Outer tank dimensions shall be in accordance with the Contract Drawings (UL 142).

B. All tanks shall be constructed in accordance with this specification and the Contract Drawings, and shall be furnished with the fittings and appurtenances in the Contract Documents.

C. All tanks shall, at a minimum, meet the requirements of the most current edition of Underwriters Laboratories Inc. (UL) Standard for Safety UL 142, “Steel Aboveground Tanks for Flammable and Combustible Liquids.” All horizontal tanks must be shop-constructed and UL listed and labeled.

1.2 RELATED REQUIREMENTS

A. Section 01 33 00 Submittal Procedures.

B. Section 01 33 23 Shop Drawings, Product Data, and Samples.

C. Section 01 77 19 Closeout Requirements.

D. Section 05 12 00 Structural Steel Framing.

E. Section 09 98 00 Hot Dip Galvanized Coatings.

F. Section 23 12 00 Fuel Tank Appurtenances.

G. Section 23 12 13 Pumps and Equipment.

1.3 REFERENCES

A. The latest revision of the following standards of the American Society for Testing and Materials (ASTM), and other listed standards, are hereby made part of this Specification. The publications may be referred to in the text by basic designation only.

B. Reference to a particular organization's standards shall be in accordance with those standards unless more restrictive criteria is listed herein or on the Contract Drawings.

C. Where Contract Drawings or Specifications call for material or construction of a better quality or larger sizes than required by the codes, rules, and regulations listed below, the provisions of the Contract shall take precedence.

ASTM A 36	Standard Specification for Carbon Structural Steel
ASTM A 283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A 570	Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality
OSHA	Occupational Safety and Health Administration; Chapter 20, Fixed Ladders
UL 142	Steel Aboveground Tanks for Flammable and Combustible Liquids
UL 2085	Protected Aboveground Tanks for Flammable and Combustible Liquids

1.4 SUBMITTALS

A. Submit material samples and manufacturer's literature in accordance with Section 01 33 00 Submittal Procedures and Section 01 33 23 Shop Drawings, Product Data, and Samples.

B. Shop Drawings:

1. Submit shop drawings, prior to fabrication, showing all principal dimensions of the tanks, details and locations of all accessories, penetrations and appurtenances, thickness of sheets and plates, details of joints and welds and description of coating system. All deviations from these Specifications and the Contract Drawings shall be clearly shown and identified on the shop drawings.

2. Submit material lists with catalog cuts for any proposed substitutions.

C. Packing Lists: The Contractor shall submit shipping packing lists, detailing all materials shipped and referencing the crate number each component is in. The

packing lists will be provided to the Project Manager prior to the delivery date of the tanks.

D. The Contractor shall submit the following prior to the start of tank erection:

1. Certified Welding Procedure Qualification Records (PQRs).

2. Certified Welding Procedure Specifications (WPSs).

3. Certified Welder Performance Qualifications (WPQs).

4. Nondestructive Testing (NDT) Procedures and NDT Personnel Certifications.

5. Welding Inspector Certification.

6. Quality Control Plan.

E. Contractor shall submit weld and pressure test results to the Engineer for approval within ten (10) working days of each test.

F. Tank Painting Schedule – See Section 09 96 00 – High-Performance Coatings.

G. Contractor shall submit certified tank coating inspection reports to the Engineer for approval within ten (10) working days of each tank coating inspection.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packing, Shipping, and Handling:

1. Packaging must meet the shipping requirements of all anticipated carriers and shall prevent abrasion, scratching, or damage of the materials during overland transport and ocean barge shipment. Exterior ladders, catwalks, and pipe supports shall be packaged and shipped separately from tanks. Packaging shall be sufficient to prevent damage during shipping. Extra care shall be taken to protect tank stand offs to ease field installation of bolt on components.

2. All threaded tank openings shall be sealed for shipping with plastic or tin plugs. All flanged tank openings shall be blind flanged for shipment. Provide provision for relief of excess pressure/vacuum, which may damage the tank, while preventing precipitation or salt water spray from entering tank. Minimum vent opening shall be 1/2” diameter.

3. Lifting connections shall be provided in accordance with the Drawings and as required for proper tank handling.

4. Shipping crates shall be clearly labeled with community name and crate number in large, waterproof, lettering for easy identification at the construction site. Two (2) packing lists shall be securely attached to each shipping container (one inside and one outside) in watertight, re-sealable, plastic bags.

B. Storage: The packaging shall provide adequate protection for the fabricated materials and appurtenances for outside storage at the site throughout the construction project.

1.6 QUALITY ASSURANCE

A. Tank manufacturers shall have a minimum of ten (10) years experience including the manufacture of at least five (5) similar tanks in the previous three (3) years.

B. Testing: Provide independent testing firm to perform testing and inspection for tank welding.

C. Tank Coating Inspection: Provide a third party NACE certified testing firm to perform tank coating inspections. For each tank, tank coating inspections shall be performed after base primer coat, intermediate coat, and top coat applications.

D. Tank Leak Test: Provide tank integrity testing in the form of a hydrostatic test in accordance with UL 142.

E. Service Testing: Perform hydrostatic or pneumatic tightness testing in accordance NFPA 30 Section 21.5.2.4 after installation and prior to placing tanks into service.

1.7 DESIGN REQUIREMENTS

A. General:

1. Horizontal tank design criteria shall be in accordance with the 2015 International Building Code, 2012 International Fire Code, the most current criteria of the American Society of Civil Engineers, and the most current edition of UL 142. Design shall use the following parameters:

a. Classification of Structure: Category IV, Essential Facility.

b. (ASCE/SEI 7-16) “Minimum Design Loads for Buildings and Other Structures”.

c. Importance Factors (IBC 2018, ASCE7-16)

Seismic = 1.5

Snow = 1.20

d. Design Loading:

Seismic = Site Class E; Short Period Response Acceleration (Sds) = 0.21; One Second Period Response Acceleration (Sd1) = 0.14;

Ground Snow load = 150 PSF

Wind = 175, MPH Exposure D

2. The tanks shall be designed, or supplemented, for anticipated shipping and handling loads. Lifting connections shall be provided in accordance with UL 142 where required for shipping and handling. The lifting eyes shall be capable of fully supporting the static weight of the completed tank (empty) without damage to the tank.

3. The tanks shall include the nozzles and fittings shown on the Contract Drawings. Provide water draw assemblies and clock gage stilling wells on all tanks as detailed on the Contract Drawings.

4. Tank dimensions and capacity shall be as shown on the Contract Drawings.

5. The tanks shall be anchored as shown on the drawings. If additional anchoring is required by UL 142 for the Contractor's tank design, Contractor, shall design, fabricate, and install anchors as required to attach to the structural steel framing at no additional cost to the Authority.

6. Tank bottoms and skids shall be designed with sufficient strength and thickness to span the structural steel framing shown on the drawings.

B. Design Service Conditions: Unless noted otherwise, all fuel tank appurtenances shall be rated for the following service conditions:

1. Fluid: Diesel fuel and Gasoline.

2. Operating temperature range: -50° F to 120° F.

3. Design working pressure: 150 psig (min) working pressure at -50° F.

1.8 DRAWINGS

A. Contract Drawings are diagrammatic and show the general design, arrangement, and extent of the facility. Due to the small scale of the drawings it is not possible to show all offsets, fittings, and accessories which may be required. Contractor shall carefully investigate the field conditions and work requirements for all trades and arrange accordingly.

B. Contractor is responsible for verifying drawing dimensions by making field measurements and preparing separate shop drawings.

1.9 OPERATION AND MAINTENANCE DATA

A. Submit in accordance with Section 01 77 19 Closeout Requirements.

1.10 SPARE PARTS

A. Provide manufacturer's touch-up primer and coating products to field repair tank coating.

1.11 WARRANTY

A. The Contractor shall warrant the tanks against any defects in workmanship and materials for a period of one (1) year from the date of shipment.

B. In the event any such defect should occur, the Project Manager shall report it in writing to the Contractor during the warranty period.

PART 2 – PRODUCTS

2.1 GENERAL

A. Materials and apparatus shall be new unless otherwise specified, and each shall have all necessary accessories to make it functionally complete. All items of the same type shall be of the same manufacturer.

2.2 MATERIALS

A. Steel - Steel Sheets, Plates and shapes shall meet the requirements of Section 05 12 00 Structural Steel Framing of these Specifications as delineated by UL 142.

B. Threaded Penetrations – Threaded penetrations shall be female pipe thread, size as indicated.

C. Flanged Penetrations – Flanged penetrations shall be class 150#, size as indicated.

D. Gaskets - Gaskets shall be Buna-N.

2.3 TANK COMPONENTS

A. Factory Coated welded steel fuel storage tanks:

1. Tank Joints:

a. Head and shell joints for horizontal cylindrical tanks:

b. Primary tank head joints shall incorporate double welded full fillet lap joints in accordance with UL 142 Figure 6.2, No. 6.

c. Horizontal seams on the ends of all horizontal tanks shall be either vertical or horizontal. Skewed seams shall be cause for rejection of tanks.

2. Horizontal Tank Ladders and Catwalks:

a. Equip horizontal tanks with exterior bolt on ladders and catwalks as shown on the Contract Drawings. All bolt on components shall be designed and constructed in accordance with federal OSHA, 2015 International Building Code, 2012 International Fire Code, and UL 142 requirements.

b. Exterior ladder and catwalk components shall be shop assembled for field installation and hot dipped galvanized. Design shall permit field installation of exterior ladders and catwalks without field welding.

c. Verify fit of bolt-on ladder components to tanks prior to painting tanks; remove and package separately for shipping.

3. Pipe/conduit standoffs:

a. Equip tanks with all, fittings, supports, and appurtenances as shown on the Contract Drawings.

b. All components shall be designed and constructed in accordance with the Specifications and applicable Federal OSHA, 2015 International Building Code, 2012 International Fire Code, and UL 142 requirements.

c. All piping shall be Schedule 80 with welded joints unless shown otherwise in the Contract Drawings.

4. Fabricated Materials:

a. Tolerances for fabricated materials shall conform to the following:

i. Shear: 1/16 Inch.

ii. Rolling:

Out of Round: +-3%.

Circumference: +- 3/16 Inch.

Radius: +-1.5%.

iii. Circle Shearing: +- 1/8 Inch.

iv. Frame Cutting: +- 1/16 Inch.

v. Squareness: <1/8 Inch.

5. Horizontal tank saddles and skids:

a. All horizontal tanks to be provided with integral steel saddles and skid foundations in accordance with UL 142 and in accordance with the Contract Documents and Drawings.

b. Saddles to be seal welded to tank - bolt on or strap on saddles will not be accepted. Space saddles as shown on the Contract Drawings.

c. Provide minimum W8x35 skid foundations.

d. Skids to extend 12" beyond each end of tank assembly, be capped with a 1/2 inch thick end plate at 45 degree angle to horizontal, and be provided with 4" diameter schedule 80 steel pipe tow bars at each end to allow dragging of the tank and lifting from one end with no damage to the tank assembly.

e. Skid and saddles shall be constructed such that the vertical distance between the bottom of the tank skid and the bottom of the tank is no less than 8 inches and no greater than 10 inches.

6. Tank Labeling

a. All tanks shall be labeled in accordance with the requirements of the 2012 IFC and NFPA 704. Each end of dual-compartment tanks shall be labeled for volume (gallons) and product type. All tank penetrations shall be labeled in accordance with the Contract Drawings in 2-inch high black lettering.

2.4 TANK COATINGS

A. Coating System

1. The tanks, skids, fittings, nozzles, and standoff supports shall be shop coated in accordance with Section 09 96 00 and in accordance with the coating manufacturer's coating application recommendations. All ladders, ladder cages, catwalks and railings shall be hot dip galvanized per Section 09 98 00.

PART 3 – EXECUTION

3.1 TANK PLACEMENT

A. Install tanks on new tank foundation decking in accordance with the Contract Drawings, the referenced publications, and the manufacturer's written instructions, checklists, and warranty requirements for each system component.

3.2 COATING REPAIR

A. Any damage to the factory-applied coating shall be repaired and restored to the original finish in strict compliance with the manufacturer's recommendations.

3.3 TESTING

A. Pressure test all tanks prior to installation and painting. Pressure test tanks in accordance with the International Fire Code and UL Standard 142.

B. After installation and prior to placing tanks in service, Contractor shall perform hydrostatic or pneumatic tightness testing in accordance NFPA 30 Section 21.5.2.4.

END OF SECTION

SECTION 26 05 01

COMMON WORK RESULTS – ELECTRICAL

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Provide the labor, materials, equipment, and test equipment necessary to furnish, install, and place into operation the power, motor, lighting, control, alarm, and associated electrical systems of this Contract. Connect motors, meters, panels, sensors, switches, and outlets or any other electrical device installed or provided as part of the project. Mark and identify circuits, terminal boards, equipment, enclosures, etc. with identification numbers, wire numbers, nameplates, and warning signs. Test, adjust and calibrate equipment and start-up all electrical equipment and its associated mechanical attachments as necessary to place the project into operation.

B. Provide and install all control equipment and wiring to instruments and devices installed by others.

C. Where the work of several crafts is involved, coordinate all related work to provide each system in complete and proper operating order.

D. Cooperate with all others involved in the project, with due regard to their work, to promote rapid completion.

E. Local Conditions: The CONTRACTOR shall thoroughly familiarize himself with the work as well as the local conditions under which the work is to be performed. Schedule work with regard to seasons, weather, climate conditions, and all other local conditions which may affect the progress and quality of work.

F. See Divisions 01 and 02 which contain information and requirements that apply to work specified herein.

G. It shall be the responsibility of the CONTRACTOR to provide electrical service to, connection and/or interconnection of various units of equipment supplied by others. The CONTRACTOR shall not be required to set in place or align motors or calibrate devices supplied as an integral part of equipment provided by others.

H. System Commissioning

1. The CONTRACTOR shall be responsible for the following pre-commissioning activities prior to the Engineer/Authority's pre-commissioning and commissioning tasks:

    a. Testing all control panel hardware, devices and wiring (in the factory and field) per the project specifications to ensure proper functioning.

2. Testing all connections and functioning of loops per the project specifications to ensure proper functioning.

3. Test and calibrate all instrumentation and devices/equipment per the project specifications to ensure proper functioning.

4. Submit a blank calibration form listing all devices (instruments, valves, fuel management console) per the specifications for approval by the Engineer/Authority a minimum of one (1) month prior to beginning pre-commissioning. The CONTRACTOR shall complete the approved form during pre-commissioning to the satisfaction of the Engineer/Authority.

5. Submit a blank functional system checklist for approval by the Engineer/Authority a minimum of one (1) month prior to beginning pre-commissioning. The CONTRACTOR shall complete the approved form during pre-commissioning to the satisfaction of the Engineer/Authority.

6. Prove fuel management console programming and functionality to ensure control panels operate properly under programmed control.

7. The Engineer/Authority shall have the option to witness all the CONTRACTOR's pre-commissioning tasks to ensure proper completion.

8. The Engineer/Authority shall be provided a detailed schedule of all the CONTRACTOR's pre-commissioning activities a minimum of one (1) month prior to the work. The Engineer/Authority shall review and approve the schedule before any pre-commissioning tasks are performed.

9. Pre-commissioning activities performed by the Engineer/Authority: These activities shall not be scheduled until all the CONTRACTOR's pre-commissioning tasks are complete and verified to the satisfaction of the Engineer/Authority. These activities shall include:

    a. Verify and validate functionality of the instruments and equipment. Any malfunctioning instruments/equipment installed by the CONTRACTOR shall be made functional by the CONTRACTOR within forty-eight (48) hours of notice by Engineer/Authority.

10. Commissioning by the Engineer/Authority: These activities shall be scheduled once all the pre-commissioning tasks are complete and verified. These activities shall include:

    a. Coordinating with facility operators to ensure all system set points and functions are correct and meet the operator's needs and expectations.

11. The CONTRACTOR's pre-commissioning activities shall not be considered substantially complete until all requirements of the specifications have been met to the satisfaction of the Engineer/Authority.

12. The Engineer/Authority anticipates preforming pre-commissioning and commissioning tasks at the same time as the substantial and final inspections, but is under no obligation to do so.

1.2 RELATED REQUIREMENTS

A. This section applies to all Division 26 and 40 work as well as other Divisions with electrical or controls components.

B. See Divisions 01 and 02 of which contain information and requirements that apply to work specified herein.

C. See also the following Sections:

1. Section 01 33 00 – Submittal Procedures.

2. Section 23 11 13 – Facility Fuel-Oil Piping.

3. Section 23 12 00 – Fuel Tank Appurtenances.

4. Section 23 12 13 – Pumps and Equipment.

5. Section 23 12 16 – Fuel Dispensers and Appurtenances.

6. Section 23 13 23 – Facility Aboveground Fuel-Oil Storage Tanks.

1.3 ELECTRICAL SUPPLY

A. Electrical power for this project is supplied from the Alaska Village Electric Cooperative (AVEC) power plant.

B. The CONTRACTOR shall provide new utility services as indicated on the Plans. All utility work shall be performed in accordance with the applicable AVEC requirements.

C. The CONTRACTOR shall include in the bid all power company charges associated with AVEC service to the project. This may include but is not limited to, secondary transformers, line extensions and overhead service drops. The CONTRACTOR shall pay all power company charges for materials, labor, one time non recurring construction costs (sometimes called excess facilities charge), and other costs assessed by the power company whether or not indicated on the Plans or specified.

D. The CONTRACTOR shall provide installation of the electrical supply as indicated on the Plans. The AVEC will inspect the installation for compliance with its requirements and the CONTRACTOR shall be required to correct any deficiencies noted by the AVEC at no additional cost to the Authority.

1.4 TELEPHONE SERVICE

A. Telephone service for this project is supplied by United Utilities, Inc (UUI).

B. The CONTRACTOR shall provide new utility services as indicated on the Plans. All utility work shall be performed in accordance with the applicable UUI requirements.

C. The CONTRACTOR shall include in the bid all UUI charges associated with the telephone utility service to the project. This may include but is not limited to, network interface boxes, line extensions, and service connections. The CONTRACTOR shall pay all telephone company charges for materials, labor, one-time non-recurring construction costs (sometimes called excess facilities charge), and other costs assessed by the telephone company whether or not indicated on the Plans or specified.

D. The CONTRACTOR shall provide installation of the telephone service as indicated on the Plans. UUI will inspect the installation for compliance with its requirements and the CONTRACTOR shall be required to correct any deficiencies noted by UUI at no additional cost to the Authority.

