

ITEM 10599.1301 M - SUBMARINE CABLES

DESCRIPTION

The work under this item shall consist of furnishing and installing eight (8) submarine cables as indicated on the plans and in accordance within the specifications.

MATERIALS

Proper and adequate identification of each conductor in submarine cables shall be provided by an approved method confirming to the Insulated Cable Engineers Association, (ICEA) Standards, S-10-81, Part 5. The required number of conductors shall be laid together in a cable form, using non-wicking fillers, to make a uniform circular section, and the whole then covered with binder tape. Over this jacket, there shall be a High Density Polyethylene (HDPE) bedding, a close winding of galvanized steel wire armor and HDPE overall. The wire armor shall conform to the requirements of the current ICEA standards, S-10-81, Paragraph 4.14.8.

Cables shall be as manufactured by one of the following companies, or an approved equal:

BIW Cable Systems, Inc.
Boston, Massachusetts 02125
(617) 822-6600

L. F. Gaubert & Company, Inc.
New Orleans, Louisiana 70150
(800) 831-7534

The Okonite Company
Ramsey, New Jersey 07446
(201) 825-0300

Prior to manufacture, the Contractor shall submit to the Engineer for approval shop drawing showing the actual cross section and make up of the required cable together with a detailed description of each component. The contractor shall submit six (6) copies of all such test reports to the Engineer, as required to the applicable ICEA Standards.

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The submarine cable group shall consist of eight (8) individual multiconductor cables:

- (1) 5 KV bridge power feeder cable made of 3 copper conductors # 4 AWG.
- (1) Roadway lighting feeder cable made of 6 copper conductors # 4/0 AWG.
- (1) Main south motors feeder cable made of 6 copper conductors # 4/0 AWG.
- (2) Normal control cables made of 64 conductors # 10 AWG.
- (2) Emergency control cables made of 64 conductors # 10 AWG.
- (1) Emergency south motors feeder cable made of 6 #2 AWG.

CONSTRUCTION DETAILS

A. Installation

The installation of the new submarine cables shall be done in such a way as to minimize the downtime operation of the bridge. One set of cables shall be installed in the trench and ready for terminations before removing the existing corresponding set of submarine cables.

The cables shall cross the channel where indicated and as shown on the Plans. The method used to install the cables at the bottom of the channel shall be as described in the Contract Plans. Where the cables cross the navigable channel, they shall be jetted in place

not less than 2.13 m below the existing channel bottom at the time of the installation.

The cables shall be laid side by side without twists or loops in a common trench at the location indicated on the Plans. No cable shall be permitted to cross another.

The Contractor shall furnish the necessary labor and equipment to properly jet the cables in place. The route of the cables may have to be altered to avoid any unforeseen obstructions. The Contractor shall either avoid any obstructions, or shall remove them as directed by the Engineer.

The Contractor's attention is directed to the fact that, at the time of installation, the exact nature of the existing channel bottom in the vicinity of the bridge may differ from the information available during the preparation of the Plans and this specification.

Therefore, he may possibly have to encroach on the proposed submarine cable routing.

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Prior to installation, soundings shall be taken to determine the channel elevations. The soundings shall be performed by a New York State licenced land surveyor currently registered in New York State. This information shall be submitted to the Engineer and the U.S. Coast Guard/Corps of Engineers for review.

The Contractor shall remove any existing material which will interfere with the proposed submarine cable routing to install the cables at the required depth.

During the installation of the cables, the Contractor shall arrange to have at the site a representative of the cable manufacturer. This representative shall be experienced in submarine cable handling and installation procedures, and he shall advise the Engineer in these matters. The Contractor shall also furnish experienced divers and the necessary diving equipment to assure that the cables are properly jettied in place and laid and spaced therein. He shall perform the necessary inspections. In making these inspections, the Contractor's diver shall operate as directed by the Engineer, and shall report directly to him.

