

## **ITEM 10551.045001 M – SOLDIER PILE WALL**

**DESCRIPTION.** This item consists of furnishing materials for and constructing a permanent cantilevered soldier pile retaining wall in conformance with these specifications and as shown on the plans and directed by the Engineer. A satisfactory record of experience in drilled shaft construction is considered to be of the utmost importance in obtaining a satisfactory installation. The Contractor's foreman and drill operator shall have at least three years experience constructing soldier pile and lagging walls. A list of projects with references completed in the last five years and resumes of personnel to be used on this project shall be submitted to the Engineer for approval.

This item also includes the work necessary to remove and dispose of an existing crib wall to the limits indicated on the plans and regrading and sodding the disturbed areas as directed by the Engineer. Work also includes removing and disposing off-site of all waste materials created during soldier pile wall construction.

### **MATERIALS.**

Structural Steel	NYSDOT Section 715-01, ASTM A588M
Epoxy Coated Bar Reinforcement	NYSDOT Section 709-04
Concrete Pile Shafts	NYSDOT Section 555, Class A
Precast Concrete Panels	NYSDOT Section 718-24
Drain Pipe	NYSDOT Section 706-15
Sodding	NYSDOT Section 612

The drainage geocomposite shall consist of a geotextile fabric mounted on one side of a drainage core. The geocomposite shall be Miradrain 6000, Ameridrain 200, Tensar DCF100 or similar product.

Slurry used in the drilling process shall be mineral slurry. The slurry shall have a mineral grain size that will remain in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. The percentage and specific gravity of the material used to make the suspension shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement. Bentonitic slurry is not recommended due to the saline environment.

**CONSTRUCTION DETAILS.** Prior to constructing the retaining wall, both ends of the existing crib wall shall be removed to the limits indicated on the plan sheets. The crib wall may be removed by any method deemed suitable to the Engineer and in such a manner that does not damage the remaining crib wall. The top of the crib wall also shall be removed to the limits indicated on the plans. The soil within the crib wall shall remain in place and graded to match the adjacent contours. Disturbed areas shall be sodded and covered with an erosion control blanket as directed by the Engineer.

Any damage done to the existing fence located along the top of the crib wall shall be repaired or replaced by the Contractor at no additional expense to the Owner. The Contractor may elect to

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temporarily remove the fence during construction and re-install the fence when construction is complete.

Due to the proximity of overhead utilities and the available work zone, the Contractor shall coordinate the wall construction with LIPA, Nassau County, and the City of Long Beach.

**Stabilization.** The excavation for the concrete pile shafts of this wall shall be stabilized to preclude loss of ground by employing casing, slurry, or other appropriate measures as described below:

1. Wet Construction Method: The wet construction method consists of advancing the excavation below the water table, keeping the excavation filled with water or slurry, desanding and cleaning the slurry and final cleaning of the excavation by means of a bailing bucket, air lift, submersible pump, or other approved devices and placing the concrete to the required elevation with a tremie or concrete pump beginning at the shaft bottom and extending to the top of shaft elevation.

2. Casing Construction Method: This method shall be used where it is inappropriate to use the wet construction method. In this method, the hole is advanced through caving material by the wet method. When a formation is reached that is nearly impervious, a casing shall be placed in the hole and sealed in the nearly impervious formation. The drilling proceeds to the projected depth, with the removal of accumulated seepage water and loose material from the excavation. The casing shall be withdrawn as the concrete is placed. In the event that seepage conditions prevent the use of this method, the excavation shall be completed using the wet method.

Where drilling is through materials having a tendency to cave, the drilling shall be advanced by drilling in mineral slurry. The level of slurry shall be maintained at a height to prevent caving of the hole. The mineral slurry shall be premixed thoroughly with clean fresh water and adequate time allotted for hydration prior to introduction into the shaft. The slurry shall be fully hydrated in fresh water before supplying it to the excavation. Adequate slurry tanks shall be provided.

In the event that a caving layer or layers are encountered that cannot be controlled by slurry, the Contractor shall install temporary removable casing through the caving layers. Overreaming to the outside diameter of the casing may be required. The Contractor shall take whatever steps are required to prevent caving during shaft excavation including installation of deeper casings. If the Contractor elects to remove a casing and replace it with a longer casing through caving soils, he shall adequately stabilize the excavation with slurry or backfill the excavation.

Before the casing is withdrawn, the elevation of fresh concrete shall be at a level that traps fluid behind the casing. As the casing is withdrawn, care shall be exercised to maintain the level of concrete within the casing so that the fluid trapped within the casing is displaced upward out of the shaft excavation without mixing with or contaminating the shaft concrete.

**Records.** The Contractor shall furnish daily records at the end of each day to the Engineer for review. The reports shall contain the following information on the shaft:

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1. Soldier pile location.
2. Date and time of approval of excavation.
3. Pertinent information from concrete batching tickets.
4. Date and time of pouring concrete.
5. Concrete placement method.
6. Size of shaft.
7. Size and length of temporary casing, if any.
8. Size and length of casing left in place, if any.
9. Depth of shaft shown on plans.
10. Depth of shaft as poured.
11. Location of top of shaft relative to ground surface.
12. Notes on observations during concrete placement.
13. Volume of concrete placed.
14. Weather conditions.
15. Depth and description of strata encountered.
16. Estimated inflow of water and depth in bottom of hole when concrete is placed.
17. Note if pumping was required.
18. All other relevant information as described in previous sections.

