DIVISION 4- MASONRY CONSTRUCTION
TABLE OF CONTENTS

SECTION 04050 – BASIC MASONRY MATERIALS & METHODS

PART 1 – GENERAL

1.01 SUMMARY

A. This Section describes the overall intent to provide a concrete masonry unit (CMU) building to house electrical and control equipment for operation of wastewater lift station planned as a part of this project. Coordinate with Division 16.

1.02 WORK INCLUDED

A. Provide concrete masonry units (concrete block), reinforcement, mortar, grout,

1.03 RELATED SECTIONS

A. Section 03200 – Concrete Reinforcement
B. Section 04065 – Masonry Mortar and Grout
C. Section 04220 – Concrete Masonry Units
D. Section 07920 – Joint Sealants

1.04 SUBMITTALS

A. Submit four (4) copies of all product data to engineer sufficiently early to avoid delays.

B. Manufacturer's Data: Provide complete description of each type of unit and accessory.

C. Certificate of Materials: Prior to delivery of materials to jobsite, submit certification from manufacturer showing compliance for specification of CMU. Certify compliance with ASTM C90. Certify mortar and grout compliance.

1.05 QUALITY ASSURANCE

A. Contractor shall have at least 5-years experience, regularly engaged in masonry work.

B. Continuous active supervisory mason-foreman in attendance while masonry work is in progress.

C. Provide CMU test results per ASTM C140 for production run to be used.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver, handle, and store concrete masonry units by means that will prevent damage and contamination by other materials.

B. Do not use reinforcing anchors having excessive rust or foreign coatings.

C. Do not use units with chips, cracks, voids, or materials that may cause staining.

D. Protect stored CMU from water absorption.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements: Comply with recommendations of IMIAWC (CW).

B. Hot Weather Requirements: Comply with recommendations of IMIAWC (HW).

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Concrete Masonry Units – Provide concrete masonry units from one manufacturer, of uniform texture and color. Submit manufacturer's data for approval. Mutual Materials, Oldcastle, Willamette Graystone, or approved equal.

B. Masonry Mortar and Grout – Mutual Materials DesignMix, or approved equal.

2.02 MATERIALS

A. Comply with material specifications of Sections 04065 and 04220.

2.03 ALTERNATIVE SUPPLIERS

A. Contractor may choose to purchase a pre-engineered CMU building package complete from a single supplier. If it is desired to utilize a CMU building package from a single supplier, some alterations to the building design may be allowed in order to comply with the supplier's standard products. Provide submittals identifying deviations from building design shown on Plans.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Comply with installation guidelines of Sections 04065 and 04220.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT – Schedule I Pump Station No. 4 Replacement

A. Cost for work and materials in this Section shall be included as a portion of the lump sum bid amount for the Project as stated on the Bid Form. No separate measurement for work in this Section will occur

END OF SECTION

SECTION 04065 - MASONRY MORTAR AND GROUT

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Mortar and grout for engineered CMU walls.

1.02 RELATED SECTIONS

A. Section 4220 – Concrete Masonry Units: for additional installation requirements for mortar and grout

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM), latest edition

1. ASTM C91 – Specification for Masonry Cement
2. ASTM C94 – Specification for Ready-Mix Concrete
3. ASTM C143 – Test Method for Slump of Hydraulic Cement Concrete
4. ASTM C144 – Specification for Aggregate for Masonry Mortar
5. ASTM C150 – Specification for Portland Cement
6. ASTM C207 – Specification for Hydrated Lime for Masonry Purposes
7. ASTM C270 – Specification for Mortar for Unit Masonry
8. ASTM C404 – Specification for Aggregates for Masonry Grout
9. ASTM C476 – Specification for Grout for Masonry
10. ASTM C1019 – Method of Sampling and Testing Grout
11. ASTM C1142 – Specification of Ready Mixed Mortar for Unit Masonry
12. ASTM C1329 – Specification for Mortar Cement

B. International Masonry Industry All-Weather Council (IMIAC): Recommended Practices and Guide Specification for Cold Weather Masonry Construction

C. IMIAC: Recommended Practices and Guide Specification for Hot Weather Masonry Construction

D. OSSC (Oregon Structural Specialty Code) 2010

1. OSSC Chapter 14 – Exterior Walls
2. OSSC Chapter 21 – Masonry

1.04 SUBMITTALS

A. Submit manufacturer's recommendations, product data, and test reports.

B. Submit Mortar Mix design.

C. Submit certificate that certifies ready-mixed or other mortar used conforms to these specifications.

D. Submit test reports on grout indicating conformance of component grout materials to requirements of UBC Standard 21-19, and test and evaluation reports to requirements of OSSC Standard 2103.12.

E. Submit test reports for mortar/grout materials indicating conformance to ASTM C270 and C476 property specifications.

1.05 QUALITY ASSURANCE

A. Blend cementitious materials, aggregate and admixtures in the factory under controlled conditions, which requires only the addition of water at the project site.

B. Use approved mix designs as long as aggregate characteristics remain unchanged. Upon significant changes in aggregate, prepare new mix designs and submit to Engineer.

C. Comply with ACI 530.1/ASCE 6 "Specifications for Masonry Structures" except as otherwise noted.

D. Review installation procedures and coordinate with other work that must be integrated with masonry.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver bulk, dry-blended ingredients to project site in enclosed containers on pallets sufficiently covered to keep dry.

B. Store mortar and grout mix in accordance with manufacturer's printed instructions to prevent contamination by extraneous chemicals.

C. Maintain packaged materials clean, dry, and protected against dampness and foreign matter.

D. Provide preblended mortar and grout mix manufacturer's recommended dispensing equipment for storage and controlled dispensing of mixtures.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Comply with IMIAC cold and hot weather requirements. When ambient air temperature is below 40°F, heat mixing water to maintain mortar temperature between 40° and 120°F until placed.

B. Deliver products in reusable packages when possible. Return or recycle empty packaging.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Mutual Materials DesignMix, or approved equal.

2.02 MATERIALS

A. Portland Cement: ASTM C150, Type I or II; gray color. Fly ash, slag and pozzolans are not permitted. Do not use masonry cement mortars.

B. Mortar Cement: UBC Standard 21-14, Mortar Cement

C. Mortar Aggregates: ASTM C144, standard masonry type; clean, dry, protected against dampness, freezing and foreign matter.

D. Grout Aggregates: ASTM C404; maximum coarse aggregate size 3/8-inch. Blast furnace slag is not permitted.

E. Hydrated Lime: ASTM C207, Type S for masonry purposes. Do not use Type N.

F. Admixtures: WR Grace DryBlock, Sika Grout Aid.

G. Water: Potable.

2.03 MORTAR

A. Weigh dry mortar mix materials, including cementitious material, aggregate and admixtures, if approved, in a factory, under controlled conditions. Factory dry and preblend mortar ingredients.

B. Select proportions to produce workability and to provide optimum bond strength. Mix shall include the integral water repellant DryBlock or equivalent. Use as much lime as practical.

C. Mortar shall conform to the minimum property requirements given in Table II of ASTM C270, based on 28-day laboratory testing only. Mortar shall be Type 'S', 1800 psi for load-bearing walls above grade. Natural color. By volume (cementitious materials): I part Portland cement, ¼ to ½ part hydrated lime, with sand 2¼ to 3 times the sum of the volume of cement and lime.

D. Thoroughly mix, in quantities needed for immediate use. Mix mortar and grout for a period of time not less than 5 minutes or more than 10 minutes in a mechanical mixer with the amount of water required for the desired workability.

E. Add only clean, potable water at the project site. Slump 5 to 8-inches.

F. Use a batch type mixer in accordance with ASTM C270, subparagraph 6.3.

G. Use mortar within 2½ hours of mixing. Retempering is allowed in accordance with ASTM C270, subparagraph 6.4.

2.04 GROUT

A. Mix grout in accordance with ASTM C476 and ACI 530.1. Do not use anti-freeze compounds to lower the freezing point of grout. Proportion grout according to Table 2103.12 of OSSC.

B. Mix dry materials utilizing equipment designed to ensure uniform blending, and precision measuring devices to ensure uniformity from batch to batch. Mix may include Sika Grout Aid per manufacturer's recommendations.

C. Add only clean, potable water at the project site.

D. Thoroughly mix, in quantities needed for immediate use. Mix mortar and grout for a period of time not less than 5 minutes or more than 10 minutes in a mechanical mixer with the amount of water required for the desired workability.

E. Use grout within 1½ hours after the initial mixing water has been added to the dry ingredients.

F. Grout Fill: Provide grout at CMU bond beams, lintels, and reinforced cells.

G. Compressive Strength: 2000 psi minimum at 28-days, determined in accordance with ASTM C1019.

H. Slump: 8-inches minimum, 10-inches maximum measured in accordance with ASTM C143.

I. Use coarse grout when grout space is equal to or greater than 4-inches in both directions. Use fine grout when grout space is smaller than 4-inches in either direction.

2.05 SOURCE QUALITY CONTROL

A. Maintain documentation of compliance to mix design. Keep a digital printout displaying the proper proportioning per batch as a permanent record. Deliver printout to Engineer and Owner.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine conditions for compliance with requirements for installation tolerances and other specific conditions, and miscellaneous conditions affecting the performance of CMU.

B. Examine rough-in and built-in construction to verify actual locations of piping and other penetrations prior to installation.

3.02 INSTALLATION

A. Maintain an ambient temperature of the materials in contact with the mortar, of not less than 40°F. Follow IMIAC and OSSC instructions.

B. Lay hollow CMU with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings/slab and where adjacent to cells or cavities to be reinforced or filled with grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.

C. Maintain consistent 3/8-inch joints.

D. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners or jambs to shift adjacent stretcher units that have been set in position. If adjustment are required, remove units, clean off mortar and reset in fresh mortar.

E. Grouting: Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure. Place carefully to avoid segregation of the grout materials. Do not allow coarse grout to fall more than 4-feet. Do not allow fine grout to fall more than 8-feet.

3.03 FIELD QUALITY CONTROL

A. Follow ACI 530.1 Testing and Laboratory Services.

B. Contractor shall hire an approved independent testing agency to take samples, perform tests, and submit results to Engineer. Tests shall show compliance with applicable specifications.

C. Mortar and grout samples shall be taken once every two weeks and additionally whenever mix design changes. Initial samples shall be taken during the first day of placement to ensure compliance before work progresses further.

D. Owner reserves the right to reject materials not in compliance with specifications and require the defective materials to be removed and replaced until compliance is achieved. No additional compensation will occur and contractor will promptly correct defective work.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT – Schedule I Pump Station No. 4 Replacement

A. Cost for work and materials in this Section shall be included as a portion of the lump sum bid

amount for the Project as stated on the Bid Form. No separate measurement for work in this Section will occur

END OF SECTION

SECTION 04220 - CONCRETE MASONRY UNITS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide concrete masonry units (concrete block), reinforcement, flashing, weepholes, and accessories for complete installation of CMU walls.

B. Install steel reinforcing bars where shown.

C. Fill all cells containing steel reinforcing full with grout. Fill all other cells with specified insulation material.

D. Build-in work of other trades and coordinate with others as required.

1.02 RELATED SECTIONS

A. Section 04065 – Masonry Mortar and Grout

B. Section 07410 - Metal Roof Panels and Flashing

C. Section 07920 - Joint Sealers

D. Section 03200 – Concrete Reinforcement

1.03 REFERENCES

A. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement, most recent.

B. ASTM A 153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware, most recent.

C. ASTM A 615 -Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement, most recent.

D. NCMA-TEK 72 – Bracing CMU Walls During Construction

E. ASTM C 90 - Standard Specification for Loadbearing Concrete Masonry Units, most recent.

F. ASTM C 476 – Grout for Reinforced and Non-Reinforced Masonry

G. ASTM C 270 – Mortar for Unit Masonry

H. IMIAWC (HW) - Recommended Practices & Guide Specifications for Hot Weather Masonry Construction; International Masonry Industry All-Weather Council; current edition.

I. Oregon Structural Specialty Code (OSSC) 2010.

1.04 SUBMITTALS

A. Submit to engineer for approval sufficiently early to avoid delays.

B. Manufacturer's Data: complete description of each type of unit product and accessory.

C. Certificate of Materials: Prior to delivery of materials to jobsite, submit certification from manufacturer showing compliance for specification of CMU. Certify compliance with ASTM C90. Certify mortar and grout compliance.

1.05 QUALITY ASSURANCE

A. Contractor shall have at least 5-years experience, regularly engaged in masonry work.

B. Continuous active supervisory mason-foreman in attendance while masonry work is in progress.

C. Provide CMU test results per ASTM C140 for production run to be used.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store concrete masonry units by means that will prevent mechanical damage and contamination by other materials.

B. Do not use reinforcing or anchors having excessive rust or foreign coatings.

C. Do not use units with chips, cracks, voids, or materials that may cause staining.

D. Protect stored CMU from water absorption.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements: Comply with recommendations of IMIAWC (CW).

B. Hot Weather Requirements: Comply with recommendations of IMIAWC (HW).

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide concrete masonry units from one manufacturer, of uniform texture and color. Submit manufacturer's data for approval. Mutual Materials, Oldcastle, Willamette Graystone, or approved equal.

2.02 CONCRETE MASONRY UNITS

A. Concrete Masonry Units (CMU):

1. Load-Bearing Units: ASTM C90-00, Grade N; light gray, high strength concrete with net area compressive strength of 2000 psi; manufactured with integral water repellent (Dry Block by WR Grace or equivalent). Block shall also meet UBC Standard 21-4.

2. Size: Standard units with nominal face dimensions of 8 x 16 inches and 8-inch nominal depths. Cells containing reinforcement shall be a minimum of 2.5-inches wide and 4-inches long.

3. Block Density: at least 115 pcf.

4. Shrinkage: CMU shall not exceed 0.06% linear shrinkage in accordance with ASTM C90.

5. Type: Smooth-Cast (unscored) and single-side Split Face blocks required. Use smooth and textured wall corners as required. Use solid-top blocks at bottom of window openings.

6. Obtain CMU from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.

2.03 MORTAR AND GROUT MATERIALS

A. Mortar: As specified in Section 04065.

B. Grout: As specified in Section 04065.

2.04 REINFORCEMENT AND ANCHORAGE

A. Reinforcing Steel: ASTM A 615 Grade 60 deformed billet bars. Clean and new.

B. Single Wythe Joint Reinforcement: Truss type; ASTM A 82 steel wire, hot dip galvanized after fabrication to ASTM A 153, Class B; 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not more than 1 inch and not less than 1/2 inch of mortar coverage on each exposure.

2.05 FLASHINGS

A. Stainless steel drip edges. Stainless steel or EPDM flashings. Stainless steel interior termination angles. Stainless Steel minimum thickness of 0.01-inch.

C. Lap Sealant: Type as recommended by Sealant Manufacturer.

2.06 ACCESSORIES

A. Preformed Control Joints: Rubber, neoprene, or polyvinyl chloride material; provide with corner and tee accessories, fused joints.

B. Building Paper: ASTM D 226, Type I ("No. 15") asphalt felt.

C. Insulation: Korfil Block Insulation or loose fill Perlite in all un-grouted concrete masonry unit cells forming the exterior envelope.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive concrete unit masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

D. Ensure that reinforcing is clean and free from rust.

E. Ensure all surfaces to receive mortar are clean.

3.02 PREPARATION

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:

1. Bond: as shown in the drawings.
2. Coursing: One unit plus one horizontal joint equals 8 inches.
3. Mortar Joints: Concave tooled.