1.5 CODES AND STANDARDS

A. Codes: Perform all work in strict accordance with all applicable national, state, and local codes; including, but not limited to the latest legally enacted editions of the following specifically noted requirements:

1. NFPA 70, National Electric Code - NEC;

2. ANSI-22, National Electrical Safety Code - NESC;

3. Uniform Building Code - UBC; and

4. Uniform Fire Code - UFC.

B. Standards: Reference to the following standards infers that installation, equipment, and materials shall be within the limits for which it was designed, tested, and approved, in conformance with the current publications and standards of the following organizations:

1. American National Standards Institute - ANSI;

2. American Society for Testing and Materials - ASTM;

3. American Society of Heating, Refrigerating and Air Conditioning Consultants - ASHRAE (Standard 90-75);

4. Factory Mutual – FM;

5. Institute of Electrical and Electronics Consultants - IEEE;

6. National Electrical Contractors Association - NECA;

7. National Electrical Manufacturers' Association - NEMA;

8. National Fire Protection Association - NFPA, and

9. Underwriters Laboratory – UL.

1.6 SPECIFIC TERMINOLOGY

A. Streamlining: In many instances, the products, reference standards, and other itemized specifications have been listed without verbiage. In these cases, it is implied that the CONTRACTOR shall provide the products and perform in accordance with the references listed.

B. The word "Contractor" as used in Division 26 and 40 specifications shall mean "Electrical Contractor."

C. The word "General Contractor" as used in Division 26 and 40 specifications shall mean the Contractor responsible for the project.

D. "Furnish" means to purchase material as shown and specified, and cart the material to an approved location at the site or elsewhere as noted or agreed and to be installed by supporting crafts.

E. "Install" means to set in place and connect, ready for use and in complete and properly operating finished condition, material that has been furnished.

F. "Provide" means furnish all products, labor, sub-contracts, and appurtenances required and install to a complete and properly operating, finished condition.

G. "Rough-in and Connect" means provide an appropriate system connection such as conduit with "J" boxes, wiring, switches, disconnects, etc., and all wiring connections. Equipment furnished is received, uncrated, assembled and set in place under the Division in which it is specified.

H. "Accessible" means arranged so that an appropriately dressed man 6-foot 2 inches tall, weighing 250 pounds, may approach the area in question with the tools and products necessary for the work intended, and may then position himself to properly perform the task to be accomplished, without disassembly or damage to the surrounding installation.

I. "Serviceable" means arranged so that the component or product in question may be properly removed and replaced without disassembly, destruction, or damage to the surrounding installation.

J. "Product" is a generic term which includes materials, equipment, fixtures, and any physical item used on the project.

K. “Authority” is as defined in the General Conditions of the Contract.

L. "Engineer" is as defined in the General Conditions of the Contract.

1.7 DRAWINGS, SPECIFICATIONS, AND SYMBOLS

A. The Plans and Specifications are complementary; what is shown on one is as binding as if called for in both. Do not scale the Plans. Locations of devices, fixtures, and equipment are approximate unless dimensioned.

B. The Plans are partly diagrammatic and do not show precise routing of conduits or exact location of all products, and may not show in minute detail all features of the installation; however, provide all systems complete and in proper operating order.

C. Drawing symbols used for basic materials, equipment and methods are commonly used by the industry and should be universally understood. Special items are identified by a supplementary list of graphical illustrations, or called for on the Plans or in the specifications.

1.8 SUBMITTALS, MANUALS, AND SHOP DRAWINGS

A. Submit to the Engineer for review and approval, as soon as practical after the date of notice to proceed and before commencement of installation or fabrication of any materials or equipment, manuals containing detailed drawings, diagrams and instructions for installing, operating, and maintaining the material and equipment proposed for installation in the electrical work.

B. The manuals shall be supplied to the Engineer for review and approval in the quantities indicated in Division 1 specifications before any electrical equipment is shipped to the job site. Record ("As Built") drawings of the work shall be provided upon completion of the work and shall be folded and punched for insertion into the manual after they are reviewed and approved by the Engineer.

C. Manuals for the electrical system shall consist of three-post, expandable metal hinge binders labeled with the job name and the CONTRACTOR's name with tab dividers for each major type of equipment.

D. Any drawings required to be prepared by the CONTRACTOR or his agent shall be of standard size no larger than 22-inch by 34-inch and with symbols similar to those used herein. Drawings shall be prepared using AutoCAD V2018 or later.

E. Provide manufacturer's installation, operation, maintenance, and service information, shop drawings, etc., for each panel, switchboard, motor control center, and equipment items furnished under the electrical work. Assemble and index each section listing the contents individually on the tab divider for that section. Compile a spare parts list and a supplier’s index for each section and assemble in the section provided. Assemble records of all tests, measurements, and calibration settings made for each device. See Section 01 33 00, Submittal Procedures.

F. Submittals: Provide submittals for all products and systems described in Division 26 specifications and shown on the Plans to demonstrate compliance with the requirements of the project. Submit data not later than sixty (60) days after Award of Contract. Furnish equipment submittals in the manner described

elsewhere in these specifications. In addition, include data for review, and organize data, as noted below:

1. Specific reference and/or drawings reference for which literature is submitted for review with an index, following specification format, and item by item identification.

2. Manufacturer's name and address, and supplier's name, address, and phone number.

3. Catalog designation or model number with rough-in data and dimensions.

4. Operation characteristics.

5. Complete customized listing of characteristics required. Indicate whether item is "As Specified" or "Proposed Substitution." Indicate any deviations on submittal. Mark out all non- applicable items. The terminology "As Specified" used without this customized listing is not acceptable.

6. Wiring diagrams for the specific system.

7. Coordination data to check protective devices.

8. Working construction Drawings (Shop Drawings).

G. Submittal Data:

1. Prior to the submission of the required shop drawings, hold a meeting with all the trades and check the shop drawings for discrepancies, dimensional errors, omissions, contradictions, and departures from the Contract requirements. The shop drawings shall then be corrected and submitted to the Engineer with appropriate notes.

2. With prior permission from the Engineer, partial submittals will be considered for review provided that they are complete sections, as listed below:

   a. Individual Special Systems (Control Panels, etc.).

   b. Lighting Fixtures, Lamps and Accessories.

   c. Service, Disconnects.

   d. Raceways, Fittings, and Supports.

   e. Wire and Cable.

   f. Wiring Devices.

3. Mark submittal literature and shop drawings clearly and bind 8-1/2-inch by 11-inch literature in three-hole loose-leaf binders by individual sets.

4. Submittal review is for general design and arrangement only and does not relieve the CONTRACTOR from any of the requirements of the Contract Documents. Submittals will not be checked for quantity, dimension, fit, or proper technical design of manufactured equipment. Where deviations of substitute product or system performance have not been specifically noted in the submittal by the CONTRACTOR, provision of a complete and satisfactory working installation of equal quality to system specified is the sole responsibility of the CONTRACTOR.

1.9 TESTS

A. FACTORY TESTS: All control panels will be tested prior to shipping. Panel operation will be demonstrated using simulated inputs and alarm conditions. Tests will be observed by Engineer and will not be shipped until panel(s) meet the functional and technical requirements established in the specifications and drawings. Successful operation as determined by the Engineer will be acknowledged in writing.

B. FIELD TESTING: The CONTRACTOR shall prepare and submit a test plan for review and approval by the Engineer.

1. Field testing cannot take place without an approved test plan.

   a. The Test Plan shall outline the tests planned for each item of equipment.

   b. The Test Procedures shall identify the test equipment to be utilized, the action of each test step and the expected result so that a test technician who has no knowledge of the details of the equipment design shall be able to successfully conduct the test.

2. Test the equipment and electrical circuits for proper connection, continuity, and absence of undesirable shorts and grounds.

3. Test wire and cable installation, when complete and again seventy-two (72) hours prior to energization of the system.

4. Check for continuity, visual damage, marking, and proper phase sequence before performing insulation testing.

5. Megger bus work, switches, circuit breakers and circuits, phase-to-phase and phase-to-ground disconnecting and reconnecting equipment which cannot be meggered otherwise.

6. The minimum acceptable steady-state value is 50 megohms. Ambient temperature and humidity during testing shall be recorded.

7. Verify operation, calibration, and settings of the meters, relays and indicating devices.

8. Check all auxiliary equipment, i.e., heaters, thermostats, lights, and all illuminated indicating devices and lamps, and all audible alarm devices to verify that they function properly.

9. Take distribution equipment test load readings after all loads are connected. Obtain the maximum reading for each phase and neutral with all lighting, appliances, motors (as applicable use largest combination), and other loads connected to the panels in service.

10. Test the resistance of the grounding electrodes in the presence of the Engineer.

11. The measurement shall be done with a ground ohmmeter or the IEEE Standard No. 550, Paragraph 3.42 method.

12. Testing shall be performed during normal dry weather conditions with at least 5 non-rain days elapsing prior to the test.

13. Measured resistance of the electrode to ground exceeding 3 ohms shall require supplemental electrode additions until electrode resistance to ground is less than 3 ohms.

14. Maximum equipment ground impedance is 25 ohms.

15. Check fuses with an ohmmeter; ring out wiring and busing; check operation of control and safety interlocks.

16. Test motor driven equipment motors before energization. Insulation test shall consist of megohmeter check phase-to-ground, per IEEE Standard 43 or manufacturer's recommendations.

17. Load test each motor of motor driven equipment showing the following:

    a. Nameplate ratings (horsepower), (speed), (voltage), (phase), (ampere rating of motor at full load).

    b. Measured load in amperes on lines 1-2.

    c. Load test pump motors, noting the operating conditions at the time of the test. Motor test data shall show suction and discharge conditions (pressure, temperature, humidity, to where such conditions affect load).

    d. Overload heaters shall be checked and the size on each phase shall be noted at this time on the test sheet.

C. Report all test results in writing. Where tests disclose problem areas, retest after the defect has been corrected.

D. Demonstrate to the Authority that the electrical installation is working by operating all electrical systems and equipment. Simulate control inputs,

responses to outputs and alarm conditions and their acknowledgement, artificially where necessary, for complete system tests.

E. Operate the electrical systems until acceptance of the work. Instruct the Authority's employees in the correct operation of all electrical and control systems under your jurisdiction.

F. Any rework or repair of equipment required during or as a result of the testing shall be done by the CONTRACTOR at no additional expense to the Authority.

G. The CONTRACTOR shall furnish to the Authority at the time the project is accepted, any special tools, calibration equipment, and testing apparatus specified or furnished by the equipment manufacturer for the proper adjustment and maintenance of the electrical equipment provided.

1.10 CODES AND INSPECTIONS

A. Electrical work shall be installed in accordance with the latest edition of the National Electric Code and local and state codes in legal force in the project area.

1. If the CONTRACTOR observes that the Plans and/or Specifications are at variance with such codes and regulations, he shall promptly notify the Engineer in writing.

2. Should the CONTRACTOR perform any work in non-compliance with the above-mentioned codes and regulations without such notice to the Engineer, the CONTRACTOR shall bear all costs arising therefrom.

B. The above codes are referenced to establish minimum requirements and wherever this specification requires higher grades of material or workmanship than required by the codes, this specification shall prevail.

C. All electrical work shall be performed by Alaska licensed Journeyman Electricians or licensed Apprentice Electricians under the direct supervision of a licensed Electrical Administrator.

D. Submit written proof of all Journeyman and Apprentice Electricians' current licenses.

E. Submit certification for tests and inspections required by the electrical inspector having jurisdiction. Certificates of approval that are issued shall be transmitted to the Authority with a copy to the Engineer.

F. The CONTRACTOR shall pay all costs and fees required by inspecting and other agencies required for his work.

G. Cooperate with the Engineer and provide assistance at all times for the inspection of the electrical work performed under this Contract. Remove covers, operate machinery, or perform any reasonable work which, in the opinion of the

Engineer, will be necessary to determine the completeness, quality, or adequacy of the work.

1.11 COORDINATION

A. Electrical Plans are partly diagrammatic and it is not the intent to show in detail all features of work or exact physical arrangement of equipment. The location of outlets and equipment are approximate unless dimensioned. The exact locations and routing of conduits shall be governed by structural conditions and physical interferences and by the location of electrical terminations on equipment. Equipment shall be located and installed so that it will be readily accessible for operation and maintenance.

B. If conduit is placed incorrectly with respect to equipment connections or if equipment connections are relocated without appropriate changes in the electrical work, and the resulting work is not coordinated, the work affected shall be removed and re-installed at the CONTRACTOR's expense, even if removal and replacement of structural and/or mechanical parts of the work are necessary.

C. The CONTRACTOR shall schedule his work to coordinate through the General CONTRACTOR and with all other subcontractors, power and telephone utilities in order to maintain job progress and to avoid conflicts with equipment installation or work done by the various trades.

D. The CONTRACTOR is responsible for maintaining required clearspace. Should the CONTRACTOR become aware of a clearspace violation or if the installation of electrical equipment as shown produces a clearspace violation, notify the Engineer in writing before proceeding with the installation.

1.12 LOCATIONS.

A. Hazardous location boundaries exist and are shown on the drawings. Locations for seal-off fittings shall be field determined by the CONTRACTOR.

B. Wet Locations: Wet locations shall include all areas underground (below grade), in direct contact with the earth, areas subject to saturation with water or other liquids from splashing, surface water, exposed to the weather and unprotected.

1.13 RECORD DRAWINGS

A. Reference requirements stated elsewhere in these specifications.

B. In addition to other requirements, mark up a clean set of Plans as the work progresses, to show the dimensioned location and routing of all electrical work which will become permanently concealed. Show routing or work in permanently concealed blind spaces within the facility. Show complete routing and sizing of any significant revisions to the systems shown.

C. Maintain Record drawings in an up-to-date fashion in conjunction with the actual progress of installation. "Record" progress mark-ups shall be available on-site for examination by the Engineer at all times.

D. Prepare wiring diagrams on reproducible media using AutoCAD V.2018 or later for all individual special systems as installed. Identify all components and show all wire and terminal numbers and connections.

E. Prior to substantial completion, deliver these drawings and their disk files in both .dwg and full size .pdf format to the Engineer and obtain a written receipt.

1.14 OPERATING INSTRUCTIONS

A. Prior to final acceptance, instruct the Authority on the proper operation and maintenance of all electrical systems and equipment under this contract. Make available a qualified technician for each component of the installation for this instruction. Give these operating instructions after the operation and maintenance manuals have been furnished to the Engineer.

1.15 OPERATION AND MAINTENANCE MANUALS

A. Provide Operation and Maintenance Manuals in the manner described elsewhere in these specifications. In addition, organize manual and include data and narrative as noted below. Bind each manual in a hard-backed loose-leaf binder.

B. Provide a separate chapter for each section of the electrical specifications with subchapters for each class of equipment or system. Provide a table of contents for each chapter, and each major item in each chapter, to indicate the page number of each. Label all pages to assure correct placement in manual. Identify each piece of equipment with its associated nameplate number, i.e. pump P-1A, etc.

C. Operating Sequence Narrative:

1. In each chapter, describe the procedures necessary for personnel to operate the system and equipment covered in that chapter.

2. Describe procedures for start-up, operation, emergency operation, and shutdown of each system. If a particular sequence is required, give step-by-step instructions in that order.

3. Describe all seasonal adjustments which should be accomplished for each system.

4. Provide the above descriptions in typewritten, simple outline, narrative form.

D. Maintenance Instructions:

1. Provide complete information for preventive maintenance for each product, including recommended frequency of performance for each preventive maintenance task.

2. Provide all information of a maintenance nature covering warranty items, etc., which have not been discussed in the manufacturer's literature or the operating sequence narrative.

3. Provide complete informational data for all the spare and replacement parts for each product and system. Properly identify each component by part number and manufacturer.

E. Manufacturers' Brochures: Include manufacturers' descriptive literature covering all products used in each system, together with illustrations, exploded views and renewal parts lists. Highlight all applicable items and instructions, or mark-out non-applicable items. Brochure bearing submittal review stamp are not acceptable.

F. Shop Drawings: Provide a copy of all corrected, approved shop drawings for the project either with the manufacturers' brochures or properly identified in a separate subsection.

1.16 INSTRUCTION OF OPERATING PERSONNEL

A. Provide services of a qualified representative of the supplier of each item or system listed below to instruct the Authority in operation and maintenance of item or system.

B. Perform instructions after system installation is complete. Duration of training shall be for the minimum number of hours indicated and performed at a time mutually agreeable.

1. Electrical Distribution Equipment: 2 hours.

2. Alarm and Control Panels: 2 hours per panel.

C. Have approved operating and maintenance data, and parts lists for all equipment on hand at the time of instruction.

1.17 PROJECT COMPLETION AND DEMONSTRATION

A. Tests: During final inspection, conduct operating tests for approval.

B. Demonstrate installation to operate satisfactorily in accordance with requirements of Contract Documents. Should a portion of installation fail to meet requirements of Contract Documents, repair or replace items failing to meet requirements until items can be demonstrated to comply.

C. Have instruments available for measuring, voltage and current values and for demonstration of continuity, ground, or open circuit conditions. Furnish personnel to assist in taking measurements and making tests.

D. In the event that systems are not complete and fully operational at the time of Final Inspection, all costs of any subsequent inspections shall be borne by the CONTRACTOR at no additional cost to the Authority.

1.18 CERTIFICATE OF COMPLETION

A. Submit, at time of request for Final Inspection, a completed letter in the following format:

I,_____(Name), of _____(Firm), certify that the Electrical Work is complete in accordance with Contract Plans and Specifications, and authorized change orders (copies of which are attached hereto), and will be ready for Final Inspection as of _____(Date). I further certify that the following Specification requirements have been fulfilled:

1. Megger readings performed, ____ copies of log attached.

2. Operating manuals completed and instructions of operating personnel performed_____(Date).
   _____(Signed)
   Engineer

3. Record drawings up-to-date and ready to deliver to Engineer.

4. Emergency systems tested and fully operational.

5. All other tests required by Specifications have been performed.

6. All systems are fully operational. Project is ready for Final Inspection.

SIGNED:_____ DATE:_____

TITLE:_____

PART 2 - MATERIALS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 26 05 02

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This Section describes specific requirements, products, and methods of execution which are typical throughout the Electrical Work of this Project. Additional requirements for the specific systems will be found in the Division specifying those systems.

