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March 5, 2008

STATE PROJECT NO. 450-09-0031
I-10 MISSISSIPPI RIVER BRIDGE PIER NO. 5 FENDER REPLACEMENT
ROUTE I-10
EAST BATON ROUGE PARISH

SUBJECT: ADDENDUM NO. 1 (CONSTRUCTION PROPOSAL REVISION)

Gentlemen:

Attached are the construction proposal revisions dated 03/05/08 on the captioned project for which bids will be received on Wednesday, March 26, 2008.

The following changes have been made:

1. Revised the following Special Provisions: Item S-102, Field Verification and Surface Cleaning; Item S-103, Precast Concrete Modules; Item S-105, Plastic Composite Marine Timber Fenders; Item S-106, Fender Cover Gratings and Ladder; and Item S-108, Navigation Lights (Lights, Frame and Electrical). (12 pages)

Please note these revisions in the proposal previously furnished you and bid accordingly.

Very truly yours,

RANDAL D. SANDERS, P. E.
CONTRACTS & SPECIFICATIONS ENGINEER

Attachments
pc: Mr. Brian Buckel
Mr. Roy Schmidt
Mr. Philip Graves
Mr. Paul Fossier
Ms. Margaret Thompson
Mr. John Oglesby
Mr. Masood Rasoulian

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ITEM S-102, FIELD VERIFICATION AND SURFACE CLEANING: This item consists of verification of all dimensions and elevations and preparation of the concrete surfaces required for installation of the concrete modules and cast-in-place concrete fills.

The contractor shall verify the following conditions, locations, dimensions and elevations prior to submitting the erection procedures, installation methods, construction sequences and concrete module shop drawings:

- Dimension of the distribution block in plan and elevation
- Dimension of sub-subshaft
- Dimension of subshaft
- Relative position of sub-subshaft to the distribution block
- Dimension of concrete pedestal
- Location of each pedestal
- Elevation at top of the distribution block
- Elevation at top of the sub-subshaft
- Elevation at top of the subshaft
- Condition at top of the distribution block
- Condition at top of the sub-subshaft
- Any other conditions, locations, dimensions and elevations that the contractor needs for the fabrication and placement of the concrete modules.

The existing fender details and existing pier details are shown on Sheets No. 23 to 31 of the plans for the contractor's information.

Acoustic survey reports of the pier and the damaged fender will be made available to the contractor for his bidding purpose. The contractor shall contact Louisiana Department of Transportation and Development for the reports and other available information on the existing fender.

The contractor shall clean the top surface of the distribution block, the top surface of sub-subshaft ledge, and the vertical surfaces of the sub-subshaft and the subshaft to remove any debris and marine growth.

The field verification and surface cleaning will involve underwater work, and the cost of divers and equipment required to perform the underwater work shall be included in this item.

Three (3) copies of all field notes and diver's reports with sketches clearly showing conditions, locations dimensions and elevations shall be delivered to the Project Engineer.

Field Verification and Surface Cleaning will be paid for at the contract unit price per lump sum, which shall include mobilization, all material, tools, equipment, labor, and incidentals, and the performance of all work necessary to complete the item.

Payment will be made under:

Item S-102, Field Verification and Surface Cleaning, per lump sum.

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ITEM S-103, PRECAST CONCRETE MODULES: This item consists of fabrication, transportation and installation of one hundred (100) precast concrete side modules, twenty (20) precast concrete corner modules and ten (10) precast concrete nose modules required for the construction of the fender system. This item also consist of the fabrication of four (4) precast concrete side modules, two (2) precast concrete corner modules and two (2) precast concrete nose modules for future use.

The fabrication of the precast concrete modules shall include but not limited to:

- Furnish of the special forms for each module type
- Furnish, fabrication and placement of the reinforcing steel as specified in the plans
- Fabrication and placement of the stainless steel anchor sleeve assemblies in the concrete module for shear keys and composite marine timber walers
- Casting of the modules with drain holes
- Fabrication of shear keys
- Furnish and installation of the 1/16" neoprene sheets between shear keys and concrete
- Installation of shear keys with stainless steel anchor bolts
- Surface preparation and cleaning and application of the coal tar epoxy coating to the surfaces designated in the plans
- Application of the polyurethane foam to the surfaces designated in the plans

All concrete work shall conform to Section 805 Structural Concrete, Louisiana Standard Specifications for Roads and Bridges. Precast concrete shall be Class A with 3,800 psi minimum acceptable 28-day compressive strength.