3.03 LAYING MASONRY UNITS

A. Prior to grouting, the grout space shall be completely clean so that all spaces to be filled with grout do not contain mortar projections greater than ½-inch, mortar droppings or other foreign material. Grout shall be placed so that all spaces designated to be grouted shall be filled with grout and the grout shall be confined to those specific spaces. Grout pours shall be limited to 5-feet in height.

B. Lay hollow masonry units with face shell bedding on head and bed joints. All head and bed joints shall be filled solidly with mortar for a distance in from the face of the unit not less than the thickness of the shell. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

C. Remove excess mortar as work progresses. Mortar fins shall be minimized and prevented from separating and falling into the cell.

D. Interlock intersections and external corners, except for units laid in stack bond.

E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

F. Perform cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

G. Spread mortar bed joints to a uniform thickness with fresh mortar. Do not throw mortar scrapings or slushing mortar into joints. Excessive furrowing of bed joints will not be permitted.

H. Tool joints smooth, dense and slightly concave.

I. Joint dimension shall be 3/8-inch +/- 1/8-inch. Vertical joints shall fall on the centerline of the unit below.

J. Lay masonry units plumb, true to line, and with accurately spaced level courses. Maximum variation from plumb and plan is ¼-inch in 10 feet.

K. Install bond beam where shown on the drawings using bond beam units. Reinforce as shown and fill with grout. Lap horizontal and vertical reinforcement 30 diameters or 18-inches whichever is greater.

L. Where bond beams are used for lintels, extend at least 24-inches or 40 bar diameters, whichever is greater, past the opening.

M. Place rebar positioners to hold vertical reinforcement away from CMU cell walls.

N. Provide weep holes (0.1 to 0.2 square inches) 32-inches on center in bottom course head joint immediately above the base flashing. Provide screening or other means to prevent Perlite

insulation from displacing through weep holes.

O. Cells with reinforcement shall be grouted full. All other cells shall be filled with insulation.

P. Use smooth blocks at bottom course, top course, and course above window and door openings. All other courses to be one textured face split face with smooth side to the interior of building.

Q. When grouting is stopped for one hour or longer, horizontal construction joints shall be formed by stopping the pour of grout not less than ½-inch below the top of the uppermost unit grouted. Clean exposed surface of loose material prior to restarting pour.

3.04 REINFORCEMENT AND ANCHORAGE

A. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend reinforcement a minimum of 24-inches beyond each side of opening.

B. Place continuous joint reinforcement in first and second joint below top of walls.

C. Place reinforcing bars as indicated on drawings. Support and secure bars from displacement; maintain within ½-inch of dimensioned position.

D. Reinforcing shall be secured against displacement prior to grouting by wire positioners or other suitable devices at intervals not to exceed 200 bar diameters.

3.05 FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.

1. Extend flashings full width at such interruptions and at least 4 inches into adjacent masonry or turn up at least 4 inches to form watertight pan. At interior exposed locations, turn up 1-inch to form pan.
2. Remove or cover protrusions or sharp edges that could puncture flashings.
3. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Extend metal flashings through exterior face of masonry and turn down to form drip. When EPDM is used as flashing, provide stainless steel drip edge at exterior.

C. Lap end joints of flashings at least 4 inches and seal watertight with mastic or elastic sealant.

3.06 ADJUSTING AND CLEANING

A. Remove excess mortar and mortar smears as work progresses; replace defective mortar with mortar matching adjacent work.

B. Clean soiled surfaces with cleaning solution, using non-metallic tools. Ensure solution compatibility with painting requirements.

C. At end of each days work, and after final pointing, clean all exposed masonry by dry brushing. Protect walls overnight during inclement weather.

3.07 PAINTING

A. Paint block per Division 9.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT – Schedule I Pump Station No. 4 Replacement

A. Cost for work and materials in this Section shall be included as a portion of the lump sum bid amount for the Project as stated on the Bid Form. No separate measurement for work in this Section will occur

END OF SECTION

DIVISION 5- METALS
TABLE OF CONTENTS

SECTION 05080 – HOT-DIP ZINC COATING

PART 1 GENERAL

1.01 WORK INCLUDED

A. Specifications for applying protective coating to structural metals, anchor bolts, fasteners, and other metal hardware.

1.02 DESIGN REQUIREMENTS

A. As specified herein.

1.03 REFERENCES

A.	ASTM A123-89	Zinc (hot-dip galvanized) Coatings on Iron and Steel Products
B.	ASTM A143-74	Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
C.	ASTM A153-82	Zinc Coating (hot-dip) on Iron and Steel Hardware
D.	ASTM A384-76	Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies
E.	ASTM A385-80	Providing High-Quality Zinc Coatings (hot-dip)
F.	ASTM A780-80	Repair of Damaged Hot-Dip Galvanized Coatings
G	MILSPEC DOD-P-21035-78	Paint, High Zinc Dust Content, Galvanizing Repair

1.04 SUBMITTALS

A. Manufacturer's product data showing conformance to specified product.

B. Manufacturer's recommendation for application of zinc dust-zinc oxide coating.

C. Coating applicator's Certificate of Compliance that the hot-dip galvanized coating meets or exceeds the specified requirements.

1.05 QUALITY ASSURANCE

A. Coating systems to protect components from corrosion and other environmental degradation. System shall result in a consistent product in quality and appearance.

1.06 DELIVERY, STORAGE AND HANDLING

A. Manufactured materials shall be delivered in original, unbroken packages bearing the label of the manufacturer.

B. All materials shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.

PART 2 PRODUCTS

2.01 Zinc Oxide Coating Systems

A. Zinc coating material shall be as specified in ASTM A153.

B. Zinc dust-zinc oxide coating shall conform to MILSPEC DOD-P-21035. Coating shall be as manufactured by Z. R. C. Chemical Products, Galvicon Company or approved equal.

C. Coating weights shall conform to ASTM A123 or Table 1 of ASTM A153, as appropriate.

PART 3 EXECUTION

3.01 WORKMANSHIP

A. Steel members, fabrications and assemblies shall be galvanized after fabrication in accordance with ASTM A123.

B. Anchor bolts and nuts shall be stainless steel unless noted otherwise.

C. Where zinc coating has been damaged after installation, substrate surface shall be first cleaned and then repaired with zinc dust-zinc oxide coating in accordance with ASTM A780. Coating shall consist of multiple coats to dry film thickness of eight (8) mils.

D. Items not physically damaged, but which have insufficient or deteriorating zinc coatings, and items damaged in shipment or prior to installation, shall be removed from the project site for repair by the hot-dip zinc coating method.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

1. Payment for Hot-Dip Zinc Coating in the Section shall be included within the lump sum basis for the amount stated on the Bid Form for the Project. No separate measurement or payment will be made for these quantities and items.

B. Schedule II – Sewer Pipe and Forcemain

1. Payment for Hot-Dip Zinc Coating in this Section shall be included within the respective unit prices for each type of pipe, manholes, services and associated appurtenance items. No separate measurement or payment will be made for these quantities and items.

END OF SECTION

SECTION 05090 – ANCHOR BOLTS AND FASTENERS

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section shall include furnishing and installing anchor bolts, screws, and other fasteners, complete with washers and nuts as shown on the Plans or specified or as required for proper anchorage of equipment and materials.

1.02 DESIGN REQUIREMENTS

A. Fasteners and bolts shall have sufficient strength for the intended location and use. Equipment anchorage fasteners shall be included in a code approved published report (ie. ICBO Evaluation Report, or ICC ER) showing tested strength values and compliance with current IBC.

1.03 REFERENCES

A.	ASTM A58.1-82	Minimum Design Loads for Buildings and Other Structures
B.	ASTM A36/A36M-89	Structural Steel
C.	ASTM A307-90	Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
D.	ASTM A320-A320M-88	Alloy-Steel Bolting Materials for Low Temperature Service
E.	IBC	International Building Code, Latest Edition
F.	ICBO	International Conference of Building Officials
G.	ICC-ES	ICC Evaluation Service, Inc.

1.04 SUBMITTALS

A. Manufacturer's product data showing conformance to specified product requirements.

B. Data indicating load capacities, chemical resistance, and temperature limitations.

C. Installation instructions

D. Evaluation report from ICC-ES for the particular brand of anchors to be used showing load capacities and compliance with the 2006 IBC.

PART 2 PRODUCTS

2.01 General

A. All anchor bolts and fasteners shall be stainless steel unless noted otherwise.

C. Anchor bolt holes in equipment support frames shall not exceed the bolt diameters by more than 15 percent, up to a limiting maximum oversizing of 1/8-inch. Unless otherwise specified, or shown in the drawings, minimum anchor bolt diameter shall be ½ inch.

D. Tapered washers shall be provided where mating surface is not square with the nut. Flat washers required all other places. Nuts and washers shall be same material as bolts.

2.02 Bolts, Nuts, Washers

A. Bolts. ASTM A320, Type 304 or 316, Stainless Steel, B8 or B8M Class 1 or 2

B. Nuts and Washers. ASTM A194, Grade 8, 304 or 316 stainless steel.

2.03 Wedge-Type Mechanical Anchor Bolts (Into Solid Concrete)

A. Wedge anchors shall have a stainless steel split expansion ring and a threaded stud bolt body and integral cone expander, nut and washer. Anchor bodies, nuts, and washers shall be type 304 or 316 stainless steel.

B. The exposed end of the anchor shall be stamped to identify anchor length. Stampings should be preserved during installation for any subsequent embedment verification.

C. Anchors shall be tested to ASTM E488 criteria and listed by ICC (formerly ICBO).

D. Approved products include: ITW Red Head Trubolt; Hilti Kwik Bolt 3; or approved equal.

2.04 Sleeve-Type Mechanical Anchor Bolts (Into Hollow Concrete Block)

A. Sleeve type anchors with split expansion sleeve over a threaded stud bolt body and integral expander, nut and washer. Anchor bodies, nuts, and washers shall be type 304, 316, or 18-8 stainless steel.

B. The exposed end of the anchor shall be stamped to identify anchor length. Stampings should be preserved during installation for any subsequent embedment verification.

C. Anchors shall be tested to ASTM E488 criteria and listed by ICC (formerly ICBO).

D. Approved products include: ITW Red Head Dynabolt; Hilti HLC Sleeve Anchor; or approved equal.

2.05 Adhesive Anchor Bolts

A. Threaded Rod. ASTM F-593 CW stainless steel threaded rod, type 304 or 316. Nuts shall be stainless steel conforming to ASTM F-594. Washers shall be stainless steel conforming to ASTM A-240, AISA 304, and ANSI B18.22.1. Rod to have a minimum yield strength (f_y) of 65,000 psi in 3/8" to 5/8" diameter and 45,000 psi in 3/4" to 1-1/4" diameter.

B. Where exposed to potable water (tank interiors, etc.), adhesive shall be listed as compliant with NSF/ANSI Standard 61.

C. Epoxy Adhesive. Two component, 100% solid (no solvents), non-sag paste, insensitive to moisture. Meets ASTM C881-90, Type IV, Grade 3, Class A, B, and C with the exception of gel time. Shrinkage during cure per ASTM D2566: .00051 in./in. maximum. Compressive strength, ASTM D695: 10,300 psi minimum. Water solubility: None. Heat deflection temperature, ASTM D648: 140°F minimum.

D. Approved products include: Threaded Rod – Hilti HAS Stainless Steel or approved equal; Adhesives – ITW Red Head C6; Hilti HIT RE 500; or approved equal.

2.06 Lag Bolts/Screws

A. Hex head 18-8 or 304 stainless steel with washers.

2.07 Toggle Bolts

A. Use only where lag screws cannot be secured to wood wall studs.

2.08 Nails

A. All nails used shall be hot-dip galvanized.

PART 3 EXECUTION

3.01 WORKMANSHIP

A. Expansion, wedge or adhesive anchors set in holes drilled in the concrete after the concrete is placed will not be permitted in substitution for cast-in-place anchor bolts except where otherwise specified. Upset threads shall not be acceptable.

B. Fieldwork, including cutting and threading, shall not be permitted on galvanized items. Dissimilar metals shall be protected from galvanic corrosion by means of pressure tapes, coatings or phenolic washers.

C. Use carbide tipped hammer drill bits made in accordance to ANSI B212.15-1994 to install anchors.

D. Cast In-Place Anchor Bolts

1. Anchor bolts to be embedded in concrete shall be placed accurately and held in correct position while the concrete is placed or, if specified, recesses or blockouts shall be formed in the concrete and the metalwork shall be grouted in place.

2. After anchor bolts have been embedded, their threads shall be protected by grease and the nuts run on.

E. Adhesive Anchor Bolts

1. Use of adhesive or capsule anchors shall be subject to the following conditions:

a. Use shall be limited to locations where exposure, on an intermittent or continuous basis, to acid concentrations higher than 10 percent, or to machine or diesel oils, is extremely unlikely.

b. Use shall be limited to applications where exposure to fire or exposure to concrete or rod temperature above 120 degrees F. is extremely unlikely. Overhead applications (such as pipe supports) because of the above concerns, shall be disallowed.

c. Approval from Engineer for specific application and from supplier of equipment to be anchored, if applicable.

d. Anchor diameter and grade of steel shall be per Contract Documents or per equipment supplier specifications. Anchor shall be threaded or deformed full length of embedment and shall be free of rust, scale, grease and oils.

e. Embedment depth shall be as specified. Adhesive capsules of different diameters may be used to obtain proper volume for the embedment, but no more than two (2) capsules per anchor may be used. When installing different diameter capsules in the same hole, the larger diameter capsule shall be installed first. Any extension or protrusion of the capsule from the hole is prohibited.

f. All installation recommendations by the anchor system manufacturer shall be followed carefully, including maximum hole diameter.

g. Holes shall have rough surfaces, such as can be achieved using a rotary percussion drill.

h. Holes shall be blown clean with compressed air and be free of dust or standing water prior to installation.

i. Anchor shall be left undisturbed and unloaded for full adhesive curing period.

j. Concrete temperature (not air temperature) shall be compatible with curing requirements of adhesives per adhesive manufacturer.

F. Expansion Anchors

1. Use of expansion or wedge type anchors shall be subject to same conditions in as epoxy (adhesive) anchors as applicable.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

a. Payment for Anchor Bolts and Fasteners in the Section shall be included within the lump sum basis for the amount stated on the Bid Form for the Project. No separate measurement or payment will be made for these quantities and items.

B. Schedule II – Sewer Pipe and Forcemain

a. Payment for Anchor Bolts and Fasteners in this Section shall be included within the respective unit prices for each type of pipe, manholes, services and associated appurtenance items. No separate measurement or payment will be made for these quantities and items.

END OF SECTION

SECTION 05095 – METAL ARCHITECTURAL PRODUCTS

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section shall include furnishing and installing column bases, beam hangers, beam to column ties, and other architectural products, complete with fasteners as shown on the Plans or specified or as required for proper anchorage of equipment and materials.

