

ITEM 11563.51 M - POST-TENSIONED CONCRETE GIRDERS **(SEGMENTAL CONSTRUCTION)**

DESCRIPTION. This work shall consist of the manufacture of precast structural concrete superstructure segments and the storage, transportation, and erection of these segments to construct the bridge superstructure to the established lines and grades, all in accordance with the design, dimensions, and details shown on the Plans and in accordance with the provisions of the Specifications.

The following items of work are included in the work covered by this Section:

1. Cast-in-place concrete work to construct transverse or longitudinal closures between precast concrete superstructure units as shown on the Plans
2. Epoxy jointing of segments
3. Furnishing and placing all items embedded in and/or appurtenant to the precast concrete segments and cast-in-place closures, including reinforcing steel and post-tensioning hardware
4. All materials and labor required to furnish and stress seven-wire prestressing strands for transverse tendons in the deck slab, and to grout these tendons after stressing

This item does not include falsework to support the existing bridge, which is covered by Items 585.01 M and 585.02 M. This item also does not include falsework to support the new bridge at Piers 1 through 5, which is intended to carry live load while the bridge is in service for a temporary period of time, and which is covered by Item 585.03 M.

GENERAL

A Definitions

Segment:	A modular precast concrete superstructure component, the dimensions and arrangement of which are shown on the Plans
Match Cast:	A procedure for manufacturing precast concrete segments by which a given segment is cast against the segment previously cast, thus producing a matching interface that permits re-establishment of the cast geometry at the time of erection. Match casting can be carried out by either the short line or the long line casting method
Short Line Casting:	A method of match casting segments one at a time in a casting cell between a permanent bulkhead at one end and a previously cast segment at the other. The first segment in a group is cast between the permanent bulkhead and a temporary bulkhead
Long Line Casting:	A method of casting segments on a casting bed of sufficient length to permit the cumulative casting of segments for the entire length of a span or cantilever between field closure

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	pours without repositioning the segments on the casting bed. With this method, the first segment is cast between bulkheads and successive segments are cast between a movable bulkhead on one end and the adjacent segment on the other
Casting Cell:	A special formwork arrangement usually consisting of a fixed vertical bulkhead of the cross-section shape at one end and adjustable soffit, side, and core forms all designed and assembled into a machine for making a single superstructure segment.
Span by Span Erection:	A method of erection by which a specified number of segments is placed on a temporary support system, aligned, and post-tensioned longitudinally to form a completed span of the superstructure
Balanced Cantilever Erection:	A method of erection by which segments are sequentially erected alternately on either side of the pier until a cast-in-place closure pour can be made to connect one cantilever with the previously completed portion of the superstructure
Casting Curve:	The curve of casting geometry that is followed in the casting cell or bed to achieve the theoretical bridge profile and alignment after all final time dependent deformations have taken place. The casting curve is a combination of the theoretical bridge geometrical profile grade, alignment, and camber
Camber:	The amount by which the concrete profile at the time of casting must differ from the theoretical geometric profile grade to compensate for all structural deformations due to dead load, post-tensioning, creep, and shrinkage, including the effect of intermediate erection stages
Erection Elevation:	The elevation to which a segment is to be set in the structure at the time it is erected. (This is not necessarily the final theoretical grade but rather the final theoretical grade corrected by the amount of deflection calculated to occur from that stage onwards.)

B Value Engineering. The Contractor may propose alternative structural details in accordance with §110-02 and the additional requirements specified herein.

No modifications will be allowed to the following aspects of the design:

1. External dimensions of the superstructure, piers, and abutments
2. Span lengths and center-to-center spacing of columns
3. Horizontal alignment, vertical alignment, and superelevation

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4. Continuity of the superstructure at piers
5. The arrangement of expansion joints

In addition to the requirements for submittal of the Value Engineering proposal specified in §110-02, the Contractor's Value Engineering submittal shall include complete and checked calculations demonstrating that all proposed changes are in accordance with the design requirements specified in the Plans and Specifications. Calculations shall be signed and sealed by a Professional Engineer licensed to practice in the State of New York.

