

## ITEM 11555.010501 M – REPAIR SUBWAY STRUCTURE COLUMN BASE

**DESCRIPTION.** The work shall consist of raising and supporting the column, repairing the column steel grillage and replacing the concrete column base.

### MATERIALS.

1. The materials shall meet the following requirements:

Material	Requirement
Structural Steel, ASTM A36M	§ 715-01
High strength bolts, nuts and washers, ASTM A325M	§ 715-14
Bar Reinforcement, Grade 400	§ 709-01
Class HP concrete	§ 501 and § 555

2. Portland cement concrete placed underneath the column base plate.

Minimum compressive strength has been specified on the Plans. The requirements of §555, in particular §555-2 shall apply except as modified herein.

The Contractor shall be responsible for the design of any concrete mix covered by this Specification. Acceptance of the mix shall be based on meeting performance criteria of this Specification . The Portland cement concrete shall consist of a homogeneous mixture of cement, fine aggregate, coarse aggregate, water, admixtures, and any supplementary cementitious materials (fly ash, microsilica, or ground granulated blast furnace slag) deemed necessary.

Materials used for the concrete shall meet the requirements of §501-2.02. In addition, the following shall apply:

1. Cement shall be either Type I, Type II, Type VII, or Type III
2. Microsilica shall be in accordance with §711-11
3. Ground granulated blast furnace slag shall be in accordance with §711-12
4. The coarse aggregate shall be CA 1 gradation.
5. If an accelerating admixture is used it shall be a non-chloride one.

After the materials have been selected for this work, the Contractor shall perform laboratory tests on trial batches to verify that the concrete satisfies the specified performance criteria. The Contractor shall engage a qualified independent testing laboratory, subject to the approval of the Department, to perform all mix development testing. Testing shall be in accordance with ASTM Standards C192, C39, C143, and C231. The designed concrete shall provide test results sufficient to assure all performance criteria requirements can be achieved during all production operations. At least one (1) month prior to the start of any concrete placement, the Contractor shall provide a copy of the mix design and trial batch test results to the Director, Materials Bureau, submitted through the Regional Materials Engineer, for evaluation. It shall be the Contractor's responsibility to submit sufficient data to permit the Director of the Materials Bureau to render an informed evaluation. The test results submitted shall include, but shall not be limited to, the following:

1. Concrete mix proportions
2. Sources of all materials
3. Air content of tested cylinder concrete
4. Slump of tested cylinder concrete

## **ITEM 11555.010501 M – REPAIR SUBWAY STRUCTURE COLUMN BASE**

5. Compressive strength at 7, 14, and 28 curing days, and at all other ages for which minimum compressive strength requirements are specified on the Plans. A curing day is defined in §555-3.09.

Submittals of mix design and test results are to ensure general conformance with the Plans and Specifications only. The rendering of an evaluation of validity by the Director of the Materials Bureau shall not be interpreted as approval of the mix design. All changes to the mix design shall be submitted for evaluation in accordance with this specification.

3. Concrete, Class HP, placed above the column base plate and above the bridge deck, shall meet all the material requirements of §555-2.

4. Lifting Equipment shall meet the requirements of the sub-section 585-2.02.

### **CONSTRUCTION DETAILS**

1. The work shall consist of the following in sequential order:

Remove the concrete column cover above the bridge deck.

Remove cast iron wheel guard.

Install the underpinning structure.

Remove the concrete fill above the column base plate.

Cut the anchor bolts.

Raise, support and lower the column to transfer the load to underpinning structure.

Remove the concrete underneath the column base.

Clean or replace the column base plate, as required.

Clean and repair the steel grillage, as required.

Install of anchor bolts.

Place the Portland cement concrete underneath the column base plate.

Raise, support and lower the column to remove loads from underpinning structure.

Tight the anchor bolts.

Place the concrete, Class HP, above the column base plate.

Re-install cast iron wheel guard.

Install of the concrete column cover, Class HP, above the bridge deck

2. The Contractor shall engage the services of a New York State Licensed Professional Engineer to design and detail the structural lifting system and underpinning structure based on the conceptual design shown on the contract plans. The Contractor shall submit 5 sets of shop drawings and calculations for the design of all underpinning structures and materials to the Engineer and to NYC Transit for approval. The Contractor's work schedule shall allow 15 working days for review.

3. The attachment of the underpinning structure to the existing girders shall be done utilizing existing holes by replacing the rivets with high strength bolts. No new holes in the existing steel girders will be allowed. Removal of existing rivets and replacement with high strength bolts shall meet the requirements of §586-3.03. The existing paint shall be removed from all the existing steel surfaces that are in contact with new steel unless the existing steel is not painted.

After completion the of repair operations and removal of the underpinning structure, all holes in existing girders and New York City Transit columns shall be filled with high strength bolts.

4. Working drawings shall meet the requirements of §585-3.02.

**ITEM 11555.010501 M – REPAIR SUBWAY STRUCTURE COLUMN BASE**

- 5. Lifting operations shall meet the requirements of §585-3.03.
- 6. The column base plate and the steel grillage elements shall be inspected by the Engineer and, as per Engineer’s instructions, cleaned repaired or replaced in kind.
- 7. The column base plate surface that will be in contact with the concrete placed underneath the column base shall be thoroughly treated with an approved form coating in the manner, and at the rate specified by the manufacture. Only those coating listed on the Approved List published by the Materials Bureau are acceptable. The surface so treated shall be protected against damage or dirt prior to placing concrete.
- 8. Portland cement concrete placed underneath the column base plate.

All the provisions of §555-5 shall apply except for the provisions of §555-3.01, Concrete Manufacturing Transporting. Concrete Manufacturing and Transporting shall be in accordance with §501-3.02, Concrete Batch Plant Requirements, §501-3.03, Handling, Measuring, and Batching Materials, and §501-3.04, Concrete Mixing, Transporting, and Discharging.

- 9. Concrete, Class HP, placed above the column base plate and above the bridge deck.

All the provisions of §555-3 shall apply.

**METHOD OF MEASUREMENT**

The quantity to be paid under this item shall be the number of column bases designated on the plans, actually repaired.

**BASIS OF PAYMENT**

Payment will be made at the unit price bid for each column base actually repaired. The unit price bid shall include the cost of all labor, materials and equipment necessary to complete the work including jacking and concrete costs.

Payment will be made under:

Item No.	Item	Pay Unit
11555.010501 M	Repair Elevated Structure Column Base	Each