1.02 DESIGN REQUIREMENTS

A. Architectural products and fasteners shall have sufficient strength for the intended location and use.

1.03 SUBMITTALS

A. Manufacturer's product data showing conformance to specified product requirements.

B. Data indicating load capacities, fastening requirements and coating information.

C. Installation instructions.

PART 2 PRODUCTS

2.01 General

A. All architectural products shall be galvanized or flat black powder coated steel unless noted otherwise.

2.02 Beam to Column Tie

A. Minimum 3/8" steel construction.

B. Minimum dimensions: 10" wide x 7" deep

C. Minimum 3/4" diameter bolt holes, 4 per tie

D. Minimum 20,000 pounds bearing load.

E. Ties shall be embedded into concrete column with a minimum of three (3) #6 rebar ties.

F. Simpson Strong Tie HGLBC; or equal.

2.03 Hurricane ties

A. Install Contractor's choice of tie which meets OSSC 2010 code requirements.

PART 3 EXECUTION

3.01 WORKMANSHIP

A. Install in accordance with manufacturer's instructions. Follow code requirements for product and installation.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

a. Payment for Metal Architectural Products in the Section shall be included within the lump sum basis for the amount stated on the Bid Form for the Project. No separate measurement or payment will be made for these quantities and items.

END OF SECTION

SECTION 05430 – SLOTTED CHANNEL FRAMING (STRUT SYSTEMS)

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Continuous slot, bolted metal framing channels and all associated fittings and hardware.

B. Trapeze type supports for cable tray, conduit, pipe and other similar systems.

C. Use of bolted metal framing as a surface metal raceway.

1.02 REFERENCES

A. ASTM A123 - Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip

B. ASTM A653 - General Requirements for Steel Sheet, Zinc-Coated Galvanized by the Hot-Dip Process

C. ASTM A1011 - Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formablility *(Formerly ASTM A570)*

D. ASTM F1136 – Standard Specification for Chromium/Zinc Corrosion Protective Coatings for Fasteners

E. ASTM A907 - Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Carbon, Hot-Rolled, Structural Quality

F. ASTM B633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel

G. MFMA - Metal Framing Manufactureres Association

H. ANSI/NFPA 70– National Fire Protection Association (National Electrical Code)

I. AISI - American Iron and Steel Institute

1.03 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in the manufacture of bolted metal framing of the types required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. MFMA Compliance: Comply with the latest revision of MFMA Standards Publication Number MFMA-3, "Metal Framing Standards Publication".

C. NEC Compliance: Comply with the latest revision NFPA 70 - Article 352 "Surface Metal Raceways and Surface Nonmetallic Raceways".

D. UL Compliance: Comply with UL "Standard for Surface Metal Raceway and Fittings", UL 5.

E. Bolted framing channels and fittings shall have the manufacturers name, part number, and material heat code identification number stamped in the part itself for identification.

Material certification sheets and test reports must be made available by the manufacturer upon request.

F. Stainless steel bolted framing parts shall be stamped to identify the material. Material certification sheets and test reports must be made available by the manufacturer upon request.

1.04 SUBMITTALS

A. Submit drawings of strut and accessories including clamps, brackets, hanger rods, and fittings.

B. Submit manufacturer's product data on strut channels including, but not limited to, types, materials, finishes, gauge thickness, and hole patterns. For each different strut cross-section, submit cross sectional properties including Section Modulus (S_X) and Moment of Inertia (I_X).

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver strut systems and components carefully to avoid breakage, denting, and scoring finishes. Do not install damaged equipment.

B. Store strut systems and components in original cartons and in clean dry space; protect from weather and construction traffic.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Manufacturer: Subject to compliance with these specifications, strut systems to be installed shall be as manufactured by Cooper B-Line, Inc.; Unistrut; or engineer approved equal.

2.02 STRUT CHANNELS AND COMPONENTS

A. General: Strut shall be 1-5/8 x 1-5/8 inches x 12 gauge in varying heights and welded combinations as required to meet load capacities and designs indicated on the drawings.

B. Materials and Finish: Material and finish specifications shall meet one of the following:

1. Epoxy Painted: Strut shall be made from steel meeting the minimum mechanical properties of ASTM A1011 SS Grade 33, then painted with green water born epoxy applied by a cathodic electro-deposition process. Fittings shall be manufactured from steel meeting the minimum requirements of ASTM A907 SS, Grade 33, and epoxy painted or hot-dip galvanized. All hardware shall be stainless steel Type 304 or Type 316.

2. Hot-dip Galvanized Steel: Strut shall be made from steel meeting the minimum mechanical properties of ASTM A1011 SS, Grade 33 and shall be hot-dip galvanized after fabrication in accordance with ASTM A123. Fittings shall be manufactured from steel meeting the minimum requirements of ASTM A907 SS, Grade 33, and hot-dip galvanized after fabrication in accordance with ASTM A123. All hardware shall be stainless steel Type 304 or Type 316. All hot-dip galvanized after fabrication products must be returned to point of manufacture after coating for inspection and removal of all sharp burrs.

3. Stainless Steel: All strut, fittings and hardware shall be made of AISI Type 304 or type 316 stainless steel.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install strut in accordance with MFMA-102 'Guidelines for the Use of Metal Framing'; in accordance with equipment manufacturer's recommendations, and with recognized industry practices.

B. All nuts and bolts shall be tightened to the following values or as recommended by manufacturer.

Bolt Size	Torque (ft-lbs)
1/4 - 20	6
5/16 - 18	11
3/8 - 16	19
1/2 - 13	50

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

a. Payment for Slotted Channel Framing and other work in this section shall be included as a portion of the lump sum price for the project as stated in the Bid Form for the Project. No separate measurement for these quantities will occur.

END OF SECTION

DIVISION 6- WOOD
TABLE OF CONTENTS

SECTION 06100 – ROUGH CARPENTRY

PART 1 GENERAL

1.01 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The most recently issued codes and publications shall apply.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B18.6.1	(1981; R 1997) Wood Screws (Inch Series)

APA - THE ENGINEERED WOOD ASSOCIATION (APA)

APA E30	(1996) Design/ Construction Guide, Residential and Commercial

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A307	(2000) Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
ASTM A563	Standard Specification for Carbon and Alloy Steel Nuts

AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)

AWPA C1	(1996) All Timber Products – Preservative Treatment by Pressure Processes
AWPA C2	(1996) Lumber, Timber, Bridge Ties and Mine Ties - Preservative Treatment by Pressure Processes
AWPA C9	(1996) Plywood - Preservative Treatment by Pressure Processes
AWPA M2	(1996) Inspection of Treated Wood Products
AWPA M6	(1996) Brands Used on Forest Products

FEDERAL SPECIFICATIONS (FS)

FS FF-B-588	(Rev. E) Bolt, Toggle: and Expansion Sleeve, Screw
FS FF-N-105	(Rev. B) (Int Amd. 4) Nails, Brads, Staples and Spikes: Wire, Cut and Wrought
FS FF-S-325	(Int Amd. 3) Shield, Expansion, Nail Expansion, and Nail, Drive Screw (Devices, Anchoring, Masonry)
FS FF-W-92	Flat Washers

OREGON STRUCTURAL SPECIALTY CODE (OSSC)

OSSC	(2010) Oregon Structural Specialty Code

U. S. DEPARTMENT OF COMMERCE, TECHNOLOGY ADMINISTRATION
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

PS 1	(1995) Construction and Industrial Plywood
PS 2	(1992) Performance Standard for Wood-Based Structural-Use Panels
PS 20	(1999) American Softwood Lumber Standard

WEST COAST LUMBER INSPECTION BUREAU (WCLIB)

WCLIB 17	(1996; Supp. VII and VIII) Standard Grading and Dressing Rules for Douglas Fir, Western Hemlock, Western Red Cedar, White Fir, Sitka Spruce Lumber

WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)

WWPA GRWL	1983 Western Woods Use Book - Chapter III – WWPA Grading Rules for Western Lumber

NATIONAL FOREST PRODUCTS ASSOCIATION (NFOPA)

NFOPA-03	(1988) Manual for House Framing

1.02 SUBMITTALS

A. The following shall be submitted in accordance with Section 01300, Submittals:

1. SD-07, Certificates – Certificates of grade

2. SD-11, Factory Test Reports – Preservative-treated lumber and plywood

1.03 DELIVERY AND STORAGE

A. Deliver materials to the site in an undamaged condition.

B. Store materials off the ground to provide proper ventilation, with drainage to avoid standing water, and protection against ground moisture and dampness.

C. Store materials with a moisture barrier at both the ground level and as a cover forming a well ventilated enclosure. Remove defective and damaged materials and provide new materials.

1.04 GRADING AND MARKING

A. Lumber – Mark each piece of framing and board lumber or each bundle of small pieces of lumber with the grade mark of a recognized association or independent inspection agency. Such association or agency shall be certified by the Board of Review, American Lumber Standards Committee, to grade the species used.

B. Plywood – Mark each sheet with the mark of a recognized association or independent inspection agency that maintains continuing control over the quality of the plywood. The

mark shall identify the plywood by species group or span rating, exposure durability classification, grade, and compliance with PS-1.

C. Preservative-Treated Lumber and Plywood – The Contractor shall be responsible for the quality of treated wood products. Each treated piece shall be inspected in accordance with AWPA M2 and permanently marked or branded, by the producer, in accordance with AWPA M6. The AWPB Quality Mark "LP-2" or LP-22" on each piece also will be accepted as evidence of compliance with applicable AWPA treatment standards.

1.05 SIZES AND SURFACING

A. Comply with PS-20 for dressed sizes of yard lumber. Lumber shall be surfaced four sides. Size references, unless otherwise specified, are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which the product is produced.

1.06 MOISTURE CONTENT

A. Air-dry or kiln-dry lumber. Kiln-dry treated lumber after treatment. Maximum moisture content of wood products shall be as follows at the time of delivery to the job site:

1. Framing lumber and boards - 19 percent maximum

2. Materials other than lumber - Moisture content shall be in accordance with standard under which the product is produced

1.07 PRESERVATIVE TREATMENT

A. Treat lumber and timber in accordance with AWPA C1 and AWPA C2, and plywood in accordance with AWPA C1 and AWPA C9. All wood shall be air or kiln dried after treatment. Specific treatments shall be verified by the report of an approved independent inspection agency, or the AWPA Quality Mark on each piece. Do not incise surfaces of lumber that will be exposed. Brush coat areas that are cut or drilled after treatment with either the same preservative used in the treatment or with a 2 percent copper naphthenate solution. The following items shall be preservative treated:

1. Wood framing, blocking, and plywood
2. Wood sills, soles, plates, furring, and sleepers, furring and nailers that are set into or in contact with concrete or masonry.
3. Nailers, edge strips, crickets, curbs, and cants for roof decks.

1.08 QUALITY ASSURANCE

A. Certificates of Grade – Submit certificates attesting that products meet the grade requirements specified in lieu of grade markings where appearance is important and grade marks will deface material.

PART 2 PRODUCTS

2.01 WOOD MATERIALS

A. Framing lumber, cant strips, sleepers, furring, sub-fascias, nailing strips, and nailers and board lumber such as subflooring and wall and roof sheathing shall be one of the species listed in the table below. Minimum grade of species shall be as listed.

B. Table of Grades for Framing and Board Lumber

Grading Rules	Species	Framing	Board Lumber
WWPA WLGR Standard grading rules	Douglas Fir-Larch Douglas Fir South Hem-Fir Ponderosa Pine – Sugar Pine Ponderosa Pine – Lodgepole Pine Subalpine Fir White Woods	All Species: Standard Light Framing or No. 3 Structural Light Framing 2x4 nominal size, (Stud Grade for 10-ft and shorter)	All Species: No. 3 Common
WCLIB 17 Standard grading rules	Douglas Fir-Larch Hem-Fir	All Species: Standard Light or No. 3 Structural Light Framing (Stud Grade for 2x4 nominal size, 10-ft and shorter)	All Species: Standard

C. Plywood Sheathing – Unless specified otherwise, Plywood sheathing shall be tongue-and-groove exterior grade sheathing, 5/8-inch minimum thickness, grade stamped "C-C Ext-DFPA," and manufactured in accordance with NIST PS 1, Group 1.

2.02 ANCHORAGE AND FASTENER MATERIALS

A. Nails and Staples – Nails, staples, and tacks shall conform to FS FF-N-105. Nails for fastening interior wood partitions or rough framing shall be steel wire nails. Nails for roof blocking, cants, and nailers shall be galvanized. Nails used to fasten exposed wood fascias or finished wood members exposed to the weather shall be aluminum alloy or galvanized finishing nails. Power-driven staples shall be galvanized Type III, Style 3.

B. Bolts, Nuts and Screws – Bolts, including non-headed anchor bolts, shall be carbon steel, galvanized, conforming to ASTM A307, Grade A. Nuts shall be carbon steel, galvanized, conforming to ASTM A563. Wood screws shall be carbon steel, galvanized, conforming to ANSI B18.6.1. Expansion shields, expansion nails, and drive screw devices shall conform to FS FF-S-325. Toggle bolts shall conform to FS FF-B-588. Washers shall be carbon steel, galvanized, general assembly purpose type, conforming to FS FF-W-92, Type A, Grade I, Class A.

C. Bar or Strap Anchors – Bar or strap anchors shall be steel conforming to ASTM A36/A36M. Hot-dip galvanized coating shall be in accordance with ASTM A525, G90.

PART 3 EXECUTION

3.01 INSTALLATION

A. General – Members shall be framed for the passage of ducts and pipes and shall not be cut, notched, or bored more than one quarter of their depth without approved reinforcement. Washers shall be provided under bolt heads or nuts in contact with wood. Lumber shall be bored to receive bolts. Nailers, blocking, and furring shall be furnished in lengths that minimize joints.

B. Interior Wood Partitions – Wood partitions shall be framed with 2x4 studs spaced 16 inches on center, unless otherwise indicated. Framing shall be closely fitted, accurately constructed to true plane lines and levels, and rigidly secured in place in conformance with NFOPA-03. Partition plates shall be secured to concrete floor with anchor bolts, expansion sleeves, and lag bolts. Powder-driven fasteners may be used. One anchor shall be provided near each end of the partition plate and at intermediate intervals at a maximum spacing of 4 feet on center. Studs shall be doubled at openings. Headers shall consist of two pieces of nominal 2-inch framing lumber set on edge and nailed together. Depth of header shall be determined in accordance with the NFOPA-03, except that the span for a header of two 2x4's shall not exceed 3 feet. Corners shall be constructed of not less than three studs. End studs of partitions abutting concrete or masonry shall be anchored thereto with 1/2-inch expansion bolts, one near each end and at intermediate maximum intervals of 4 feet, or with powder-driven threaded fasteners, same size and spacing. Rough wood bucks and frames shall be anchored to masonry and concrete with 3/16-inch by 1-1/4-inch steel straps, turned up 2 inches at ends and extending not less than 4 inches into concrete masonry units or concrete. Anchors shall be placed near top and bottom of each buck and frame and at intermediate intervals of 3-feet maximum. Partitions shall have two top plates and a single bottom plate with one continuous row of horizontal wood blocking the full width of the partition, wedged and nailed in place at mid-height. Partitions shall be framed for the installation of the facing material, trim, cabinets, plumbing, and other work. Blocking and nailers, of not less than 1x4 stock, shall be cut to fit horizontally and vertically between framing and nailed thereto to receive finished wall material. Solid blocking shall be provided at locations required for installation of wall-mounted cabinets, shelves, fixtures, and equipment.