1.2 RELATED REQUIREMENTS

A. Section 26 05 01 - Common Works Results – Electrical.

B. All other Division 01, 02, 25, 26 and 40 Specifications.

1.3 COORDINATION

A. Layout all the work in advance and avoid conflict with other Work in progress. Physical dimensions shall be determined from Civil and Structural plans. Verify locations for junction boxes, disconnect switches, stub-ups, etc., for connection to equipment furnished by others, or in other Divisions of this Work.

1.4 SERVICEABILITY OF PRODUCTS

A. Furnish all products to provide the proper orientation of serviceable components to access space provided.

B. Coordinate installation of all products to allow proper service areas for any items requiring periodic maintenance inspection or replacement.

C. Replace or relocate all products incorrectly ordered or installed.

1.5 ACCESSIBILITY OF PRODUCTS

A. Arrange all work to provide access to all serviceable and/or operable products. Layout work to optimize net usable access space within confines of space available. Advise the Engineer, in a timely manner, of areas where proper access or required clearspace cannot be maintained. Furnish Layout Drawings to verify this claim, if requested.

B. Provide access doors in ceilings, walls, floors, etc., for access to j-boxes, automatic devices, and all serviceable or operable equipment in concealed spaces.

PART 2 - PRODUCTS

2.1 PRODUCTS FURNISHED IN DIVISION 26

A. All products furnished and installed in permanent construction shall be new, full-weight, standard in every way, and in first class condition.

B. All equipment furnished by the CONTRACTOR shall be listed by and shall bear the label of Underwriters' Laboratories, Incorporated, (UL) or of an independent testing laboratory acceptable to the local Code enforcement agency having jurisdiction.

C. Products shall be identical with apparatus or equipment which has been in successful operation for at least two (2) years. All products of similar class or service shall be of one manufacturer.

D. Capacities, sizes, and dimensions given are minimum unless otherwise indicated. All systems and products proposed for use on this project shall be subject to review for adequacy and compliance with Contract Documents.

2.2 PRODUCTS FURNISHED IN OTHER DIVISIONS

A. Controls, including conduit, wiring, and control devices required for the operation of systems furnished in other Divisions shall be installed in accordance with Division 26 Specifications.

B. All equipment furnished by the CONTRACTOR shall be listed by and shall bear the label of Underwriters' Laboratories, Incorporated, (UL) or of an independent testing laboratory acceptable to the local Code enforcement agency having jurisdiction.

C. All work on the project that falls under the jurisdiction of the electrical trade shall be performed by Licensed Electricians in possession of Alaska State Fitness Cards in conformance with the Electrical Specifications.

D. Provide complete power connections to equipment including but not limited to feeders, connections, disconnects, and motor running overcurrent protection. Where starters are provided as part of a packaged product, overcurrent heaters shall be provided.

2.3 IDENTIFICATION

A. Equipment Labels and Nameplates:

1. Provide rigid engraved labels and nameplates of laminated plastic 1/16-inch thick with white letters on a black or gray background. Label for emergency equipment shall be red with white letters.

2. Securely attach labels with two screws, minimum, per label. Where rating of panel may be affected, use epoxy.

3. Temporary markings not permitted on equipment. Repaint trims, housings, etc., where markings cannot be readily removed. Refinish defaced surfaces.

4. No labeling abbreviations will be permitted without prior approval.

5. Label and Nameplate Locations:

a. Provide 1/2-inch minimum height letters on following equipment:

(1) Service disconnects (red background).

(2) Secondary feeder breakers in distribution equipment. Designation as required by load served.

(3) Special equipment housed in cabinets, as designated on plans, on outside of door.

b. Provide 1/4-inch minimum height letters on:

(1) Disconnects and starters for motors or fixed appliances - (include item designation and branch feeder circuit number); and

Designated electrical equipment.

B. Branch Circuit Panelboard Schedules: Provide neatly typed schedule (odd numbered circuits on left side or top, even on right side or bottom) under plastic jacket or protective cover to protect the schedule from damage or dirt. Securely mount on inside face of panelboard door. Define briefly, but accurately, nature of connected load (i.e., Lighting, interior; receptacles, work bench; etc.) as approved.

C. Empty Conduits: Provide tags with typed description of purpose, and location of opposite end, wired to each end of conduits provided for future equipment.

1. Conduits: Mark all conduits entering or leaving panels with indelible black magic marker with the circuit numbers of the circuits contained inside.

2. Junction Boxes: Mark the circuit numbers of wiring on all junction boxes with steel covers. Mark with indelible black marker.

D. Conductors:

1. Branch circuit conductors shall be color coded as indicated in Section 26 05 21, Wire and Cable.

2. Control and alarm circuit conductors

a. Field conductors shall be identified by destination panel and terminal block designations.

b. Internal (Control Panel) numbering system shall be provided by the CONTRACTOR. The numbering system shall assign each logical conductor set a unique identification number that will be reflected on the as-built drawings.

PART 3 - EXECUTION

3.1 STORAGE AND HANDLING

A. All items shall be delivered and stored in original containers, which shall indicate manufacturer's name, the brand, and the identifying number.

1. Items subject to moisture and/or thermal damage shall be stored in a dry, heated place.

2. All items shall be covered and protected against dirt, water, chemical and/or mechanical damage.

3.2 PROTECTION OF PRODUCTS

A. The CONTRACTOR shall be held responsible for products to be installed under this Contract.

1. The CONTRACTOR will be required to make good, at his own cost, any injury or damage which said products may sustain before Final Acceptance.

3.3 INSTALLATION

A. All products shall be installed by skilled craftsmen. The norms for execution of the work shall be in conformity with NEC Chapter 3 and the NECA "Standards of Installation," which herewith is made part of these Specifications.

1. WORKING SPACE AND REQUIRED CLEARANCES ABOUT ELECTRIC EQUIPMENT (600 VOLTS, NOMINAL, OR LESS): Sufficient access and working space shall be provided and maintained about all electric equipment to permit ready and safe operation and maintenance of such equipment.

2. WORKING CLEARANCES: Except as elsewhere required or permitted in the NEC, the dimension of the working space in the direction of access to live parts operating at 600 volts, nominal, or less and likely to require examination, adjustment, servicing, or maintenance while energized shall not be less than indicated in NEC. Distances shall be measured from the live parts if such are enclosed. Concrete, brick, or tile walls shall be considered as grounded.

a. In addition to the dimensions shown in the table, the working space shall not be less than 30 inches wide in front of the electric equipment.

b. CLEAR SPACES: Working space required by this section shall not be used for storage. When normally enclosed live parts are exposed for inspection or servicing, the working space, if in a passageway or general open space, shall be suitably guarded.

c. Where clear space has been penetrated by ground level piping. Platforms providing the required footprint (30X36 minimum) shall be provided at no additional cost to the Authority.

d. Repair all surfaces and furnish all required products and labor to maintain fire-proof, air-tight and water- proof characteristics of the construction.

B. Installation of all equipment shall be in accordance with manufacturer's instructions.

3.4 SUPPORT SYSTEMS

A. All materials used shall be hot dipped galvanized. Where support elements are field cut, exposed metal shall be coated with spray-on galvanizing.

1. Support from structure only.

2. Conduits shown to be run at grade shall be supported every 10 feet by wood sleepers as shown on the drawings. Conduits may share fuel piping sleepers if installed such that neither system will require removal during maintenance or replacement.

3.5 MOUNTING HEIGHTS

A. Mounting heights shall be above finished floor (AFF) or above finished grade as noted below, unless otherwise shown or indicated.

1. Lighting Switches, 46 inches to center.

2. Receptacles shall be mounted not less than 36” above the platform walkways.

3. Other mounting heights are indicated on the Drawings by detail. Specific dimensions AFF are shown adjacent to the symbol.

3.6 CUTTING AND PATCHING

A. Obtain written permission from the Engineer before cutting or piercing structural members.

1. Sleeves through floors and walls to be galvanized iron pipe, flush with walls, ceilings or finished floors, sized to accommodate the raceway. Interstitial space around conduit passing through sleeves shall be filled with non-hardening duct sealant.

3.7 PROTECTIVE FINISHES

A. Take care not to scratch or deface factory finish on electrical apparatus and devices. Repaint all marred or scratched surfaces.

1. Provide hot dip galvanized components for ferrous materials exposed to the weather.

3.8 CLEAN-UP AND COMMISSIONING

A. Throughout the Work, the CONTRACTOR shall keep the work area reasonably neat and orderly by periodic clean-ups.

1. As independent parts of the installation are completed, they may be commissioned and utilized during construction.

3.9 WARRANTY

A. Unless otherwise specified, the Warranty starts on the date Written Notice is given that the project is complete and all required corrections have been made. Warranty shall certify that all defects in products or workmanship shall be promptly repaired or replaced by the CONTRACTOR, to the satisfaction of the Authority, for a period of one year, except when, in the opinion of the Engineer such failure is due to neglect or carelessness by others.

3.10 OPERATIONAL INSTRUCTIONS

A. The CONTRACTOR shall instruct the Authority in the operation of the products shown and/or specified. Allow one (1) day on-site in base bid for Division 26.

END OF SECTION

SECTION 26 05 21

WIRE AND CABLES

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section describes specific requirements, products, and methods of execution relating to wire and cable, 600 volts or less, approved for use on this project.

1.2 RELATED REQUIREMENTS

A. Section 26 05 01 - Common Works Results – Electrical.

B. Section 26 05 02 - Basic Materials and Methods.

1.3 QUALITY ASSURANCE

A. All conductors shall be sized according to American Wire Gauge (AWG). Stranding, insulation, rating, and geometrical dimensions shall conform to Underwriters Laboratory Specifications.

B. All conductors shall be copper.

PART 2 - PRODUCTS

2.1 SERVICE RISER CABLE

A. Insulation shall be 600 volt Type XHHW-2.

2.2 FEEDER AND BRANCH CIRCUIT WIRING

A. Insulation shall be 600 volt type XHHW-2. Wiring in fixture channels shall be rated 90 degrees C. or over, 600 volt. Do not install thermoplastic insulated conductors when the temperature is below 0 degrees F.

2.3 FLEXIBLE CORD

A. All flexible cord shall be type SOW-A or for larger size cable, type G.

2.4 MISCELLANEOUS

A. Miscellaneous wire and cable for special purpose applications and not covered in the categories as indicated above, shall be as shown on the Plans and/or required by the intended use.

2.5 MINIMUM SIZE

A. Unless specified otherwise, minimum wire sizes shall be as follows:

1. All 120 volt homeruns over 75 feet; No. 10 AWG.

2. Branch circuit wiring; No. 12 AWG.

3. Low voltage switching circuits if a part of an approved cable assembly; No. 20 AWG (No. 14 AWG otherwise).

4. Cable or conductors for other special systems shall be as described in other sections of the specifications, noted on the Plans, or recommended by the equipment manufacturer.

2.6 MISCELLANEOUS CONDUCTORS AND ACCESSORIES

A. Control panel wiring 120V shall be Class C stranded copper conductor with Type MTW insulation. Minimum conductor size shall be No. 14 AWG or 16 AWG for control applications.

B. Multi-conductor control cables shall be XHHW insulated, Class B stranded conductors in overall PVC jacket. Color coding shall be per IPCEA Method No. 1.

C. Cords shall be stranded copper conductor Type SOW-A with green insulated grounding conductor.

D. Connectors for splicing copper conductors shall be; "Scotchlok" insulated spring connectors for No. 18 through No. 6 AWG solid conductors; insulated, solid-barrel, crimp type plated copper alloy connectors for No. 18 through No. 6 AWG stranded conductors; plated copper alloy compression splicing sleeves installed by high-pressure compression tools for No. 4 and larger size stranded conductors.

E. Insulating materials for splices shall be "Scotchfill" or equal for filling bolted or irregular areas before taping with Scotch No. 88, 33 plus or equal 7 mil vinyl plastic tape.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Conduit shall be completely installed, free from obstructions, and clean before installing conductors. Provide conductors from device to device and splice only at the device or junction boxes. Install all conductors in a single raceway at one time and leave sufficient cable at all fittings or boxes. Keep minimum bending radii. Lubricants for wire pulling, if used, shall conform to UL requirements for the insulation and raceway material.

3.2 CONDUCTOR SUPPORT

A. Provide conductor supports as recommended by the NEC or cable manufacturer in vertical conduits.

3.3 SPLICING

A. CONTRACTOR shall not make any conductor slices unless given written permission from the Engineer. If a splice is approved, no splicing or joints will be permitted in either feeder or branch circuits except at device or accessible junction boxes. Utilize compression type solderless connectors when making splices or taps in conductors No. 8 AWG or larger. Utilize pre-insulated connectors, 3M Company "Scotchlok" or Ideal Industries, Inc. "Super Nut" for splices and taps in conductors No. 10 AWG and smaller. Tape all splices and joints with Scotch No. 88 plastic tape to secure insulation strength equal to that of the conductors joined. Keep splices in underground junction boxes, handholes, and manholes to an absolute minimum. Where splices are necessary, use resin splicing kits manufactured by the 3M Company, St. Paul, Minnesota to totally encapsulate the splice.

3.4 CONDUCTOR TERMINATION

A. Stranded Conductors: Provide all power, control, communication and alarm conductors that terminate on equipment or terminal strips with compression type solderless lugs. T and B "Sta-Kon" terminals, or approved equal.

3.5 CONDUCTOR PHASE COLOR CODING

A. All service, feeder, and branch circuit conductors throughout the project's secondary electrical system shall be color coded as follows:

Phase	120/240VAC
L1	Black
L2	Red
Neutral	White
Ground	Green/Bare

B. Where color code conductors are not commercially available, colored non-aging plastic tape may be utilized when permitted by code.

END OF SECTION

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SECTION 26 05 26

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section describes general requirements, products, and methods of execution relating to the furnishing and installation of a grounding system complete as required for this project.

1.2 RELATED REQUIREMENTS

A. Section 26 05 01 - Common Works Results – Electrical.

B. Section 26 05 02 - Basic Materials and Methods.

1.3 MINIMUM REQUIREMENTS

A. The minimum requirement for the system shall conform to Article 250 of the NEC.

B. Unless specified elsewhere, the ohmic values for grounds and grounding systems shall be as follows.

1. For grounding metal enclosures and frames for electrical and electrically operated equipment: 5 ohms maximum.

2. For grounding systems to which electrical utilization equipment and appliances are connected: 5 ohms maximum.

3. For grounding secondary distribution systems, neutrals, noncurrent carrying metal parts associated with distribution systems, and enclosures of electrical equipment not normally within reach of other than authorized and qualified electrical operating and maintenance personnel: 10 ohms maximum.

4. For individual transformer and lightning arrester grounds on distribution systems: 10 ohms maximum.

5. For equipment not covered in the above: 10 ohms maximum

PART 2 - PRODUCTS

2.1 GROUND RODS, CONDUCTORS AND APPURTENANCES

A. All ground rods and conductors for ground systems shall be as follows:

1. Ground rods to be 3/4-inch by 10-foot copper clad steel.

2. Grounding conductor for building service ground shall be bare copper. Size shall be as noted on the drawings.

3. Ground ring shall be #2 AWG bare copper.

4. Tank, platform and structure grounding shall be as noted on the drawings. If not shown, #6 AWG copper is the minimum size. Bond in accordance with manufacturer's requirements.

2.2 CONNECTIONS

A. Joints in grounding conductors and mats below grade shall be made with exothermic welds. Terminations above grade shall be made with exothermic welds, except where noted.

PART 3 - EXECUTION

3.1 SERVICE AND STRUCTURE GROUND

A. Provide Service Ground.

B. Create a Grounding Electrode System (GES) for this project by connecting the following:

1. The service system's grounded neutral conductor.

2. All connections shown on the Grounding Plan drawings and connections in accordance with NEC.

3. The service entrance board and/or main disconnect ground bus and all conduits entering and leaving the board/disconnect.

4. Other items or equipment called for on the Plans.

5. Current carrying capacity of the grounding and bonding conductors shall be in conformity with Table 250.66 of the NEC.

C. All structure and tank bonding shall be in accordance with manufacturer's recommended practice.

3.2 EQUIPMENT GROUND

A. The raceway system shall be bonded in conformity with NEC requirements to provide a continuous ground path. Provide an additional grounding conductor sized in conformance with Table 250.122 of the NEC in all raceways.

B. Provide separate grounding conductor securely bonded and effectively grounded to both ends of all non- metallic raceways and all flexible conduit.

C. Each fuel tank shall be bonded to the ground at two separate locations.

D. If non-metallic enclosures are provided, all metal conduits terminating or entering the enclosure shall be bonded together with approved bonding bushings and #6 AWG copper cable.

E. Fences shall be bonded to the equipment ground.

3.3 SUBMITTAL DATA

A. Provide typewritten report on the ground test for each ground system installed under this contract.

END OF SECTION

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SECTION 26 05 29

HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Support and align raceways, cabinets, boxes, fixtures, etc., in an approved manner and as specified.

1.2 RELATED REQUIREMENTS

A. Section 26 05 32 - Outlet Boxes, Conduit Boxes, and Fittings.

B. Section 26 05 34 – Conduit and Fittings.

C. Section 26 50 00 – Lighting Fixtures.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Support raceways on approved types of wall brackets, ceiling trapeze hangers, or malleable iron straps.

1. "Kindorf", "Unistrut", or equal.

2. Plumbers perforated strap not permitted as means of support.

3. Support used for exterior equipment shall be galvanized or Stainless steel.

B. Earthquake anchorages:

1. Anchor equipment weighing more than 100 pounds to the building structure to resist lateral earthquake forces.

2. Total lateral (earthquake) force shall be 1.00 times the equipment weight acting laterally in any direction through the equipment center of gravity. Provide adequate backing at structural attachment points to accept the forces involved.

3. Provide equipment supported by flexible isolation mounts with earthquake restraining supports positioned as close to equipment as possible without contact in normal operation (earthquake bumpers). The maximum lateral displacement due to the computed earthquake force from above shall not exceed 1.5 inches. Floor mounted equipment weighing less than 2000 pounds may have one 6-inch by 6-inch by 3/8-inch by 18-inch steel angle bolted to the floor with four 5/8-inch diameter bolts placed on each of four sides of the equipment.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Conduits and equipment shall be mounted using strut or similar supports unless otherwise noted.

B. Do not strap conduits to fuel piping. When run in parallel with exposed fuel piping maintain adequate separation to allow maintenance to take place on either piping or conduit system so that the other does not have to be removed when maintenance is required.

