

BIDDING DOCUMENTS

Issued on: _____

for

Procurement of

**North-South Expressway Construction Project
Danang-Quang Ngai Section
Civil Works Contract Package 3B
(KM18+100 – KM021+500)
(ADDENDUM)**

**PART 2-WORKS REQUIREMENTS
Section VI - Works Requirements
Volume 2.1 - Specification (1/2)
Chapter I, II & III**

Employer: Vietnam Expressway Corporation

Country: The Socialist Republic of Vietnam

August 2013

SPECIFICATION SECTION 03400 - EMBANKMENT

1. DESCRIPTION

1.1 Embankment

This Specification Section prescribes the requirements and procedures for the construction of the subgrade and roadway Embankment.

1.2 Setting Out the Work, Staking and Surveying

This Specification Section also prescribes the requirements and procedures for surveying, setting out and staking.

Surveying, setting out and staking shall be performed by technically qualified survey crews using survey instruments and supporting equipment fit for purpose, capable of achieving the specified survey tolerances and the construction tolerances included in this and other Specification Sections.

The Contractor shall furnish the necessary equipment and material to survey, calculate and record data for the control of work and acceptable tools, supplies, and stakes and other materials necessary to set out the works of the type and quality normally used in highway survey work and suitable for the intended use.

2. MATERIAL REQUIREMENTS

2.1 Reference Standards

The latest edition of the following Standards shall be applied to the Works covered by this Specification Section.

Vietnamese Standards:

TCVN 4447-87 Earthworks – Construction and Acceptance

TCVN 9436-2012 Highway Embankments and Cuttings - Construction and Quality Control

TCVN8861-11 Flexible Pavement Determination of Elastic Modulus of Soils and Pavement Components Using Static Plate Load method

22TCN 304-03 Natural Gravel Aggregate Layer in Pavement Structure – Code of Construction and Acceptance Procedure

22TCN 346-06 Testing Procedure on Definition of Compaction of Road Foundation and Embankment by Sand Cone Method

22TCN 333-06 Procedures of Soil and Macadam Compaction in Laboratory

22TCN 332-06 Testing Procedures on Definition of CBR Value for Soil and

support under the entire length of the Culvert bearings.

- b) The width of any trenches shall be considered to be the distance between the vertical planes through the outer limit of the bedding on each side of the culvert as shown on the Drawings. The Engineer, at his discretion, may allow extra trench widths, but the Contractor shall receive no additional payment for the wider trench excavation.
- c) Where side slopes are used on trenches the slopes used shall be selected to suit the stability of the soil. Any over excavation of culvert trenches shall be backfilled and compacted using approved embankment materials, subject to the approval of the Engineer, at the Contractor's expense.
- d) Water shall be removed from trenches by sump pumping or other approved methods.
- e) Materials shall be handled in such a manner as to ensure delivery to the point of installation in the sound undamaged condition. Bearings, Pipe or Box Culverts delivered to the Site shall be inspected by the Engineer before placing and/or laying. Any defective bearings, Pipe or Box Culverts shall be rejected and replaced by the Contractor at his own expense. No bearing, Pipe or Box Culverts shall be laid when the trench conditions are unsuitable for such work.
- f) The pipe bearings, Pipe or Box Culverts shall be laid to the grades and alignment as indicated on the Drawings or as directed by the Engineer.
- g) All Pipe or Box Culverts shall be laid and fitted together such that the joint sealant forms a full and effective seal around the full circumference of the Pipe or the Box Culverts. Joint sealants shall be placed such that any joints or overlaps in the sealant are at the top of the Pipe or the Box Culverts.
- i) All bearings and Pipe or Box Culverts in place shall be approved before being covered up.
- j) The Contractor shall backfill and compact the granular materials to the density of 95% of the maximum dry density determined according to Vietnamese Standard 22TCN 333-06, Method 2D, around and over the bearings and Pipe or Box Culverts using approved materials in accordance with Specification Section 03200 Structural Excavation. Oversized material shall be removed.
- k) The Contractor shall backfill the Culvert to a minimum height of 50 cm