C. Blocking, Cant Strips, and Nailers – Nailing strips, blocking, cant strips, and sub fascia wood members shall be continuous, cut with square ends and in maximum practical lengths. For bolted connections, sub-fascia members shall be fastened to concrete or concrete masonry units with 1/2-inch bolts at a maximum spacing of 4 feet on center, one bolt near each end of the member. Bolt heads shall be countersunk flush with the surface of the wood. Sub-fascia members shall be held to a tolerance of 1/8 inch in 10 feet. Wood cant strips shall be not less than 4-inches long and set at projections through the roof deck, expansion joints, and fascias. Perimeter roof blocking shall have screened holes providing a net open area equivalent to at least 10 percent of the edge face to provide ventilation for insulation.

D. Wood Furring – Furring strips shall be erected plumb and rigid, using wood shims wherever necessary to adjust the face of the furring to a true, even plane to receive finish materials. Exterior masonry walls shall be furred to receive or dry-wall finish. Furring shall be 1x3 continuous strips, 16 inches on center, installed vertically. Furring shall be secured to concrete with nailing plugs, clips, or masonry nails. Fasteners shall be provided at top and bottom and at 24 inches on center, minimum. Furring strips fastened to concrete masonry units shall be secured by toggle bolts, anchor bolts, or screw expansion sleeves.

E. Wood Sheathing – Plywood sheathing shall be of indicated thickness and installed in accordance with APA E30. Nailing shall conform to the nailing schedule per OSSC Chapter 23, unless otherwise shown on the drawings.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

1. Payment for Rough Carpentry and other work in this section shall be included as a portion of the lump sum price for the project as stated in the Bid Form for the Project. No separate measurement for these quantities will occur.

END OF SECTION

SECTION 06173 – WOOD TRUSSES

PART 1 GENERAL

1.01 WORK INCLUDED

A. This section includes all work associated with furnishing and placing prefabricated metal-plate-connected wood trusses as shown on the drawings and as indicated by the requirements of this section.

1.02 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract (including General and Supplementary Conditions and Division 1 sections) apply to the work of this section.

1.03 RELATED SECTIONS

A. Section 06100 – Rough Carpentry

1.04 DESIGN CRITERIA

A. Trusses should be capable of withstanding design loads indicated without exceeding ANSI/TPI 1 deflection limits.

1. Where gypsum board ceilings are hung directly from trusses, limit live load deflection to 1/360th of span.

1.05 QUALITY ASSURANCE AND REGULATORY REQUIREMENTS

A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with TPI quality-control procedures for manufacture of connector plates published in TPI 1.

1. Manufacturer's responsibilities include preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that involves inspection by SPIB, Timber Products Inspection, TPI, or other independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.

C. Comply with ANSI/TPI 1, "National Design Standard for Metal Plate Connected Wood Truss Construction," and TPI HIB, "Commentary and Recommendations for Handling, Installing & Bracing Metal Plate Connected Wood Trusses."

D. Wood Structural Design Standard: Comply with applicable requirements in AFPA's "National Design Specifications for Wood Construction" and its "Supplement."

1.06 SUBMITTALS

A. Submit Product Data: For metal-plate connectors, metal framing anchors, bolts, and fasteners indicated.

B. Submit Shop Drawings: Show location, pitch, span, camber, configuration, and spacing for each type of truss required; species, sizes, and stress grades of lumber; splice details;

type, size, material, finish, design values, orientation, and location of metal connector plates; and bearing details.

1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Submit Qualification Data for the following:

1. Metal-plate manufacturer.
2. Fabricator.

D. Research/Evaluation Reports for the following:

1. Metal-plate connectors.
2. Metal framing anchors.

1.07 DELIVERY AND STORAGE

A. Store trusses on job site in accordance with manufacturer's instructions. Provide bearing supports and bracings to prevent bending or overturning of trusses during transit and storage.

PART 2 PRODUCTS

2.01 DIMENSION LUMBER

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.

B. Grade and Species: Any species for truss chord and web members, graded visually or mechanically, and capable of supporting required loads without exceeding allowable design values according to AFPA's "National Design Specifications for Wood Construction" and its "Supplement."

2.02 METAL PRODUCTS

A. Metal Connector Plates: Fabricate connector plates to comply with ANSI/TPI 1 from hot-dip galvanized steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation; Designation SS, Grade 33, and not less than 0.036 inch (0.9 mm) thick.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Alpine Engineered Products, Inc.
b. CompuTrus, Inc.
c. Eagle Metal Products.
d. Jager Industries, Inc.
e. Mitek Industries, Inc.
f. Robbins Manufacturing Company.
g. TEE-LOK Corporation.
h. Truswal Systems Corporation.

B. Fasteners: Where trusses are exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

1. Nails, Wire, Brads, and Staples: FS FF-N-105.
2. Power-Driven Fasteners: CABO NER-272.
3. Wood Screws: ASME B18.6.1.
4. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).
5. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

C. Metal Framing Anchors: Provide framing anchors made from hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Alpine Engineered Products, Inc.
b. Cleveland Steel Specialty Co.
c. Harlen Metal Products, Inc.
d. KC Metals Products, Inc.
e. Silver Metal Products, Inc.
f. Simpson Strong-Tie Company, Inc.
g. Southeastern Metals Manufacturing Co., Inc.
h. United Steel Products Company, Inc.

2. Allowable Design Loads: Meet or exceed those indicated per manufacturer's published values determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.03 FABRICATION

A. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.

PART 3 EXECUTION

3.01 INSTALLATION

A. Lifting points, as indicated, shall be used to hoist trusses into position. Exercise care to prevent out-of-plane bending of trusses.

B. Install and brace trusses according to ANSI/TPI 1 recommendations and as indicated. Install trusses plumb, square, and true to line and securely fasten to supporting construction.

C. Anchor trusses securely at bearing points; use metal framing anchors. Install fasteners through each fastener hole in metal framing anchor according to manufacturer's fastening schedules and written instructions.

D. Securely connect each truss ply required for forming built-up girder trusses. Anchor trusses to girder trusses as indicated.

E. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.

1. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.

F. Install wood trusses within installation tolerances of ANSI/TPI 1.

G. Do not cut or remove truss members.

H. Return wood trusses that are damaged or do not meet requirements to fabricator and replace with trusses that do meet requirements.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

1. Payment for Wood Trusses and other work in this section shall be included as a portion of the lump sum price for the project as stated in the Bid Form for the Project. No separate measurement for these quantities will occur.

END OF SECTION

DIVISION 7- THERMAL AND MOISTURE PROTECTION
TABLE OF CONTENTS

SECTION 07410 - METAL ROOF PANELS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Factory-formed Standing seam metal roofing. Metal roofing system includes:

1. Snap-On Standing Seam Panels
2. Ridge Vents
3. All related flashing, clips, and accessories as required for complete system

B. Related Sections: Section(s) related to this section include:

1. Joint Sealants: Section 07920.
2. Gutters and downspouts: Section 07715.

1.02 REFERENCES

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

1. ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
3. ASTM E283 Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
4. ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

B. Underwriters Laboratories, Inc. (UL):

1. UL 263 Fire Tests of Building Construction and Materials.
2. UL 580 Tests for Uplift Resistance of Roof Assemblies.
3. UL 790 Tests for Fire Resistance of Roof Covering Materials.

C. Sheet Metal and Air Conditioning Contractors National Association Inc. (SMACNA):

1. SMACNA Architectural Sheet Metal Manual.

1.03 SYSTEM DESCRIPTION

A. Performance Requirements: Provide sheet metal roofing which has been manufactured, fabricated and installed to withstand structural and thermal movement, wind loading and weather exposure to maintain manufacturer's performance criteria without defects, damage or failure of infiltration of water.

1. Wind-Uplift: Roof panel assembly shall comply with UL 580 for UL 90 rated assemblies.
2. Static Air Infiltration: Completed roof system shall have a maximum of 0.06 cfm/sf with 6.24 psf (299 Pa) air pressure differential as per ASTM E283.
3. Water Infiltration: No evidence of water penetration at an inward static air pressure differential of not less than 6.24 psf (299 Pa) and not more than 12 psf (575 Pa) as per ASTM E331.

1.04 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1

Submittal Procedures Section.

B. Product Data: Submit product data, including manufacturer's SPEC-DATA[a] product sheet, for specified products.

C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors and textures.

D. Samples: Submit selection and verification samples for finishes, colors and textures. Color to be selected by Owner from manufacturer's standard color selection.

E. Quality Assurance Submittals: Submit the following:

1. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and physical requirements.
2. Manufacturer's Instructions: Manufacturer's installation instructions.

F. Closeout Submittals: Submit the following:

1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals, Maintenance Data and Operation Data Section. Include methods for maintaining installed products, precautions against cleaning materials and methods detrimental to finishes and performance.
2. Warranty: Warranty documents specified herein.
3. Record Documents: Project record documents for installed materials in accordance with Division 1 Closeout Submittals (Project Record Documents) Section.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Installer shall be experienced in performing work of this section and should have specialized in the installation of work similar to that required for this project.

1. Installer shall have successfully completed at least three (3) installations.

B. Sheet Metal Industry Standard: Comply with Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Architectural Sheet Metal Manual.

C. Preinstallation Meetings: Conduct preinstallation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements.

1.06 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 1 Product Requirements Sections.

1. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Identify fabricated components with UL 90 label where appropriate.

C. Storage and Protection: Store materials protected from exposure to harmful conditions. Store material in dry, above-ground location.

1. Stack prefinished material to prevent twisting, bending, abrasion, scratching and denting. Elevate one end of each skid to allow for moisture runoff.
2. Prevent contact with material that may cause corrosion, discoloration or staining.

3. Do not expose to direct sunlight or extreme heat trim material with factory applied strippable film.
4. Damaged material shall be replaced prior to installation.

1.07 PROJECT CONDITIONS

A. Field Measurements: Verify actual measurements and openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.08 WARRANTY

A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under the Contract Documents.

B. Warranty Required: 20-year non-prorated warranty covering material finish, including color, fade, chalking and film integrity. Commences on Date of Substantial Completion.

PART 2 PRODUCTS

2.01 SHEET METAL ROOFING

A. Manufacturer: Petersen Aluminum Corporation or engineer approved equal.

1. Contact: 1005 Tonne Road, Elk Grove Village, IL 60007; Telephone: (800) 323-1960, (847) 228-7150; Fax: (800) 722-7150; website: www.pac-clad.com.

B. PAC-CLAD Snap-On Panels:

1. Type: Standing Seam.
2. Seam Height: 1" Seam Height or 1 1/2" Seam Height.
3. Material: 24 gauge G-90 hot-dipped galvanized panel.
4. Panel Dimension: 12" to 18" oc.
5. Texture: Smooth texture.
6. Rating: UL 90 rating (Wind uplift) panel assembly.
7. Flashing and Trim: HDG Steel, 22 gauge.
8. Fasteners: Nonpenetrating clip, manufacturer's standard.

C. PAC-CLAD Flashing and Trim: Manufacturer's standard flashing and trim profiles, factory formed, gauge as recommended by manufacturer, color and finish to match metal roofing panels.

D. Substitutions: May be considered when quality and warranty are equal to specified product. Submit for approval in timely manner to avoid delays. Coordinate with Division 1.

2.02 MATERIALS

A. Galvanized Steel Sheet: ASTM A653, G90 steel sheet, zinc coated (galvanized) by hot dip process, structural quality.

1. Thickness: 24 gauge and 22 gauge as indicated.

2.03 RELATED MATERIALS

A. General: Coordinate use of related materials:

1. Underlayment: ASTM D226, Type II No. 30 asphalt saturated organic roofing felt. Two layers required.
2. Plywood Deck: 5/8" nominal thickness, exterior grade.
3. Sealants: Elastomeric joint sealants.

2.04 FABRICATION

A. General:

1. Continuous Length: Fabricate panels 40' and less in one continuous length.
2. Trim and Flashings: Fabricate trim and flashings from same material as roof system material.
3. Portable Roll Former: Panels fabricated by portable roll former shall not be approved.

2.05 FINISHES

A. PAC-CLAD Factory Applied Finish:

1. Topside: Full-strength fluoropolymer (70% Kynar 500 or Hylar 5000 resin) system of 1.0 mil total dry film thickness.
2. Underside: Wash coat of 0.3 – 0.4 mil (0.008 – 0.010 mm) dry film thickness.
3. Texture: Smooth texture, dull matte specular gloss 25% – 35% at 60°.
4. Protective Film: Strippable vinyl film applied during panel fabrication and finishing.

B. COLORS

1. Submit manufacturer's color selection samples. At least 10 colors shall be available.
2. Color will be selected by Owner.

2.06 SOURCE QUALITY

A. Source Quality: Obtain sheet metal roofing from a single manufacturer.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, recommendations and installations instructions for substrate verification, preparation requirements and installation.

1. Strippable Film: Remove manufacturer's protective film, if any, from surfaces of roofing panels.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

3.03 PREPARATION

A. Coordination: Coordinate metal roofing with other Work (drainage, flashing and trim, deck substrates, parapets, copings, walls) and other adjoining work to provide a noncorrosive and leakproof installation.

B. Dissimilar Metals: Prevent galvanic action of dissimilar metals.

3.04 INSTALLATION

A. General: Install metal roofing panels to profiles, patterns and drainage indicated and required for leakproof installation. Provide for structural and thermal movement of work. Seal joints for leakproof installation.

1. Seams: Provide uniform, neat seams.
2. Fasteners: Conceal fasteners in exposed work. Cover and seal fasteners and anchors for watertight and leakproof installation.
3. Sealant-Type Joints: Provide sealant-type joint where indicated. Form joints to conceal sealant. Comply with Division 7 Joint Sealants Section for sealant installation.

3.05 FIELD QUALITY REQUIREMENTS

A. Site Tests (Post-Installation Testing): Owner reserves right to perform post-installation testing of installed sheet metal roofing.

3.06 CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose of debris.

3.07 PROTECTION

A. Protection: Protect installed product from damage during construction.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

1. Payment for Metal Roof Panels and other work in this section shall be included as a portion of the lump sum price for the project as stated in the Bid Form for the Project. No separate measurement for these quantities will occur.

END OF SECTION

SECTION 07715 – ALUMINUM GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes aluminum gutters, downspouts, drop outlets, elbows, end caps, miters, supports, straps, and other accessories and finish for a complete system.

B. Also included: Installation and testing.

1.02 REFERENCES

A. American Architectural Manufacturer Association (AAMA) Specification 1405.1: *Specification for Aluminum Gutters and Downspouts.*

1.03 SYSTEM DESCRIPTION

A. Downspouts at locations as shown on the Plans. Provide all necessary downspout straps and other items for a complete installation. System shall be free from leaks.

1.04 SUBMITTALS

A. Prior to ordering, submit manufacturer's data for approval. Include material compliance information, coating system, warranty, and finish.

B. Submit manufacturer's color samples for approval by City Engineer in accordance with Section 09900- Paint and Coatings.

PART 2 PRODUCTS

2.01 MATERIAL

A. Downspout shall be produced from 3105 H26P aluminum sheet with a minimum tensile strength of 29,000 psi and minimum yield strength of 25,000 psi.

1. Downspout, Downspout Strap, and Elbow Thickness: 0.027-inch minimum

2.02 SIZE AND STYLE

A. Downspouts shall be 2-inch by 3-inch rectangular corrugated.

2.03 FINISH

A. Both sides of the aluminum sheet shall be coated with a corrosion inhibiting primer or pretreatment system and an acrylic or polyester topcoat.