C. Where conduits are buried (parallel) with fuel piping maintain a minimum 1-foot separation.

END OF SECTION

SECTION 26 05 31

JUNCTION, PULL BOXES, AND CABINETS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section describes general provisions, products and methods of execution relating to pull and junction boxes approved for use on this project. Furnish all such boxes, whether shown or not, in order to conform to requirements for maximum pulling length and maximum number of bends allowed.

1.2 RELATED REQUIREMENTS

A. Section 26 05 01 - Common Works Results – Electrical

B. Section 26 05 02 - Basic Materials and Methods

C. Section 26 05 32 - Outlet Boxes, Conduit Boxes, and Fittings

1.3 QUALITY ASSURANCE

A. Pull and junction boxes 150 cubic inches and smaller shall conform to Section 26 05 32.

B. Pull and junction boxes larger than 150 cubic inches shall conform to Underwriters Laboratory (UL) standard 50-1970, Cabinets and Boxes. The UL label shall constitute proof of acceptable quality.

PART 2 - PRODUCTS

2.1 PULL AND JUNCTION BOXES

A. Pull and junction boxes shall conform to Article 370 of the NEC and the following requirements:

1. Sheet metal boxes shall be approved for use in all dry, interior, non-hazardous locations.

2. Boxes exposed to rain or installed in wet locations shall be NEMA 4X or as noted.

3. Boxes installed underground shall be either precast concrete or cast iron.

4. Special boxes, as noted on the Plans, shall be installed in areas of specific service and/or hazards.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All boxes shall be installed so that covers are readily accessible and adequate working clearance is maintained after completion of the installation.

END OF SECTION

SECTION 26 05 32

OUTLET BOXES, CONDUIT BOXES, AND FITTINGS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section describes general requirements, products and methods of execution relating to outlet boxes for use with wiring devices and lighting fixture outlets approved for use on this project. All boxes shall be sized per NEC - Article 370.

1.2 RELATED REQUIREMENTS

A. Section 26 05 01 - Common Works Results – Electrical

B. Section 26 05 02 - Basic Materials and Methods

1.3 QUALITY ASSURANCE

A. UL approval for intended usage shall constitute proof of acceptable quality.

PART 2 - PRODUCTS

2.1 CAST BOXES

A. Device boxes shall be Type FS or FSD as required.

B. Boxes shall be equipped with mounting lugs, threaded hubs and gasketed covers and used in the following locations:

1. All exterior locations;

2. All wet or damp locations;

3. Where exposed to mechanical damage;

4. All exposed interior locations below 48 inches above floor;

5. Where shown on Plans.

2.2 EXPLOSION-PROOF BOXES

A. Boxes used in hazardous locations shall be listed and labeled for the Class, Division, and Group rating of the location in which they are to be used.

B. Explosion-proof boxes shall be used to house control stations, switches, any arc producing device, and terminal for splicing in hazardous locations. The boxes shall be made from copper-free aluminum with stainless steel hardware, have a hinged cover, and use O-ring gaskets for watertight integrity. The boxes shall be factory painted with epoxy gray paint. Boxes 12” x 12” and larger shall have (1)

2” hole and (2) 1.5” holes, and (2) 1” holes drilled, tapped, and plugged on the bottom of the box. The boxes shall be **Appleton Electric AJBEW**, or equal.

2.3 GALVANIZED PRESSED STEEL BOXES

A. May be used wherever they are permitted by code, except in areas indicated in Paragraph 2.1 above.

2.4 GROUNDING SCREW

A. All pressed steel boxes shall have a drilled and tapped hole in the back of the box for a grounding screw.

2.5 ACCESSORIES

A. Box covers, extension rings, bases, hanger bars, etc., for use in connection with the installation, shall be approved for use in the various applications.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Outlet Boxes shall be securely fastened in position and supported independently of the conduit system.

B. Boxes shall be installed true to the building lines and at equal heights in conformity with mounting heights specified elsewhere in other sections of the specifications.

C. Provide the best suitable box for each outlet requirement.

D. Boxes shall have only the holes necessary to accommodate the conduits at point of installation. All boxes shall have lugs or ears to secure covers.

E. All boxes shall be accessible.

END OF SECTION

SECTION 26 05 34

CONDUIT AND FITTINGS

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. This section describes specific requirements, products, and methods of execution relating to conduit and conduit fittings approved for use on this project. Type, size, and installation methods shall be as shown on the Plans, required by Code and specified in these specifications.

1.2 RELATED REQUIREMENTS

A. Section 26 05 01 - Common Works Results – Electrical

B. Section 26 05 02 - Basic Materials and Methods

C. Section 26 05 26 – Grounding and Bonding

1.3 QUALITY ASSURANCE

A. Conduit and conduit fittings shall be standard types and sizes as manufactured by a nationally recognized manufacturer of this type of materials and be in conformity with applicable standards and UL listings.

1.4 SUBMITTALS

A. Shop Drawings and Product Data: Submit shop drawings and product data for the products of this section in compliance with Section 26 05 01.

PART 2 – PRODUCTS

2.1 GALVANIZED RIGID CONDUIT (GRC)

A. Galvanized rigid conduit shall be mild steel with continuous welded seam, hot-dip galvanized complying with ANSI C80.1 and shall be UL listed.

B. Elbows, bends, and fittings shall be made of full weight materials complying with the above and shall be coated and threaded the same as conduit.

C. Threads for conduit shall be tapered and clean cut. All threads shall be hot dip galvanized after cutting.

D. Conduit shall be 1/2-inch trade size or larger and shall be manufactured by Allied Tube and Conduit Corp., Triangle PWC, Inc., or approved equal.

2.2 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Liquidtight flexible conduit shall be manufactured from galvanized steel strip, sealed with a polyvinyl outer jacket and shall be UL listed.

B. Fittings shall be designed for use with liquidtight flexible conduit and shall maintain electrical continuity throughout fittings and conduit.

C. Liquidtight flexible metal conduit shall be 1/2-inch trade size or larger and shall be manufactured by O-Z/Gedney Co., Southwire Co., or approved equal.

2.3 EXPLOSION – PROOF FLEXIBLE COUPLINGS

A. Flexible couplings for use in connection to motors and other equipment subject to movement or vibration in hazardous locations shall be listed and labeled for the Class, Division, and Group rating of the location they are to be installed in.

2.4 ELECTRICAL METALLIC TUBING (EMT)

A. Electrical metallic tubing shall be mild steel, hot-dip galvanized tubing complying with ANSI C80.3 and Fed.Spec. WWC-563 and shall be UL listed.

B. Elbows, bends, and fittings shall be made from full weight materials complying with the above and shall be coated the same as electrical metallic tubing.

C. EMT connectors and couplings shall be compression type with insulated throat. Set screw type not allowed. Fittings shall comply with UL514B.

D. EMT conduit may be used in dry interior, non-hazardous locations only.

E. Electrical metallic tubing shall be 1/2-inch trade size or larger and shall be manufactured by Allied Tube and Conduit Corp., Triangle PWC, Inc., or approved equal.

2.5 FITTINGS

A. Expansion fittings shall be O.Z. type AX, EX, EXDS, TX, or EXE; Crouse Hinds type XJ; or approved equal.

B. Fittings utilized with rigid steel shall be galvanized steel. Conduit bushings shall be of the insulated type. Where grounding bushings are required, insulated grounding bushings with pressure type lugs shall be provided. Lock rings shall be of the sealing gland type. Provide conduit bushings on all penetrations without hubs.

C. Fittings for liquid-tight flexible conduit shall be steel or malleable iron, of a type incorporating a threaded grounding cone, nylon or plastic compression ring, and a tightening gland, providing a low resistance ground connection. All throats shall be insulated.

D. Seal-Off fittings shall be listed for the Class and Division required (or greater). Provide fittings that do not require de-rating conduit fill capacities or adjust conduit size to accommodate fitting limitations. Complete sealing after final acceptance is complete and all wiring has been verified.

E. Fittings used in Hazardous locations shall be approved for use if approval is required.

2.6 EXPLOSION-PROOF CONDUIT FITTINGS AND UNIONS

A. Explosion-proof conduit fittings and unions shall be made from zinc electroplated malleable iron. Fittings shall include gasketed water-tight connections, be UL-listed for use in Class I, Division 1 areas. Fittings shall be **Appleton Electric**, or equal.

PART 3 – EXECUTION

3.1 CONDUIT USAGE

A. Galvanized rigid conduit shall be used for all wiring in classified areas and general wiring, except as otherwise specified herein or indicated on the Plans.

B. Rigid conduit shall be used for underground, in slab or direct burial installations.

C. Liquidtight flexible steel conduit shall be used in lengths 18 to 24 inches for connections to motors or equipment subject to vibration. Longer lengths may be used for equipment connection if grounding conductor is installed through conduit. Flex conduit may be used in Class I, Division 2 locations with approved fittings.

D. EMT conduit may be used in dry, interior locations only.

3.2 CONDUIT INSTALLATION, GENERAL

A. Install conduit exposed.

B. Conduit field joints shall be cut square and reamed smooth. Threads shall be cleanly cut and joints drawn up tight. After make-up all exposed, non-galvanized surfaces of completed joint shall receive two coats of Zinc rich paint equal to "Zinc it", manufactured by CRC. No running threads will be permitted.

C. Offsets and bends shall be made carefully, without reducing cross sectional area, and shall not be less than the radius of standard elbows.

D. Convenience outlets, switches, and other devices located on walls shall be serviced from above, unless otherwise indicated.

E. Install expansion fittings where conduits cross structural expansion joints.

F. Raceways penetrating vapor barriers or traversing from warm to cold areas shall be sealed (at the penetration point) with a non-hardening duct sealing compound to prevent the accumulation of moisture.

G. All metal conduits shall have insulating bushings and shall have locknuts inside and outside of enclosure box, etc. Conduits smaller than 1-1/4-inch trade size shall be equipped with bushings and shall have locknuts inside and outside of enclosure.

H. All conduit runs shall be grounded in an effective and approved manner at point of origin and shall maintain a continuous ground throughout all runs, cabinets, pull boxes, and fittings from point of service to all outlets.

I. All conduit stubbed up out of floor and termination inside of an enclosure shall have insulating grounding bushings installed.

J. Provide hazardous location raceway seal fittings at the following locations:

1. Within 18” of the boundary between classified and non-classified locations.

2. At all switches devices located in classified locations.

3. As shown on the drawings.

4. As required in strict accordance with the NEC.

K. Conduit, fittings, and boxes required in hazardous classified areas shall be suitably rated for the area and shall be provided in strict accordance with NEC requirements.

L. Conduit Supports:

1. Support conduits by wall brackets, pipe straps and unistrut sections, or trapeze hangers spaced not more than 10 feet on center.

2. Conduits shall be supported from the structural system. Provide additional support as required for junction and pull boxes.

3. Conduit risers along poles 1” and smaller may be secured using 2-hole galvanized straps. Conduits larger than 1” shall be supported using offset brackets and appropriate pipe straps.

4. Where structural supports are not available provide wood block supports as shown on the drawings.

M. All conduit runs shall be completed and cleaned free from foreign matter inside before conductors are drawn in. After installation conduit ends shall be plugged or capped to prevent the entrance of foreign materials.

N. All conduits not used by this Contract shall have a pull wire installed and securely tied off at each end for future conductor installation.

END OF SECTION

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SECTION 26 24 17

PANELBOARDS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The work under this section includes furnishing and installing panelboards and related appurtenances, complete.

1.2 RELATED REQUIRMENTS

A. Section 26 05 01 - Common Works Results – Electrical

B. Section 26 05 02 - Basic Materials and Methods

1.3 QUALITY ASSURANCE

A. Panelboards shall be UL listed and shall comply with the NEC.

1.4 SUBMITTALS

A. Shop Drawings and Product Data: Submit shop drawings and product data for the products of this section in compliance with Section 26 05 01.

B. Operation and Maintenance Manuals: Submit operation and maintenance manuals for the products of this section in compliance with Section 26 05 01.

PART 2 - PRODUCTS

2.1 PANELBOARDS

A. A nameplate shall be provided listing panel type and ratings.

B. Bus bars for the mains shall be of copper, sized in accordance with UL standards. Unless otherwise noted, full size neutral bars shall be included. Bus bar taps for panels with single pole branches shall be arranged for sequence phasing of the branch circuit devices.

C. The short circuit rating of the assembled panelboard shall be as indicated on the Plans and in accordance with UL standards and their test verification.

D. All panelboards shall be fitted with an equipment ground bar.

E. Boxes shall be rated for NEMA 3R environment. Boxes shall be of sufficient size to provide a minimum gutter space of 4 inches on all sides. Lighting panel boxes shall use three-piece construction wrapper sheet for back and two sides with removable top and bottom ends.

F. Hinged doors covering all switching device handles shall be included in all panel trims, except that panelboards having individual metal clad externally operable dead-front units may be supplied without such doors.

G. Doors in panelboard trims shall conform to the following:

1. In making switching device handles accessible, doors shall not uncover any live parts.

2. Doors shall have flush-type cylinder lock and catch. Door hinges shall be concealed. All locks shall be keyed alike. A directory frame and card having a transparent cover shall be furnished on each door. Directory shall be typed, not handwritten.

3. The trims shall be fabricated from code gauge sheet steel.

H. All exterior and interior steel surfaces of the panelboard trims shall be properly cleaned and finished with ANSI-61 paint over a rust-inhibiting phosphatized coating.

I. Circuit breakers shall be rated as specified in Section 26 28 21, Overcurrent Protective Devices.

J. Single pole 15 and 20 ampere circuit breakers shall be UL listed as "Switching Breakers" and carry SWD marking.

2.2 MANUFACTURERS

A. Square D.

B. Cutler Hammer.

C. Substitutions: Approved Equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards as indicated on the Plans. Support wall-mounted Panelboards from the structure with no weight bearing on conduits.

B. Install panelboards so top breaker is not higher than 6 feet above the floor.

C. Distribute and arrange conductors neatly in the wiring gutters. CONTRACTOR shall maintain the largest practical bending radius of conductors.

D. Connect grounding electrode conductor to the equipment grounding terminal bar. Verify that the ground bar is securely bonded to the load center or panelboard cabinet and that it is not connected to the neutral bar except at "service equipment" as permitted in the latest revision of NEC Article 250.

E. Inspect and remove any debris, scrap wire, etc. from the cabinet interior before installing fronts.

END OF SECTION

This page is blank intentionally.

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section describes general provisions, products, and methods of execution relating to line voltage wiring devices approved for use on this project.

1.2 RELATED REQUIREMENTS

A. Section 26 05 01 - Common Works Results – Electrical

B. Section 26 05 02 - Basic Materials and Methods

1.3 QUALITY ASSURANCE

A. Manufacturers mentioned and catalog numbers specified are for establishment of type, configuration, and quality. Other manufacturers and types may be submitted for approval.

PART 2 - PRODUCTS

2.1 SWITCHES

A. Provide wiring devices indicated. Catalog numbers shown are Leviton unless noted otherwise. Equal devices manufactured by Pass and Seymour, Slater, Bryant, Hubbell and G.E. are acceptable. Provide all similar devices of same manufacturer. Provide gray device color.

B. Provide 20 amp, 120/277V rated switches with Underwriters Laboratory approved for tungsten lamp loads or inductive loads without de-rating. Switches shall be as follows:

1. Single Pole: Cat# CSB1-20G.

2. Three-Way: Cat# CSB3-20G.

3. 4-way: Cat# CSB4-20G.

4. Double-pole: Cat# CSB2-20G.

C. Switches requiring ratings and configurations different from those listed above shall be provided as shown on the Plans and/or required by the equipment served.

2.2 RECEPTACLES

A. Provide grounding type receptacles as follows, or as required to match equipment furnished in this or other Divisions.

1. 20A-125V.

2. NEMA 5-20R.

3. Indicator Light.

4. Leviton Cat# 8898-T or 7899-T.

B. Outlets requiring ratings and configurations different from those listed above shall be provided as shown on the Plans and/or required by the equipment served.

2.3 PLATES / COVERS

A. Provide weatherproof cover plates for all surface mounted wiring devices.

B. Install blank covers on all boxes without devices or fixtures.

C. Provide metallic, gasketed, weatherproof, while-in-use covers for all exterior receptacles, Taymac or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install all wiring devices indicated complete with cover plates. Cover plates shall fit snugly on box and line up true with adjacent building lines.

B. All switches shall be installed so their handles move in a vertical plane.

C. Door/gate swings shall be checked and, if necessary, switches shall be relocated to place them on the striker side of the door/gate on single door/gate installations.

END OF SECTION

SECTION 26 28 21

OVERCURRENT PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This Section describes general requirements, products, and methods of execution relating to overcurrent protective devices approved for use on this project. Type, duty rating and characteristics, fault interrupting capability and coordination requirements shall be determined from the Plans and the following specifications.

1.2 RELATED REQUIREMENTS

A. Section 26 05 01 - Common Works Results – Electrical

B. Section 26 05 02 - Basic Materials and Methods

C. Section 26 24 17 - Panelboards

D. Section 26 28 23 – Disconnect Switches – Fused and Non-Fused

1.3 QUALITY ASSURANCE

A. Devices shall be the latest approved design as manufactured by a nationally recognized manufacturer and in conformity with applicable standards and UL listed.

PART 2 - PRODUCTS

2.1 MOLDED CASE CIRCUIT BREAKERS

A. Molded case circuit breakers shall be suitable for individual as well as panelboard mounting. Bolt-on type, unless "plug-on" type specifically allowed.

B. The breakers shall meet NEMA and/or UL specifications as applicable to frame and size, standard rating and interrupting capability.

C. The breakers shall be one-, two-, or three-pole as scheduled, operate manually for normal ON-OFF switching and automatically under overload and short circuit conditions.

D. Operating handle shall open and close all poles simultaneously on a multi-pole breaker. Operating mechanism shall be trip-free so that contacts cannot be held closed against abnormal overcurrent or short circuit condition.

2.2 FUSIBLE SWITCHES

A. Fusible switches shall be designed for individual mounting as specified in Section 26 28 23, Disconnects, or for panelboard mounting.

B. Switches designed for panelboard mounting shall have the same properties as specified for the individually mounted switches.

C. Switches shall conform to NEMA and UL 98 standard.

D. Switches shall be used in conjunction with fuses as specified in the following in order to constitute a complete "Overcurrent Protective Device".

