GENERIC SPECIFICATION SHELL
FOR
WELDED STEEL PIPE (WSP) INSTALLATION BY TUNNELING AND JACKING

1.0 SCOPE OF WORK

This Contract is for the supply and installation of _____mm diameter welded steel pipe (WSP) culvert x _____m invert length with _____mm diameter CSP (SPCSP) end sections on Hwy _____, located approximately _____ km ____of _____.

Without limiting the provisions of these Specifications and this Contract, the Scope of the Work shall include:

(Note: Typical items are shown. Add, delete or edit items as required.)

- traffic accommodation
- structural and channel excavation
- removal and disposal of existing CSP (SPCSP) culvert ends
- supply and installation of welded steel pipe (WSP) culvert
- supply and installation of CSP culvert end sections
- structural backfill (granular)
- grouting of culverts
- supply and installation of woven and non-woven geotextiles
- supply and installation of Class _____ Heavy Rock Riprap
- supply and installation of geotextile fence barriers (silt fence)
- supply and installation of Erosion Control Soil Covering
- roadway work

Unless otherwise specified, the Contractor shall supply all materials necessary to complete the Work. A complete job is called for, therefore, any labour, material, equipment, tool or incidental item not specifically mentioned but necessary for completeness will be considered incidental to the Work and no separate or additional payment will be made.

1.1 CONSTRUCTION SCHEDULING AND INTERIM COMPLETION DATE

(Note: Where roadway cover over the crown of the WSP is shallow, installation must take place under frozen subgrade conditions. This is to prevent possible road surface subsidence during installation. March 15 is shown below as a guideline and the actual date selected should be based on the specific area of the province. Use this clause where the roadway cover over the crown of the WSP is less than 2.0 m. for WSP diameters up to 1.83 m. Additional cover will be required for diameters greater than 1.83 m)

The Contractor is advised that work under this Contract is subject to an interim completion date. The following work shall be carried out under frozen subgrade conditions and completed with the roadway available for unrestricted public traffic by **March 15, _____.**

- Installation of welded steel pipe (WSP) culvert with CSP (SPCSP) culvert ends
- Grouting of culverts
- Backfill over structure ends including berm construction
- Restoration of embankment slopes
- Completion of all in-stream work including placement of heavy rock riprap
- Installation of temporary geotextile fence barriers (silt fences)

The completion of all other work, including final trimming, landscaping, topsoiling and seeding and installation of permanent geotextile fence barriers and erosion control soil covering shall be completed by the Contract completion date of **June 15, _____.**

Liquidated damages will be assessed on both interim and final completion dates.

Prior to commencement of work, the Contractor shall provide the Consultant with a detailed construction schedule showing his proposed plan for accomplishing the work by the above noted dates.

1.2 ASSESSMENT OF CALENDAR DAYS FOR SITE OCCUPANCY

(Note: Use this clause in conjunction with Construction Scheduling and Interim Completion Date)

Notwithstanding the provisions of Specification Amendment AMC B010, the assessment of calendar days for site occupancy will be carried out in two phases in accordance with the following:

Phase 1 - Assessment of calendar days for site occupancy will commence on the day of the first disturbance within the project limits and will cease when, in the opinion of the Consultant, all work subject to the interim completion date is acceptably completed.

Phase 2 - Assessment of calendar days for site occupancy will recommence when work is resumed.

1.3 EXISTING RIGHT-OF-WAY AND ADDITIONAL EASEMENTS

(Note: In many cases additional space is required beyond the normal Right-of-Way requirements for tunneling equipment set-up.)

If any construction or equipment set-up is required to take place outside the existing right-of-way limits, the Contractor shall be responsible for obtaining any necessary right-of-way easements and shall, prior to the commencement of construction, provide copies of the easement agreements to the Consultant for review.

All costs associated with obtaining right-of-way easements, if required, shall be the responsibility of the Contractor, and no separate or additional payment will be made.

1.4 TRAFFIC ACCOMMODATION

The Work shall be carried out in accordance with Appendix "A" Section 7 Specification 7.1 of the Specifications for Bridge Construction, the drawings, the provisions contained herein, and as determined by the Consultant.

Equipment shall not be parked or stored on the roadway. A clear roadway width of ____ m shall be maintained at all times.

- Uninterrupted flow of two-way traffic shall be maintained at a posted speed of 80 kph.

- Flagpersons shall be employed when crossing the roadway with equipment, or when unloading materials. In these instances, traffic stoppages shall be limited to a maximum of 5 minutes per occurrence.

- The Contractor shall supply, install and maintain interlocking concrete New Jersey type barriers, at the edge of both roadway shoulders for the full length of the roadway adjacent to the culvert ends and excavations.