Fabrication and placement of reinforcing bars shall conform to Section 806 Reinforcement, Louisiana Standard Specifications for Roads and Bridges. All reinforcing bars shall be deformed type steel bars conforming to ASTM 615, $F_y = 60$ ksi.

All metal work shall conform to Section 807 Structural Metals, Louisiana Standard Specifications for Roads and Bridges. Shear key steel shall be ASTM A-709, Grade 50.

Welding shall conform to Section 815 Welding, Louisiana Standard Specifications for Roads and Bridges.

Shear keys shall be hot-dip galvanized as per Section 811.12 Galvanizing, Louisiana Standard Specifications for Roads and Bridges.

Stainless steel anchor sleeve assemblies should be fabricated as per the details on Sheet No. 16 of the plans. The anchor bolts shall be 1" diameter SS316 stainless steel bolts with washers.

Coal tar epoxy coating shall comply with SSPC Paint No. 16. Concrete surface to be coated must be clean and free of oils, grease, loose contamination and any form released agent. The concrete shall be dry-abrasive blasted to remove all surface contaminants prior to the coating being applied. Surfaces to be coated must also be smooth without extruding elements exceeding ¼" in either diameter or depth. The coating must be uniformly applied with constant thickness of 16 mils as specified in the plans. All voids, cavities, air bubbles and air holes exceeding ¼" in either diameter or depth shall be filled with a suitable epoxy grout.

A low viscosity, two component, 2.5 - 3.0 lb closed-cell, spray-applied rigid polyurethane foam system shall be applied on top of the coal tar epoxy coating on the surfaces designated in the plans. The foam must be uniformly applied with constant thickness of ¼".

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The contractor shall submit to the Project Engineer the material data sheets and manufacturer's recommendations on surface preparation, application and all other details of his chosen coal tar epoxy coating and polyurethane foam system. The purpose of applying coal tar epoxy coating and polyurethane foam system is to create non-adhesive surfaces that will not bond with the cast-in-place concrete poured against the surfaces and avoid mechanical interlocking so that the module can be moved freely along the surfaces with coating and foam. The contractor shall conduct the testing of his chosen coal tar epoxy coating and polyurethane foam system on one module to confirm that the coating and foam system meet the performance expectation. The contractor shall submit the testing results, the material data sheets and manufacturer's recommendations on surface preparation, application and all other details of his chosen coal tar epoxy coating and polyurethane foam system to the Project Engineer for approval. The contractor may propose alternative coating and foam system based the performance criteria, and shall submit the alternative system to the Project Engineer for approval. Cost of testing shall be included in this item.

All coating and foam systems shall be applied by only trained and approved applicators.

The contractor shall take all necessary protection measures to ensure that workmen and work areas are adequately protected from fire and health hazards resulting from abrasive-blasting cleaning, handling, mixing and application of the coating and foam material, observing all necessary safety precautions required by regulatory authorities.

Contractor shall transport the modules from the fabrication facilities to the construction site and obtain appropriate permits for transporting oversize loads and/or heavy loads from the regulatory agencies.

The concrete modules must be aligned horizontally and vertically so that the offsets between adjacent units will not exceed ¾". To achieve the required tolerances it is imperative that the modules be erected plumb. Possible means of making adjustments in case the top surface of the distribution block is not level include the use of shim plates to support the bottom modules off the distribution block at selected points, using removable erection guides to keep the modules plumb, bracing the steel columns against the pier shaft and using them as guides for the modules and using adjustable legs connected to the inside of the bottom modules. The contractor shall submit detailed erection procedures, methods and sequence of placing modules and pouring cast-in-place concrete for approval prior to construction. The contractor shall also submit in detail the selected method of adjustments for erecting modules plumb if the top surface of the distribution block is not leveled based on the field verification report.

The installation of the concrete modules will involve underwater work, and the cost of divers and equipment required to perform the underwater work shall be included in this item.

If the contractor chooses to modify the modules to avoid the existing pedestals at top the distribution block, the cost of such modification shall be included in this item.

Precast Concrete Modules will be paid for at the contract unit price per lump sum, which shall include mobilization, all material, tools, equipment, labor, and incidentals, and the performance of all work necessary to complete the item.

Payment will be made under:

Item S-103, Precast Concrete Modules, per lump sum.

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ITEM S-105, PLASTIC COMPOSITE MARINE TIMBER FENDERS: This item consists of providing all material and labor needed to furnish and install plastic composite marine timber fender system as shown on the contract plans.