2.3 FUSES

A. Fuses of the sizes and types specified on the Plans shall be installed. Fuses shall be capable of interrupting the prospective symmetrical fault current. Furnish to the Owner one complete set of spare fuses of each rating installed. Provide fuse puller(s) for fuse sizes used.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Size devices as required by the load being served.

END OF SECTION

SECTION 26 28 23

DISCONNECT SWITCHES – FUSED AND NON-FUSED

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This Section describes general requirements, products, and methods of execution relating to fusible and non-fusible disconnecting devices approved for use on this project.

1.2 RELATED REQUIREMENTS

A. Section 26 05 01 - Common Works Results – Electrical.

B. Section 26 05 02 - Basic Materials and Methods.

C. Section 26 28 21 - Overcurrent Protective Devices.

1.3 QUALITY ASSURANCE

A. Devices shall be of the latest approved design as manufactured by a nationally recognized manufacturer and in conformity with UL listings and the governing NEMA standards.

PART 2 - PRODUCTS

2.1 SAFETY SWITCHES

A. Safety switches, fusible and non-fusible shall conform to NEMA Standards KSI-1969 for Type HD (Heavy Duty).

B. Switch Interior: All switches shall have switch blades which are fully visible in the OFF position when the door is open. Switches shall be of dead-front construction with permanently attached arc suppressors. Lugs shall be UL listed for copper and/or aluminum cables and front removable.

C. Switch Mechanism: Switches shall have a quick-made and a quick-break operating handle and mechanism which shall be an integral part of the box, not the cover. Switches shall have a defeatable dual cover interlock to prevent unauthorized opening of the switch door in the ON position or closing of the switch mechanism with the door open. The switch shall be capable of being locked in the OFF position with three padlocks.

D. Enclosures: Switch enclosure shall be suitable for the environment in which the switch is mounted. NEMA 1 enclosure shall be code gauge, UL 98, sheet steel, treated with a rust inhibiting phosphate and finished in gray, baked enamel. NEMA 3R enclosure - same requirements as NEMA 1 except galvanized prior to painting. Special purpose enclosures such as NEMA 4, 5, 7, and 12, shall be cast aluminum or stainless steel.

E. Rating: Ampere, volt and horsepower ratings, as well as number of poles and presence of neutral bar shall be shown on the nameplate.

2.2 CIRCUIT BREAKERS

A. Circuit breakers used as disconnects shall meet requirements specified in Section 26 28 21, Overcurrent Protective Devices. Enclosures for same shall meet the requirements as specified above.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Coordinate all details pertaining to size of equipment, and requirements to enclosures, ratings, etc., so as to provide the most suitable unit for the intended purpose.

B. Provide nameplates for all disconnects. Coordinate names with mechanical equipment lists.

END OF SECTION

SECTION 26 29 10

MOTOR STARTERS TO 600V

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section describes general requirements, products, and methods of execution relating to magnetic motor starters provided in this and other Divisions. Overloads shall be furnished and installed in Division 26.

1.2 RELATED REQUIREMENTS

A. Section 26 05 01 - Common Works Results – Electrical.

B. Section 26 05 02 - Basic Materials and Methods.

1.3 QUALITY ASSURANCE

A. Equipment shall be of the latest approved designs manufactured by a nationally recognized manufacturer and in conformity with the governing NEMA standards.

PART 2 - PRODUCTS

2.1 AC MAGNETIC STARTERS – LINE VOLTAGE TYPE

A. Motor starters shall be across-the-line magnetic type rated in accordance with NEMA or IEC standards, sizes and horsepower ratings.

B. Starters shall be mounted in Local Control Panels or individually in their own NEMA rated enclosures as shown on the Plans.

C. Starters shall be furnished with solid-state, Class 10, adjustable, overload relays in every phase conductor.

D. Starters through NEMA size three shall be equipped with double break silver alloy contacts. All contacts shall be replaceable without removing power wiring or removing starter from panel.

E. Coils shall be of molded construction and shall be 120VAC.

F. Starters shall be suitable for the addition of at least four external electrical interlocks of any arrangement normally open or normally closed.

G. All individually enclosed starters shall have enclosure mounted red running pilot light.

2.2 ACCESSORIES

A. Provide push-buttons, selector switches, pilot lights, elapsed time meters, etc., as indicated on the Plans or as required herein and elsewhere in these specifications. Device shall be standard components normally supplied from the factory with the starters.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Coordinate all details pertaining to the motor control equipment with the Division of these specifications where the equipment is specified.

B. Align starters in control panels to permit logical location of mechanical reset pushbutton.

3.2 CONTROL WIRING

A. Control wiring and control devices shall be provided under the specification section in which the controlled equipment is specified.

3.3 DISCONNECT

A. Provide a disconnect switch for each motor remotely located, adjacent to the motor, unless the motor is in sight of and within 25 feet of its overcurrent device.

3.4 CONNECTIONS

A. Provide liquid-tight flexible conduit connections to motors and other equipment subject to vibration. Minimum length 12 inches.

3.5 NAMEPLATES

A. Provide nameplates for all starters. Coordinate names with mechanical equipment lists.

3.6 OVERLOAD PROTECTION

A. Install overload protection. Verify that protection corresponds to motor full load current and that motors starts and operates properly.

END OF SECTION

SECTION 26 50 00

LIGHTING FIXTURES

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section describes general requirements, products, and methods of execution relating to lighting fixtures approved for use on this project.

1.2 RELATED REQUIREMENTS

A. Section 26 05 01 - Common Works Results – Electrical.

B. Section 26 05 02 - Basic Materials and Methods.

1.3 QUALITY ASSURANCE

A. The fixture shall be a standard cataloged item as described on the Plans and as made by a nationally recognized manufacturer and UL approved.

1.4 SUBMITTALS

A. Submit per Section 26 05 01.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide fixtures in conformance with Fixture Schedule shown on the Plans.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fixture Installation: Install fixtures per plans.

B. Cleaning: After construction of total project is completed, wash dirty luminaires inside and out with a non-abrasive mild soap or cleaner. Clean luminaire plastic lenses with antistatic cleaners only. Touch up all painted surfaces of luminaires with high-grade exterior enamel.

END OF SECTION

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SECTION 31 20 00

EARTH MOVING

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section describes general requirements for all types of earthwork and is applicable to all earthwork required on the Project.

B. IMPORTANT NOTES:

1. The project site is primarily located on the community's old landfill site. The old landfill has been capped with soil material. Contractor shall not excavate any portion of the old landfill. Excavation activities permissible in locations outside the old landfill area.

2. Due to surface water run-off, dewatering of pad area may be required.

1.2 RELATED REQUIREMENTS

A. Section 00 80 00 – Supplementary Conditions

B. Section 02 00 00 – Existing Conditions

C. Section 23 11 13 – Facility Fuel-Oil Piping

D. Section 31 23 19 – Dewatering

E. Section 31 30 00 – Clearing and Grubbing

F. Section 31 32 19 – Geosynthetic Soil Stabilization and Layer Separation

G. Section 32 92 00 – Seeding

H. Section 33 47 13 – Secondary Containment and Fuel Protection Liners

1.3 PROTECTION

A. Protect equipment and vehicular traffic from trenches and excavations by providing adequate barricades and signage.

B. Protect excavation side-slopes or adjacent structures by providing adequate back-slopes, shoring, bracing, or other methods required to prevent failure of the excavations or existing soils.

C. Protect all above and below ground utilities.

D. Notify the Engineer of unexpected sub-surface conditions.

E. Grade top perimeter of the excavation to prevent surface water runoff from entering the excavation.

F. Provide for dewatering of the trench where ground water is encountered.

G. Appropriate Personal Protection Equipment will be used to protect workers from work site hazards.

H. The CONTRACTOR is responsible for meeting the OSHA requirements for worker safety on the work site.

1.4 QUALITY CONTROL ASSURANCE

A. Testing Procedures and Methods:

1. Earthwork Quality Control Assurance testing procedures and methods shall be in accordance with Section 01 45 00 – Quality Control and this Section.

2. Other testing procedures and methods referenced in individual specification sections.

B. Quality Control Monitoring:

1. CONTRACTOR shall secure and pay for all required quality control monitoring. CONTRACTOR shall utilize Engineer approved, certified, independent laboratory and field personnel for all required testing.

2. Provide certified test results as required in Paragraph 1.5 Submittals of this specification.

3. Fill material placed prior to Engineer approval of test results is at the sole risk of the CONTRACTOR. Material not meeting requirements shall be removed and replaced at CONTRACTOR's expense.

C. Minimum testing requirements are indicated in Section 01 45 00.

1.5 SUBMITTALS

A. Submittals shall be made in accordance with the General Conditions, Division 1, and this Section.

B. Test Reports

1. Field Density Tests: Submit density test reports within 24 hours of field testing.

2. Laboratory Tests: Submit laboratory test reports prior to use of materials.

3. Qualifications: Submit qualification of commercial testing laboratory or Contractor's Testing facilities prior to construction.

C. Provide the following submittals:

1. Name of proposed independent certified testing laboratory and field testing subconsultant.

2. Format of proposed laboratory and field test forms.

3. Laboratory results of gradation and moisture density tests for each fill type to be used on the Project.

4. If the CONTRACTOR changes the source and/or stockpile from which materials are obtained, Gradation Analysis and Moisture-Density test reports for these new sources shall be submitted to the Engineer.

5. Catalog and manufacturer's data sheets for proposed compaction equipment.

6. Disposal plan for unusable excavation.

D. Additional Testing:

1. All testing necessary for the CONTRACTOR to locate acceptable sources material for the Project shall be provided by the CONTRACTOR at no additional cost to the Authority.

2. During construction, the Authority may elect to have further gradation and compaction testing completed on the materials being furnished by the CONTRACTOR. This testing shall be at the expense of the Authority. The CONTRACTOR shall provide material samples as may be necessary to complete this testing and these material samples shall be furnished from material available on the Project site or from the CONTRACTOR's source and/or supplier.

1.6 SUBSURFACE CONDITIONS

A. For subsurface conditions see Section 02 00 00 – Existing Conditions.

1.7 MATERIAL SOURCES

A. When the quantity of usable excavation required for the work exceeds that available from excavated materials, the additional material shall be from CONTRACTOR-furnished borrow areas (material sources). The CONTRACTOR shall locate, obtain, develop, and process satisfactory material to complete the requirements of work.

B. The CONTRACTOR shall coordinate as necessary with the materials site property owners, shall acquire all necessary permits and/or material sales agreements, and shall pay required fees, royalties, and other costs associated with pit access and material extraction.

C. The CONTRACTOR shall be responsible for all costs associated with locating, procuring, transporting, testing, storing, placing, and compacting fill material. The Authority is not responsible for fill lost during transportation.

1.8 CLASSIFICATION OF EXCAVATION

A. General. Excavation specified shall be done on a classified basis, in accordance with the following designations and classifications:

1. **Unsatisfactory Material.** Material that does not meet the testing requirement for satisfactory material. Material containing vegetable or organic matter, such as muck, peat, organic silt, or sod is considered unsatisfactory for use in embankment construction.

2. **Satisfactory Material.** Satisfactory material may be obtained from classified Usable Excavation or borrow. The Engineer will approve material as “satisfactory” for use in embankment when the material meets the following criteria:

   a. Sand, rock, gravel, silt, and other inorganic material;

   b. Gradation of 100% by weight passing 6 inch screen; and

   c. Comprise any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, SW, SP, SM, SW-SM, SP-SM, SP-SC, ML. ML materials shall not be used under roads or driveways.

   d. The Engineer may, in their discretion, approve oversize material as “satisfactory” for use in embankment when the material is well graded with an even distribution of rock sizes, and can be compacted with a minimal amount of voids.

3. **Usable Excavation.** Usable excavation shall include the excavation of satisfactory materials re-used on the site in fills or backfills.

4. **Unusable Excavation.** Unusable excavation shall include the excavation and disposal of all materials not re-used on the site, including surplus usable excavation and unsatisfactory materials. Materials that do not comply with the requirements for usable excavation materials are unusable excavation materials. Unusable excavation materials also include man-made fills; trash; refuse; backfills from previous construction; and material classified as unsatisfactory which contains root and other organic matter or frozen material. The Authority’s Representative shall be notified of any contaminated materials. Material that is contaminated by hazardous substances, including fuel or oil, in greater quantity than state and federal standards may be considered unsatisfactory and unsuitable for use.

PART 2 - PRODUCTS

2.1 EXCAVATION

A. Complete all excavation regardless of the type, nature, or condition of the materials encountered as shown on the drawings and/or at the Engineer's direction.

B. Satisfactory materials excavated from the project area shall be considered Usable Excavation.

C. Unsatisfactory materials excavated from the project area shall be considered Unusable Excavation.

2.2 FILL MATERIAL

A. Fill Material shall meet the requirements for material types listed below.

1. Structural Fill:

a. Structural Fill shall consist of reasonably well graded aggregate containing no muck, frozen material, roots, sod, or other deleterious matter and with a plasticity index not greater than 6 as determined by ATM 204 and ATM 205.

b. Structural fill material shall conform to the following gradation as determined by ATM 304:

U.S. Standard	Percent Passing,
Sieve Size	by Weight
3 inch	100
2 inch	75-100
No. 4	15-70
No. 200	0-6

2. Crushed Aggregate Surface Course (CASC):

a. Crushed Aggregate Surface Course shall consist of crushed stone or crushed gravel, consisting of sound, tough, durable pebbles or rock fragments of uniform quality. Free from clay balls, vegetable matter, or other deleterious matters.

b. Crushed Aggregate Surface Course shall conform to the following gradation as determined by ATM 304:

U.S. Standard Sieve Size	Percent Passing, by Weight
1 inch	100
3/4 inch	70-100
3/8 inch	50-85
No. 4	35-65
No. 8	20-50
No. 50	15-30
No. 200	8-15

3. Erosion Control Aggregate:

   a. Erosion Control Aggregate shall consist of reasonably well graded aggregate containing no muck, frozen material, roots, sod, or other deleterious matter.

   b. Erosion Control Aggregate shall conform to the following gradation as determined by ATM 304:

U.S. Standard Sieve Size	Percent Passing, by Weight
8 inch	100
6 inch	50-80
4 inch	25-50
3 inch	0-25
2 inch	0-10
No. 200	0-1

B. Drain Rock:

1. Drain Rock Material shall consist of clean, uniform, gravel.

2. Drain Rock material shall conform to the following gradation as determined by ATM 304:

U.S. Standard Sieve Size	Percent Passing, by Weight
1 inch	100
3/4 inch	90-100
1/2 inch	50-70
3/8 inch	20-50
No. 4	0-10
No. 200	0-1

C. Fill from Usable Excavation:

1. Usable Excavation shall consist of native granular materials that are free of contaminated soils, silts, organics, debris, ice, excess moisture, and other deleterious materials.

D. Bedding Material:

1. Select or process clean fill, backfill, and embankment materials. Do not sure wet, soft, or frozen material, asphalt and concrete chunks, cinders, ashes, refuse, or organic material, boulders, or other deleterious material as backfill.

2. Suitable Materials may be obtained from on-site excavations, may be processed on-site materials, or may be imported.

3. Bedding material shall be free of shale, clay, friable material, and debris; graded in accordance with ASTM C136 or ASTM D422; within the following limits:

U.S. Standard Sieve Size	Percent Passing, by Weight
1/2 inch	100
3/8 inch	80-100
No. 4	20-75
No. 8	12-60
No. 30	2-30
No. 200	0-6

E. Topsoil: Material suitable for topsoil obtained from excavations is defined as: Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than two inches diameter, brush, excessive weeds, toxic substances, and other material detrimental to plant growth. Amend topsoil pH range to obtain a pH of 5.5 to 7.

1. Topsoil shall consist of a natural friable surface soil without admixtures of undesirable subsoil, refuse, or foreign materials and shall be representative of naturally available soils at or near the project site. The material shall be free from roots, clods, hard clay, rocks greater than 2 inches in diameter, noxious weeds, tall grass, brush, sticks, stubble, or other litter, and shall be free draining and non-toxic.

2. Topsoil shall consist of meet the grading requirements specified below:

U.S. Standard Sieve Size	Percent Passing, by Weight
1 inch	100
1/2 inch	-
No. 4	75-100
No. 16	50-95
No. 200	20-80

2.3 LOCATOR/WARNING TAPE

A. Metallic Locator/Warning tape shall be capable of being inductively detected electronically. Materials shall conform to the following:

1. **Film:** Inert plastic. Each film layer shall be not less than 0.0005-inch thick (0.5 mil).

2. **Imprint:** 3/4-inch or larger bold black letters.

3. **Legend:** The buried utility line tape shall be identified with imprint such as “Caution: Fuel Line Below” and the identification repeated on approximately 24-inch intervals.

4. Metallic foil laminated between two layers of impervious plastic film not less than 2 inches wide. The adhesive shall be compatible with the foil and film. Total thickness of tape shall not be less than 0.005 inch (5 mil).

PART 3 - EXECUTION

3.1 GENERAL

A. Safety – The CONTRACTOR shall be solely responsible for making all excavations in a safe manner. Provide appropriate measures to retain excavation sideslopes and prevent sloughing to ensure that persons working in or near the excavation are protected

B. Earthwork safety, excavation slope stability, and dewatering will be the responsibility of the CONTRACTOR.

C. Contact Local utilities to locate all existing underground utilities in the vicinity prior to beginning excavation.

D. Maintain and protect the existing utilities that may pass through the work area.

E. Carefully lay out work to minimize disruption and damage to existing structures.

F. Perform all work in accordance with OSHA requirements. Barricade open excavations to prohibit public entry.

G. Notify Engineer of any discrepancies between Contractual requirements and site conditions prior to start of Work.

H. Maintain subgrade, backfill, and embankment areas or lifts open until testing is complete and testing requirements are met, or approval of testing is secured from the Engineer.

I. Any work covered up prior to test completion and achieving testing requirements or Engineer's approval shall be excavated and reconstructed at CONTRACTOR's expense.

J. Work in inclement weather at CONTRACTOR's risk. Any materials which become unstable as the result of improper moisture content, improper selection of techniques, equipment, or operations during inclement wet weather shall be replaced at CONTRACTOR's expense.

K. Excavations and embankment shall be accomplished in such a manner that drainage is maintained at all times. Any areas not graded to drain shall be kept free of standing water by pumping if necessary.

