

SUPPLEMENTAL SPECIFICATION SECTION 208 - COFFERDAMS

208.01 DESCRIPTION. This work shall consist of the construction, material excavation within, dewatering, maintenance and removal of cofferdams in accordance with the specifications at locations designated in the Plans or in the Contract.

The work will be classified as follows:

- (a) Cofferdam. This item shall consist of providing a method for the purpose of constructing, in the dry, a specific foundation or other component of a structure in accordance with Contract requirements. This may involve the design, construction, maintenance, and removal of a watertight structure or may involve alternate methods of de-watering and stabilizing the specific site. Construction of foundation seals per Contract or as required per Contractor plans and schedule of operations is also within the scope of work for the Cofferdam item. The Contractor shall obtain any and all necessary permits or clearances for alternate methods.

A cofferdam may have only two or three sides depending upon the particular location and the Contractor's design.

Cofferdam Excavation, Earth. This item shall consist of all material excavated within the pay limits as set forth in these specifications or indicated on the Plans except solid rock, mortared stone masonry, concrete, and boulders measuring 0.5 cubic meters (yards) or more.

Cofferdam Excavation, Rock. This item shall consist of all solid rock material excavated within the pay limits as set forth in these specifications or indicated on the Plans, including all solid rock, mortared stone masonry, concrete, and boulders measuring 0.5 cubic meters (yards) or more.

208.02 MATERIALS. Concrete used in a cofferdam foundation seal shall have a minimum 28 day compressive strength of 20 MPa (3000 psi) and shall conform to the requirements of Section 501 or Section 501A.

208.03 GENERAL CONSTRUCTION REQUIREMENTS. The locations and elevations for excavation shall be as indicated on the Plans. The Engineer may order removal of poor foundation material below the normal designated elevation and replacement with an approved material.

All suitable excess excavated material shall be used in the formation of embankments as indicated on the Plans, or as directed by the Engineer. The material shall be hauled and disposed of with no additional compensation to the Contractor.

208.04 PRESERVATION OF CHANNEL. Unless otherwise indicated on the Plans or ordered by the Engineer, the Contractor, in performing the excavation, shall confine excavating operations to the site of the proposed structure and to the limits of the cofferdam. The natural stream bed shall not be disturbed without permission of the Engineer.

208.05 FOOTING MODIFICATIONS. When it is necessary to modify a footing from the detail shown on the Plans in order to provide a satisfactory foundation, the Engineer shall issue a written order for such changes in elevations or dimensions.

208.06 PREPARATION OF FOUNDATION. The foundation pits shall be excavated so that the footings will be the full lengths and widths indicated on the Plans. The footings shall be constructed with full horizontal beds. Unless otherwise specified or authorized by written order, foundations shall be constructed in the dry. In the dry means foundations and other structural components being constructed are not in or under water. The site shall be dewatered to, or below, the bottom of footing elevation or lowest elevation of a structural component.

The excavation shall continue to either ledge or a solid foundation, unless otherwise specified. If sloping ledge is encountered, the foundation shall be stepped as directed by the Engineer. All loose material shall be removed and all seams in the rock shall be cleaned out and filled with concrete, mortar, or grout. No excavation shall be done below the elevations indicated on the Plans unless directed by the Engineer in writing. Any material so excavated without authority shall be replaced with concrete at the Contractor's expense.

When the footing is to be constructed on an excavated surface other than rock, particular care shall be taken not to disturb the bottom of the excavation. No excavation shall be performed below the elevations indicated on the Plans unless directed by the Engineer in writing. Any material excavated without authority shall be replaced with approved backfill, which shall be thoroughly compacted in accordance with Subsection 204.12, at the Contractor's expense.

When poor foundation material is encountered at the foundation design elevation, it shall be removed as Cofferdam Excavation, Earth or Cofferdam Excavation, Rock and replaced with Granular Backfill for Structures or other suitable material, as indicated on the Plans or as directed by the Engineer, and thoroughly compacted in accordance with Subsection 204.12.

208.07 COFFERDAMS. The Contractor shall prepare detailed plans and a schedule of operations for each cofferdam specified in the Contract. Unless otherwise noted in the Contract Documents, the design and structural details of the cofferdam structure or alternative dewatering and stabilizing method shall be signed, stamped, and dated by a qualified Professional Engineer (Structural or Civil) registered in the State of Vermont.

The Professional Engineer is responsible for ensuring that the proposed cofferdam meets the following criteria:

- (a) the design is structurally stable for all conditions to be encountered (e.g., soils, water, forces, and loadings);
- (b) the design and details conform with the Contract and the applicable AASHTO requirements in the "Standard Specifications for Highway Bridges";
- (c) the design and details are in conformance with applicable safety codes;
- (d) the size and shape are adequate to construct the foundation and structural components specified;
- (e) the cofferdam is adequately watertight for proper performance of the work; and

(f) any foundation seal is adequate to achieve its design function

One copy of the plans and schedule of operations shall be submitted to the Resident Engineer for Agency use.

The submittal shall include plan, elevation and section details indicating the following:

- (a) the waterway;
- (b) information regarding the cofferdam and any foundation seal - indicate if a seal is required to ensure the structural integrity of the cofferdam during dewatering and foundation construction and inspection;
- (c) substructure location;
- (d) dimensions of any temporary restrictions that are to be placed in the waterway, e.g. barges, lines, earth dams, causeways, temporary diversion channels and access bridging;
- (e) the location, dimensions, clearances, and other relevant information for any temporary scaffolding or netting;
- (f) dewatered heads, taking into consideration fluctuations of water levels;
- (g) details for screening, pumping and filtering discharge;
- (h) a statement as to whether or not any equipment will be removed at night; and
- (i) a schedule or sequence of operations - include placement of the foundation seal, time from placement to dewatering, and foundation construction and inspection.

