

ITEM 18603.0501 M - LINING EXISTING CULVERT WITH CONCRETE-LINED CORRUGATED STEEL PIPE

DESCRIPTION: Work shall consist of inserting a concrete-lined Type I corrugated steel pipe into an existing culvert in accordance with this specification and contract documents. The inserted pipe is placed such that grout may later be placed in the annular space between the new and existing culverts. The insert culvert has the following characteristics:

	Diameter
	Gauge
	Corrugations

MATERIALS: Materials shall meet the requirements of the following specifications:

Corrugated Steel Pipe	707-02
Portland Cement Concrete - General	501
Portland Cement	701-01
Portland Cement, Type IP	ASTM C595
Flyash	711-10
Concrete Sand	703-07
Water	712-01
Vertical and Overhead Patching Material	701-08

The corrugated steel pipe and end sections, if used, shall be galvanized.

Corrugated steel pipe shall have grout holes and fittings located as specified in the contract plans. Plugs shall be inserted into a grout fitting after the grouting operation is complete at that fitting. Grout fittings shall be compatible with plugs and grout delivery equipment.

Cement, flyash (when used), sand and water shall be mixed to a consistency capable of producing a dense, homogeneous, nonsegregating concrete lining. In no case shall the amount of portland cement, blended cement, or portland cement plus flyash be less than 280 kg/m³ of concrete. When portland cement and flyash are added separately to the mixture, the flyash shall not exceed 20 percent by weight of cementitious material. When Type IP cement is used, no flyash shall be added in batching. All concrete shall have a water-cement ratio not exceeding 0.50 by weight.

The concrete lining shall be placed and finished by a machine that places and trowels the concrete in the pipe while one moves relative to the other. The rate of concrete placement and relative rate of travel of pipe and machine shall be mechanically

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regulated so as to produce a homogeneous, nonsegregating lining throughout the pipe and around the entire periphery of the pipe. The concrete lining shall be 13 mm minimum above the crests of the corrugations.

Immediately after lining, the pipe ends shall be capped with an air-tight membrane to properly cure the lining. If there is moisture loss, additional water shall be provided to keep the concrete continuously wet. Curing shall be a minimum of seven days.

CONSTRUCTION DETAILS

Existing Culvert Preparation: The Contractor shall dewater, inspect, and clean the existing culvert. The Engineer and Contractor shall identify voids in the backfill around the existing culvert by visual inspection or by chain drag or other sounding method acceptable to the Engineer. The Contractor shall fill all voids by cutting holes in the culvert and pumping grout into areas of lost backfill. The Contractor shall provide strutting and bracing to insure the stability of the existing culvert during this operation.

Handling and Assembly of Pipe: The pipe shall be handled and assembled in accordance with the manufacturer's instructions except as modified in the contract documents. The pipe shall be inserted in reasonably close conformance to line and grade. To facilitate placement and proper alignment of the new pipe, the Contractor shall install skids in the existing culvert or construct a concrete bed in the existing invert. The Contractor may propose an alternate method to place and align the new pipe, subject to the approval of the Engineer.

If the Contractor chooses to install skids, the skids shall be 2 meter minimum lengths and staggered along the entire length of the existing culvert. The staggered skids shall be spaced such that grout will freely flow beneath the entire inserted pipe. The skids shall be securely attached to the existing culvert near the invert such that the invert of the new pipe does not drag along the invert of the existing culvert during placement.

If the Contractor chooses to construct a concrete bed in the invert of the existing culvert, the concrete shall be Class A and meet the requirements of NYSDOT Specifications Section 501, Portland Cement Concrete - General, and Sections 555-3.04 and 555-3.06. No water shall pass through the existing culvert during concrete placement. The concrete shall be finished such that the new pipe lays reasonably close to line and grade. The edges of the placement shall be feathered back to allow

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grout to pass freely between the corrugations of the new pipe and the concrete bed. The Contractor will not be required to grout voids where the concrete bedding will fill voids caused by the loss of the existing culvert invert.

Adjacent pipe sections shall be aligned such that the grout holes are placed as detailed in the contract plans regardless of the placement and alignment system used. The displacement between adjacent pipe ends shall not exceed 13 mm.

Pipe sections may be pushed or pulled into place. As pipe sections are placed, each end shall be braced against the existing culvert such that the new pipe shall remain in place during a grouting operation. Bracing material shall not significantly impede grout flow into the annular space between culverts. Bracing bolts which cannot be fully turned out shall be cut off and ground smooth to the new culvert interior seven days after the completion of the grouting operation.

Joints: Joints for concrete-lined pipe shall meet the requirements of subsection 603-3.06A.

As an alternate, the upstream end of each pipe section shall be equipped with six "stab bands" or "finger plates". The stab bands shall be spaced approximately equidistant around the pipe periphery so as to interlock with the adjacent pipe end. Only the inlet pipe section shall have stab bands on the downstream end.

When stab-type joints are used, internal expanding joint bands with foam gaskets shall be placed at all joints to contain grout. Before grouting, these bands shall be strutted to the satisfaction of the Engineer. The internal bands and struts shall remain in place for seven days after the completion of the grouting operation. After removing the internal bands and struts, gaps in the concrete lining at joints shall be filled with Item 701-08, Vertical and Overhead Patching Material, such that the pipe interior is essentially smooth. Grout holes that do not contain couplings or plugs shall also be filled with Item 701-08. Alternate joint methods may be submitted to the Director, Materials Bureau, for approval. Such a submission is not cause for an extension of time as provided under Subsection 108-04.

Vertical and Overhead Patching Material: Patching material shall be prepared in accordance with the manufacturer's printed instructions. The Engineer shall be given two copies of the manufacturer's instructions at least two weeks prior to the start of all patching work. The instructions shall include mix proportions, mixing method, and surface preparation and priming requirements. The material shall be troweled on in layers, the thickness of which depends on the material consistency and the location and profile of the surface to which it is applied. However, lift

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Damaged Pipe and Repair: Pipe sections damaged or disturbed through any cause prior to contract acceptance shall be repaired, realigned, or replaced as directed by the Engineer at the Contractor's expense. Pipe sections which are defective from any cause, and determined by the Engineer to be unrepairable, are unacceptable and shall be replaced at no cost to the State. Damaged areas of concrete lining, determined by the Engineer to be repairable, shall be repaired with Item 701-08, Vertical and Overhead Patching Material. The concrete lining shall be free of cracks exceeding 1 mm in width or the pipe will be rejected.

METHOD OF MEASUREMENT: Concrete-lined corrugated steel pipe placed as culvert linings shall be measured in linear meters along the invert centerline.

BASIS OF PAYMENT: The unit price bid per linear meter shall include the cost of furnishing all labor, materials, and equipment necessary to manufacture and install the concrete-lined corrugated steel pipe, including: dewatering, cleaning, inspecting, strutting, bracing, skids, concrete, joint bands, seals, installing grout holes, plugs, fittings, Vertical and Overhead patching material, and damaged pipe repair. Grout used to fill the annular space and backfill voids shall be paid for under a separate item.