The fender system shall consist of black and yellow composite marine timber walers attached to the exterior of the various precast concrete modules. Vertical backing walers behind the clearance gage panels shall also be included in this item.

The walers should be 12" by 12" fiberglass reinforced plastic composite marine fender timber with four 1.25" diameter fiberglass reinforcing elements.

The anchor bolts shall be 1" diameter SS316 stainless steel bolts with washers.

3.5" diameter 2" deep counterbore shall be provided at each anchor bolt location.

Plastic Composite Marine Timber Fenders will be paid for at the contract unit price per lump sum, which shall include all material, tools, equipment, labor, and incidentals, and the performance of all work necessary to complete the item.

TECHNICAL SPECIFICATIONS FOR
FIBERGLASS REINFORCED PLASTIC COMPOSITE
MARINE FENDER TIMBER
12" BY 12" WITH FOUR (4) EACH 1.25" DIAMETER FIBERGLASS
REINFORCING ELEMENTS

1. SCOPE

1.1 Scope. This specification covers a fiberglass reinforced plastic composite marine timber to be used for the construction of various marine related structures, including piers, wales for facing of docks, bullrails, chocks, camels barge guide wall systems and rubbing strips.

2. APPLICABLE DOCUMENTS

2.1 Publications. The following documents form a part of this specification to the extent specified herein.

ASTM D543 - Resistance of Plastics to Chemical Reagents
ASTM D570 - Water Absorption of Plastics
ASTM D638 - Tensile Properties of Plastics
ASTM D695 - Compressive Properties of Rigid Plastics
ASTM D746 - Brittleness Temperature of Plastic and Elastomers by Impact
ASTM D792 - Specific Gravity (Relative Density) and Density of Plastics by Displacement
ASTM D1761 - Method of Testing Mechanical Fasteners in Wood (Section 102)
ASTM D2240 - Rubber Property-Durometer Hardness
ASTM D4060 - Abrasion Resistance of Organic Coatings by the Taber Abraser
ASTM D4329 - Operating Light and Water Exposure Apparatus (Fluorescent Condensation Type) for Exposure of Plastics (UVA-340)
ASTM D4476 - Flexural Properties of Fiber Reinforced Pultruded Plastic Rods
ASTM E12 - Density and Specific Gravity of Solids, Liquids and Gases

2.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications or specification sheets), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

2.3 Submittals. The manufacturer shall submit to the purchasing authority one (1) copy each of his standard and most recent product brochure and Technical Manual for the product covered by this specification. Copies of material test reports and performance test data which support compliance with the specification requirements shall be submitted to the purchasing authority as required by the procurement documents.

3. REQUIREMENTS

3.1 Standard commercial product. The fiberglass reinforced plastic composite marine timber shall be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this specification, but which are a part of manufacturer's standard commercial product, shall be included in the timber being furnished. A standard commercial product is one that has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs or brochures, and represents the latest production model. Manufacturer shall provide documentation that it has manufactured the product for a minimum of 4 years.

3.2 Drawings. The purchaser is responsible for preparing his own shop drawings. Where tolerances prescribed may cumulatively result in incorrect fits, the contractor shall provide tolerances within those prescribed herein to insure correct fit, assembly, and operations of the items. No deviation from the prescribed dimensions or tolerances is permissible without prior approval of the purchaser.

3.3 Materials. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice.

3.3.1 Plastic. The plastic shall be a mixture of one or more of the following recycled post consumer or post industrial thermoplastics: High density polyethylene, medium density polyethylene, low density polyethylene, and polypropylene. This plastic shall be mixed with the appropriate colorants, UV inhibitors and antioxidants, so that the resulting plastic portion of the product shall conform to the characteristics as listed in Table I.

3.3.2 Reinforcing. The plastic composite marine timber shall be reinforced with fiberglass elements. The reinforcing elements shall conform to the characteristics found in Table II.

3.4 Design. The fiberglass reinforced plastic composite marine timber shall be designed as described herein.

3.4.1 General Configuration. The plastic composite marine timber shall have a square cross section with radiused corners. Both ends shall be cut square. It shall be seamless with a smooth outer skin.