As a guide for developing his Traffic Accommodation Strategy the Contractor may use Drawing No. TCS-B-1.2A contained in the Traffic Accommodation in Work Zones Manual. The Contractor shall submit his Traffic Accommodation Strategy to the Consultant for review and approval at least two weeks prior to the pre-construction meeting. All signs shall be in place and the Contractor's traffic control measures approved by the Consultant prior to the commencement of any work.

Payment for traffic accommodation work shall be made at the lump sum price bid for "Traffic Accommodation" and shall be full compensation for the supply of all labour, materials, equipment, tools and incidentals necessary to safely accommodate public traffic through the work site in accordance with the provisions contained herein and to the satisfaction of the Consultant. The Contractor will receive 60% of the lump sum price tendered upon installation and acceptance of signing, with the remaining payment made after the signs are removed at the conclusion of all Work.

1.5 EXCAVATION

Excavation shall be carried out in accordance with Section 1, Excavation, of the Specifications for Bridge Construction, as shown on the Drawings, and as determined by the Consultant.

Excavation shall be classified in accordance with the following:

Structural/ Channel Excavation includes the following:

- all excavation below the design streambed elevation that is required to accommodate construction of bedding or backfill of the ends of the new culvert
- all excavation necessary for the installation of the rock riprap, including stream channel transitions

- all excavation associated with handling stream flow and maintaining the foundation in a de-watered condition for structure installation

Common Excavation shall include:

- all excavation above the design streambed elevation necessary to install the ends of the new structure as shown on the Drawings

The Contractor is advised of the possibility of unsuitable foundation material underlying the culvert bed. All unsuitable material, as determined by the Consultant, shall be removed and replaced with crushed aggregate material (Designation 2, Class 25). This may require excavation and backfilling beyond the limits shown on the Drawings. The suitability of excavated material for reuse will be determined by the Consultant. Unsuitable material shall be disposed of to the satisfaction of the Consultant.

Payment for structural/ channel excavation shall be made at the lump sum price bid for "Excavation - Structural/ Channel ". The lump sum price shall be full compensation for all materials, labour, equipment, tools and incidentals necessary to complete the Work to the satisfaction of the Consultant.

All costs associated with common excavation shall be included in the lump sum price bid for "Roadway Work", and no separate or additional payment will be made.

1.6 SUPPLY OF WELDED STEEL PIPE (WSP) CULVERT MATERIAL

Welded steel pipe culvert supplied by the Contractor shall have a wall thickness of ____mm and shall meet the requirements of Specification ASTM 252 Grade 2, except that hydrostatic testing is not required.

Payment for the supply of welded steel pipe culvert materials will be made at the unit price bid for "Welded Steel Pipe - Supply". The price bid shall be full compensation for the supply of culvert materials including delivery to the construction site, and all materials, labour, tools and incidentals necessary to complete the Work to the satisfaction of the Consultant.

1.7 INSTALLATION OF WELDED STEEL PIPE (WSP) CULVERT

The welded steel pipe shall be installed as shown on the Drawings, to the satisfaction of the Consultant and as follows:

- The Contractor shall schedule his work such that for the duration of the welded steel pipe installation the highway embankment is in a frozen state.
  (Note: Use only for WSP covers less than 2.0 m)

- The Contractor shall develop an installation procedure and method for installing the welded steel pipe. The procedure shall be submitted to the Consultant for his review two weeks prior to the pre-construction meeting. The following requirements shall be included in the procedure:

- the _____ mm dia. welded steel pipe shall be installed by simultaneous tunneling and jacking such that at no time shall tunneling in advance of the pipe jacking exceed 0.3 m., and the tunneled dimension of the hole shall be no greater than the pipe diameter plus 75 mm

- method for continuously monitoring the vertical and horizontal alignment of the welded steel pipe to ensure accurate installation

- sections of pipe shall be spliced and welded in accordance with the Drawings

~~The following is the Inspection Requirement for welding of steel pipes. The Consultant may however, waive this requirement for a specific site upon consultation with the Department.~~

The Contractor shall arrange to have all full penetration welds inspected either by ultrasonic testing or radiographic inspection methods. The NDT shall be done by a company certified to CSA 178.1. Ultrasonic and radiographic testing technicians shall be certified to Level II of CGSB. A copy of the test results shall be provided to the Consultant.

All costs associated with non-destructive testing of full penetration welds shall be the responsibility of the Contractor.

Payment for the installation of the welded steel pipe culvert shall be made at the unit price bid for "Welded Steel Pipe - Install". The price bid shall be full compensation for equipment set-up, cutting the embankment face, installation of the culvert, splicing and all labour, materials, tools and incidentals necessary to complete the Work to the satisfaction of the Consultant.