L. The CONTRACTOR shall provide for the proper maintenance of traffic flow and accessibility as may be necessary, and shall also make adequate provisions for the safety of property and persons.

M. No separate payment for any excavation shall be made. All excavation shall be incidental to the Bid Item being performed.

3.2 GENERAL EXCAVATION

A. The Contractor shall perform excavation of every type of material encountered within the limits of the project to the lines, grades, and elevations indicated and as specified. Satisfactory excavated materials shall be transported to and placed in fill or embankment within the limits of the work. Unsatisfactory materials

encountered within the limits of the work shall be excavated below grade and replaced with satisfactory materials as directed. Such excavated material and the satisfactory material ordered as replacement shall be included in excavation. Surplus satisfactory excavated material not required for fill or embankment shall be disposed of as unusable excavation, unless otherwise indicated on Drawings. Unsatisfactory excavated material shall be disposed of as unusable excavation. During construction, excavation and fill shall be performed in a manner and sequence that will provide proper drainage at all times. Material required for fill or embankment in excess of that produced by excavation within the grading limits shall be obtained from CONTRACTOR-furnished borrow areas.

B. Drainage. Provide for the collection and disposal of surface and subsurface water encountered during construction. Completely drain construction site during periods of construction to keep soil materials sufficiently dry. The CONTRACTOR shall grade the construction area to provide positive surface water runoff away from the construction activity and/or provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide fill from usable excavation. It is the responsibility of the CONTRACTOR to assess the soil and ground water conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed.

C. Dewatering. Dewatering procedures shall be in accordance with Section 31 23 19 – Dewatering.

D. Stockpiles. Stockpiles shall be kept in a neat and well-drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed by rubber-tired equipment. Excavated satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the CONTRACTOR fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources. CONTRACTOR shall provide a dewatering plan and any permits required for dewatering operations.

E. Underground Utilities. Movement of construction machinery and equipment over pipes and utilities during construction shall be at the CONTRACTOR'S risk. Perform work adjacent to non-owner utilities as indicated in accordance with procedures outlined by utility company. Report damage to utility lines or subsurface construction immediately to the Authority’s Representative.

F. Unauthorized Excavation:

1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or neat-line dimensions, including locations on old landfill area, without written approval by the Engineer.

2. Unauthorized excavation, as well as remedial work as directed, shall be at CONTRACTOR's expense.

3. Backfill and compact unauthorized excavations as specified for authorized excavations of same classification.

3.3 SITE PREPARATION

A. The CONTRACTOR shall install Geotextile Fabric in accordance with Section 31 32 19 of the Specifications.

B. The CONTRACTOR shall install fill materials as shown on the drawings, and in accordance with Paragraph 3.6 and to a level, uniform surface before the placement of subsequent layers.

C. The CONTRACTOR shall plow, bench, or break up sloped ground surfaces steeper than 1 vertical to 4 horizontal on which embankment is to be placed in such manner that the fill material will bond with the prepared surface.

D. Frozen Material. Fill shall not be placed on a foundation which contains frozen material, or which has been subjected to freeze-thaw action. This prohibition encompasses all foundation types, including the natural ground, all prepared subgrades (whether in an excavation or on an embankment) and all layers of previously placed and compacted earth fill which become the foundations for successive layers of earth fill. All material that freezes or has been subjected to freeze-thaw action during the construction work, or during periods of temporary shutdowns, such as, but not limited to, nights, holidays, weekends, winter shutdowns, or earthwork operations, shall be removed to a depth that is acceptable to the Authority and replaced with new material. Alternatively, the material will be thawed, dried, reworked, and recompacted to the specified criteria before additional material is placed. The Authority will determine when placement of fill shall cease due to cold weather. The Authority may elect to use average daily air temperatures, and/or physical observation of the soils for his determination. Fill material shall not contain frozen clumps of soil, snow, or ice.

3.4 EMBANKMENT CONSTRUCTION

A. Embankment Fill Placement:

1. The specified material shall be placed at the locations and to the lines and grades indicated on the Contract Drawings. The fill shall be placed and spread uniformly in successive layers not exceeding eight (8) inches in loose thickness. The layers shall be carried up full width from the bottom of the fill. Each layer shall be compacted in accordance with Section 3.6 of this Specification. Grade to provide positive drainage and blend grading into existing surfaces.

2. Blading and compaction shall continue until the surface is smooth, free from waves and irregularities, and conforms to elevations shown on the Contract Drawings. If at any time the material is excessively wet; it shall be scarified by means of blade graders, harrows, or other suitable

equipment and dried until the moisture content is satisfactory. The material shall then be compacted and finished as specified above.

3. Oversized cobbles or boulders with dimensions in excess of 2/3 of the lift thickness and organics, and other deleterious material shall be removed. Portions of any lift in which the fill material becomes segregated shall be removed and replaced with satisfactory material and remixed to secure a homogeneous fill as directed by the Engineer. No separate payment will be made for any material removed or regraded in areas where material becomes segregated.

3.5 MOISTURE CONTROL

A. Provide water for compaction. Water for compaction shall be incidental to the construction.

B. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum content.

1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry density.

3.6 COMPACTION

A. Structural Fill and Crushed Aggregate Surface Course: Deposit materials in layers not exceeding eight (8) inches in thickness before compaction. Compact by routing construction equipment and vibratory rollers uniformly over the entire surface of each layer before the next layer is placed. Keep dumping and rolling areas separate. Compact each lift to a minimum of 95% of the maximum dry density as determined by ATM 207 for AASHTO T 180 or ATM 212.Compactive effort shall be sufficient to maintain the lines and grades shown in the plans for placed fill and allow for positive drainage for the duration of its intended use. Do not cover any lift by another until the required compaction has been completed, and lift has been approved by the Engineer.

B. Drain Rock: Deposit materials in layers not exceeding six (6) inches in thickness before compaction. The Drain Rock material shall be placed and lightly compacted with hand operated compactors. A minimum of three passes with a hand operated compactor over each lift is required. Compactive effort shall be sufficient to maintain the lines and grades shown in the plans for placed fill and allow for positive drainage for the duration of its intended use. Do not cover any lift by another until the required compaction has been completed, and lift has been approved by the Engineer.

C. Correct improperly compacted areas or lifts if soil density tests indicate inadequate compaction.

D. Portions of any lift in which the materials become noticeably segregated shall be removed by the CONTRACTOR and replaced with satisfactory materials, or blended with additional material until segregation is eliminated and re-compacted in accordance with the Contract Documents.

E. If, in the opinion of the Project Manager, based on testing service reports and inspection, subgrade and layers of embankment do not meet the specified compaction requirements, the CONTRACTOR shall perform additional compaction as directed by the Project Manager until specified compaction is obtained, at no additional cost to the Authority.

F. The CONTRACTOR shall be responsible for providing the proper size and type of compaction equipment and for selecting the proper method of operating said equipment to attain the required compaction.

3.7 GRADING

A. Existing ground contours shown on the Contract Drawings are based upon limited information and are approximate.

B. Finished surfaces shall be not more than 0.10 foot above or below the finished grade elevations shown on the Contract Drawings; soft spots or settling areas shall be corrected at CONTRACTOR's expense. Blend finish grades to match adjacent existing roads and parking surfaces where required.

3.8 MAINTENANCE

A. As necessary, CONTRACTOR shall water the site to control dust.

B. CONTRACTOR shall protect newly graded areas from traffic and erosion and keep free of trash and debris.

C. CONTRACTOR shall repair and re-establish grades in settled, eroded, and rutted areas as directed by the Project Manager.

D. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact in accordance with these Specifications prior to further construction.

E. All open excavations shall be adequately signed and barricaded to protect the public.

3.9 EXCAVATION FOR UTILITY TRENCHES

A. General. Excavation shall be performed to the lines and grades indicated. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 2 feet. Excavated material not required or not satisfactory for backfill shall be removed from the site. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating shall be removed to maintain the

stability of the bottom and sides of the excavation. Unauthorized over excavation shall be backfilled in accordance with paragraph UTILITY TRENCH BACKFILLING AND COMPACTION.

B. Trench Excavation Requirements. The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below the top of the pipe shall be made vertical, and of such width as recommended in the manufacturer's installation manual. Where no manufacturer's installation manual is available, trench walls shall be made vertical. Trench walls more than 4 feet high shall be shored, cut back to a stable slope, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Vertical trench walls more than 4 feet high shall be shored. Trench walls which are cut back shall be excavated to at least the angle of repose of the soil. Special attention shall be given to slopes which may be adversely affected by weather or moisture content. The trench width below the top of pipe shall not exceed 30 inches plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter and shall not exceed 42 inches plus pipe outside diameter for sizes larger than 24 inches inside diameter. Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Owner.

1. Bottom Preparation. The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of 2 inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

2. Removal of Unsatisfactory Material. Where unsatisfactory material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph UTILITY TRENCH BACKFILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Owner.

C. Drainage. During construction, excavation and fill shall be performed in a manner and sequence that will provide proper drainage at all times. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. See Section 3.2.B for additional requirements.

D. Dewatering. Dewatering procedures shall be in accordance with Section 31 23 19 – Dewatering.

E. Stockpiles. See Section 3.2.D.

F. Underground Utilities. See Section 3.2.E.

3.10 UTILITY TRENCH BACKFILLING AND COMPACTION

A. General. Backfill material shall consist of satisfactory material, and select granular material, as required. Backfill shall be placed in layers not exceeding 6 inches loose thickness for compaction by hand operated machine compactors, and 8 inches loose thickness for other than hand operated machines, unless otherwise specified. Each layer shall be compacted to the density specified.

B. Trench Backfill. Trenches shall be backfilled to the grade shown. The trench shall be backfilled to a minimum of 3 feet above the top of pipe prior to performing the required pressure tests.

1. Replacement of Unsatisfactory Material. Unsatisfactory material removed from the bottom of the trench or excavation shall be replaced with Satisfactory Material placed in layers not exceeding 8 inches loose thickness.

2. Bedding and Initial Backfill. Bedding and initial backfill shall be material and thickness as shown on the Drawings. Initial backfill material shall be placed and compacted with approved tampers to a height above the pipe as shown on the Drawings. The backfill shall be brought up evenly on both sides of the pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe. Compaction shall be as shown on the Drawings. Install warning tape as shown on the Drawings.

3. Final Backfill. The remainder of the trench shall be filled with material as detailed on the Drawings. Backfill material shall be placed and compacted as follows:

    a. Backfill shall be deposited in layers of a maximum of 12 inch loose thickness, and compacted as detailed on the Drawings. Compaction by water flooding or jetting will not be permitted.

C. Frozen Material. See Section 3.3.D.

3.11 FIELD QUALITY CONTROL

A. CONTRACTOR's quality control shall be performed in accordance with Section 01 45 00.

B. Notify the Engineer at least 24 hours in advance of trench backfilling operations to allow for inspection. Failure to obtain inspection prior to placement of backfill may be cause for rejection of installed buried pipelines and placed fills.

C. The results of each density test shall be recorded on a test sheet. The following information shall be recorded.

1. Horizontal and vertical location.

2. Density and percent of referenced standard compaction.

3. Material description and appropriate compaction control standard

D. The following number of tests, if performed at the appropriate time, will be the minimum acceptable for each item and type of operation:

Item description	Test type	Test standard (select one if given a choice)	Testing frequency
Bedding Material	gradation	WAQTC FOP for AASHTO T 27 and 11	At least 1 and as required by changes in material
	maximum density	WAQTC FOP for AASHTO T 99 and T 180 **OR** ATM 212	At least 1 and as required by changes in material
	field density	WAQTC FOP for AASHTO T 310 **OR** WAQTC FOP for AASHTO T 255 and T 265	1 per lift for each separate trench
Structural Fill and Crushed Aggregate Surface Course	fracture	WAQTC FOP for AASHTO TP 61	1 per source, prior to use
	wear	AASHTO T 96	1 per source, prior to use
	Na_2SO_4 soundness loss	AASHTO T 104	1 per 2,000 tons (1,000 CY)
	degradation	ATM 313	1 per source, prior to use
	liquid limit	WAQTC FOP for AASHTO T 89	1 per 2,000 tons (1,000 CY)
	plasticity index	WAQTC FOP for AASHTO T 90	1 per 2,000 tons (1,000 CY)
	gradation	WAQTC FOP for AASHTO T 27 and T 11	1 per 2,000 tons (1,000 CY)
	maximum density	WAQTC FOP for AASHTO T 99 and T 180 **OR** ASTM 212	At least 2 and as required by changes in material
	field density	WAQTC FOP for AASHTO T 310	1 per lift per 1,000 tons (500 CY) but not less than 2 per lift
Topsoil	Organic Content	Alaska FOP for AASHTO T 267	1 per source
Erosion Control Aggregate	gradation	ATM 304	1 per source
Drain Rock	gradation	ATM 304	1 per source

END OF SECTION

SECTION 31 23 19

DEWATERING

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This Section describes the requirements for dewatering during construction in accordance with the CONTRACTOR's approved Storm Water Pollution Prevention Plan.

1.2 RELATED REQUIREMENTS

A. Section 31 20 00 – Earth Moving.

1.3 SYSTEM DESCRIPTION

A. Dewatering and temporary diversion works shall be designed by and be the sole responsibility of the CONTRACTOR.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 GENERAL

A. Selection of equipment and materials to perform the work is at the option of the CONTRACTOR.

PART 3 - EXECUTION

3.1 GENERAL

A. Comply with the CONTRACTOR's approved Storm Water Pollution Prevention Plan.

B. The construction area shall be maintained in a relatively dry condition during the placement of fill materials. CONTRACTOR shall make his own provisions for diverting surface run off, alleviating ponding water, and dewatering excavation when ground water is encountered. CONTRACTOR shall be responsible for coordinating, acquiring, and paying for all permits required for dewatering operations.

C. Remove ponded water and limit water flowing or infiltrating into the work area to the extent that the quality of work is not compromised.

D. Surface water flows within the work area shall be diverted by constructing temporary ditches, berms, or other means to control and direct the water away from the work. The use of pumping equipment may be required to dewater some areas.

E. Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift, and heave in the excavation and to eliminate interference with orderly progress of construction. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of the in-situ material. While the excavation is open, the water level shall be maintained continuously, at least 2 feet below the working level. Operate dewatering system continuously until construction work below existing water levels is complete.

F. Discharge from dewatering operations shall be returned to natural drainage routes. Settling pits, silt fences, straw dikes, or other appropriate measures shall be taken to prevent highly turbid waters from entering existing ponds, streams, or wetlands.

END OF SECTION

SECTION 31 30 00

CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This item consists of furnishing all labor, equipment, supplies, and material in performance of all operations required for site clearing, grubbing, and clean-up operations.

B. No clearing shall occur between May 5 and July 25.

1.2 RELATED REQUIREMENTS

A. Section 31 20 00 – Earth Moving

B. Section 31 23 19 – Dewatering

1.3 DEFINITIONS

A. Clearing: Includes cutting and grubbing all brush, trees and stumps, including roots, to natural ground. CONTRACTOR is responsible for the removal and proper disposal of cleared brush, trees, and root systems. Clearing also includes the removal of all snow and ice in the project area.

PART 2 – PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 GENERAL

A. CONTRACTOR shall perform all clearing and grubbing operations where designated on the Contract Drawings and as specified herein or as directed by the Project Manager.

1. Locate, identify, and protect utilities from damage.

2. Verify and protect any vegetation to remain.

3.2 PROTECTION

A. Provide protection as necessary to prevent damage to existing improvements and utilities indicated to remain.

1. Protect improvements on adjoining properties and on project site.

2. Protect trees, plant growth, and features designated to remain. Protect survey benchmarks, property corners, survey monuments, and existing work from damage or displacement.

B. All property corners, benchmarks or other permanent survey marker disturbed during construction shall be removed and recorded. The CONTRACTOR shall be responsible for the resurvey and resetting of any disturbed property corners, benchmarks or other permanent survey markers by a professional land surveyor, licensed by the State of Alaska.

3.3 USE AND DISPOSAL OF CLEARED MATERIAL

A. Except as otherwise stated, the CONTRACTOR shall make his/her own arrangements and assume all costs in connection with disposal sites. Disposal sites shall be located and maintained in such a manner as to prevent a public nuisance.

B. If the disposal site is located on private land, the CONTRACTOR shall obtain written permission from the property owner or owners for such disposal sites and shall furnish the Project Manager with a copy of this permission. The written permission shall specifically provide that the property owner will not hold the Authority, its employees, agents, or engineers liable for use of or damage to this property. The CONTRACTOR shall be held liable for any trespass and property damage incurred outside of the disposal site.

END OF SECTION

SECTION 31 32 19

GEOSYNTHETIC SOIL STABILIZATION AND LAYER SEPARATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The Work under this Section consists of furnishing all labor, equipment, supplies and materials necessary to perform all operations pertaining to the furnishing and placement of non-woven geotextiles and geocells.

1.2 RELATED REQUIREMENTS

A. Section 01 33 23 – Shop Drawings, Product Data, and Samples.

B. Section 01 60 13 – Material and Equipment.

C. Section 31 20 00 – Earth Moving.

D. Section 33 47 13 – Secondary Containment and Fuel Protection Liners.

1.3 SUBMITTALS

A. Furnish Manufacturer's Information and design data, including complete product installation instructions.

1.4 DELIVERY, STORAGE AND HANDLING

A. Packaging and Identification Requirements:

1. Non-woven geotextile rolls and geocells shall be furnished with suitable wrapping for protection against moisture, contamination, and extended ultra-violet exposure prior to placement.

2. Each roll or bundle shall be labeled or tagged to provide product identification sufficient for field identification.

3. Products shall be stored in a manner that protects them from the elements. If stored outdoors, they shall be elevated and protected with a waterproof cover.

1.5 QUALITY ASSURANCE

A. Manufacturer: The manufacturer of the non-woven geotextile and geocell materials shall have a minimum of ten (10) years' experience in their fields.

B. Sampling and Compliance Requirements:

1. A competent laboratory must be maintained by the producer of the non-woven geotextile and geocells at the point of manufacture to insure quality control in accordance with ASTM testing procedures.

2. That laboratory shall maintain records of its quality control results and provide, upon request of the specifying agent prior to shipment, a manufacturer's certificate.

3. The certificate shall include:

   a. Name of manufacturer.

   b. Chemical composition.

   c. Product description.

   d. Statement of compliance to specification requirements.

   e. Signature of legally authorized official attesting to the information required.