B. Topcoat finish shall be available in at least 10 different colors.

2.04 RELATED MATERIALS

A. Elastomeric Joint Sealant.

PART 3 EXECUTION

3.01 INSTALLATION

A. Before starting work, verify governing dimensions at site. Clean and prepare adjacent surfaces prior to securing gutters and downspouts. Install after exterior coating is applied, coordinate with paint contractor.

B. Downspouts shall be securely fastened to building at the top and bottom with intermediate supports spaced a maximum of 10-feet apart.

C. Provide downspout elbows as required.

3.02 PROTECTION

A. Care must be exercised in placing aluminum in contact with dissimilar materials. Aluminum shall not be installed in contact with dissimilar metals, concrete, pressure treated/pretreated lumber, masonry, or corrosive non-metallic materials. Dissimilar materials shall be painted or otherwise protected before contact with aluminum or when drainage from them passes over aluminum.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

1. Payment for Aluminum Gutters and Downspouts, and other work in this section shall be included as a portion of the lump sum price for the project as stated in the Bid Form for the Project. No separate measurement for these quantities will occur.

END OF SECTION

SECTION 07920 – JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Joint Sealants for interior and exterior surfaces

B. Flexible Joint Fillers

C. Backer Rods

1.02 RELATED SECTIONS

A. Section 03300 – Cast-In-Place Concrete

B. Section 07410 – Metal Roof Panels

C. Section 07715 – Aluminum Gutters and Downspouts

1.03 REFERENCES

A. ASTM C 834 - Standard Specification for Latex Sealants.

B. ASTM C 882 - Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.

C. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.

D. ASTM C 1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

E. ASTM C 1193 – Standard Guide for Use of Joint Sealants.

F. FS (Federal Specification) A-A-1556A (formerly TT-S-00227E) - Federal Specification for Sealing Compound: Elastomeric Type, Multi-Component (for Caulking, Sealing, and Glazing in Buildings and Other Structures).

G. FS (Federal Specification) TT-S-00230C - Federal Specification for Sealing Compound: Elastomeric Type, Single Component (for Caulking, Sealing, and Glazing in Buildings and Other Structures).

H. FS (Federal Specification) TT-S-001543 - Federal Specification for Sealing Compound: Silicone Rubber Base (for Caulking, Sealing, and Glazing in Buildings and Other Structures).

I. Sealant, Waterproofing and Restoration Institute (SWRI) – Sealant and Caulking Guide Specification.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Manufacturer's Technical Data Guides and application procedures.

C. Submit samples illustrating colors selected.

D. Submit laboratory tests or data validating product compliance with performance criteria specified.

E. Submit manufacturer's statement of product compatibility with intended use, and list of recommended products for each type of joint to be sealed.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company regularly engaged in manufacturing and marketing of products specified in this section.

B. Perform work in accordance with SWRI Guide Specifications and ASTM C 1193.

C. Installer Qualifications: Qualified to perform work specified by reason of experience or training provided by product manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in original factory packaging bearing identification of product, manufacturer, and batch number. Provide Material Safety Data Sheets for each product.

B. Store products in a location protected from freezing, damage, construction activity, precipitation, and direct sunlight in strict accordance with manufacturer's recommendations. Do not exceed product shelf-life.

C. Condition products to approximately 60 to 70 degrees F (16 to 21 degrees C) for use in accordance with manufacturer's recommendations.

D. Handle all products with appropriate precautions and care as stated on Material Safety Data Sheet.

1.07 PROJECT CONDITIONS

A. Do not use products under conditions of precipitation or freezing weather. Use appropriate measures for protection and supplementary heating to ensure proper curing conditions in accordance with manufacturer's recommendations if application during inclement weather occurs.

B. Ensure substrate is dry and prepared according to manufacturer's written recommendations.

C. Protect adjacent work from contamination due to mixing, handling, and application of flexible epoxy joint filler.

1.08 WARRANTY

A. Provide manufacturer's material warranty, five-years minimum.

B. Include coverage for replacement of sealant materials which fail to achieve water tight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

1. Sonneborn
2. GE
3. Dow Corning
4. Pecora
5. Tremco
6. WR Meadows

B. Provide all joint sealers of the same type from a single manufacturer.

C. Specification uses Sonneborn product names. Submit equal products for approval.

2.02 MATERIALS

A. Single Component, Non-Sag Polyurethane Sealant: ±25% movement capability for vertical joints; ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, A, G, and O; FS TT-S-00230C, Type II, Class A; USDA approved; SWRI validated; UL classified (fire resistance). Sonneborn "Sonolastic NP 1"

B. Two Component, Non-Sag Polyurethane Sealant: ±50% movement capability for vertical joints; ASTM C 920, Type M, Grade NS, Class 25, Use NT, T, G, A, M, and O; FS TT-S-00227E, Type II, Class A; USDA approved; SWRI validated; UL classified (fire resistance). Sonneborn "Sonolastic NP 2"

C. Single Component, Self-Leveling Polyurethane Sealant: ±25% movement capability for horizontal joints; ASTM C 920, Type S, Grade P, Class 25, Use T and M; FS TT-S-00230C, Type I, Class A; USDA approved. Sonneborn "Sonolastic SL 1"

D. Two Component, Self-Leveling Polyurethane Sealant: ±25% movement capability for horizontal joints; ASTM C 920, Type M, Grade P, Class 25, Use T and M; FS TT-S-00227E, Type I, Class A; USDA approved. Sonneborn "Sonolastic SL 2"

E. Siliconized Acrylic Latex Sealant: ASTM C 834; USDA compliant. Sonneborn "Sonolac".

F. UV Resistant Silicone Sealant: ASTM C 920, Type S, Grade NS, Class 25, Use NT, A, and M; FS TT-S-001543A, Type Non-Sag, Class A; FS TT-S-00230C, Type II, Class A; USDA approved; SWRI validated. Sonneborn "Omniseal".

G. Mildew Resistant Silicone Sealant: ±25% joint movement capability; ASTM C 920, Type S, Grade NS, Class 25, uses NT, G, and A; FS TT-S-001543A, Type Non-Sag, Class A; USDA approved; SWRI validated. Sonneborn "OmniPlus".

H. NSF Approved Polysulfide Sealant: ±25% joint movement capability; ASTM C 920, Type M, Grade NS, Class 25, Use T, G, M, A, and O; FS TT-S-00227E, Type II, Class A; USDA approved; ANSI/NSF Standard 61 Certified. Sonneborn "Sonolastic Polysulfide Sealant".

I. Poured Flexible Epoxy Joint Filler: Sonneborn "Epolith-P"; two component 100% solids epoxy joint filler with flexible, pourable, self-leveling properties.

1. Shore A Hardness: 85 ± 5.
2. Shore D Hardness: 34.

3. Elongation: 75%.
4. Tensile Strength: 655 psi (4.5 MPa) ±10 psi (0.07 MPa).
5. Mixing Ratio: 1 to 1 by volume.
6. Pot Life: 40 to 55 minutes at 75 degrees F (24 degrees C).
7. Cure Time, Foot Traffic: 4 hours.
8. Cure Time, Vehicular Traffic: 24 hours.
9. Application Temperature: Minimum 55 degrees F (13 degrees C).

J. Gunned Flexible Epoxy Joint Filler: Sonneborn "Epolith-G"; two component 100% solids, gun-grade epoxy joint filler with flexible, pick-proof properties for sloped areas.

1. Shore A Hardness: 90 ± 5.
2. Shore D Hardness: 50.
3. Elongation: 50%.
4. Tensile Strength: 900 psi (6.2 MPa) ±10 psi (0.07 MPa).
5. Slant Shear Strength: 865 psi (6.0 MPa) per ASTM C 882.
6. Slant Shear Strength: 112 psi (0.8 MPa) per ASTM C 321.
7. Mixing Ratio: 1 to 1 by volume.
8. Pot Life: 40 to 55 minutes at 75 degrees F (24 degrees C).
9. Cure Time, Foot Traffic: 4 hours.
10. Cure Time, Vehicular Traffic: 24 hours.

2.03 ACCESSORIES

A. Primer: Sealant manufacturer's recommended primer when needed.

B. Joint Cleaner: Non-corrosive and non-staining type recommended by sealant manufacturer and compatible with joint forming materials.

C. Soft Backer Rod: non-gassing, reticulated closed-cell polyethylene rod designed for use with cold-applied joint sealants.

1. Comply with ASTM C 1330.
2. Size required for joint design.

D. Closed-Cell Backer Rod: closed-cell polyethylene rod designed for use with cold-applied joint sealants for on-grade or below-grade applications.

1. Comply with ASTM C 1330.
2. Size required for joint design.

E. Joint Filler: closed-cell polyethylene joint filler designed for use in cold joints, construction joints, or isolation joints wider than 1/4 inch (6 mm).

1. Size required for joint design.

F. Bond Breaker: Pressure-sensitive tape recommended by sealant manufacturer to suit application.

2.04 COLOR

A. Sealant Colors: Selected by Owner. Match site substrate colors.

PART 3 EXECUTION

3.01 EXAMINATION

A. Inspect all areas involved in work to establish extent of work, access, and need for protection of surrounding construction.

B. Protect all surroundings from flexible epoxy joint filler including, but not limited to, floors, equipment, line striping, walkways, and drives.

C. Verify proper joint depth and width for each type of use.

3.02 PREPARATION

A. Remove loose materials and foreign matter which impair adhesion of joint filler.

B. Clean joints and saw cuts by grinding, sandblasting, or wire brushing to expose a sound surface free of contamination and laitance.

C. Ensure structurally sound surfaces, dry, clean, free of dirt, moisture, loose particles, oil, grease, asphalt, tar, paint, wax, rust, waterproofing, curing and parting compounds, membrane materials, and other foreign matter.

D. Where the possibility of joint filler staining of adjacent areas or materials exists, mask joints prior to application.

1. Do not remove masking tape before joints have been tooled and initial cure of joint filler has taken place.
2. Work stained due to failure of proper masking precautions will not be accepted.

F. Verify sealant compatibility with substrate and proper adhesion.

3.03 INSTALLATION

A. Back-Up Material:

1. Install appropriate size backer rod, larger than joint where necessary according to manufacturer's recommendations.
2. Install polyethylene joint filler in joints wider than 1/4 inch (6 mm) to back-up material per manufacturer's recommendations.
3. Do not install epoxy joint filler over backer rod.

B. Bond Breaker: Install bond-breaker strip in joint to be sealed on top of back-up material to prevent adhesion of sealant to back-up material; install per manufacturer's recommendations.

C. Sealant:

1. Prepare sealants that require mixing; follow manufacturer's recommended procedures, mixing thoroughly.
2. Mix only as much material as can be applied within manufacturer's recommended application time period.
3. Apply materials in accordance with manufacturer's recommendations; take care to produce beads of proper width and depth, tool as recommended by manufacturer, and immediately remove surplus sealant.

4. Apply materials only within manufacturer's specified application life period. Discard sealant after application life is expired or if prescribed application period has elapsed.

D. Epoxy Joint Filler:

1. Transfer entire contents of activator container thoroughly with entire contents of base container in separate container of appropriate size.
2. Mix only as much material as can be applied within manufacturer's recommended application time period.
3. Mix with slow-speed drill (80-100 rpm) and slotted paddle. Ensure mixing paddle reaches bottom and scrapes side of container several times. Scrape paddle several times to ensure thorough mixing. Keep paddle blade below surface to avoid whipping air into material.
   a. Mix Epolith(R)-P for 5 to 7 minutes.
   b. Mix Epolith(R)-G for 8 to 10 minutes.
4. Pour Epolith-P from spouted can or professional bulk-loading caulking gun.
5. Apply Epolith-G by professional bulk-loading gun.
6. Maintain minimum joint application of 2/3 joint depth or 1 inch (25 mm), whichever is greater.
7. Fill joints from bottom up to exterior face by holding properly sized nozzle against joint bottom.
8. Tool joint to ensure maximum adhesion to joint sides, correct bead configuration, and a neat joint. Dry tool or dampen tool with Reducer 990. Do not use water or soapy water.
9. Apply materials only within manufacturer's specified application life period. Discard joint filler after application life is expired or if prescribed application period has elapsed.

3.04 CLEANING

A. Remove uncured sealant and joint filler with xylene, toluene, or MEK, or other approved solvent. Remove cured sealant and joint filler by razor, scraping, or mechanically.

B. Remove all debris related to application of sealants from job site in accordance with all applicable regulations for hazardous waste disposal.

3.05 SCHEDULE OF JOINT SEALERS

A. Coordinate with manufacturer to obtain recommendations for each specific sealant application. Sealant used shall be manufacturer's recommended "best choice" for each application location considering substrate materials, exposure, joint movement, joint orientation, traffic loading, etc. Submit list of manufacturer's recommendations.

B. General-Purpose Interior and Exterior Applications:

1. Sealant:

   a. Single component polyurethane
   b. Two component polyurethane
   c. Polysulfide
   d. Silicone (where painting not required)

2. Applications:

   a. Joints and recesses between adjacent constructions and frames, sills, and subsills of windows, doors, and louvers.

b. Coping joints and wash joints in precast concrete, cast stone, or natural stone.
c. Masonry joints beneath shelf angles.
d. Around penetrations in exterior walls.
e. Under door thresholds and at bottom of door frames.
f. Where necessary to prevent infiltration of water or air into or through exterior building envelope.

C. Other Exterior Applications:

1. Sealant:

a. Single component polyurethane
b. Two component polyurethane
c. UV Resistant Silicone (where exposed to sunlight)
d. Mildew Resistant Silicone (roofing and flashing sealant hidden from sunlight)

2. Applications:

a. Between adjacent construction and gravel stops, copings, fascias, and miscellaneous flashings.
b. Metal flashings inserted into reglet.
c. Top edges of surface mounted counterflashing.
d. Expansion and control joints in masonry where expansion joint covers are not indicated.
e. Joints between new and existing exterior construction.

D. Interior Wetted Areas:

1. Sealant: Mildew Resistant Silicone
2. Applications: Between adjacent construction and vanities, shower stalls, bathtub and shower enclosures, sinks, counter tops, plumbing cut-outs, and plumbing fixtures.

A. Other Interior Applications:

1. Sealant:

a. Single component polyurethane
b. Two component polyurethane
c. Polysulfide
d. Acrylic Latex

2. Applications:

a. Between adjacent construction and equipment, shelving, casework, and furniture.
b. Perimeters of door and window frames, access panels.
c. Between interior partitions and adjoining concrete or steel columns, walls, or other construction.
d. Other exposed locations within partitions to seal against passage of air.
e. Other interior joints of small dimension which require painting.
f. Gypsum board partitions:

1) Between gypsum panels and dissimilar walls; install sealant just prior to installation of gypsum panel.
2) Between adjacent face layers of abutting intersection gypsum board partitions; install sealant before taping and finishing joint.

3) Between gypsum panels and penetrations: Seal around openings of ducts and pipes.
4) Seal control joints prior to installing control joint trim.

g. Other concealed locations within partitions to completely seal against passage of air.

3. Allow sealant to cure before painting over joint.

B. Exterior Traffic Surfaces:

1. Sealant:

a. Two component self-leveling polyurethane.
b. Single component self-leveling polyurethane.