Removal and disposal of the existing culvert end sections shall be considered incidental to the Work, and no separate or additional payment will be made.

1.8 GROUTING OF WSP LINER AND EXISTING CSP CULVERTS

The following conditions shall apply to grouting culverts:

- The grout shall consist of a cementitious fill material with a minimum compressive strength of 2.0 MPa at 28 days.

- Grouting shall be carried out using methods and materials approved by the Consultant. The Contractor shall take precautions during grouting operations to ensure that no blow outs occur and that all voids are filled. The Contractor shall provide a means of measuring the volume of material used to grout the culverts in cubic metres.

(Note: Add the following clause for WSP diameters greater than 2.5 m)

- All grouting shall be carried out in 3 equal and uniform vertical stages, such that grouting of subsequent stages shall not proceed until the previous stage has obtained initial set. To ensure complete grouting between the WSP casing and the tunneled area, the Contractor shall install 16 mm dia. inspection holes. Longitudinally these holes shall be spaced at no greater than 5.0 m intervals. Circumferentially these holes shall be installed

at the 1:30, 4:00, 8:00, 10:30, and 12:00 o'clock locations.

Payment for grouting the welded steel pipe culvert will be made at the unit price bid for "Grouting of Culverts". The unit price bid shall be full compensation for the supply and placement of grout; including all labour, equipment, materials, tools and incidentals necessary to complete the Work to the satisfaction of the Consultant.

1.9 CSP (SPCSP)/ WSP CONNECTIONS

(Note: Use CSP or SPCSP as applicable)

The CSP (SPCSP)/ WSP connections shall be carried out in accordance with the Drawings. In addition the following shall apply:

- Grouting shall be carried out after completing the backfill around the culvert ends. Vibratory compaction equipment will not be permitted within 8 m of the CSP (SPCSP)/WSP connection until the grout has cured for a minimum of 72 hours.

- In cold weather the grouted connections shall be suitably hoarded and heated. Before placing grout adequate pre-heat shall be provided to the connection joint to raise the temperature to at least 10° C. After grouting the connection joint shall be suitably protected/ insulated or heated as required for a minimum period of 72 hours.

Payment for the CSP (SPCSP)/ WSP connections will be made at the lump sum price bid for "CSP (SPCSP)/ WSP Connections", and will be full compensation for all labour, equipment, materials, tools and incidentals necessary to complete the Work to the satisfaction of the Consultant.

1.10 STRUCTURAL BACKFILL (GRANULAR)

Structural Granular Backfill shall consist of "Crushed Aggregate Material" - Des. 2, Class 25. Structural Backfill shall be supplied and placed as shown on the Drawings, as determined by the Consultant, and in accordance with the following:

- Proposed haul roads shall be identified by the Contractor, and copies of all required approvals shall be provided to the Consultant.

- After approval of the foundation by the Consultant, the first 300 mm layer of granular bedding in the foundation may be placed in one uniform lift prior to compaction.

- Structural backfill shall be placed and compacted by equipment moving parallel to the structure with simultaneous handwork along the structure. Large earth moving equipment and large compaction equipment shall not be permitted within 0.3 m of the structure wall.

In addition to Section 2.2.3, Backfill Material Tests, of the Specifications for Bridge Construction, the Contractor shall engage a qualified testing firm to provide two current sieve analyses of granular material to be supplied. The results shall be provided to the Consultant for review one week prior to the hauling of any granular material.

Payment for structural backfill will be made at the lump sum price bid for "Structural Backfill (Granular)". The lump sum price shall be full compensation for all labour, materials, equipment, tools and incidentals necessary to complete the Work to the satisfaction of the Consultant.

1.11 ROADWAY WORK

Roadway work shall be carried out as shown on the Drawings, in accordance with the applicable sections of the Standard Specifications, the Provisions contained herein and as determined by the Consultant.

Roadway work includes the following:

(Note: The following are general or typical items. Add, delete or edit items as required)

- Removal and salvage of topsoil from the roadway embankment side slopes.
- Common excavation and all other earthworks not meeting the classifications for structural/ channel excavation or structural backfill.
- Construction of roadway embankment, berms, slope transitions and stream-bank transitions/tie-ins as required.
- Trimming and topsoiling of disturbed areas including embankment and channel slopes.
- Seeding, fertilizing and harrowing of topsoiled areas.
- Temporary removal and restoration of fences as required.

Payment for roadway work will be made at the lump sum price bid for "Roadway Work". The lump sum price shall be full compensation for all labour, materials, equipment, tools, and incidentals necessary to complete the work to the satisfaction of the Consultant.