

BOGUE BROOK RESERVOIR DAM REHABILITATION

SECTION 11282 SLIDE GATE AND OPERATOR

PART 1 – GENERAL

1.01 SCOPE

- A. The Contractor shall furnish all labor, materials, and equipment and shall perform all work required to install the new slide gate and operator on the upstream end of the new low-level outlet pipe at the Bogue Brook Reservoir Dam as shown on the plans and as specified in this and other sections.
- B. The work of this item shall consist of the installation of a new control slide (i.e. sluice) gate on the low-level outlet at the Bogue Brook Reservoir Dam and removing and replacing the existing 16 inch cast iron pipe with a new 24 inch ductile iron pipe. The work of this item shall require the drawdown and control of water in the Reservoir, as specified in Section 01565, and the installation of a temporary coffer dam, as specified in Section 02170.
- C. The work of installing the slide gate at the low-level outlet pipe at the Dam shall include, but not be limited to, the following:
 - 1. Excavation of upstream face required for construction of new intake structure. Installation of an excavation support system, if needed.
 - 2. Construction of the cast-in-place reinforced concrete upstream intake structure, including encased D.I. pipe, to accept the new slide gate.
 - 3. Installation of slide gate and frame, air vent, operator stem bushing, and other accessories at the upstream ends of the low-level intake structure, as shown on the Contract Drawings.
 - 4. Connection of new upstream intake structure to new pipe with mechanical connections.
 - 5. Installation of gate operator stem and casing and air vent up the upstream face of the embankment.
 - 7. Provision and installation of all other systems and items, incidental or otherwise, necessary to construct the intake structure as shown on the Drawings and ensure their proper functioning.
- D. The intent of this section is to provide suitably watertight slide gates for the low-level outlet at the upstream end of the conduit. The slide gate and associated system should be durable and easily operable and maintained. The Contractor shall ensure compatibility between components by ordering the slide gate and components from same manufacturer or otherwise ensuring compatibility.

1.02 RELATED WORK

- A. The following is a list of related work items that shall be performed or furnished under other sections of these specifications as indicated:

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1. Temporary Erosion and Sedimentation Control - Section 01560.
2. Temporary Water Control – Section 01565
3. Temporary Cofferdams – Section 02170
4. Earthwork - Section 02200.
5. Ductile Iron Pipe and Fittings – Section 02660
6. Pipeline Abandonment– Section 02760
7. Cast-In-place concrete – Section 03300

1.03 SUBMITTALS

- A. Not less than twenty (20) calendar days prior to the scheduled start of construction/installation, the Contractor shall submit shop drawings, and designs as per the requirements of the individual technical specifications. Shop drawings for the slide gate assembly and operator system shall be specifically included in the submittals.
- B. Not less than ten (10) calendar days prior to the scheduled start of overall construction of the intake, the Contractor shall submit his proposed overall schedule and methodology for the work.

PART 2 – PRODUCTS

Products specifically mentioned by name on the drawings shall be provided unless an equivalent substitution is approved by the Resident Engineer.

2.01 DUCTILE IRON PIPE AND FITTINGS

Ductile Iron Pipe and Fittings shall meet the requirements of Section 02660

2.02 CAST-IN-PLACE REINFORCED CONCRETE

Cast-in-Place Reinforced Concrete shall meet the requirements of Division 3.

2.03 SLIDE GATE

- A. The slide gate for the low-level intake structure shall be a 42 by 42 inch cast iron slide gate as manufactured by HydroGate, Steel-Fab, Whipps or approved equal. The slide gate should be designed for throttling flows.
- B. the slide gate shall meet the requirements of AWWA C560-07 standard or its most recent replacement.
- C. Construction materials shall be cast iron for the frame, gate, and guides. Wedges, thrust nut, lift nut, and couplings are bronze castings. Seat facings are extruded bronze. Adjusting screws and some special fasteners are bronze. Materials shall meet relevant ASTM standards.