2. Applications:

a. Control and expansion joints in sidewalks and pavements.

C. Interior Traffic Surfaces (where joint will be covered with floor covering):

1. Sealant:

a. Two component self-leveling polyurethane.
b. Single component self-leveling polyurethane.

2. Applications:

a. Control and expansion joints in floors.

D. Interior Traffic Surfaces (where no floor covering will be installed):

1. Surface preparation: Freshly saw-cut or blast-clean joints; blow with oil-free compressed air.

2. Sealant: Epoxy Joint Filler.

a. Pour flush with adjacent surface in 2 pours in accordance with manufacturer's instructions.

3. Applications: Control joints in floors subject to vehicular traffic.

E. Glazing:

1. Sealant:

a. Silicone.

2. Applications:

a. Glazing, including butt and lap sheer joints, stopless glazing, and cap, head and toe bead in conventional glazing.

J. Joints to be submerged:

1. Sealant:

a. Polysulfide Sealant

2. Applications:

a. Control joints at submerged locations.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

1. Payment for Joint Sealants and other work in this section shall be included as a portion of the lump sum price for the project as stated in the Bid Form for the Project. No separate measurement for these quantities will occur.

END OF SECTION

DIVISION 8- DOORS AND WINDOWS
TABLE OF CONTENTS

SECTION 08110 – STEEL DOORS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes steel doors with light kits for control building. Also included is door installation.

1.02 RELATED WORK

A. Section 08710 – Door Hardware
B. Division 9 for painting

1.03 REFERENCES

A. American Society for Testing and Materials

1. ASTM B 117 - Standard Practice for Operating Salt Spray (Fog) Apparatus
2. ASTM E 283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
3. ASTM A 568 & A 569 – Standard Specification for Steel, Sheet, Carbon, Hot-Rolled, Commercial Quality.
4. ASTM A 653 – Standard Specification for Steel, Sheet, Zinc-Coated (Galvannealed) by the Hot-Dip Process
5. ASTM A 924 – Standard Specification for General Requirements for Steel, Sheet, Metallic Coated by the Hot-Dip Process
6. ASTM D 1735 - Standard Practice for Testing Water Resistance of Coating Using Water Fog Apparatus

B. American National Standards Institute

1. ANSI A224.1 – Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames
2. ANSI A250.3 – Test Procedure and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames
3. ANSI A250.4 – Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcing
4. ANSI A250.6 (SDI 107) – Hardware on Standard Steel Doors (Reinforcement-Application)
5. ANSI A250.7 – Nomenclature for Steel Doors and Steel Door Frames
6. ANSI A250.8 (SDI-100) – Recommended Specifications for Steel Doors & Frames
7. ANSI A250.10 – Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames
8. ANSI/DHI A115 – Specifications for Hardware Preparations in Standard Steel Doors and Frames
9. ANSI/DHI A115.IG – Installation Guide for Doors and Frames

C. Steel Door Institute

1. SDI 106 – Recommended Standard Door Type Nomenclature
2. SDI 108 – Recommended Selection and Usage Guide for Standard Steel Doors

3. SDI 109 – Hardware for Standard Steel Doors & Frames
4. SDI 111 – Recommended Standard Details for Steel Doors and Frames
5. SDI 112 – Zinc-Coated (Galvanized/Galvannealed) Standard Steel Doors & Frames
6. SDI 122 – Installation and Troubleshooting Guide for Standard Steel Doors and Frames
7. SDI 124 – Maintenance of Standard Steel Doors and Frames

1.04 REGULATORY REQUIREMENTS

A. Doors and frames shall conform to applicable codes for fire ratings.

B. Install fire labeled doors and frame products in accordance with NFPA-80, current edition.

1.05 SUBMITTALS

A. Submit shop drawings, product data, and O&M data under provisions of Division 1.

B. Indicate door elevations, material thickness, internal reinforcement, closure method, and cutouts for louvers.

C. Submit manufacturer's installation instructions and other information as necessary to show specification and code compliance.

D. Submit samples of manufacturer's colors for Owner selection.

1.06 DELIVERY, STORAGE AND PROTECTION

A. Doors shall be stored in an upright position under cover. Place the units on at least 4-inch wood sills on floors in a manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters which create humidity chambers and promote rusting. If the corrugated wrapper on the door becomes wet, or moisture appears, remove the wrapper immediately.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Doors and Frames shall be manufactured by Amweld, Steelcraft, Fleming, or approved equal. All products supplied under this Section shall be from a single manufacturer.

2.02 MATERIALS

A. Frames, frame components, and doors shall be manufactured tension leveled steel conforming to ASTM A924, galvanized to ASTM A653, commercial steel (CS), coating designation A40 (Galvanneal). Galvannealed steel shall be treated to insure proper paint adhesion. All steel component parts used in galvannealed doors and/or frames shall meet the galvanized specification.

B. All exterior doors, frames and frame components shall be cleaned, phosphatized and finished as standard with one coat of rust inhibiting prime paint in accordance with ANSI A250.10. Exterior doors and frames will be field painted.

2.03 DOORS

A. Exterior doors

1. 16-gage hot dipped galvannealed steel, with closed tops.

2. Full-flush Seamless construction, continuous smooth welded or epoxy filled mechanically interlocked edge seams.

3. Sizes and style as shown on the drawings. Verify size and thickness with on-site measurements.

4. Rigid extruded polystyrene, polyisocyanruate, or polyurethane core, fire retardant, thermal value: R11.0 minimum, conforming to ASTM C578.

B. Construction of Doors:

1. Doors shall be reinforced, stiffened, sound deadened and insulated with impregnated specified core completely filling the inside of the doors and laminated to inside faces of both panels using contact adhesive applied to both panels and core.

2. Door shall have continuous vertical mechanical interlocking or welded joints at lock and hinge edges with visible edge seams (interior) or with edge seam filled and ground smooth (exterior). The internal portion of the seam shall be sealed with epoxy, or welded. An intermittent fastening along the seam is not permitted. Doors shall have beveled (1/8" in 2") hinge and lock edges. Top and bottom steel reinforcement channels shall be galvannealed 14 gauge and projection welded to both panels.

3. Hinge reinforcements shall be 7-gauge for 1-3/4" doors. Lock reinforcements shall be 16 gage and closer reinforcements 14 gauge - box minimum 6" high and 20" long. Hinge and lock reinforcements shall be projection welded to the edge of the door. Doors shall be factory blanked, reinforced, drilled and tapped for fully templated hardware and factory blanked and reinforced for hardware that is not fully templated. Galvannealed doors shall have galvannealed hardware reinforcements. Adequate reinforcements shall be provided for other hardware as required. Coordinate with specified hardware. Hinge locations must match existing frames, Contractor to verify.

4. Trim for doors with cutouts shall be 24-gage steel conforming to ASTM designation A 924 hot dipped galvannealed steel with a zinc coating of 0.06 ounces per square foot (A60). The trim shall be installed into the door as a four sided welded assembly. The trim shall cap the cutout but shall not extend more than 1/16" from the door face. The corners of the assembly shall be mitered, reinforced and welded. The trim shall be the same on both sides of the door. Exposed fasteners shall not be permitted. Label and non-label doors shall use the same trim.

5. All exterior out swing doors shall have the tops closed to eliminate moisture penetration. Door tops shall no have holes or openings. Top caps are permitted. All exterior doors shall include a self-adjusting, concealed door sweep installed in the bottom channel. The bottom seal shall not utilize springs.

6. Door faces shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles or waves.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify door frame openings are installed plumb, true and level, and dimensionally correct before beginning the installation process. Make corrections and/or adjustments as necessary.

B. Verify that proper door and frame reinforcement has been provided for the specified hardware and that cutouts and reinforcements are properly located.

C. Select fasteners of adequate type, number and quality to perform the intended functions.

D. Verify that louver cutouts are located and sized properly.

3.02 INSTALLATION

A. Doors and frames shall be installed in accordance with ANSI/DHI A115.IG Installation Guide for Doors and Frames and manufacturer's installation instructions.

B. Adjust operable parts for correct clearances and function.

C. Exposed field welds shall be finished to present a smooth, uniform surface. Touch-up with rust inhibitive primer.

D. Exposed surfaces that have been scratched or otherwise marred during shipment, installation or handling shall be touched-up with a rust inhibitive primer.

E. Finish paint in accordance with Section 09900.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

1. Payment for Steel Doors and other work in this section shall be included as a portion of the lump sum price for the project as stated in the Bid Form for the Project. No separate measurement for these quantities will occur.

END OF SECTION

SECTION 08305 – CAST-IN ACCESS DOORS

PART 1 GENERAL

1.01 SUMMARY

A. The work in this Section consists of furnishing all labor and materials, and performing all work necessary for the proper installation of cast-in-place metal access doors as indicated on Plans. Coordinate with access door manufacturer and pre-cast wetwell and vault manufacturer(s).

1.02 REFERENCES

A. Section 03300 – Cast-In-Place Concrete.

1.03 SUBMITTALS

A. Submit product data in accordance with Section 01300.

B. Submit shop drawings showing layout, profile and product components including attachment, accessories, finish and color. Submit shop drawings for approval prior to fabrication.

1.04 PROJECT CONDITIONS

A. Verify all dimensions before ordering product. Contractor is responsible for product fitment and function.

1.05 WARRANTY

A. Provide written warranty signed by Manufacturer, agreeing to repair or replace equipment which exhibits defects in materials or workmanship for a minimum period of 5 years.

PART 2 PRODUCTS

2.01 ACCESS HATCH

A. Access cover shall be designed for cast-in-place installation. All surfaces that will come into contact with concrete shall be coated with bitumastic paint.

B. Access covers shall be single or double leaf with integral safety grate. Safety grate shall not allow hatch to be closed unless the fall through protection has been put back in place. Safety grate shall be constructed of aluminum and painted safety orange. Safety grate shall have a load rating at least equal to the load rating of access cover.

C. Frame shall be extruded aluminum channel and all surfaces that will come into contact with concrete shall be coated with bitumastic paint.

D. Frame and hatch shall be rated for H20 wheel loading.

E. Hatch shall be constructed of ¼" thick aluminum diamond tread plate. Hatch shall be equipped with pneumatic-spring lift assist and automatic hold-open arm. Hatch must be easily opened such that one person can reasonably open hatch with one hand.

F. Hatch shall be equipped with a stainless steel slam lock with protected keyway. Lock shall be fastened with 316 stainless steel hardware.

G. Hinge shall be 316 stainless steel construction with 316 stainless steel hinge pin. Hardware shall be 316 stainless steel.

H. Hatch shall be equipped with a stainless steel flush drop handle.

I. Wetwell pump station hatch shall have clear opening of 36"x48".

J. Valve vault hatch shall have clear opening of 5436"x30".

K. Flow meter vault hatch shall have clear opening of 36"x30".

L. Manufacturer shall be Syracuse Castings, Halliday Products, Nystrom; or equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install per manufacturers recommendations and per contract drawings. Steel rebar shall not be allowed to be in contact with any portion of aluminum frame. Hatches shall open in direction indicated on drawings. No alteration of location or orientation will be allowed without written approval by the Engineer.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

1. Payment for Cast-In Access Doors and other work in this section shall be included as a portion of the lump sum price for the project as stated in the Bid Form for the Project. No separate measurement for these quantities will occur.

END OF SECTION

SECTION 08710 – DOOR HARDWARE

PART 1 GENERAL

1.01 SUMMARY

A. Section includes items known commercially as finish hardware or builders hardware, required for swing and other doors.

B. Types of finish hardware may include: hinges, lock cylinders and keys, lock and latchsets, bolts, thresholds, protection plates, weatherstripping, sound stripping, astragals, and other miscellaneous door hardware as required.

1.02 REFERENCES

A. ANSI A117.1 – American National Standards Institute Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People

B. ANSI A115.1 – Specification for Standard Steel Door and Frame Preparation for Mortise Locks for 1 3/8" and 1 ¾" Doors

C. ANSI A115.2 – Specification for Standard Steel Door and Frame Preparation for Bored or Cylindrical Locks for 1 3/8" and 1 ¾" Doors.

D. ANSI/BHMA A156.2 – Bored and Preassembled Locks and Latches

E. ANSI/BHMA A156.13 – Mortise Locks and Latches

F. ANSI/BHMA A156.18 – Materials and Finishes

G. National Fire Protection Association (NFPA) Standard No. 80. This requirement takes precedence over other requirements for such hardware.

1.03 SUBMITTALS

A. Submit Hardware Schedule, 3 copies

1. Detailed hardware schedule shall be prepared by an experienced hardware consultant. All items shall be suitable for the intended location and purpose.
2. Hardware finish and styles shall match as closely as possible at all locations.
3. Organize hardware schedule into "hardware sets" for each door, indicating complete designations of every item.
4. Include manufacturer's technical data and hardware directions for each door.
5. Do not order materials until Schedule has been reviewed and approved by the Engineer.

B. Deliver templates to fabricators of other work which is to receive finish hardware.

1.04 QUALITY ASSURANCE

A. Use products of similar type from one manufacturer throughout project. Coordinate with manufacturer for proper use and installation of each piece of hardware.

B. Hardware supplier shall be a recognized builders hardware supplier, who has been furnishing hardware in Oregon for a period of not less than 3 years. Supplier shall employ an experienced AHC certified hardware consultant, available for consultation during the course of the work.

C. Hardware supplier shall prepare detailed hardware schedule based on these specifications and their experience for the best use and function of hardware.

1.05 WARRANTY

A. Blanket coverage on locksets for a minimum period of 5 years. Mechanical failure on door closers for 5 years. Failure on other parts of hardware for 2 years. These minimums may be superceded by specific requirements in the following sections.

PART 2 PRODUCTS

2.01 FINISH

A. All hardware shall have a silver satin (dull, brushed) finish. Finishes from various manufacturers and different hardware shall be matched as closely as possible.

2.02 HINGES

A. Five knuckle, button tip, full mortise template type with non-rising loose pins and ball bearings. Manufactured by Stanley; or approved equal.

B. Doors up to 36-inches wide: 4.5-inch by 4.5-inch. Provide at least 3 hinges per leaf for doors up to 86-inches high.

C. Exterior Doors: 4 ball bearing, stainless steel, 0.180 gage minimum hinges with non-removable pin construction.

2.03 LOCKS

A. Heavy-Duty Cylindrical Locks and Latchsets. Reversible door handing. Solid cast Lever handles. Schlage ND-Series Grade 1, Style ND92PD Entrance Lock.

1. Lockset must be cylindrical type with minimum 2 ¾-inch backset, with 1/2-inch throw latchbolt.
2. Lockset with 6-pin interchangeable and masterkeyed core.
3. Keyed lever to be removeable only after core is removed, by authorized control key, to allow access to lever "keeper".
4. Locks to have solid shank with no opening for access to keyed lever keeper.
5. Locksets and latchsets must conform to ANSI A156.2, Series 4000, Grade 1. and be UL listed.
6. Keys shall be matched to Owner's existing pump station master key set. Provide matching keys and coordinate with Owner

2.04 THRESHOLDS

A. Thresholds shall have height and shape conforming to ANSI A117.1 with height not exceeding ½-inch. Aluminum with corrugated surface.