TABLE I PLASTIC (TYPICAL PROPERTIES)

Density (ASTM D792)	Skin	Unblown plastic - 55-63 lb./cu. ft
Density (ASTM E12)	Core/Annulus	34-50 lb./cu. ft
Water Absorption (ASTM D570)	Skin	24 hr.: < 3.0% wt. Increase 2 hr.: < 1.0% wt. Increase
Brittleness (ASTM D746)	Skin	No break at -40°F
Impact Resistance (ASTM D746 modified)	Skin	Greater than 4 ft-lb./in.
Hardness (ASTM D2240)	Skin	45-55 (Shore D)
Ultraviolet (ASTM D4329 UVA-340)	Skin/Core/Annulus	No more than 10% change in Shore D durometer hardness after 500 hours exposure
Abrasion (ASTM D4060)	Skin	Weight Loss:< 0.5 g Wear Index: 2.5 to 3.0 Cycles = 10,000 Wheel = CS17 Load = 1 kg
Chemical Resistance (ASTM D543 modified, Procedure I)	Skin/Core/Annulus Sea Water Gasoline No. 2 Diesel	 < 1.5% weight increase < 7.5% weight increase < 6.0% weight increase
Tensile Properties (ASTM D638)	Skin/Core/Annulus	Minimum 500 psi at break
Compressive Modulus (ASTM D695)	Skin/Core/Annulus	Minimum 40,000 psi
Coefficient of Friction (ASTM F489)	Skin	Maximum 0.25, wet or dry
Nail Pull Out (ASTM D1761 Section 102)	Skin/Core/Annulus	Minimum 60 lb.

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TABLE II REINFORCING

For Fiberglass Reinforcing Elements:

Flexural Strength (ASTM D4476)	Flexural Strength	70,000 psi
Compressive Properties (ASTM D695)	Compressive Strength	40,000 psi

3.4.2 Dimensions. Dimensions for the fiberglass reinforced plastic composite marine timber shall be as shown in Table III.

TABLE III DIMENSIONS

Marine Timber	Dimension	Tolerance
Length	Per order (105 feet maximum)	+/-1.0 feet
Width	12 inches	+/-0.25 inches
Height	12 inches	+/-0.25 inches
Corner radius	1.875 inches	+/-0.375 inches
Outer Skin Thickness	3/16 inches	+/-0.125 inches
Distance from outer surface to rebar elements	2.00 inches	+/-1.0 inches
Straightness (gap, bend or bulge inside while lying on a flat surface)		< 1.5 inches per 10 feet of length

3.4.3 Repairability. The outer skin must be repairable if chipped or spalled by using a commercially available roofing compound.

3.5 Construction. The plastic composite marine timber shall be manufactured in a continuous process that will result in it having no joints. The plastic composite marine timber shall have a coextruded outer skin of dense, unblown plastic, an inner core of foamed plastic manufactured prior to the manufacture of the timber, and an annulus of foamed plastic encapsulating the reinforcing elements. The plastic composite marine timber shall conform to the design requirements of Section 3.4 of the specification.

3.5.1 Colored Outer Skin. The outer skin shall be black or yellow in color as shown on the plan sheets. It shall contain hindered amine light stabilizers to provide sufficient resistance to ultra violet light degradation as to meet the requirements in Table I. The outer skin of the plastic composite marine timber shall be continuous and homogenous throughout the entire length and perimeter of the timber. It shall be formed by coextruding a plastic material at the same time that the annulus material is extruded. It shall conform to those applicable Sections of Table I.

3.5.1.A Flame Retardant Co-extruded Skin. The co-extruded, outer skin of the FRPP/FRPL shall include a flame-retardant additive. The additive used shall be stable bromine/antimony trioxide . The minimum amount of additive included in the co-extruded skin

shall be 7.5% (by weight). Each shipment of FRPP/FRPL delivered to the job site shall include a quality control report from the manufacturer certifying these minimum requirements are satisfied.

3.5.2 Annulus. The annulus of the timber shall be a continuous foamed structure throughout the entire length of the timber. It shall conform to those applicable Sections of Table I, and shall be black in color. The annulus shall be melt fused to the inner core in such a manner that the joint between the inner core and the annulus develops the full strength of the plastic.

3.5.3 Reinforcing. The reinforcing elements shall be arranged in a square pattern, as described in Table III, within the annulus of the plastic composite marine timber. Each plastic composite marine timber shall have a quantity of four (4) fiberglass reinforcing elements, 1.25" in diameter. Each individual element shall typically run the entire length of the timber, terminating flush with the ends, with the rebar exposed. No plastic, fiberglass or metal elements or supports for the reinforcing element shall be used in the timber. The reinforcing elements shall be designed to enable residual stresses to be relieved through a post production treatment.

