

ITEM 8 ___ - ___ - ALTERNATE CULVERT

Provision Body:

PART A

I. DESCRIPTION - This work is either construction of the culvert as designed or designing and constructing an equivalent culvert of an alternate design in place of the "as-designed" culvert.

II. DESIGN -

(a) General. If an alternate design culvert is bid, furnish, to the Department, preliminary conceptual design calculations and drawings for the alternate culvert, on reproducible tracing cloth or drafting film. Provide an alternate design equivalent to the original design and meeting applicable design criteria for strength and serviceability. Submit the alternate design to the District Bridge Engineer for acceptance. Furnish, with the preliminary conceptual design submission, a tabulation identifying the major differences between the "as designed" culvert and the alternate design culvert.

Any delay in submission and acceptance of a proposed alternate design will not extend the contract time.

If an alternate design culvert is bid, and an acceptable preliminary conceptual design is not approved within 30 calendar days from the award date (6 days for the submission and 24 days for Department review), the Department reserves the right to reject the alternate design. Resubmit an acceptable alternate design or furnish the "as-designed" culvert at no additional cost to the Department.

Experimental or demonstration-type design concepts; or products, structures, or elements not preapproved by the Department for general usage, will not be permitted in the alternate design.

Value Engineering may be applied to the "as-designed" culvert, but do not Value Engineer an alternate design culvert.

Have the alternate design completed by a Professional Engineer (P.E.) registered in the Commonwealth of Pennsylvania.

In identifying alternate design culverts, retain the "as designed" culvert number, but suffix the number with the letters A, B, etc.

Show, on the alternate design, the seal of a P.E. registered in the Commonwealth of Pennsylvania, a valid signature in ink, the date signed, a business name, a business address, and the note "These drawings (S-XXXXXA) supersede drawings (S-XXXXX) approved (insert appropriate date)".

The Department will furnish tracings for the "as-designed" culvert upon request.

Complete original plans for an alternate design entirely in either ink or pencil. Make changes in the same medium.

Ink reproductions on tracing cloth may be furnished, if made by the "contact negative process".

(b) Design Computations and Design Specifications. On the first sheet of the computations for the alternate design, show the seal of a P.E. registered in the Commonwealth of Pennsylvania, a

valid signature, and the date signed.

Perform required design of an alternate culvert in accordance with current Department practice, unless otherwise indicated or specified. Current design practice includes the use of all applicable codes and Department design specifications, publications, policies, and procedures in effect on the date bids are opened.

In the event that certain design parameters, stresses, or specifications are in conflict, the following order of predominance governs:

- Design requirements listed herein and in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".
- Design related Strike-off letters in effect on the date of project advertisement. Refer to the list in PART B.
- Pennsylvania Department of Transportation (PENNDOT) Design Manual Part 4M (Design Manual Part 4).
- PENNDOT Design Standards.
- AASHTO Standard Specifications for Highway Bridges, and interim specifications, as indicated for the "as-designed" walls.

In the event that a clear order of predominance cannot be established, or a difference in the interpretation of the design criteria, standards, specifications, or methodology cannot be resolved, the Chief Bridge Engineer will be arbiter and the Chief Bridge Engineer's decision will be final.

Submit shop drawings to the District Engineer for review and acceptance. The Department will in no way be responsible for work done without approved shop drawings.

(c) Design Requirements. In the design of an alternate culvert, comply with PENNDOT Design Manual Part 4, "Structures", and other design criteria as specified for the "as-designed" culvert, subject to the exceptions and/or additions in PART B, "SPECIAL DRAWINGS AND SPECIAL DESIGN REQUIREMENTS".

Do not change the indicated horizontal and vertical alignment or the waterway opening of the culvert, except as noted in PART B.

Design the alternate culvert to be within the limits of allowable foundation bearing pressures as indicated for the "as-designed" culvert. Do not change the bottom of footing elevation, unless approved by the District Bridge Engineer or District Geotechnical Engineer.

Do not change from the culvert protective system(s) indicated or specified for the "as-designed" culvert.

III. MATERIAL - As indicated and as specified for the "as-designed" culvert; in accordance with applicable sections of the Specifications, Publication 408, and numbered changes thereto; and/or the Special Provisions for each respective item included in the culvert. Provide Class A Cement Concrete for cast-in-place walls and footings.

IV. CONSTRUCTION - In accordance with applicable sections of the Specifications, Publication 408, and numbered changes thereto in effect before the letting date; the Special Provisions for each respective item; and any additional requirements contained herein. Submit construction procedures for an alternate design for acceptance, if other than those contained herein.

If utility relocations are required as part of an alternate design, be responsible for the cost of the

utility relocations and any related delay claim costs.

If unsuitable foundation material or rock is encountered, construct footings as specified in Section 1085.3(g)1. Excavation beyond the limits indicated or specified and backfill material required to replace unsuitable material will be paid for in accordance with Section 110.03(c).

Install precast concrete culvert segments starting from the outlet end; taking special care to place segments to the correct line and grade.

Seal all joints between precast concrete culvert segments with membrane waterproofing as shown on the Standard Drawings.

V. MEASUREMENT AND PAYMENT - Lump Sum

For the type of alternate design culvert selected; subject to a reduction of \$1,000 for each alternate culvert for the Contractor's share of the Department's engineering costs.

The Contractor's share of the Department's engineering costs will be recovered by processing a work order, using the contract item number for the applicable Alternate Culvert and Item Type Code B. The contract lump sum price will be reduced by an amount equal to the Contractor's share.

A utility company's share of fabricated structural steel and/or installation of sleeves, inserts, casings, hanger assemblies, ducts, etc. for utilities is to be a separate item. Do not include the utility company's share in the bid price for the alternate design culvert unless otherwise specified.

(a) Culvert As Designed. If the "as-designed" culvert is bid, submit the "Component Item Schedule", included with the Proposal, as specified in Section 103.01(a).

Make the "Total" at the end of the "Component Item Schedule" equal the amount of the lump sum bid for Culvert As Designed.

(b) Alternate Culvert. If an alternate design culvert is bid, the apparent low bidder is required to submit a "Component Item Schedule for Alternate Design" as specified in Section 103.01(a). No adjustments will be made to the contract lump sum price bid for alternate design culvert for any field adjustments necessary to complete the structure.

Make the "Total" at the end of the "Component Item Schedule for Alternate Design" equal the amount of the lump sum bid for Alternate Culvert.

(c) Alternate Structure Design Costs. The apparent low bidder is to include a component item for Alternate Design Costs in the Component Item Schedule when an equivalent item of an alternate design is bid. Include this item in the total of the lump sum bid price. Payment of 25% of the total design costs will be made upon approval of the preliminary conceptual design. The remaining amount will be paid for in a proportionate manner, designated by the Department, on the basis of approval of the final design.