PART 2 - PRODUCTS

2.1 GEOTEXTILE

A. Non-woven Geotextile Fabric

1. Non-woven Geotextile Fabric shall be TenCate®'s Mirafi 180N or approved equal.

2. The fabric shall be inert to naturally encountered chemicals, hydrocarbons, mildew and rot resistant, resistant to ultraviolet light exposure, insect and rodent resistant, and conform to the properties in the following table.

3. The minimum average roll value (MARV) for strength properties of any individual roll tested from the manufacturing lot or lots of a particular shipment shall be in excess of the MARV stipulated herein.

SPECIFICATION PROPERTY	TEST LIMIT	METHOD
Grab Tensile Strength	200 lbs	ASTM D-4632
Trapezoid Tear Strength	75 lbs	ASTM D-4533
CBR Puncture Strength	500 lbs	ASTM D-6241
Survivability Class	2	AASHTO M288

B. Package, label, handle, and store geotextile material according to ASTM D-4873.

2.2 GEOCELL

A. Geocells shall be Envirogrid or approved equal.

B. Base Materials:

1. Polymer Density shall be between within 0.935 – 0.965 g/cm^3 in accordance with ASTM D 1505

2. Carbon Black content shall be 1.5 percent minimum by weight and homogeneously distributed throughout the material.

3. Environmental Stress Crack Resistance shall be 5000 hours minimum in accordance with ASTM D 1693.

C. Cell Properties:

1. Individual cells shall be uniform in shape and size when expanded.

2. Cell walls shall be perforated.

3. Cell Height = 4”.

PART 3 - EXECUTION

3.1 INSTALLATION OF NON-WOVEN GEOTEXTILE FABRICS

A. Preparation:

1. Prepare subgrade and embankment as specified.

2. Grade to a smooth surface, leaving no surface undulations or irregularities. Do not stretch and or “bridge” fabric over gaps or undulations.

3. Remove any loose and angular materials, rocks, brush, and sticks that may damage the fabric.

B. Installation:

1. Weather Limitations: All work shall be performed under weather conditions recommended by the manufacturer.

2. The non-woven geotextile fabric sheet shall be unrolled, placed in a relaxed position, free from stress and with minimum wrinkles, and in full contact with the subgrade in accordance with manufacturer’s recommendations. Do not bridge over voids or low areas in the subgrade.

3. Seams shall be overlapped 2-feet or as approved by the Engineer in accordance with the manufacturer's recommendations.

4. Construction vehicles shall not be allowed to travel directly on the fabric.

5. Take due care to ensure that fabric is not damaged during construction activities.

6. Fabric damaged to a degree that compromises its intended capabilities shall be replaced with same approved geotextile fabric at no additional cost to the Authority.

C. Placement:

1. One layer of nonwoven geotextile material shall be installed for soil separation application.

2. Two (2) layers of nonwoven geotextile material shall be installed above and below the Tank Farm Secondary Containment Liner.

3.2 INSTALLATION OF GEOCELL

A. Preparation: Preparation shall be the same as described above for Geosynthetic fabrics.

B. Installation:

1. Weather Limitations: All work shall be performed under weather conditions recommended by the manufacturer.

2. The geocell sheet shall be stretched and placed in a relaxed position in full contact with the subgrade, in accordance with manufacturer’s recommendations. Do not bridge over voids or low areas.

3. Secure cells at one each end. Insure anchoring method does not puncture or damage the fuel containment liner installed below the geocell. Apply additional anchoring as needed to ensure the cells retain their shape.

4. Seams shall be overlapped by 12-18” or as approved by the Engineer in accordance with the manufacturer's recommendations.

5. Spread cement-stabilizing fill evenly over the geocells and fill all cells with cement-stabilized fill.

6. Construction vehicles shall not be allowed to travel directly on unfilled geocells.

7. Take due care to ensure that geocells are not damaged during construction activities.

8. Geocells damaged to a degree that compromises their intended capabilities shall be replaced with same approved geocell material at no additional cost to the Authority.

C. Placement:

1. Geocell shall be placed on the interior side slopes of the containment dike.

3.4 GEOTEXTILE REPAIR

A. If the geotextile become torn or damaged, they shall be repaired at the Contractor's expense prior to backfill operations.

B. The fill material shall be cleaned from the surface of the geotextile and the torn area overlain with new fabric per manufacturer's recommendations. Care shall be taken that the patch remains in place during subsequent fill placement.

END OF SECTION

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SECTION 32 31 13

CHAIN LINK FENCE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Furnishing and installing chain link fence for new installations.

1.2 RELATED REQUIREMENT

A. Section 05 50 00 – Metal Fabrications.

1.3 REFERENCES

A. Chain Link Fence Manufacturers Institute Product Manual CLF-PM0610.

B. Specification of Metallic-Coated and Polyvinyl Chloride (PVC) Coated Steel Chain Link Fence Fabric, published by Chain Link Fence Manufacturers Institute, Washington, DC 20036.

C. Federal Specification RR-F-191, Fencing, Wire, and Post Metal.

D. State of Alaska, Department of Transportation, and Public Facilities, “Standard Specifications for Highway Construction”.

E. State of Alaska, Department of Transportation, and Public Facilities, “Standard Drawings Manual”.

1.4 SUBMITTALS

A. Product Data: Provide data on fabric, posts, accessories, fittings, and hardware.

B. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components.

C. Manufacturer's Installation Instructions.

D. Method of post installation. Submit alternate post installation method for consideration if different method from those shown in these Construction Documents is proposed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. CONTRACTOR shall verify shipping dimensions and weight limitations with shipper to ensure that the receipt and delivery of materials will not require the use of specialized equipment.

B. CONTRACTOR shall provide packing lists with all bundles and packages which shall list all materials contained in the package or bundle. Packing list shall be

securely attached to each bundle in a watertight carrier.

PART 2 - PRODUCTS

2.1 GENERAL

A. Materials shall be new and products of recognized, reputable manufacturers. Used, re-rolled, or re-galvanized materials are not acceptable.

B. All materials shall be hot-dip galvanized after fabrication. Unless otherwise specified, all materials shall have a minimum zinc coating of 1.2 ounces per square foot of surface.

C. Miscellaneous steel fittings and hardware shall meet AASHTO M 181, Type I, Grade 1 unless otherwise specified.

2.2 WIRE FABRIC

A. Chain-link fence fabric shall meet AASHTO M 181, 9 gauge thickness, Type I (zinc-coated steel) Class D coating, and 2-inch mesh.

2.3 POSTS, RAILS, AND BRACES

A. Line posts, rails, and braces shall be galvanized steel pipe, or equivalent galvanized roll-formed sections, and meet AASHTO M 181, Type I, Grade 1 or Grade 2.

B. The dimensions of the posts, rails, and braces shall be as shown on the Plans.

2.4 CAPS

A. Dome Caps and Rail caps shall be pressed steel, or malleable iron per ASTM F 626, and designed as a weather-tight closure cap for tubular posts.

B. Provide one cap for each new or replaced post.

2.5 TENSION WIRE

A. Tension wire shall meet AASHTO M 181, 7 gauge thickness, Type I, Class 3 coating.

2.6 TENSION BARS

A. Stretcher bars shall be one-piece lengths equal to full height of fabric with a minimum cross-section of 3/16 inch by 3/4 inch. Provide one stretcher bar for each gate post and two bars for each corner and pull post.

2.7 BANDS

A. Bands shall be heavy-pressed steel, spaced not over 15 inches on center to secure tension bars, top rail and brace ends to end, corner, pull, and gate posts.

2.8 HARDWARE

A. Steel bolts nuts and washers.

B. Top rail and brace ends shall be pressed steel, malleable iron per ASTM F 626.

C. Top rail couplings shall be 6” long pressed steel, hot dip galvanized.

2.9 WIRE TIES

A. Wire ties for use in conjunction with a given type of fabric shall be of the same material and coating weight identified with the fabric type.

2.10 TRUSS ROD AND TIGHTENER

A. Steel rods with minimum diameter of 5/16”. Capable of withstanding minimum tension of 2,000 pounds.

2.11 GATES

A. Gate frames shall consist of galvanized steel pipe, or equivalent galvanized roll-formed sections, and shall meet AASHTO M 181, Type I, Grade 1 or Grade 2. The fabric shall be of the same type material as used in the fence. Gate drawings are proto-typical and steel dimensions shown on Plans are minimums. Contractor shall submit shop drawings of final gate design to Engineer for approval prior to fabrication. Provide Single Swing 4.0 ft. wide man gates as indicated.

B. Gate latches and other gate appurtenances shall be of sufficient strength and design to assure easy, trouble free operation. Gates shall be constructed so that they may be operated by one person.

C. Hinges shall swing 180 degrees free of binding.

D. Emergency egress man gates shall be able to be opened from the inside of the facilities.

2.12 LOCKS

A. Provide 1.5-inch industrial grade, corrosion resistant padlock for each gate. Provide locks for valves where indicated. Master or approved equal. Key all padlocks alike for the same ownership.

B. Submit for approval.

2.13 SAND WATER SLURRY

A. Sand water slurry shall be composed of concrete sand with 30% by weight potable water added. Concrete sand shall meet the following gradation requirements: 100% passing the 3/8 inch sieve and 0-2% passing the No. 200 sieve. The aggregate for the slurry should be fully thawed prior to mixing and the resulting slurry mix should have a temperature of 40℉ +/- 5℉ at the time of placement. The slurry materials must be saturated and should have a consistency similar to

concrete with a slump of 5 inches +/- 1-inch. The augered hole shall be cleaned of foreign materials to the full design depth prior to backfilling. The post or pile shall be firmly held in place during placement, backfilling, and curing periods. Cuttings from the augered holes should not be used to make slurry. Slurry backfill procedures shall be completed in a continuous manner and thoroughly compacted by Engineer approved methods including rodding, tamping, or vibratory compaction techniques.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate fencing and install posts as shown on Plans and space posts as specified.

B. Erect fencing in straight lines between angle points by skilled labor experienced in this type of construction. Erect in accordance with the manufacturer's recommendations as approved and with these Specifications.

C. Tension chain-link fabric as specified by manufacturer. Fasten chain link fabric to end, corner, pull or gate posts with tension bars and bands. Fasten chain link fabric to line posts and top rail at approximately 12 inch centers. Fasten chain link fabric to tension wires at approximately 24 inch centers.

D. Braces shall be installed between end/corner/ pull/gate posts and post(s) adjacent to end/corner/ pull/gate post. Securely truss bracing from line post to base of end/corner/ pull/gate post with a truss rod and tightener.

E. Install top rail in caps on line posts. Terminate top rail at end/corner/ pull/gate posts with rail ends. Install rail sleeves and expansion springs to tension top rail. Sweged top rail not allowed.

F. Provide minimum three (3) full twists for each wire tie.

3.2 CLEANUP

A. Upon completion of the fence installation, clean up all waste material resulting from the operation.

END OF SECTION

SECTION 32 92 00

SEEDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Seeding.

B. Related Sections

1. Section 31 20 00 – Earth Moving.

1.2 DEFINITIONS

A. Topsoil: Well drained usable on-site excavated material free of stumps, brush, excessive weeds, toxic substances, and other material detrimental to plant growth. See Section 31 20 00 – Earth Moving for topsoil requirements.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Submit certification tag for the seed mixes provided listing species, proportion by weight, percent purity, and percent germination. The certification tag shall come from the specified seed mixes.

C. Submit fertilizer certificate from supplier/manufacturer with guaranteed analysis of the contents of the fertilizer, showing the percentage for each ingredient.

D. Planting Schedule indicating anticipated planting dates.

PART 2 - PRODUCTS

2.1 SEED

A. Grass seed mixture shall meet the requirements of the State of Alaska Seed Regulations 11 AAC 34, Article 1 and Article 4 and the Federal Seed Act, 7 CFR Part 201.

B. Provide the seed mixture as specified in the table below. Provide seed collected or harvested within 2 years of the targeted seeding date. Provide all seed in pure live seed (PLS) unless otherwise directed. Provide seed true of genus and species.

1. Seed shall conform to the following mix type:

Name	Proportion by Weight	Purity	Germination
Red Fescue (Arctared)	40%	90%	85%
Bering Hairgrass (Norcoast)	40%	90%	85%
Tufted Hairgrass (Nortran)	20%	90%	85%

a. The Contractor shall submit an alternate seed mix when the specified seed is not commercially available. Provide a letter confirming the specified seed is not available. Include an agronomist certified seed mix design, including application rate, suited to the project site.

2.2 FERTILIZER

A. Complete dry packaged fertilizer with a mixture of chemical ingredients providing a total available nitrogen, phosphoric acid, and potassium in a 20-20-10 percentage, containing no cyanamid compounds or hydrated lime. Tolerances of the chemical ingredients shall be plus or minus 2%.

B. Use standard commercial fertilizer supplied separately or in mixtures, and in moisture proof containers. Mark each container with the total net weight and with the manufacturer's guaranteed analysis of the contents showing the percentage for each ingredient.

2.3 MULCH

A. Processed wood fiber that contains no germination or growth inhibiting factors. It shall remain in uniform suspension with the seed, to form a homogeneous slurry. It shall have moisture absorption and percolation properties and the ability to cover and hold the seed in contact with the soil. It shall have a dye of suitable color to facilitate inspection of its placement.

2.4 PROHIBITED AND RESTRICTED NOXIOUS WEEDS AND QUARANTINED PESTS

A. Provide seed and appliances certified to be free of prohibited noxious weeds or quarantined pests, and certified to contain no more than the maximum allowable tolerances for restricted noxious weeds, according to Alaska Administrative Code, Title 11, Chapter 34 (11 AAC 34).

1. Seed or appliances found to contain prohibited noxious weeds or quarantined pests will be rejected, according to 11 AAC 34.020(a) and 11 AAC 105-180, respectively.

2. Seed or appliances found to contain restricted noxious weed seed in excess of the maximum allowable tolerance per pound will be rejected, according to 11 AAC 34.020(b).

3. Prohibited and restricted noxious weeds are listed in 11 AAC 34.020, and can be viewed at the following webpage: http://plants.alaska.gov/invasives/noxious-weeds.htm.

B. **Labeling**

1. Ensure each bag or container of individual seed species is labeled to meet requirements of 11 AAC 34.010. Do not remove labels from bags or containers.

C. **Certification**

1. Certify seed is free of prohibited noxious weeds and restricted noxious weeds are within allowable tolerances. Provide to the Engineer no later than ten (10) days prior to seeding a signed copy of a statement signed by the vendor identifying the lot number or lot numbers, certifying each lot of seed has been tested within the preceding nine (9) months, by a recognized seed testing laboratory, a member of the Association of Official Seed Certifying Agency (AOSCA), or the Alaska Plant Materials Center.

Include the following in each certification:

a. Name and address of laboratory.

b. Date of test.

c. Lot number.

d. Seed name.

e. Percent pure seed.

f. Percent germination.

g. Percent weed content.

h. Percent inert matter.

Seed will be rejected if:

a. Contains prohibited noxious weeds;

b. Contains restricted noxious weeds above maximum allowable tolerances;

c. Not certified as tested within the preceding nine (9) months;

d. Wet, moldy, or otherwise damaged in transit or storage; or

e. Containers do not have labels or the labels have been removed.

Seed may be rejected for:

a. Discrepancies in the lot numbers listed on the statement to the lot numbers indicated on the labels of the seed containers.

The Contractor shall immediately remove rejected seed from the project premises. If seed is rejected for containing prohibited noxious weeds or for exceeding maximum allowable tolerances of restricted noxious weeds, dispose of rejected seed according to 11 AAC 34.075(g).

PART 3 - EXECUTION

3.1 SOILS PREPARATION

A. Roughen the soil surface by walking a dozer transversely up and down the slopes, or by grading with a scarifying slope board. The resulting indentations shall be perpendicular to the fall of the slope.

3.2 SEEDING SEASONS

A. All seeding shall be performed between May 15, and August 15. Seeding at other than the specified dates will only be allowed upon written permission of the Authority.

3.3 HYDROSEEDING

A. Apply seed, mulch, and fertilizer in a single application at a rate that ensures 2 pounds of seed per 1,000 square feet, 46 pounds of mulch per 1,000 square feet, and 12 pounds of fertilizer per 1,000 square feet.

B. Use hydraulic seeding equipment that will maintain a continuous agitation and apply a homogeneous mixture through a spray nozzle. The pump must produce enough pressure to maintain a continuous, nonfluctuating spray that will reach the extremities of the seeding area.

C. Add mulch to water slurry in the hydraulic seeder after adding seed and fertilizer.

D. Add seed to slurry mixture no more than 30 minutes before application.

E. General: Maintain and establish grass by watering, fertilizing, weeding, replanting, and performing other operations as required to establish healthy, viable grass. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth grass. Provide materials and installation the same as those used in the original installation.

3.4 MAINTENANCE

A. Water to prevent seeded areas and soil from drying out.

B. Reseed any areas not showing evidence of satisfactory growth within 3 weeks of seeding.

C. Repair eroded areas, provide topsoil and reseed as needed to obtain healthy stand of plants.

D. Repair surfaces that are gullied or otherwise damaged following seeding by re-grading and reseeding, as directed. Maintain seeded areas in a satisfactory condition until final inspection and acceptance of the work.

E. Keep temporary erosion control measures in place until the vegetation is accepted.

F. Water the seeded areas, as required, for proper germination and growth. Use equipment that can acceptably water all seeded areas without vehicular traffic on seeded areas.

G. Reseed any seeded areas not showing evidence of satisfactory growth, as directed.

3.5 ACCEPTANCE

A. Final acceptance will be based on Contractor conformance to Plans and Specifications and performance during surface preparations, applications of seed/fertilizer, maintenance of seeded areas, and must provide 70% vegetative coverage of the seeded area. Final acceptance will be based on the Authority's approval.

END OF SECTION

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SECTION 33 05 26.13

SIGNAGE

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section covers the furnishing and installation of signs at the bulk tank farm, dispensing tanks, dispensing area, retail sales building, and truck fill facilities.

B. The CONTRACTOR shall furnish and install all signs and fasteners.

1.2 RELATED REQUIREMENTS

A. Section 01 33 00 – Submittal Procedures.

B. Section 32 31 13 – Chain Link Fence.

1.3 REFERENCES

A. International Fire Code (IFC), Sections 5704.

B. National Fire Protection Association, No. 704

C. State of Alaska, Department of Transportation, “Standard Specification for Highway Construction” and “Standard Drawings Manual”.