3.5.4 Inner Core. The inner core of the plastic composite marine timber shall be a continuous foamed structure throughout the entire length of the timber. It shall conform to those applicable Sections of Table I, and shall be black in color. Butt joints as required for manufacturing may be utilized provided the full strength of the plastic is developed in the joint.

3.5.5 Stress relieving. All plastic composite marine timber shall undergo a post production operation to ensure residual stresses are relieved.

3.5.6 Owners Field Guide. With the shipment of the first plastic composite marine timber, the manufacturer shall provide one copy of its owners field guide. This guide shall include information and diagrams describing and illustrating the recommended means for handling, placing, installing, and finishing the plastic composite marine timber.

3.6 Performance. The plastic composite marine timber shall be designed to provide the following structural characteristics when using the material properties shown in Tables I and II.

Flexural Modulus of Elasticity	319,123 psi
Stiffness (EI)	5.17×10^8 lb·in^2
Yield Stress in Bending	3,466 psi
Weight	41-50 lb./ft.

An independent laboratory report verifying the Modulus of Elasticity of a full size test specimen is to be included in the submittal package. The Modulus is to be taken at a strain of 0.01 inches per inch, where strain equals (6) x (depth of cross section) x (deflection) / (span length squared) and where Modulus of Elasticity equals (load) x (span length cubed) / [(48) x (deflection) x (moment of inertia)].

3.7 Interchangeability. All units of the same classification furnished with similar options under a specific contract shall be identical to the extent necessary to insure interchangeability of component parts, assemblies, accessories, and spare parts.

3.8 Identification Markings. Each individual plastic composite marine timber shall be clearly marked with the manufacturers name and distinct serial number near each end of the product.

3.9 Workmanship.

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3.9.1 Outer Skin. The dense outer skin of the plastic composite marine timber shall be generally smooth but may contain occasional blisters and pockmarks.

3.9.2 Annulus and Inner Core. The foamed inner core should be homogenous and reflect a consistent cell structure when viewed across the grain. It shall be uniform in color. The product shall contain no singular void in excess of 3% of the total foamed cross sectional area and greater than 3" in length.

3.9.3 Reinforcing. The reinforcing elements shall be those of standard industry make and appearance, and free from kinks and sharp bends.

4. QUALITY ASSURANCE PROVISIONS

4.1 Quality Assurance. The manufacturer shall have in place a Quality Assurance Program that will ensure the plastic composite marine timber is manufactured to the specifications noted in Sections 3.4, 3.5, 3.6, 3.9.

4.2 Examination. Each complete plastic composite marine timber shall be examined by an inspector of purchaser's designation for compliance with the appropriate requirements of Section 3 of this specification. This inspection shall encompass all visual examinations and dimensional measurements. Records maintained by the manufacturer shall be inspected to ensure that the materials used in construction of all contract items conform to the requirements. In particular, it shall be verified that the material requirements of Tables I and II, and manufacturing tolerances found in Table III are met. Noncompliance with any specified requirements or presence of one or more major defects preventing or lessening maximum efficiency shall constitute cause for rejection.

4.3 Tests. The manufacturer shall provide documentation showing that the tests described in 4.3.1 have been performed, and that the test results meet the requirements of this specification. The tests shall be conducted entirely by a testing laboratory independent of the manufacturer, under the direction of a testing engineer. The manufacturer shall also provide a copy of the test report that shows the results of the physical and mechanical tests listed in Table I. For these tests, all test specimens must be extracted from a full-scale product. Test specimens shall not be made by injection or compression molding or calendering, but shall be made from plastic cut from the full-scale product (except those tests that require the entire cross section of the product to be tested).

4.3.1 The product shall be tested in bending, to quantitatively determine the flexural modulus of elasticity and the bending yield stress. The product shall be tested full-scale. Scale model tests are not acceptable. The test configuration shall be three point bending (the product shall be simply supported at two locations, with the load applied equidistant from the two supports). The supported span to depth ratio shall be a minimum of 16:1. The product shall be loaded at least until the specified minimum yield stress is reached, or until failure if so desired. During the test, load and corresponding deflection data shall be recorded. Deflection shall be measured at the load point, and at two other points, each equidistant between the supports and the load. Deflection shall be measured at least at 1,000 pound load increments.

4.3.2 Load and deflection data acquired during the test shall be used to calculate the stiffness (EI), and the bending stress. The flexural modulus of elasticity is calculated by dividing EI by the moment of inertia of the cross section of the product.