The Contractor will be responsible for performing the work in accordance with the submitted details and schedule of operations. All welding shall be performed in accordance with Subsection 506.10, Welding.

Cofferdam construction shall conform to AASHTO Standard Specifications for Highway and Bridge Construction, Division II, Section 1.4.

Cofferdams shall be constructed so as to protect freshly placed concrete against damage from sudden rising of the water level and to prevent damage to the foundation or other structural component by erosion. The cofferdam shall be constructed so that no timber, bracing, or forms will extend into the foundation or other structural component.

In the event the Contractor elects to place fill material in the stream to facilitate access to, or be part of, a cofferdam operation, it shall be clean stone fill.

208.08 PUMPING. Pumping from or dewatering of the interior of any cofferdam enclosure shall be performed so that disturbance of the subsoil or freshly placed concrete will not occur. Dewatering of a sealed cofferdam will be in conformance with the Contractor's sequence or schedule of operations. Pumping during the construction of a foundation or other structural component shall be from a suitable sump separated from the concrete work.

The discharge from any pumping operation, filtration system, or settling basin shall conform to the requirements of Subsections 105.23 and 105.24, and Section 652.

208.09 INSPECTION OF FOUNDATION PIT. Immediately following the completion of each foundation pit, the Contractor shall notify the Engineer, who shall approve the depth of the pit and the nature of the foundation before the placement of the concrete.

208.10 BEDDING FOR STRUCTURES. Excavation and preparation of the bed for a structure shall conform to the specifications for the specific structure being installed.

208.11 METHOD OF MEASUREMENT.

- (a) Cofferdam. The quantity to be measured for payment will be on a lump sum basis for each cofferdam specified on the Plans or in the Contract.
- (b) Cofferdam Excavation, Earth. The quantity to be measured for payment will be the number of cubic meters (cubic yards) of earth excavated from within the pay limits of the cofferdam as set forth in these specifications or as shown on the Plans.

The removal of earth excavation authorized by the Engineer below the elevation of the bottom of the excavation, as indicated on the Plans, will be factored in accordance with the appropriate table:

METRIC

Vertical Depth Below Bottom of Excavation indicated on the Plans	Volume of Excavation Multiplied by:
0 to 300 mm	100 percent
Over 300 to 1500 mm	150 percent
Over 1500 to 3000 mm	450 percent
Over 3000 to 4500 mm	750 percent
Over 4500 mm	(Paid by Supplemental Agreement)

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Vertical Depth Below Bottom of Excavation indicated on the Plans	Volume of Excavation Multiplied by:
0 to 1 foot	100 percent
Over 1 to 5 feet	150 percent
Over 5 to 10 feet	450 percent
Over 10 to 15 feet	750 percent
Over 15 feet	(Paid by Supplemental Agreement)

- (c) Cofferdam Excavation, Rock. The quantity to be measured for payment will be the number of cubic meters (cubic yards) of rock excavated from within the pay limits of the cofferdam as set forth in these specifications or as shown on the Plans.

The removal of rock excavation authorized by the Engineer below the elevation of the bottom of the excavation, as indicated on the Plans, will be factored in accordance with the table shown in 208.12(b) above.

Where a footing is designed or directed to be placed on ledge, a maximum of 150 mm (6 inches) average allowance for overbreakage will be allowed. Additional overbreakage will be at the Contractor's expense.

- (d) When a foundation seal is specified in the Contract, the bottom of excavation shall be considered to be the bottom of the excavation required for the foundation seal, and when a seal is not specified in the Contract, the bottom of excavation shall be the bottom of footing.

208.12 BASIS OF PAYMENT. The accepted quantity of Cofferdam will be paid for at the Contract lump sum price, which price shall be full compensation for the preparation of detailed plans and schedule of operations, performing the work specified, and the furnishing of all labor, tools, equipment, materials, and incidentals necessary to complete the work, including the cost of altering the cofferdam, foundation seals, sheeting, bracing, dewatering, installation and maintenance of siltation and sedimentation control measures for treating cofferdam discharge, incidentals necessary for properly constructing the foundation or structural component, maintaining the cofferdam in a dewatered condition, and removing the cofferdam when no longer required.

The accepted quantities of Cofferdam Excavation, Earth, and Cofferdam Excavation, Rock will be paid for at the Contract unit price per cubic meter (cubic yard) for each of the pay items in the Contract, which price shall be full compensation for performing the work specified and the furnishing of all labor, materials, tools, equipment, disposal of surplus material, and any other incidentals necessary to complete the work.

Payment for Cofferdam will be made as follows:

A payment of 75% of the lump sum bid price will be made when excavation within the limits of the structural unit is completed, and the cofferdam has been successfully dewatered.

The remaining 25% of the lump sum bid price will be made when the cofferdam has been completely removed. However, in the event the Engineer (by written order) requires a Cofferdam to be left in place, the Contractor will be paid only for the documented cost of the cofferdam material left in place excluding any costs associated with the foundation seal.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
208.30 Cofferdam Excavation, Earth	CUBIC METER (CUBIC YARD)
208.35 Cofferdam Excavation, Rock	CUBIC METER (CUBIC YARD)
208.40 Cofferdam	LUMP SUM