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- D. A threaded operating stem shall be utilized to connect the operating mechanism to the slide. The threaded portion shall engage the operating nut in the manual operator. The operator stem shall be minimum 1.5-inch diameter, stainless steel.
 - E. A casing shall be utilized to house the operator stem within the concrete. The casing shall be minimum 4-inch ductile iron pipe. Centralizers shall be used and installed per manufacturer's recommendations.
 - E. The gate frame shall be of a type suitable for direct mounting to the concrete intake structure with embedded anchor bolts, as shown on the drawings.
 - F. The gate operator shall be a geared crank operated bench stand suitable for rising stem operations, such as Hydro Gate CPS4 or approved equal.
- 2.06 STAINLESS STEEL
- A. Stainless steel products shall meet the requirements shown on the Drawings and in general shall be Type 316.
- 2.07 TRASH RACK
- A. Trash rack shall be installed in accordance with Section 011284.
- 2.08 MISCELLANEOUS PRODUCTS
- A. All products and materials not specifically mentioned above shall meet the requirements shown on the Drawings. If no requirements are provided on the drawings, products and material shall be provided which are usual and customary for the type of construction in question.

PART 3 – EXECUTION

3.01 PREPARATORY WORK

- A. Prior to beginning the construction of the low-level outlet, the Reservoir must be drawn down, and all water control and erosion and sedimentation control measures must be in place.
- B. Prior to beginning the construction of the low-level upstream intake structure, a temporary cofferdam must be in-place and the area dewatered.
- C. Complete all other miscellaneous necessary work as per the Drawings.

3.02 TESTING

- A. Prior to and upon refilling of the Reservoir, test the new gate for leakage as per the requirements of AWWA C560. The gate leakage, when subjected to the specified heads, shall not exceed (a) Under seating head conditions, the leakage shall not exceed 0.1 gallon per minute per foot of perimeter; and (b) for unseating head conditions up

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to a maximum of 20 feet, the leakage shall not exceed 0.2 gallons per minute per foot of seating perimeter. The Contractor shall take all necessary corrective action. All testing and repair shall be at the Contractor's expense.

PART 4 – MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

No measurement of the slide gate and operator shall be made. The successful fabrication and installation of the low-level outlet structure shall be paid as a Lump Sum item.

4.02 PAYMENT

- A. Payment for the scope of work associated with the low-level outlet slide gate and operator specified herein shall be paid for at the applicable lump sum price stated on the Form for Bid. It shall include all labor, materials, equipment, and incidentals required for installation of the slide gate and operator.

<u>Item No.</u>	<u>Payment Item</u>	<u>Unit</u>
11282.01	Slide Gate and Operator	Lump Sum

***** END OF SECTION *****

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SECTION 11284 TRASH RACK SYSTEM

PART 1 – GENERAL

1.01 DESCRIPTION

- A. This specification relates to the design, materials of construction, fabrication, furnishing, and installation of a trash rack system to protect the entrance in front of the low-level outlet structure associated with the Bogue Brook Reservoir. The purpose of the trash rack (also called a bar screen) is to mitigate unwanted material from entering the low-level water conveyance structure and to protect the pipelines therein.
- B. The Work of this Section covers the fabrication of trash rack and associated elements required to mechanically attach the trash rack to the existing concrete structure. The work also includes mechanically attaching the trash rack.
- C. The proposed trash rack shall be fabricated from galvanized carbon steel.

1.02 SCOPE OF WORK

The Scope of this Section shall include the all materials, labor, equipment, design, and other effort for the fabrication, provision, and installation of trash rack systems which shall be designed to be installed on the upstream side of the existing concrete dam face.

It is hereby noted that the Contract Drawings prepared by the Engineering Consultant are meant to provide a guide to the Contractor and their manufacturing subconsultant with regard to the intent of what would be acceptable for the trash rack systems. The Contractor is free to submit an alternate trash rack configurations, and/or systems for review and approval by the Engineering Consultant so long as they satisfy the performance requirements for the protective trash rack systems stipulated herein.

1.03 SUBMITTALS

- A. Not less than five (5) days prior to the scheduled start of fabrication, the Contractor shall submit shop drawings and design calculations depicting the design of the trash rack and the proposed method of installing/attaching the trash rack, to the Engineering Consultant for review. The submittal shall include as a minimum the following items:
 - 1. The design of the trash rack and guides including size, weight, material, and seat details. Information regarding the trash rack manufacturer shall also be provided.
 - 2. The design of the attachment/mounting system between the trash rack and the structure.