Approval by the Department of the Contractor's Value Engineering proposal shall not be construed to relieve the Contractor of the requirements for submittals contained in Sections 718-50 through 52 and elsewhere in the Specifications.

MATERIALS

- 3.1 Concrete Segmental Construction. Refer to Section 718-50.
- 3.2 Post-Tensioning. Refer to Section 718-51.
- 3.3 Structural Steel. Refer to Section 715-01 of the Standard Specifications.
- 3.4 Reinforcing Steel. Refer to Section 709-01 of the Standard Specifications.
- 3.5 Epoxy Jointing of Precast Segments. Refer to Section 718-52.

CONSTRUCTION DETAILS. The requirements of Sections 718-50 through 52 and Sections 709-01 and 715-01 of the Standard Specifications shall apply.

Unless indicated otherwise in Sections 718-50 through 52, the New York State Steel Construction Manual (SCM) and the New York State Prestressed Concrete Construction Manual (PCCM) shall apply.

METHOD OF MEASUREMENT. Post-Tensioned Concrete Girders (Segmental Construction) will be measured as one lump sum.

BASIS OF PAYMENT. The lump sum price bid for this item shall include all concrete, reinforcing steel and incidental items, and all the equipment, tools, forms, labor, erection equipment and incidentals necessary to complete the work (including fabrication, storage, and transportation costs). Also included under this item shall be full compensation for furnishing and stressing all temporary and permanent post-tensioning steel, anchorage assemblies, bar couplers, internal and external ducts and duct supports, steel deviation pipes, grouting, local zone reinforcement required to resist stresses imposed on the concrete by the anchorage devices, anchorage protection, furnishing samples of materials and devices, testing of post-tensioning tendons, and for all labor, materials, tools, equipment, and incidentals necessary for completing

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this work.

Payment will be made only for those items specifically listed in the bidding document. The Contractor shall assume all other items as incidental to the various pay items. The incidental items shall include, but shall not be limited to the following:

1. Drainage holes, vent holes, and related items
2. Superstructure access openings and doors
3. Brackets or other hardware required for temporary post-tensioning
4. Future post-tensioning anchorages and corrosion protection
5. Local zone reinforcement for all post-tensioning anchorages
6. Falsework other than that covered by Items 585.01 M through 585.03 M
7. Erection equipment
8. Engineering fees
9. Testing
10. Epoxy compounds
11. All embedded items
12. Any materials not shown on the Plans that are made necessary by revisions to the superstructure proposed by the Contractor to accommodate the permanent and temporary post-tensioning systems and the erection scheme and sequence he selects

Monthly progress payments will be made. For the purpose of determining monthly progress payments, a price per segment shall be established by dividing the lump sum amount bid for this item by the total number of superstructure segments shown in the Plans. Sixty percent of the price per segment thus determined will be paid for segments that have been placed into storage after casting and have been certified by the Department's Inspector as having been manufactured in accordance with the Plans and Specifications, and as being free of defects or damage. Twenty five percent of the price per segment will be paid for segments that have been erected into the superstructure after epoxy jointing, cast-in-place closure pours, longitudinal post-tensioning, and grouting of longitudinal tendons have been completed in an acceptable manner. Ten percent of the total lump sum price will be paid after transverse tendons at diaphragms at Piers 1 through 5 have been stressed and grouted and all falsework has been removed. Five percent of the total lump sum price will be paid when all necessary repairs and finishing of the concrete surfaces have been completed and accepted. All payments shall be subject to retainage as specified elsewhere.

The Contractor shall submit each month a schedule listing the status of all segments, highlighting the percent payment due on each segment. The Department will not be required to use any schedule submitted later than three days prior to the scheduled estimate date, to allow review. Payments will be based on the submitted schedule as verified by the Engineer-in-Charge.

No payment will be made for any work excluded from payment by the terms of this Specification.

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Payment will be made under:

Item No.	Item	Pay Unit
11557.51 M	Post-Tensioned Concrete Girders (Segmental Construction)	Lump Sum