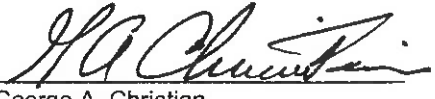


To: SUPERSEDED BY <u>EB 06-057</u> EFFECTIVE <u>5/3/07</u>		New York State Department of Transportation ENGINEERING INSTRUCTION	EI 03-043
Title: NEW SECTION 562 - REINFORCED CONCRETE THREE-SIDED STRUCTURES			
Distribution: ☒ Manufacturers (18) ☐ Surveyors (33) ☐ Main Office (30) ☒ Consultants (34) ☒ Local Govt. (31) ☒ Contractors (39) ☒ Regions/Agencies (32) ☐ _____ ()		Approved:  George A. Christian Acting Deputy Chief Engineer (Structures) <u>12/12/03</u> Date	

ADMINISTRATIVE INFORMATION:

- This EI is effective with projects submitted for the letting of May 6, 2004.
- No EIs or EBs are superseded by this issuance.
- The Standard Specification issued with this EI will be incorporated into the next revision of the Standard Specifications.

PURPOSE:

This EI issues new Standard Specifications for Section 562 Reinforced Concrete Three-Sided Structures.

IMPLEMENTATION:

- The following Special Specifications are disapproved as of the letting of May 6, 2004: 562.95nnxx16, 562.96nnbb16, 562.97nnbb16.
- Main Office DQAB will insert the Standard Specification Shelf Note into Contract Proposals effective with the letting of May 6, 2004.
- New specifications are: Section 562 - Reinforced Concrete Three-Sided Structures.

TRANSMITTED MATERIALS:

- A shelf note containing Section 562 - Reinforced Concrete Three-Sided Structures.

BACKGROUND: Reinforced Concrete Three-Sided Structures have been used successfully by NYSDOT since the early 1990s. The new section revises and replaces special specifications that have been used regularly for many years. These economical structures now account for most of the short-span bridges and large culverts built by NYSDOT. The specification has been updated to reflect current practice.

CONTACT:

Direct questions regarding this EI to Mathew Royce of the Structures Design and Construction Division at 518-457-4534 or via e-mail at mroyce@dot.state.ny.us.

SECTION 562 REINFORCED CONCRETE THREE-SIDED STRUCTURES

562-1 DESCRIPTION. The work consists of designing and constructing reinforced concrete three-sided structure(s) at the location(s) indicated on the Plans.

A reinforced concrete three-sided structure is composed of some of the following discrete elements:

- Span Unit
- Span Unit Footing
- Wing Wall with Footing
- Headwall
- Invert Slab with Cut-off Wall
- Apron with Cut-off Wall

NOTE: Any of the above elements may be cast in place at no additional cost to the State.

562-2 MATERIALS. Materials for all precast concrete components shall meet the requirements of the PCCM. Materials for cast-in-place concrete shall be Class A concrete meeting the requirements of Section 555 and reinforcement meeting the requirements of Section 556.

562-3 CONSTRUCTION

562-3.01 Design. An appropriate structure design and all details necessary for construction meeting the Design parameters given in these specifications shall be developed and submitted to the DCES for approval. All design work, detail development, and proposed handling and installation procedure development, shall be done by a Professional Engineer. The design submittal shall conform to the requirements stated in the PCCM. The DCES reserves the right to reject a proposed design(s) if the structure type is determined to be unsuitable for the proposed application based on safety, durability, serviceability, or maintainability.

The Load Rating shall be determined in accordance with the AASHTO *"Manual for Condition Evaluation of Bridges, 1994 - Second Edition,"* with all interim provisions in effect. The contractor shall show which method (working stress or load factor) was used in load rating computations. The load rating shall be shown on the Production Note Sheet of the shop drawings. The contractor shall include all load rating computations in the design calculation submittal.

562-3.02 Design Parameters. The design of the structure(s) described above shall meet the following:

1. Design Specification : New York State Standard Specifications for Highway Bridges.
2. Live Load : MS 23
3. Highway Profile Section : As shown in the contract documents.
4. Soil Parameters : As shown in the contract documents.
5. Layout, Span, Rise, and Length of the Bridge Structure : As shown in the contract documents.
6. Staged Construction : Construction staging shall be as shown in the contract documents.
7. Wing Walls : As shown in the contract documents.
8. Railing or Barrier : The railing anchorages or barrier anchorages on the structure shall be designed to develop adequate global and local capacities required to resist the loads in Section 2 of the New York State Standard Specifications for Highway Bridges.
9. Hydraulics : The proposed structure shall provide hydraulic area (effective flow area) below the design high water elevation shown in the contract documents.
10. Allowable concrete stress : As per the provisions of the Standard Specifications, except that maximum tensile stress in concrete for handling and erection loads when analyzed according to the proposed handling and installation procedures, shall not exceed $0.40 \sqrt{f'_{ci}}$, where f'_{ci} is the concrete compressive strength at the time being considered.