All cable bends shall be within the limits recommended by its manufacturer so as not to damage or overstress the cable or its insulation.

Submarine cable guides shall be built to direct the cables through the existing chutes. Support clamps shall be used to hold the cables tied to the submarine cable guide entrance. Submarine cable guides and support clamps shall be installed as detailed and shown on the contract plans.

The wire armor shall be removed from the portion of the submarine cable above the support plates. The portion of the wire armor left shall be long enough to be bent around the support plate. The cables shall be guided through the existing chute and enter the existing submarine cable terminal cabinets and power splice boxes through the existing sealing fittings.

B. Insulation Resistance Test

After the submarine cables have been laid, each conductor in each cable shall be tested to determine its insulation resistance to ground. Six (6) copies of the test reports shall be submitted to the Engineer for approval before backfilling the trench or making final cable terminations.

C. Backfilling and Soundings

After the test reports have been approved by the Engineer, the trenches shall be backfilled, using existing side cast materials and new clean sand as required to meet the existing river bottom profile. Sounding shall be taken to determine the elevations of the

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channel after cable installation and backfilling. The soundings shall be performed by a New York State licenced land surveyor currently registered in New York State. This information shall be submitted to the Engineer for his review and shall be shown on the "As-Built" Record Drawings. The soundings shall also be submitted to the U.S. Coast Guard/Corps of Engineers.

D. Wire Terminations

After one set of (4) new submarine cables have been laid in the trench, the contractor shall disconnect from the existing submarine cable terminal cabinets the terminations of the existing corresponding set of cables and remove them from the existing chute to create space for pulling the new set of submarine cables. He shall also make terminations as required in the existing terminal/power splice cabinets. Then, the Contractor shall disconnect and remove the other existing set of submarine cables, install the new set and make terminations as required.

All interior wiring shall be installed neatly and carefully, and shall be terminated at suitable terminal blocks in the existing terminal/power splice cabinets. All wire terminations shall be made with ring tongue nylon self-insulating wire terminals. Wire terminals shall be installed using a high compression indenting crimping tool that assures a full crimp by releasing the terminal only when the crimp is complete.

Each terminal and both ends of each conductor shall be permanently labeled to match the corresponding existing terminal block number and coincide with the identification indicated on the wiring diagrams. Existing terminal blocks and devices already numbered shall be so-numbered on the Plans and equipment supplied shall also be so-numbered.

Individual conductors shall be identified by marking with a pen similar to Thomas & Betts Company "TLY-RAPP" marking pen Catalog No. VT1631M-1, Panduit Corporation Part No. POX marking pen, Stanford Permanent Marking Pen or approved equal. The marking shall be done on a sleeve not less than 13 mm long. The inside diameter of the sleeve shall be such that it will slip snugly over the insulated wire. Each sleeve shall be marked so that the identification shall be permanent and waterproof. Adhesive type labels are not acceptable.

E. "As-Built" Record Drawings

The Contractor shall generate "As-Built" Record Drawings which, certified by the licence land Surveyor, will:

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1. Show the exact location and depth to which the new submarine cables have been installed.
2. Show the sounding information about the elevations of the channel.
3. Present a point-to-point, geographic type wiring diagrams for wiring termination inside the existing terminal cabinets and power splice boxes.

Wiring diagrams, provided by the Contractor for wire terminations in each existing submarine cable terminal cabinet and power splice box, shall include all wiring of the individual panel item as it actually appears in the panel: contact arrangement of switches, internal wiring of relays, instruments, etc, These wiring diagrams shall be prepared on sheets approximately 559 mm X 914 mm.

METHOD OF MEASUREMENT

This work will be measured as the number of linear meters of submarine cable installed from one terminal cabinet to the other across the channel, as required.

BASIS OF PAYMENT

The unit price bid per linear meter shall include the cost of all labor, materials, equipment, jetting and backfilling and all incidentals necessary to complete the work.