**Drilling Equipment, Excavation and Soldier Piles.** The soldier piles shall be installed in 762 mm (30 inch) diameter drilled shafts; driving is not a permitted method of installation. The excavation and drilling equipment used to construct the drilled shafts shall have adequate capacity including power, torque, and downthrust and the excavation and over-reaming tools shall be of adequate design, size, and strength to perform the work shown on the plans or described herein. All spoil material created from the drilling operation shall be removed and disposed of off-site. Furthermore, appropriate measures shall be taken to confine the drilling spoil to the construction site and prevent sediment runoff.

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During drilling of the shaft, the Contractor shall make frequent checks on the plumbness, alignment and dimensions of the shaft. It is the contractor's responsibility to maintain appropriate quality control measures to ensure that the precast concrete lagging can be placed between the soldier piles as indicated on the plans. If the piles are installed such that the precast lagging can not be placed as indicated on the drawings, the contractor shall make the necessary corrections as approved by the Engineer at no additional cost to the Owner. Concrete spacers or other approved non-corrosive spacing devices shall be used at sufficient intervals to ensure concentric spacing for the entire length of pile. Any deviation exceeding allowable tolerances shall be corrected with a procedure approved by the Engineer. Approval will be obtained before continuing with the retaining wall construction. Materials and work necessary to correction out-of-tolerance excavation or soldier pile placement shall be furnished at no additional cost to the owner.

All piles shall be installed with a 2 percent batter toward the backfill.

After placing the soldier pile, the shaft shall be filled with concrete that is in conformance with these Specifications. The concrete shall be placed by tremie methods either by gravity flow or by pumping. The panels may be placed when the concrete has gained sufficient strength but no sooner than 14 days after concreting.

All portions of the steel soldier piles, except the exposed front flange, from a distance of 914 mm (3 feet) below the bottom of drilled shaft elevation to the top of pile elevation shall be coated with a coal tar epoxy. The coal tar epoxy shall be evenly spread. The exposed front flange shall be painted in accordance with Section 740-01 and as directed by the Engineer.

**Precast Concrete Panels.** The wall facing shall be precast concrete elements in conformance with these Specifications and as indicated on the plan sheets. The wall shall be constructed by lowering the precast concrete panels in between the flanges of the steel piling. The Contractor shall center the panel between the two soldier piles and position the panel such that it is firmly against the inside edge of the outside flange. For panels that require the installation of weep holes, the weep hole shall be centered along the length of the panel. The pipe shall extend behind the wall two inches on the side that retains the fill.

All panels shall be installed level. The bottom panel may require shims to level the panel. The shims shall consist of a durable material that will not degrade with time. Shims should be placed between the top of drilled shaft and the first panel.

**Placement of Geocomposite and Select Granular Fill.** Before the select granular fill material is placed, the Contractor shall install the geocomposite on the panels in the method recommended by the manufacturer. The geocomposite shall be installed on the fill side of the wall and shall cover the entire wall, both in the horizontal and vertical direction. The geotextile fabric shall be wrapped around all edges of the drainage composite.

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At the weep hole locations, the contractor shall embed the drainpipe, extending behind the wall 2 inches, into a burlap sack filled with coarse aggregate. The geotextile from the geocomposite shall extend over the burlap sack so that the retained fill will not migrate out through the weep hole.

The Contractor shall place all the precast concrete panels and install the geocomposite before any select granular fill is placed. The fill shall be compacted by means of a mechanical hand- tamper to sufficiently compact the material. No heavy equipment is allowed behind the retaining wall. The cost of furnishing the Select Granular Fill is Item No. 203.07M. The cost of placing and tamping the Select Granular Fill is included in Item 10551.045001M.

**Pavement.** The Contractor shall cut and remove the pavement in front of the wall in an orderly and neat fashion a distance of 0.762 meters, or as directed by the Engineer, to provide a neat line for replacement of the pavement. The Contractor shall repair the pavement located in front of the newly constructed soldier pile wall. The Contractor shall install the pavement section as indicated on the plans and in general conformance with NYSDOT Standard Specifications. The cost of saw cutting and pavement removal and disposing off-site is included in Item No. 10520.09M. The cost of removing and disposing of concrete curbs off-site is included in Item No. 10551.045001M.

**METHOD OF MEASUREMENT.** All material and labor required to construct the soldier pile wall, placing and compacting the granular backfill, installing the geocomposite, repairing/relocating the existing fence, removing and disposing of the crib wall and associated regrading and disposing of excess materials off-site and general site restoration shall not be measured.

**BASIS OF PAYMENT.** All items covered under this Specification as well as all incidentals, unless otherwise noted, shall be paid at the Contract Lump Sum price under Item No. 10551.045001M.