11. Joints : All joints between Span Units shall be designed to be leak proof. The determination of the acceptability of the proposed joint system by the DCES shall be final.

Note: The shape(s) of the Span Unit shown in the contract documents is for illustration purposes only. Other shapes meeting the design parameters are acceptable, unless otherwise noted in the contract documents.

562-3.03 Changes to Design Parameters. If the Contractor wants to propose a structure not in full compliance with the design parameters in the contract, a preliminary proposal, fully explaining the changed design parameters shall be submitted to the DCES for review and approval. The Contractor is not expected to develop a detailed design until the proposed design parameters have been approved by the DCES.

562-3.04 Design Computations, Shop Drawings/Detail Drawings. The preparation and submission for review and approval shall be according to the PCCM. Shop drawings shall show detailed handling procedure to be used during fabrication, storage, and transportation of the precast elements. All necessary supporting calculations shall be included in the design computation package.

Fabrication of all steel components shall meet the requirements of the SCM.

Shop drawings shall show the required tolerances for the geometry of all precast components, placement of reinforcement, location of all inserts, etc. Design shall consider the effects of these tolerances.

562-3.05 Fabrication. Fabrication of all precast elements shall be according to the PCCM.

562-3.06 Installation Drawings. Installation drawings shall meet the requirements of the PCCM and the following:

- A. Details of all joints including all materials and a step-by-step procedure for installing them shall be shown on the installation drawings.
- B. All welding operations during installation shall be shown on the installation drawings and shall meet the requirements of the SCM.
- C. Details for all cast-in-place concrete not detailed in the contract documents.

562-3.07 Installation. Installation of all precast elements shall be according to the approved installation drawings. All elements after installation and prior to backfilling will be inspected for cracks or other visible defects. All defective elements shall either be replaced or be repaired using procedures approved by the DCES and at no additional cost to the state.

562-3.08 Erection Drawings. A separate set of erection drawings shall be prepared and submitted for review and approval of the Department as per the provisions of Section 2.6 ERECTION DRAWINGS of the PCCM.

562-3.09 Tolerances (After Erection)

- A. Joint Width: ± 10 mm
- B. Vertical Difference Between Top of Adjacent Units: ± 13 mm
- C. Span - Variation From Post-Pour Measurement Recorded on the Shipping Paperwork: ± 8 mm

562-3.10 Backfilling

A. Backfilling operations shall not begin until:

- 1. Span units to span unit footing key joints are grouted as shown on the approved installation drawings and have cured a minimum of 24 hours.
- 2. Transverse connections between unit segments are placed and secured (if required).
- 3. Joint seals are properly placed and approved by the Engineer.

B. Backfilling operations shall be conducted in accordance with Section 203 - Excavating and Embankment, with the following modifications:

1. Fills shall be placed and compacted in layers not exceeding 300 mm in depth.
2. Dumping for filling operations shall not be nearer than 900 mm to a plane passing vertically through the back face of any footing.
3. Backfill shall be placed as symmetrically as possible around the structure with differential depths of backfill on opposite sides of the structure span units not exceeding 450 mm.
4. Fill within 300 mm of any surface of the structure shall be compacted with hand compaction equipment.
5. Vibratory rollers shall not be used within 3.0 m of any surface of the structure.
6. Construction equipment shall not travel or rest on an uncompleted structure unless the designer of the structure span unit has evaluated the loading conditions, submitted calculations to the DCES, and has received written approval of the proposed loading. Actual conditions at the time of loading, including both the weight of the fill and the equipment, shall be part of the analysis. The Contractor shall repair any damage resulting from equipment passage at no additional cost to the State.

562-4 METHOD OF MEASUREMENT. Measurement for payment for the Reinforced Concrete Span Units, Wing Walls, Apron, and Invert Slabs will be computed from the payment lines shown on the plans. No field measurements will be made.

562-5 BASIS OF PAYMENT. The Contractor shall include the cost of all engineering, labor, materials, and equipment necessary to complete the work in the unit price bid. The Contractor shall include the costs of the footings, headwalls, and cut-off walls in the unit price bid of the element to which it is attached.

Payment will be made under:

Item No.	Item	Pay Unit
562.01nn M	Reinforced Concrete Span Units	square meter
562.02 M	Invert Slab With Cut-Off Wall	square meter
562.03 M	Wing Wall with Footing	square meter
562.04 M	Concrete Apron With Cut-off Wall	square meter

Note: Serialization for the Span Units: nn represents the specific structure identifier.