4.3.3 Calculations of the properties in 4.3.2 shall be made utilizing standard elastic beam flexure formulas (as found in references such as Machinery's Handbook; and Formulas for Stress and Strain, by Roark and Young). Stiffness (EI) shall be reported as the average of the stiffness at all measurement locations, between zero load and half the load corresponding to the

specification yield stress. The specified minimum yield stress in bending shall be reached before failure of the product. Stress shall be calculated at the load point, on the tension side of the plastic composite marine timber.

4.3.4 As stated in 4.3.1, the tests shall be conducted on a full-scale product of the specified size. The results of these tests may be extended through engineering calculations, to a product of another size only if the other size has the same or smaller cross section than the tested product. Smaller cross sections shall not be used to predict the performance of larger cross sections.

5. SHIPPING

5.1 Shipping. The plastic composite marine timber shall be shipped in a manner to minimize any scratching or damage to the outer surface.

6. INSTALLATION

6.1 Installation. Installation shall be in accordance with manufacturer's guidelines as noted in its owners field guide. Unless otherwise specified, installation of the plastic composite marine timber is not included as part of manufacturer's responsibility under this purchase order.

7. PURCHASING

7.1 Requirements. The following items must be included in any purchase orders:

- Length of timbers
- Outer color (Black, unless otherwise specified)
- Quantity
- Required accessories
- F.O.B. point

Payment will be made under:

Item S-105, Plastic Composite Marine Timber Fenders, per lump sum.

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ITEM S-106, FENDER COVER GRATINGS AND LADDER: This item consists of providing all material, equipment and labor needed for furnishing and installation of the steel gratings over the voids of the concrete modules and one access ladder at the location specified in the plans.

Steel gratings shall have 1½"x 3/16" bearing bars spaced @ 1 3/16" centers with end trim bars. An example of the grading product meeting such requirement is GW series by McNichols. Steel saddle clips with powder-actuated fastener shall be used to anchor the gratings. The powder-actuated fasteners shall be HILTI X-AL-H67P8 or approved equal. The contractor shall submit the details of the chosen products to the Project Engineer for approval.

All metal work shall conform to Section 807 Structural Metals, Louisiana Standard Specifications for Roads and Bridges. The metal work shall include fabrication of the steel ladder and furnishing of 1" diameter dome head drive spikes. Welding shall comply with Section 815 Welding, Louisiana Standard Specifications for Roads and Bridges.

Steel gratings, steel saddle clips and fasteners, steel ladder and dive spikes shall be hot-dip galvanized as per Section 811.12 Galvanizing, Louisiana Standard Specifications for Roads and Bridges.

Fender Cover Gratings and Ladder will be paid for at the contract unit price per lump sum, which shall include all material, tools, equipment, labor, and incidentals, and the performance of all work necessary to complete the item.

Payment will be made under:

Item S-106, Fender Cover Gratings and Ladder, per lump sum.

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ITEM S-108, NAVIGATION LIGHTS (LIGHTS, FRAME AND ELECTRICAL): This item consists of providing all material, equipment and labor needed for furnishing and installation of two navigation lights, two on/off switches and electrical conduits connecting navigation lights at the nose of the fender to the existing conduits at the base of the pier column, and fabrication, transportation and installation of two steel navigation light frames.

All electrical work shall conform to Section 730 Electrical Systems, Louisiana Standard Specifications for Roads and Bridges. Electrical shop drawings shall be submitted as per Section 730.04 of the Standard Specifications.

Aluminum conduit shall be installed separated from concrete by approved means, and shall be properly anchored. Cost for furnishing, fabrication and installation of anchoring devices shall be included in this item.

All metal work shall conform to Section 807 Structural Metals, Louisiana Standard Specifications for Roads and Bridges.

The metal work shall include fabrication of the steel navigation light frames and furnishing of 1" diameter dome head drive spikes. Welding shall comply with Section 815 Welding, Louisiana Standard Specifications for Roads and Bridges.

The steel frames and spikes shall be hot-dip galvanized as per Section 811.12 Galvanizing, Louisiana Standard Specifications for Roads and Bridges.

In the process of replacing the existing fender system, approved temporary navigation lights shall be furnished, installed, and maintained by the contractor. The cost of materials and work for temporary navigation lights shall be included in this item.

Navigation Lights (Frames, Lights and Electrical) will be paid for at the contract unit price per lump sum, which shall include all material, tools, equipment, labor, and incidentals, and the performance of all work necessary to complete the item.

Payment will be made under:

Item S-108, Navigation Lights (Lights, Frame and Electrical), per lump sum.

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