2.05 WEATHERSTRIPPING

A. Silicone rubber seal. Provide at each edge of every exterior door. Pemko, Reese, or approved equal.

2.06 KEYING

A. All door locks shall be keyed alike for a single building. Contractor shall provide contractor lock cores for use during construction. Replacement lock cores shall be provided in unopened packaging to the Owner upon completion.

2.07 HARDWARE SCHEDULE

A. Exterior Doors

1. Heavy-Duty Cylindrical Locks
2. Heavy-Duty Security Deadbolts
3. Threshold
4. Weatherstripping

PART 3 EXECUTION

3.01 PREPARATION

A. Ensure that door and frame reinforcements have been provided properly for the hardware to be used.

B. Have sufficient quantities of fasteners required. Use fasteners supplied by the hardware manufacturer.

C. Doors to be field painted shall be painted prior to installing hardware.

3.02 INSTALLATION

A. Install door hardware in accordance with the manufacturer's instructions. Use fasteners provided by hardware manufacturer.

B. Ensure that proper hardware is mounted for each specific door according to the approved hardware schedule. Note where left and right handed doors are shown.

C. Adjust strikes, latches and closers for proper function. Readjust prior to final acceptance if necessary.

D. Upon completion, deliver all keys to Owner.

E. Standards: Install in accordance with requirements of DHI and BHMA. Mounting height measurements are from finish floor except top butt.

1. Butts: Top 11 3/4" center of butt to top of door; intermediate equal distance between top and bottom butts; bottom 13" to center of butt.
2. Knob Locks: 40 5/16" to center of strike.
3. Deadlocks: 48" to center of strike.
4. ADA Standard: Conform to ANSI A117.1 for positioning requirements for disabled.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

1. Payment for Door Hardware and other work in this section shall be included as a portion of the lump sum price for the project as stated in the Bid Form for the Project. No separate measurement for these quantities will occur.

END OF SECTION

DIVISION 9- FINISHES
TABLE OF CONTENTS

SECTION 09900 – PAINTS AND COATINGS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Work in this section includes furnishing and field application of all paints and coating systems required for interior and exterior coating of drywall, wood, steel, iron, plastic, concrete, masonry, and other materials to be painted.

1. Unless otherwise specified or shown, paint all surfaces and items that are exposed to view.

B. Section also necessary surface preparation, protection, curing and touch-up.

C. Summary of items to be painted on this project under this section include:

1. Exposed piping, including pipe inside vaults.
2. Interior ceiling and CMU walls
3. Steel doors and frames on control building.
4. Exterior wood trim and other exposed wood
5. Fiber cement siding
6. Any new materials provided not prefinished or painted.

1.02 RELATED SECTIONS

A. Division 15 – Mechanical: Fabricated and/or shop primed items
B. Division 16 – Electrical: Fabricated and/or shop primed items

1.03 SURFACES NOT TO BE PAINTED

A. Prefinished items including finished metal surfaces.
B. Walls or ceilings of concealed or inaccessible areas.
C. Fire or smoke rating labels on doors or frames.
D. Equipment name plates.
E. Piping identification labels.
F. Moving parts of mechanical or electrical equipment.
G. Cast in place concrete surfaces.

1.04 SUBMITTALS

A. Product Data

1. Materials List: Complete list of proposed manufacturers and products.
2. Manufacturer's Specifications: Manufacturer's technical information for each product, including paint analysis and application instructions.
3. Material safety data sheets for each product.

B. Samples: Preliminary Samples: 8-1/2" x 11" samples of each color, texture and sheen on glossy card stock. Owner will select colors to be used from manufacturer's standard.

D. Certificates: Provide certificate from each manufacturer stating material is premium quality and suitable for intended use on this Project.

E. Closeout Submittals:

1. Two copies of manufacturer's color and sheen formula, and 4" x 6" color chips, for each final color used in the Project.
2. Product Usage Records: Three copies of product usage records for each paint, coating and solvent product used in the project. Include product name, amount used, surface preparation records, and period of time over which the product was used.

1.05 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years successful experience in work of similar scope.
B. Regulatory Requirements: Products containing chromates, cadmium, lead, or mercury or are not permitted.
C. Manufacturer's Instructions: Perform painting work in accordance with manufacturer's written instructions and recommendations.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the Project in original, new, unbroken packages and containers bearing manufacturer's name and label, with:
   1. Name of material, color and sheen.
   2. Manufacturer's name, product number and date of manufacture.
   3. Contents by volume of major pigments and vehicle constituents.
   4. Thinning and application instructions.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers: ICI Paint Stores, Tnemec, Benjamin Moore, or Sherwin Williams.

   1. Unless otherwise indicated, Tnemec products are specified in Paint Schedule Articles 3.03 to establish standards and type of materials required. Equal products of manufacturers specified above are acceptable.

2.02 MATERIALS

A. Material Quality

   1. Provide premium quality materials. Materials not bearing manufacturer's identification as a premium-grade product are not acceptable.
   2. Should manufacturer's specifications or product numbers change, provide its current equal or better product.
   3. Primer and undercoats are to be of same manufacturer as final coat.
   4. Materials left from previous jobs are not acceptable.
   5. Use only thinners approved by paint manufacturer, and use only within recommended limits.
   6. Etching Solutions: As recommended by paint manufacturer for the use intended.
   7. Solvents: Non-petroleum based, as recommended by paint manufacturer for the use intended.

B. Finish Coat Coordination: Provide finish coats which are compatible with prime paints used.

2.03 COLORS

A. General

1. Use of proprietary names in color selections does not imply exclusion of equivalent products of other manufacturers.
2. The proposal and acceptance of any paint manufacturer shall not restrict the owner to selection of standard colors of that manufacturer.

B. Finish coat colors shall be factory mixed.

PART 3 EXECUTION

3.01 PREPARATION

A. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as specified for substrate condition.

B. Remove hardware, accessories, and items in place and not to be painted, or provide protection prior to surface preparation and painting. Reinstall removed items after painting.

C. Clean surfaces before applying paint. Remove oil and grease prior to mechanical cleaning. Schedule cleaning so contaminants from cleaning process do not fall onto wet, newly painted surfaces.

D. Moisture Content: Do not paint over surfaces where moisture content exceeds manufacturer's instructions.

E. Ferrous Metals:

1. Bare Surfaces: Clean of oil, dirt, loose mill scale, and other foreign substances with solvent or by mechanical cleaning.
2. Shop Applied Primer: Touch up where damaged or bare using same type of primer as adjacent surfaces.
3. Galvanized Surfaces: Clean free of oil and surface contaminants using solvent.

F. Plywood/Gypsum Board: Remove dust, and repair surface imperfections. Spot-prime defects after repair.

G. Mix painting materials in accordance with manufacturer's instructions.

H. Store materials in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.

I. Stir materials before application to produce mixture of uniform density, and stir as required during application. Do not stir surface film into material, strain material before using if necessary.

3.02 APPLICATION

A. Apply paint in accordance with manufacturer's instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Apply additional coats when stains or blemishes show through final coat, until paint is a uniform finish, color and appearance.
2. Ensure dry film thickness at corners and crevices is equivalent to that of flat surfaces.
3. Sand lightly between each succeeding enamel or varnish coat.
4. Finish exterior doors on tops, bottoms and side edges same as exterior faces.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated or otherwise prepared for paint as soon as practicable after preparation.

1. Do not apply materials in areas where dust is being generated, or will be generated, before coatings are thoroughly dry.
2. Allow time between successive coats to permit proper drying.
3. Do not recoat until paint feels firm and does not deform or feel sticky under moderate thumb pressure.

C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to achieve a total dry film thickness (DFT) as recommended by coating manufacturer and as specified.

D. Prime Coats: Apply to items not previously primed. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat.

E. Finish Coats: Provide even texture. Leave no laps, irregularity in texture, skid marks, or other surface imperfections.

1. Opaque Finishes: Provide opaque, uniform finish, color and coverage. Cloudiness, spotting, holidays, brush marks, runs, sags, ropiness or other surface imperfections are not acceptable.
2. Transparent Finishes: Provide glass smooth surface film of even luster. Cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections are not acceptable.

F. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not accepted.

3.03 PAINT SCHEDULE

EXTERIOR COATINGS				
Location	**Preparation**	**Primer / Intermediate**	**Finish Coats**	**Total DFT**
Unprimed Metals	Commercial Blast (SSPC-SP6)	Series 66 or N69 Hi-Build Epoxoline Two coats DFT 3.0-5.0 mils, each coat	Series 73, or 1075 Endura-Shield Polyurethane DFT 2.0-5.0 mils	9.0 – 13.0 mils
Shop-Primed Metals	Hand Tool or Power Tool (SSPC-SP2 or SP3)	Factory Primed Intermediate coat of Series 27 Typoxy DFT 2.0-3.0 mils	Series 73, or 1075 Endura-Shield Polyurethane DFT 2.0-3.0 mils	4.0 – 6.0 mils
Wood	Clean and Dry	Series 36 Undercoater DFT 2.0-3.5 mils	Series 23 Enduratone DFT 2.0-3.0 mils	4.0 – 6.5 mils

Ductile Iron Pipe	As recommended by manufacturer	Series 66 or 69 DFT 3.0 to 3.0 mils/ Intermediate coat Series 66 or 69 DFT 4.0 to 6.0 mils	Series 73, 1074 or 1075 DFT 2.0 to 3.0 mils	9.0 – 14 mils
INTERIOR COATINGS				
Location	**Preparation**	**Primer / Intermediate**	**Finish Coats**	**Total DFT**
Unprimed Metals	Commercial Blast (SSPC-SP6)	Series 66 or N69 Hi-Build Epoxoline Two coats DFT 3.0-5.0 mils, each coat	Series 73, or 1075 Endura-Shield Polyurethane DFT 2.0-5.0 mils	9.0 – 13.0 mils
Shop-Primed Metals	Hand Tool or Power Tool (SSPC-SP2 or SP3)	Factory Primed. Intermediate coat of Series 27 Typoxy DFT 2.0-3.0 mils	Series 73, or 1075 Endura-Shield Polyurethane DFT 2.0-3.0 mils	4.0 – 6.0 mils
Wood	Clean and Dry	Series 36 Undercoater DFT 2.0-3.5 mils	Series 23 Enduratone DFT 2.0-3.0 mils	4.0 – 6.5 mils
CMU (unpainted)	ASTM D4259	Series 130 Envirofill Intermediate Coat: Series 113 H.B. Tneme-Tufcoat DFT 4.0-6.0 mils	Series 113 H.B. Tneme-Tufcoat DFT 4.0-6.0 mils	8.0 – 12.0 mils plus filler
Gypsum Board	Clean and Dry	Series 51-792 PVA Sealer or 151-1051 Elasto-Grip FC DFT 1.0-2.0 mils	Series 113 H.B. Tneme-Tufcoat DFT 4.0-6.0 mils	5.0 – 8.0 mils

3.04 APPROVED EQUALS

A. The painting materials listed above are provided as references. Approved equal materials will be allowed upon submittal.

3.05 COLOR SCHEDULE

A. Contractor to coordinate with Owner and Engineer for color selections.
B. For exterior touch-up, match existing paint colors.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

1. Payment for Paints and Coatings and other work in this section shall be included as a portion of the lump sum price for the project as stated in the Bid Form for the Project. No separate measurement for these quantities will occur.

END OF SECTION

DIVISION 11- EQUIPMENT
TABLE OF CONTENTS

SECTION 11310 – SUBMERSIBLE CENTRIFUGAL PUMPS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specifications for the submersible centrifugal pumps and motors for wastewater pumping.

1.02 SUMMARY

A. Two (2) pumps are required, 1 duty pumps and 1 pump for redundancy. Each pump will run independently, or in conjunction with one other pump to meet the duty point. Maximum design flow will be achieved with one (1) pump running. Pumps will alternate starts and run cycles to achieve approximately equal run time averages.

B. Pump shall be supplied with electric motor, close coupled volute, and cast iron discharge elbow, guide bar brackets, power cable and accessories.

C. The pump, mechanical seals and motor units provided under this specification shall be from the same manufacturer. Provide individual conduits for each pump supplied to wetwell disconnect panel.

1.03 RELATED SECTIONS

A. Division 16 for drives, control unit and other electrical requirements

1.04 QUALITY ASSURANCE

A. The pumps shall be heavy duty, electric submersible, centrifugal non-clog units designed for handling raw unscreened sewage and wastewater and shall be fully guaranteed for this use.

B. The pumps shall be capable of operating in an ambient liquid temperature of 104 degrees F as specified by the National Electrical Manufacturers Association (NEMA) and Factory Mutual (FM).

C. The pump and motor shall be suitable for continuous operation at full nameplate load while the motor is completely submerged or partially submerged.

D. Motor horsepower shall be sufficient to be non-overloading over entire pump curve.

E. The pump, mechanical seals and motor units provided under this specification shall be from the same manufacturer in order to achieve standardization of operation, maintenance, spare parts, manufacturer's service and warranty.

F. The pump, motor and associated devices shall be suitable for no less than 15 evenly spaced starts per hour without overheating.

1.05 WARRANTY

A. Warranty shall meet the standard warranty requirement as outlined in the contract documents.

B. Warranty period shall commence on date of valid start-up.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver equipment to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer or as otherwise shipped and protected by the manufacturer.

B. Store equipment in a clean dry area indoors in accordance with manufacturer's instructions. Keep containers sealed until ready to use.

C. Protect equipment during handling and installation to prevent damage or contamination.

1.07 SUBMITTALS

A. Technical submittal data shall consist of:

1. Certified pump performance curves
2. Anticipated frequency in Hz for flow conditions indicated in Section 2.01.A
3. Pump outline drawing
4. Electrical motor data
5. Control drawing and data
6. Typical installation guides
7. Technical manuals
8. Parts list
9. Printed warranty
10. Manufacturer's equipment storage recommendations
11. Manufacturer's standard recommended start-up report form

1.08 SPARE PARTS

A. For each pump, an appropriate set of spare parts shall be provided, based on the manufacturer's recommendations, to allow expeditions servicing of the pump and returning it to full service. At a minimum, a complete set of mechanical seals, gaskets, wear rings, and spare impeller shall be provided.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Static head approximately 44.5 feet.

B. System shall be capable of producing a minimum of 700 gpm at 57 feet total dynamic head with one pump running under old pipe conditions with C = 120.

C. System shall also be capable of producing:

1. 700 gpm at 52.8 feet total dynamic head with one pump running under new pipe conditions with C = 150.
2. 500 gpm at 51.1 feet TDH with one pump running under old pipe conditions with C = 120 and 48.9 feet TDH under new pipe conditions with C = 150.
3. 275 gpm at 46.7 feet TDH with one pump running under old pipe conditions with C = 120 and 46 feet TDH under new pipe conditions with C = 150

D. Pumps shall be capable of running at 45 Hz, or less, for sustained periods of time without overheating.

E. Voltage requirements: 460 Volt, 3-phase, 60 Hz.

2.02 MANUFACTURER AND MODEL

A. ITT Flygt, Model NP3153.091 HT with 263 mm impeller. Motor shall be explosion proof, 20 hp, 460 volt, 60 Hz, 3 phase, 4 pole as supplied by ITT Flygt.

B. Pump and manufacturer of equal quality to those named above, and meeting the requirements of these specifications.

2.03 CONSTRUCTION

A. PUMP DESIGN

1. The pumps shall be automatically and firmly connected to the discharge connection, guided by no less than two (2) guide bars extending from the top of the station to the discharge connection. There shall be no need for personnel to enter the wetwell. No portion of the pump shall bear directly on the sump floor.