1.4 SUBMITTALS

A. Submit shop drawings of all signs, including height and width as well as sign thickness. Indicate background color and text color, text information (i.e. height and stroke) proposed for each sign.

B. Submit manufacturer’s data and standard colors for vinyl backgrounds and letters.

C. Submit one (1) sample for approval of each type of fastener used to install, hang, or otherwise fasten signs.

PART 2 - PRODUCTS

2.1 GENERAL

A. Signs shall be provided in the locations indicated in the Contract Drawings.

B. Signs posted shall be constructed of 0.08” minimum aluminum plate. Warning signs shall be red non-reflective letters on a white non-reflective background. Informational signs shall be black non-reflective letters on a white non-reflective background, unless otherwise indicated.

C. Lay out letters such that no letters touch or overlap, and all words are clearly readable.

D. Signs and letters shall be sized as indicated on the Contract Drawings.

E. Provide 3M series 255 High Performance vinyl letters on 3M 3650-10 white vinyl background, or Gerber thermal transfer film printed letters on Gerber High Performance vinyl background as indicated on the Drawings, or as appropriate for the application.

PART 3 - EXECUTION

3.1 GENERAL

A. Install in accordance with IFC flammable and combustible liquid signage standards, and NFPA 704.

B. Signs shall be conspicuously mounted and easily read.

C. Where signs are fastened to fences, the fasteners used shall be steel hog rings or steel wire ties.

END OF SECTION

SECTION 33 05 27

CULVERTS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section includes the construction of a culvert for the underground road crossing of the Fuel Transfer Pipeline as shown on the Plans.

1.2 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Provide manufacturer's literature.

C. Manufacturer's Installation Instructions.

PART 2 - PRODUCTS

2.1 GENERAL

A. Corrugated Metal Pipe (CMP) or Corrugated Polyethylene Pipe (CPEP) shall be used in culvert crossings and pipe carrier crossings. The pipe shall conform to the following specifications:

1. Corrugated Metal Pipe shall meet the requirements of AASHTO M-36.

2. Corrugated Polyethylene Pipe shall meet the requirements of AASHTO M-294, Type-S.

2.2 PIPE JOINING

A. Joints shall be made with coupling bands.

1. Metal Pipe: Metal pipe shall be firmly joined by form fitting coupling bands conforming to the requirements of ASTM A760 for steel pipe.

2. Polyethylene Pipe: Polyethylene Pipe shall be firmly joined by form fitting coupling bands. Couplings shall be corrugated to match the index in the pipe corrugations and to a width not less than three quarters (3/4) of the nominal pipe diameter.

2.3 END SECTIONS

A. Metal end sections shall be provided on each culvert end.

1. Metal end sections shall be installed per Manufacturer’s installation instructions.

PART 3 - EXECUTION

3.1 EXCAVATION

A. The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, with dimensions as shown on the Plans.

B. The trench walls shall be approximately vertical.

C. The width of excavation shall be as shown on the Plans.

D. Where rock, hardpan, or other unyielding material is encountered, the CONTRACTOR shall remove it from below the foundation grade as shown on the Plans.

E. Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with Bedding Material for the full trench width. The Engineer shall determine the depth of removal necessary. The material shall be compacted to provide adequate support for the pipe.

F. The excavation below grade shall be backfilled with select material, lightly compacted in layers not over 6 inches in un-compacted depth to form a uniform but yielding foundation.

G. The excavation for pipes that are placed in embankment fill shall not be made until the embankment has been completed to a height above the top of the pipe as shown on the Plans.

3.2 BEDDING

A. The pipe bedding shall be Bedding Material, as specified in Section 31 20 00 – Earth Moving.

B. Compact all bedding to 95% of the maximum density as determined by ATM 207 or ATM 212.

3.3 INSTALLATION

A. Install piping while keeping the lower segment of the pipe in contact with the subgrade throughout its full length.

B. The CONTRACTOR shall repair or replace, at no expense to the Authority, any culvert damaged by his operation. Damaged metallic coating on metal pipe shall be repaired according to Section 09 98 00.

3.4 BACKFILLING

A. Pipes shall be inspected before any backfill is placed; any pipes found to be out of alignment, unduly settled, or damaged shall be removed and re-laid or replaced at the CONTRACTOR’s expense.

B. Bedding material shall be placed at a minimum 6 inches below and above the pipe.

C. Care shall be exercised to thoroughly compact the backfill material under the haunches of the pipe without displacing the pipe.

D. Material shall be brought up evenly on both sides of the pipe for the full length of the pipe.

E. All backfill shall be compacted to the density as shown on the Plans.

F. It shall be the CONTRACTOR's responsibility to protect installed pipes and culverts from damage due to construction equipment operations.

END OF SECTION

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SECTION 33 46 00

SUBDRAINAGE

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section includes the subdrainage system for the tank farm containment dike.

1.2 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Provide manufacturer's literature.

C. Manufacturer's Installation Instructions.

1.3 DELIVERY, STORAGE, AND HANDLING

A. CONTRACTOR is responsible for protection of all material provided from damage during transportation, storage, and installation processes.

B. Material, equipment, or apparatus damaged because of improper storage or protection will be rejected and replaced at CONTRACTOR’s expense.

PART 2 - PRODUCTS

2.1 GENERAL

A. Materials shall be new unless otherwise specified. All items of the same type shall be of the same manufacturer.

2.2 PERFORATED-WALL PIPES AND FITTINGS

A. Perforated PE Pipe and Fittings: Fabric wrapped perforated ADS 472 drain pipe or approved equal.

1. Couplings: ADS 412 couplings or approved equal.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install couplings according to manufacturer's written instructions and other requirements indicated.

1. Tank Farm Subdrainage: Install piping pitched down in direction of flow, at a minimum slope of 0.5 percent

2. Lay perforated pipe with perforations down.

3. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.

END OF SECTION

SECTION 33 47 13

SECONDARY CONTAINMENT AND FUEL PROTECTION LINERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes geomembrane liners within the tank farm containment dike area for both secondary containment and fuel protection as shown in the Plans.

1.2 RELATED REQUIREMENTS

A. Section 01 33 23 – Shop Drawings, Product Data and Samples.

B. Section 01 60 13 – Material and Equipment.

C. Section 31 20 00 – Earth Moving.

D. Section 31 32 19 – Geosynthetic Soil Stabilization and Layer Separation.

1.3 SUBMITTALS

A. Shop Drawings: Show fabrication and installation details for geomembrane liners. Show panel layout, seams, perimeter anchorage, and methods of attachment and sealing to other construction. Differentiate between factory and field seams and joints.

B. Samples: For each geomembrane.

C. Product test reports.

D. Manufacturer's installation instructions.

1.4 DELIVERY, STORAGE AND HANDLING

A. Packaging and Identification Requirements:

1. Geomembrane shall be furnished with suitable wrapping for protection against moisture, contamination, and extended ultra-violet exposure prior to placement.

2. Each roll or bundle shall be labeled or tagged to provide product identification sufficient for field identification.

3. Products shall be stored in a manner that protects them from the elements. If stored outdoors, they shall be elevated and protected with a waterproof cover.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: The installer shall have a minimum of five (5) years of experience with seaming geomembranes and have completed at least three (3) projects with geomembrane liner materials. The installer shall be an employee of a company trained and approved by manufacturer.

B. Sampling and Compliance Requirements:

1. A competent laboratory must be maintained by the producer of the geotextile at the point of manufacture to insure quality control in accordance with ASTM testing procedures.

2. That laboratory shall maintain records of its quality control results and provide, upon request of the specifying agent prior to shipment, a manufacturer's certificate.

3. The certificate shall include:

a. Name of manufacturer.

b. Chemical composition.

c. Product description.

d. Statement of compliance to specification requirements.

e. Signature of legally authorized official attesting to the information required.

1.6 WARRANTY

A. Specified form in which CONTRACTOR agrees to repair or replace geomembrane liner that fail(s) in materials or workmanship or that deteriorate(s) under conditions of normal weather and intended service within specified warranty period. Warranty does not include deterioration or failure of geomembrane liner due to exposure to harmful chemicals, gases or vapors, abnormal and severe weather phenomena, fire, earthquakes, floods, vandalism, or abuse by persons, animals, or equipment.

B. CONTRACTOR shall warranty liner for a period of one (1) year from date of Project substantial completion.

PART 2 - PRODUCTS

2.1 SHEET MATERIALS

A. General: Provide impervious geomembrane liner fabricated from sheet material indicated and complying with specified product characteristics:

1. Reinforcing Scrim: One-ply polyester fabric totally encapsulated between two sheets.

2. Secondary Containment Nominal Thickness: 30-mil nominal thickness per ASTM D 751.

   Fuel Protection Nominal Thickness: 40-mil nominal thickness per ASTM D 1593.

3. Hydrostatic Resistance: Not less than 800-psi resistance per ASTM D 751, Procedure A.

4. Dimensional Stability, Reinforced Sheet: Not more than plus or minus 0.5 percent per ASTM D 1204.

5. Bursting Strength: Not less than 750 lb. per ASTM D 751 (Ball Tip).

6. Weathering Resistance: Not less than 8,000 hours, per ASTM G 23 (Carbon Arc).

Secondary Containment: Seaman Corporation 8130 XR-5 or approved equal.

2.2 MISCELLANEOUS MATERIALS

A. Adhesives: Provide types of adhesive primers, compounds, solvents, and tapes recommended in writing by geomembrane liner manufacturer for bonding to structures (if required).

2.3 FABRICATION

A. Fabricate geomembrane liner panels from sheets in sizes as large as practical with factory-sealed seams, consistent with limitations of weight and installation procedures. Minimize field seaming.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine substrates, with Installer present, for compliance with requirements for soil compaction and grading; for subgrade free from angular rocks, rubble, roots, vegetation, debris, voids, protrusions, and ground water; and for other conditions affecting performance of geomembrane liner.

B. Provide temporary ballast, until edges are permanently secured, that does not damage geomembrane liner or substrate, to prevent uplift of geomembrane liner in areas with prevailing winds.

C. Place secondary containment geomembrane liner over the two (2) layers of nonwoven geotextile that have been placed on the prepared surfaces to ensure minimum handling. Place two (2) layers of nonwoven geotextile above the geomembrane layer once installed. Install according to Shop Drawings and to comply with geomembrane liner manufacturer's written instructions. In areas with prevailing winds, begin placing geomembrane liner at Project's upwind direction and proceed downwind. Install geomembrane liner in a relaxed

condition, free from stress and with minimum wrinkles, and in full contact with geotextile on subgrade. Do not bridge over voids or low areas in the subgrade. Permanently secure edges.

D. Field Seams: Comply with geomembrane liner manufacturer's written instructions. Form seams by lapping edges of panels 2 to 4 inches, unless instructions require a larger overlap. Wipe contact surfaces clean and free of dirt, dust, moisture, and other foreign materials. Use solvent-cleaning methods and grind geomembrane seam surfaces if recommended by geomembrane liner manufacturer. Proceed with seaming at required temperatures for materials and ambient conditions. Continuously bond sheet to sheet to construct single or double seams of width recommended for method of seaming used. Seal or fuse free seam edges as instructed. Inspect seams and reseal voids.

E. Installation in Anchor Trench: Install geomembrane liner in trench according to manufacturer's written instructions and the drawings, backfill, and compact to lock liner into trench.

F. Liner Repairs: Repair tears, punctures, and other imperfections in geomembrane liner and seams using patches of geomembrane liner material, liner-to-liner bonding materials, and bonding methods according to geomembrane liner manufacturer's written instructions. Apply bonding solvent or weld to contact surfaces of both patch and geomembrane liner, and press together immediately. Roll to remove wrinkles.

3.2 FIELD QUALITY CONTROL

A. Nondestructive Testing: Visually inspect seams and patches. Comply with ASTM D 4437 for Air Lance Test, Vacuum Box Testing, or Ultrasonic (High Frequency) Pulse Echo Testing or with GRI Test Method GM6, as applicable to geomembrane liner and seam construction. Record locations of failed seams and patches. For the record, individually number and date occurrences and details of leak and remedial action. Repair leaking seams and patches.

3.3 PROTECTION

A. Protect installed geomembrane liner according to manufacturer's written instructions. Repair or replace areas of geomembrane liner damaged by scuffing, punctures, traffic, rough subgrade, or other unacceptable conditions.

END OF SECTION

SECTION 40 63 00

CONTROL-ALARM PANEL EQUIPMENT

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. This section describes specific requirements, products, and methods of execution relating to the construction and furnishing of Control/Alarm panels used on this project.

1.2 RELATED REQUIREMENTS

A. Section 26 05 01 - Common Works Results – Electrical.

B. Section 26 05 02 - Basic Materials and Methods.

C. Section 26 05 21 - Wire and Cables.

1.3 QUALITY ASSURANCE

A. The panels shall be built to UL, ETL, or an independent testing laboratory acceptable to the local code enforcement agency having jurisdiction. The panels shall have UL or ETL labels attached to them by the panel builder. The panel builder shall provide with each panel a certification from the independent testing lab inspector that the panel is built to their standards.

1.4 SUBMITTALS

A. In addition to the requirements stated elsewhere in these specifications, the following items shall be included in the submittal:

1. Quality Assurance: State how supplier intends on satisfying the Listing/Labeling requirements in Paragraph 1.3 above.

2. Components: Include a listing of all components provided in or on the panel. List shall include the components labeling (or listing) installation instructions, allowable ambient environment, and operation characteristics. "Cut" sheets are an acceptable format if all required data is presented in a readable manner. Where options are identified as available but not provided they shall be marked out. Alternately identify only those options intended to be supplied with the component; if none, then state so on the submittal.

3. Environmental Calculations: Provide calculations verifying that allowable component environment will not be exceeded or will be maintained via heating/ cooling and the manner with which the environment will be maintained.

PART 2 - PRODUCTS

2.1 ENCLOSURES

A. Enclosures

1. In all non-hazardous areas enclosures shall be NEMA 4X. If stainless steel, provide with brushed finish. Where possible, penetrations shall be made in such a manner to maintain the NEMA 4X rating. If this is not possible, the penetrations shall be made in such a manner to minimize entry of foreign materials into the enclosure.

2. Enclosures shall be wall or rack mounted. Internal control components shall be mounted on a removable mounting pan. Mounting pan shall be finished white.

3. Enclosure dimensions shall be based on door mounted component size and layout, components contained within, including terminal strips and wiring gutter.

4. Enclosures shall be insulated and internal heating supplied to maintain temperatures 10F above the highest minimum operating temperature of any of the components installed in the panel.

2.2 CONTROL PANELS (CP)

A. The CONTRACTOR shall furnish the CP(s) to satisfy the functional requirements on the drawings. Each CP shall be fabricated with UL labeled components and the CP's shall be Listed as Assemblies. Panels not specifically specified as being provided in other Sections of the Specification shall be furnished and installed under this Section. All panels shall be wired under this Section.

B. The CP controls shall be 120 volt maximum. Control conductors shall be copper, #14 AWG minimum, SIS or MTW, 600V."

C. Each CP shall be provided with identified terminal strips for the connection of all external conductors. The CONTRACTOR shall provide sufficient terminal blocks to connect 25 percent additional conductors for future use. Termination points shall be identified in accordance with the plans. The terminal strip listed shows only external connections. Internal numbering is to be provided by the manufacturer. All equipment associated with the CP(s) shall be ready for service after connection of conductors to equipment, controls, and CP(s).

D. All internal wiring shall be factory-installed and shall be contained in plastic raceways or troughs having removable covers. Wiring to door-mounted devices shall be extra flexible and anchored to doors using wire anchors cemented in place. Exposed terminals of door-mounted devices shall be guarded to prevent accidental personnel contact with energized terminals.

E. The control power disconnect shall have a door-mounted handle unless otherwise specified or shown.

F. Identification of panel-mounted devices, conductors, and electrical components shall meet the requirements specified elsewhere.

G. All panel-mounted devices shall be mounted a minimum of 3 feet above finished floor elevation.

2.3 CONTROL PANEL COMPONENTS

A. As listed on the Plans.

2.4 FACTORY TESTING

A. Each CP shall be factory assembled and tested for sequence of operation prior to job site delivery.

B. The Project Manager and Engineer shall be notified two weeks prior to Factory test.

C. All panels to be provided for this project shall be tested during the same session.

D. Factory test will be witnessed by the Engineer or other AUTHORITY designated representative. Panels may not be shipped until tests are completed to the Engineer’s approval. Approval must be in writing.

E. If panel manufacturer is outside of the state, all expenses required to bring the Engineer or AUTHORITY’s representative to the manufacturer’s facility shall be borne by the CONTRACTOR.

2.5 SPARE PARTS

A. Provide a minimum of 10% spare lamps (minimum 2) and one spare lens for each color pilot lamp in each panel.

B. For each panel, provide 1 each relay, motor starter, contactor, switch and pushbutton of types contained within that panel. Components shall be delivered to the Owner in original shipping boxes suitable for long term storage.

PART 3 - EXECUTION

3.1 INSTALLATION

A. CP(s) shall be installed in accordance with the requirements specified Division 26 and in accordance with the Manufacturer's recommendations.

B. CP(s) shall be protected at the job site from loss, damage, and the effects of weather. CP(s) shall be stored in an indoor, dry location. Heating shall be provided in areas subject to corrosion, and humidity.

C. CP(s) interiors, and exteriors shall be cleaned, and coatings shall be touched up to match original finish upon completion of the work.

D. Conduit, conductors, and terminations shall be installed in accordance with the requirements specified elsewhere.

3.2 FIELD TESTING

A. Functional Test

1. Panel operation will be demonstrated after all components and sensors associated with each panel have been installed and individually tested and calibrated or adjusted.

2. The demonstration shall be witnessed by Engineer or other designated AUTHORITY representative.

3. AUTO functions may be tested with simulated inputs. Input to be enabled as near to the actual device as possible, i.e., at the float terminals in the case of float controls.

B. Panel functions to be tested include all manual and automatic functions, all alarms and status displays and the emergency shutdown where installed. The Functional Narratives and Operational Instructions on the drawings will form the basis of the operational test.

C. Acceptance.

1. CONTRACTOR will repair, replace as necessary components/sensors that fail. Testing will be repeated until panels are accepted.

2. Travel, labor, and subsistence costs for subsequent trips to the project site to test the panels shall be borne by the CONTRACTOR.

END OF SECTION