

SECTION 504 CULVERTS, RETAINING WALLS AND ENDWALLS

504.1 Description

- (1) This section describes constructing culverts, retaining walls, and endwalls.
- (2) This section applies to all culverts, whether the department classifies them as culverts, or bridges as defined in [section 101](#).
- (3) This work does not include furnishing or installing pipe culverts.

504.2 Materials

- (1) Furnish materials conforming to the following:

Concrete	section 501
Steel reinforcement.....	section 505

504.3 Construction

504.3.1 Concrete Composition

- (1) Unless specified otherwise, conform to the requirements for grade A, A-FA, A-S, A-T, A-IS, or A-IP concrete as specified in [section 501](#). Where the contract specifies or the engineer allows, the contractor may use high early strength concrete.
- (2) Conform to coarse aggregate sizes specified in [501.2.5.4.4](#) and [501.3.2.2](#).

504.3.2 Placing Concrete

- (1) Before placing concrete give the engineer sufficient notice to allow inspection of the forms, reinforcement, and casting preparations.
- (2) For constructing concrete box culverts, unless specified otherwise, place the curtain walls, base slab, and the barrel sidewalls as a single unit to an approximate height of 6 inches and allow to set before constructing the remaining culvert. Construct the sidewalls and top slab of box culverts as a monolith, unless specified otherwise. Allow not less than one hour or more than 3 hours to elapse between placing the concrete in the sidewalls and that in the top slab.

504.3.3 Removing Falsework and Applying Load

- (1) Do not remove culvert falsework with a span of 4 feet or less until 5 days after pouring, exclusive of days subject to temperatures below 40 F, except if using concrete grades A-FA, A-S, A-T, A-IS, or A-IP, and did not control field operations by cylinder tests, then increase the time to 12 days. If controlling field operations by cylinder tests, the engineer may approve falsework removal, if cylinder tests show a compressive strength not less than 2000 pounds per square inch. Determine cylinder strengths as specified under falsework in [502.3.4.2](#). If using high early strength concrete, the engineer may reduce the above 5-day period to 3 days.
- (2) Remove culvert falsework with a span of more than 4 feet according to [502.3.4.2](#) for removing falsework for concrete bridges.
- (3) The contractor may backfill culverts, retaining walls, and end walls that have attained the specified compressive strength or upon expiration of the minimum times as specified in [206.3.13](#). Do not apply additional loads on culverts until attaining a compressive strength of 3500 psi or, absent compressive strength information, for at least 21 days.

504.3.4 Name Plates

- (1) Install on each culvert and retaining wall, a nameplate conforming to [506.2.4](#) at the location the plans show or as the engineer directs. Attach the nameplate as specified in [502.3.11](#). Furnishing and placing the nameplate is incidental to the work.

504.3.5 Curing

- (1) Cure concrete in culverts, retaining walls, and end walls by any of the methods specified for curing substructure units in [502.3.8](#).

504.4 Measurement

- (1) The department will measure the several bid items that constitute the completed and accepted structure according to the provisions of the contract for those bid items and in the units the contract specifies. All

work included within the scope of this contract but not listed as bid items in the proposal is incidental to the work.

- (2) The department will measure the Concrete Masonry Culverts bid items by the cubic yard acceptably completed. The department will not measure work or material for forms, falsework, cofferdams, unless specified otherwise. The department will not measure pumping, bracing, or other incidentals necessary to complete the work.
- (3) The department will measure the Concrete Masonry Retaining Walls bid items by the cubic yard acceptably completed. The department will not measure work or material for forms, falsework, cofferdams, unless specified otherwise. The department will not measure pumping, bracing, or other incidentals necessary to complete the work.
- (4) The department will measure Concrete Masonry Endwalls by the cubic yard acceptably completed. The department will not measure excavation, reinforcement, work or material for forms, pumping, bracing or other incidentals necessary to complete the work.

504.5 Payment

504.5.1 General

- (1) The department will pay for measured quantities at the contract unit price under the following bid items:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
504.0100	Concrete Masonry Culverts	CY
504.0200	Concrete Masonry Culverts HES	CY
504.0500	Concrete Masonry Retaining Walls	CY
504.0600	Concrete Masonry Retaining Walls HES	CY
504.0900	Concrete Masonry Endwalls	CY

- (2) Perform miscellaneous work the plans show, or the contract otherwise specifies but does not list as a bid item, as a part of and included in the contract price for other contract bid items.
- (3) Payment for the Concrete Masonry Culverts bid items is full compensation for all materials, forms, falsework, placing, finishing, curing, protecting, and heating.
- (4) Payment for the Concrete Masonry Retaining Walls bid items is full compensation for all materials, forms, falsework, placing, finishing, curing, protecting, and heating.
- (5) Payment for Concrete Masonry Endwalls is full compensation for all excavating; all materials, including reinforcement; forms; placing, including reinforcement; finishing, curing, protecting and heating.