Reinforcing Steel for Concrete	Specification Section 07500: Reinforcing Steel
Excavation	Specification Section 03200: Structural Excavation
<u>Backfill (Granular Material)</u>	<u>Specification Section 03200: Structural Excavation</u> <u>Specification Section 03400: Embankment</u>

3. CONSTRUCTION REQUIREMENTS

3.1 Shop Drawings and Schedule

3.1.1 Shop Drawings

- (a) The Contractor shall furnish the Engineer with shop drawings containing the construction details for Box Culverts indicated on the Drawings and as directed by the Engineer. Shop drawings shall be submitted to the Engineer for respective approval by the Engineer.
- (b) Construction of the Box Culverts shall begin only after the issue of the Engineer's approval to the shop drawings submitted by the Contractor.

3.1.2 Work Scheduling

- (a) The Contractor shall not begin Box Culvert construction or concrete drain works without the Engineer's approval of the schedule and construction method. Temporary drainage works and/or temporary detours shall be in place and operating before the commencement of embankment Works or as directed by the Engineer.
- (b) No subgrade preparation or pavement overlay work (either in the road or the shoulder areas) shall commence until the culverts, headwalls and other minor structures below the subgrade level along that particular section of the Works are completed.

3.2 Rectification and Maintenance

3.2.1 Rectifying Unsatisfactory Work

- (a) All the work and materials for construction of Box Culverts shall be inspected by the Engineer before his approval on quality and dimensions. Based on the results obtained through the inspection, the Engineer will issue his approval on the inspected work or will instruct the Contractor to take necessary provisions of the measures for rectifying unsatisfactory items.

3.2.2 Maintaining Accepted Work

- (a) Notwithstanding the Contractor's obligation to rectify unsatisfactory or failed work the Contractor shall also be responsible for routine maintenance of all completed and accepted Box Culverts up to the issue of the Taking-Over Certificate.

3.3 Site Preparation

- (a) The Contractor shall excavate and prepare trenches and foundations for Box Culverts in accordance with the provisions of Specification Section 03200 Structural Excavation and Specification Section 03400 Embankment.
- (b) The Contractor shall be responsible for; all dewatering of the trenches (if needed), detours, Temporary Works and any other incidental works that might be necessary during construction.
- (c) The Contractor shall place supports and/or bedding material(s) in accordance with the requirements of the Drawings or as required or instructed by the Engineer in conformity with applicable Specification Sections.

3.4 Constructing Box Culverts

- (a) The Contractor shall construct Box Culverts in accordance with the Drawings or as indicated by the Engineer.
- (b) Unless otherwise required all work shall be in accordance with the requirements of AASHTO M259.
- (c) All reinforced concrete work shall conform to the requirements of Specification Section 07100 Concrete and Concrete Structures. All excavation work shall comply with the provisions of Specification Section 03200 and all backfill work shall comply with the provisions of subsection 3.5 of Specification Section 03200 Structural Excavation and Specification Section 03400 Embankment, if applicable. Compaction for the backfill shall be carried out to both sides of the Box Culverts at the same time to the density of 95% of the maximum dry density determined according to Vietnamese Standard 22TCN 333-06, Method 2D.
- (d) Cut off plates shall conform to the cross section and to the minimum dimensions indicated in the Drawings.
- (e) If after placing concrete cut off plates are materially out of position or shape the surrounding concrete shall be removed, the cut off plates reset and the concrete replaced, all at the Contractor's expense.
- (f) Field splices for polyvinylchloride cut off plates shall be performed by heat sealing the adjacent surfaces in accordance with the manufacturer's recommendations. A thermostatically controlled electric source of heat shall be used to make all splices. The heat shall be sufficient to weld but not char the plastic.
- (g) Cut off plates when being installed shall be cut and spliced at changes in direction as may be necessary to avoid buckling or distortion of the web or flange.
- (h) Field splices shall develop water tightness equal to that of the unspliced