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1.04 REFERENCES

- A. ASTM A123/A123M-02 - Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron & Steel Products

PART 2 - PRODUCTS

2.01 TRASH RACK

- A. All steel components shall be carbon steel bars conforming to ASTM A322 – 07, commercial quality.
- B. Joints: All joints shall be welded per AWS D1.3.
- C. Fittings and Fasteners: Same material and alloy as parts being joined, unless otherwise indicated. Do not use materials that will be corrosive or incompatible with materials being fastened; do not use pop-rivets, sheet metal screws, adhesives or cast fittings.
 - a. Fasteners: Series 300 Stainless Steel
 - b. Component Fittings: Machined from solid 6063 alloy incorporating expanding internal tines.
- D. Vertical bars 1/2" x 1/2" solid square sections.
- E. Bar Spacing: Bars shall have a maximum horizontal spacing of 6" on-center.
- F. Provide horizontal structural tube stiffeners as shown on the design drawings.
- G. The design intent is that the trash rack shall be fabricated either as a single item or in sections depending upon galvanizing and installation ease.
- H. All carbon steel components shall be hot-dip galvanized as per ASTM A123.

PART 3 – EXECUTION

3.01 FABRICATION

- A. The Contractor shall be responsible for determining the exact dimensions of the trash rack and mechanical attachment supports based on the Contract Drawings and as verified in the field.
- B. The Contractor shall fabricate the trash rack and all mechanical attachments.

3.02 GALVANIZING

Note galvanizing shall be such that the entire piece to be galvanized is entirely dipped in the galvanizing tub. No partial and/or double dipping shall be allowed. Contractor shall be sure to design the rack (or rack sections) such that they can be properly galvanized in

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one dipping pass.

- A. Blast clean to near white metal in accordance with SSPC-SP10.
- B. Hot-dip galvanize fabricated items in accordance with ASTM A123 and hardware items in accordance with ASTM A153.
- C. Assembled and non-assembled steel as indicated on Drawing shall be galvanized.
- D. Galvanize items after assembly when possible.
- E. Thickness of galvanizing shall be as specified in ASTM A123 and A153 except coating shall not be less than 2 oz. (3.3 mils) per square foot.
- F. Galvanizing shall provide a visually acceptable substrate for applied coatings and shall be free of lumps, globules, sharp edges or heavy deposits which will interfere with intended use or aesthetic appearance of materials.
- G. After erection touch-up all damaged galvanized surfaces and field welds as follows:
 - 1. Surfaces to be reconditioned with zinc-rich paint shall be clean, dry, and free of oil, grease and corrosion.
 - 2. Areas to be repaired shall be power disc sanded to bright metal. To ensure that a smooth reconditioned coating can be affected, surface preparation shall extended into the undamaged galvanized coating.
 - 3. At galvanized surfaces, apply organic zinc repair paint complying with requirements of ASTM A780. Galvanizing repair paint shall have 65 percent zinc by weight.
 - 4. The paint shall be spray applied in multiple coats until a dry film thickness of 4-6 mils minimum has been achieved. A finish coat of aluminum paint shall be applied to provide a color blend with the surrounding galvanizing.
 - 5. Coating thickness shall be verified by measurements with a magnetic or electromagnetic gauge.
 - 6. Acceptable Repair Paint:
 - a. ZIRP by Duncan Galvanizing.
 - b. Tneme - Zinc by Tnemec.
 - c. or equivalent.

3.03 TRASHRACK INSTALLATION

- A. The Contractor shall field verify all dimensions.
- B. The trashrack shall be installed as per manufacturer instructions.
- C. Attachment of the trash rack to the concrete shall be via ½”-diameter stainless steel Hilti Kwik Bolts, or approved equivalent, with a minimum embedment of 3 ¼ inches into concrete.

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- D. Touch up any damage to the corrosion protection system as needed.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT FOR PAYMENT

- A. No measurement of the trash rack system shall be made. The successful fabrication and installation of the Trash Rack shall be paid as a Lump Sum item.

4.02 PAYMENT

- A. Payment for the scope of the work specified herein, including all fabrication, transport labor, materials, equipment and incidentals associated with the work of furnishing and installing the approved Trash Rack systems shall be paid for at the applicable Lump Sum Price stated for Item 11284.01 on the Bid Form.

<u>Item No.</u>	<u>Payment Item</u>	<u>Unit</u>
11284.01	Trash Rack Systems	Lump Sum

***** END OF SECTION *****

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