B. EXPLOSION PROOF MOTOR AND CABLE

1. The pump system including the pump, motor and power cable shall be approved for use in areas classified as hazardous locations in accordance with the NEC Class I, Div. 1, Group C and D service as determined and approved by a U.S. nationally recognized testing laboratory (U.L., FM, CSA) at the time of the bidding of the project. As required by Factory Mutual (FM) the motor shall be capable of continuous operation in pumped media up to 104°F.

2. Motor horsepower shall be sufficient so that the pump is non-overloading throughout its entire performance curve, from shut-off to run-out. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of at least 65 feet.

3. Motors shall be Inverter Duty, premium efficiency.

4. Motor shall be NEMA design with minimum 1.15 service factor, 40°C ambient.

5. Motor shall have a voltage tolerance of ±10% from nominal, and voltage imbalance tolerance of 1%.

6. Each pump motor stator shall incorporate three thermal switches, one per stator phase winding and be connected in series, to monitor the temperature of the motor. Should the thermal switches open, the motor shall stop and activate an alarm.

7. Power cables shall be sized according to the NEC and ICEA standards and shall be of sufficient length to reach junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. Cables shall be appropriate for use with variable frequency drives. Cables shall be routed from pump to wetwell panel in separate conduits.

C. SEALS AND BEARINGS

1. The integral pump/motor shaft shall rotate on two bearings. The motor bearings shall be sealed and permanently grease lubricated with high temperature grease. The minimum L_{10} bearing life shall be 50,000 hours at any usable portion of the pump curve.

2. Each pump shall be provided with a lubricant chamber for the shaft seal system. Seals shall not be lubricated by the pumped medium. Seal springs shall be isolated from pumped medium.

3. Each pump shall be equipped with tandem mechanical shaft seal system. Seal rings shall be tungsten-carbide or silicon-carbide.

4. Seals shall be mechanically protected from abrasive particulate matter and fibrous material.

5. A separate seal leakage chamber shall be provided so that any leakage that may occur past the seals will be captured prior to entry into the motor stator housing. Leakage chamber shall be equipped with a device to send a signal to an alarm if the chamber should reach 50% capacity.

D. SHAFT

1. The pump shaft and motor shaft shall be an integral, on piece unit adequately designed to meet the maximum torque required at any normal start-up condition and any operational point on the pump curve. Multi-piece, welded, sleeved or mechanically coupled shafts are not acceptable.

2. Shaft shall have full shutoff head design factor of safety of 1.7 or greater.

3. Shaft shall be stainless steel. Carbon steel or chrome plated steel are not acceptable.

E. IMPELLER

4. The impeller shall be dynamically balanced to prevent vibration and shall be capable of passing a minimum 3-inch diameter sphere, as required by Oregon DEQ.

5. The impeller shall be constructed of grey cast iron, leading edges of impeller shall be hardened to Rc 45 and shall be capable of handling solids, fibrous materials, heavy sludge and other matter normally found in raw wastewater.

6. The impeller to volute clearance shall be readily adjustable by the means of a single trim screw or by an adjustable wear plate.

7. The impeller shall be locked to the shaft, held by an impeller bolt and treated with a corrosion inhibitor.

F. VOLUTE

1. Pump volute shall be single-piece gray cast iron, Class 35B, non-concentric design with smooth passages large enough to pass any solids that may enter the impeller.

2. Discharge shall be 4-inch flange.

G. CABLE ENTRY

1. The cable entry design shall not require a specific torque to insure a water tight seal.

2. The cable entry shall consist of cylindrical elastomer grommets, flanked by stainless steel washers.

3. Cable entry designs which utilize potting compounds to provide a water tight seal, or those which do not allow the cable to be easily changed in the field shall not be considered equal.

H. CONTROLS – See Division 16

I. FINISH

1. Pump and motor surfaces not constructed of stainless steel shall be factory primed and painted.

J. PROTECTION

1. Pumps shall be equipped with moisture-sensing probes to detect moisture intrusion, and shall also have over-temperature sensors.

K. LIFTING PROVISIONS

1. Each pump shall be fitted with minimum 3/8" Grade 30 galvanized lifting chain, or 3/8" 316 stainless steel of appropriate length, including shackles and appropriate Grip-Eyes for lifting pumps in multiple bites. Grip-Eye lifting system shall consist of stainless steel cable connected to lifting chain attached to the lifting bail of the pump. Grip-Eye shall be forged steel and designed for the intended lifting application.

L. GUIDE RAIL SYSTEM

1. Guide rails shall be 2-inch, schedule 40 stainless steel pipe per manufacturer recommendations.

2. Intermediate guide bar brackets shall be supplied. Bracket, U-Bolt and hardware shall be either stainless steel or hot-dip galvanized structural steel. Install one intermediate guide bar bracket at the center of each guide bar length (one per pump).

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions at locations shown on the drawings and as directed.

B. Construct pump base in accordance with drawings and manufacturer recommendations. Level and grout as required. Use properly sized stainless steel anchor bolts. Ensure that pump is completely level and plumb.

C. The pump and motor shall be factory assembled and tested prior to shipment to the project site. The manufacturer shall certify, and shall submit to the Engineer in writing, that all factory testing has been completed prior to shipment.

3.02 STARTUP & TESTING

A. Manufacturer shall furnish the services of a qualified factory trained field service engineer for one 8-hour working day at the site to inspect the installation and instruct the owner's personnel on the operation and maintenance of the pumping units. After the pumps have been completely installed and wired, the contractor shall have the manufacturer do the following:

1. Megger stator and power cables
2. Check seal lubrication
3. Check for proper rotation
4. Check power supply voltage
5. Measure motor operating load and no load current
6. Check level control operation and sequence

B. All units shall be field tested to determine the head, flow and electrical characteristics to ensure that equipment meets the specifications. After installation, the pump shall be dry tested to ensure smooth operation of all components. Acceptance tests shall be run to ensure that each pump meets the following requirements:

1. The pumping units operate as specified without excessive noise, cavitation, vibration, or without overheating.

2. All automatic and manual controls are functional and capable of operating the pumps as specified.

3. All drive equipment operates without overload.

4. Pumps which do not provide the required flow at the stated head, or provide the required turndown flow rates, will be removed and replaced, or modified as required and accepted by the Owner.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

1. Payment for Submersible Centrifugal Pumps and other work in this section shall be included as a portion of the lump sum price for the project as stated in the Bid Form for the Project. No separate measurement for these quantities will occur.

END OF SECTION

DIVISION 13- SPECIAL CONSTRUCTION
TABLE OF CONTENTS

SECTION 13420 – MAGNETIC FLOW METER

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specifications for the flow meter that will measure wastewater flows discharged from the pump station.

1.02 SUMMARY

A. The meter shall be magnetic type (magmeter) complete with flanged metering tube, remote wall-mount data display/keypad/transmitter, and sufficient interconnecting signal cable.

B. Meters shall be equipped to forward analog signals to the pump controller from the meter remote display/signal converter. The flow proportional signal will be used to display rate/total (both at the remote display and the SCADA computer) and control the speed of variable frequency drive pumps to provide a specific flow as set by the Operating Strategy.

C. Flow range will range from 0 to 1,000 gpm.

D. Provide a spool sized to replace the flow meter in-line to allow flowmeter to be removed for service if necessary.

1.03 RELATED SECTIONS

A. Division 3 for precast concrete flowmeter vault.

B. Division 16 for signal and power wiring.

1.04 QUALITY ASSURANCE

A. Manufacturer shall specialize in flow measurement and shall have been providing flow meters for a minimum of 5 years. Entire unit, including meter body, flow transmitter, and remote display/flow computer shall be shipped as a single package from the manufacturer.

1.05 WARRANTY

A. Warranty shall meet the standard warranty requirement as outlined in the contract documents.

B. All components making up the meter shall be warranted for 24 months from date of shipment and defects due to faulty materials or workmanship will be repaired or replaced free of charge during the two year warranty period.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver equipment to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer or as otherwise shipped and protected by the manufacturer.

B. Store equipment in a clean dry area indoors in accordance with manufacturer's instructions. Keep containers sealed until ready to use.

C. Protect equipment during handling and installation to prevent damage or contamination.

PART 2 PRODUCTS

2.01 MANUFACTURERS & MODELS.

A. The meter shall be McCrometer Ultra Mag UM06, Endress and Hauser Proline Promag, or equal. Meter body shall have 8-inch flanges.

2.02 CONSTRUCTION

A. Body

1. The meter tube shall be fabricated stainless steel pipe with 150 pound AWWA Class "D" flanges for mating to 8-inch pipe. Meter tubes shall have a constant nominal inside diameter offering no obstruction to the flow.

2. Interior of body shall be fully lined with polyurethane or fusion bonded epoxy.

3. Electrodes shall be 316 stainless steel, or C22 tantalum.

4. Meter body exterior shall be a factory applied corrosion resistant coating, polyurethane or Al/Zn coating.

B. Signal Converter

1. The signal converter shall be independent from the meter body and shall be supplied with up to 300 feet of interconnecting cable. Signal converter shall be wall mounted in control building. Contractor to verify installation location and order specific cable length to avoid unnecessary looping of extra cable.

2. The signal converter shall be microprocessor based with backlit LCD for continuous display of rate of flow and total volume of flow. Rate shall be displayed in gallons per minute (gpm) and totalized volume in gallons.

3. Unit shall be housed in a NEMA 4X case. Unit shall be wall-mounted in the control building as shown in the drawings or as directed by Engineer.

4. Instrument shall be factory programmed and shall include a self diagnostic test mode, password protected configuration parameters, and a front panel keypad used change display and parameters. The converter shall be compatible with Microsoft Windows and other software programs with built in terminal communication capabilities through an interface port.

5. The converter shall provide an isolated 4-20 mA output.

6. Unit shall store all data in a non-volatile memory with 10-year retention.

C. Grounding ring shall be 316 stainless steel or C-22 tantalum and shall be supplied with meter tube.

2.03 PERFORMANCE

A. When installed in accordance with manufacturer's instructions, meter shall have the following minimum accuracy:

1. Display, serial communications and frequency output accuracy to be ±0.2% of reading or ±0.003 ft/sec, whichever is greater.

2. Repeatability and reproducibility shall be ±0.05% or ±0.0008 ft/s, whichever is greater.

2.04 FLOW METER SPACER

A. Flow meter spacer shall be constructed of 8-inch stainless steel pipe with welded flanges. Spool shall be precisely sized to replace the flow meter in-line. Contractor will be required to demonstrate spool fitment.

B. Spool shall be labeled "Flow Meter Spacing Tool". Label shall conform to nametags specified in Section 15075; however label shall be affixed by adhesive or industrial grade double-sided tape.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions at location shown on the drawings and as directed.

B. Maintain upstream and downstream straight pipe runs as indicated in the Plans and as directed by the manufacturer.

C. Install grounding rings and gaskets as required. Ground as directed by manufacturer.

D. Wall mount remote display in control building as shown in the drawings and as directed.

E. Provide shielded signal cable as recommended by manufacturer for the outputs. All signal cable from the flowmeter vault to control cabinet shall be installed in conduit. Provide minimum 3 feet of flexible conduit near metering tube.

F. Provide power to remote display (120 VAC) as shown in the drawings and as specified. Provide flexible conduit near converter.

G. The manufacturer or authorized factory representative shall provide a minimum of one (1) day training and startup service to ensure installation and operation as required.

H. Verify that flow reading is accurate using approved device and method.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

1. Payment for flow meter and other work in this section shall be included as a portion of the lump sum price for the project as stated in the Bid Form for the Project. No separate measurement for these quantities will occur.

END OF SECTION

SECTION 13425 – DIAPHRAGM SEAL & PRESSURE GAUGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specifications for the diaphragm seal, isolation valve and pressure transmitter/gauge assemblies for discharge pressure monitoring.

1.02 SUMMARY

A. The diaphragm seal shall be a wafer type isolation ring with a flexible inner cylinder separating the process flow from the inner fill fluid. Isolation ring shall have an integral isolation valve to isolate the pressure gauge from the diaphragm seal.

B. The transmitter pressure gauge shall be a lower connected, stainless steel gauge and provide a 4-20 mA output signal.

C. The diaphragm seal, isolation valve, pressure gauge and internal pressure transmitting fluid shall be provided as a fully factory assembled unit, filled and ready for installation.

1.03 QUALITY ASSURANCE

A. Manufacturer shall specialize in pressure and temperature instrumentation and shall have been providing diaphragm seals and pressure gauges for a minimum of 5 years. Entire unit, including diaphragm seal, isolation valve and pressure gauge shall be shipped as a single package from the manufacturer.

B. Pressure gauge shall have an ASME B 40.1 Grade 1A, 1% accuracy full scale.

1.05 WARRANTY

A. Warranty shall meet the standard warranty requirement as outlined in the contract documents.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver equipment to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer or as otherwise shipped and protected by the manufacturer.

B. Store equipment in a clean dry area indoors in accordance with manufacturer's instructions. Keep containers sealed until ready to use.

C. Protect equipment during handling and installation to prevent damage or contamination.

PART 2 PRODUCTS

2.01 MANUFACTURERS & MODELS.

A. The diaphragm seal shall be Ashcroft Iso-Ring Type 80 wafer type with integral needle valve; or approved equal.

B. Pressure gauge/transmitter shall be Ashcroft Type 2279, lower mount; or approved equal.

2.02 CONSTRUCTION

A. Wafer Type Diaphragm Seal

1. The assembly flange shall be 316 stainless steel and housing shall be carbon steel. Inner flexible wall shall be Viton. Instrument connection shall be ½ -inch NPT. Filling fluid shall be glycerin.

2. Isolation ring diaphragm seal shall be equipped with an integral threaded needle valve to permit the removal of the pressure gauge without stopping the process flow or draining the fill fluid. Needle valve shall be capable of acting as a snubber by adjusting valve to "nearly closed" position. Needle valve shall be an integral part of the diaphragm housing, "stacked" valves mounted in between housing and gauge will not be allowed. Needle shall be of bronze construction.

B. Pressure Gauge

1. The pressure gauge shall be of 316 stainless steel, all welded construction. Gauge socket material shall be 316 stainless steel.

2. Gauge shall have no stop pin to mask false zero readings. Gauge face shall have graduated scale ranging from 0-100 psi on the pump discharge. Gauge dial shall be 4 ½-inch diameter.

3. Gauge connection shall be ½ -inch NPT.

4. Output signal shall be 4-20 mA.

5. Connecting pipe nipple bend and other fittings between gauge and pipe saddle shall be 316 stainless steel.

C. Isolation Ring diaphragm seal, isolation valve, and pressure gauge shall be provided as a single unit, factory filled with glycerin and ready for installation.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions at location shown on the drawings and as directed.

B. Provide all materials necessary for complete and functional installation.

C. Signal wire from gauge output shall be routed through conduit to control building. Individual pressure displays shall be provided in control building, locate in accordance with drawings or as directed.

PART 4 SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

A. Schedule I – Pump Station No. 4 Replacement

1. Payment for diaphragm seal, pressure gauge and other work in this section shall be included as a portion of the lump sum price for the project as stated in the Bid Form for the Project. No separate measurement for these quantities will occur.

END OF SECTION