To: MODIFIED BY EI 10-034 EFFECTIVE 5/5/11		*New York State Department of Transportation* ENGINEERING INSTRUCTION	EI 03-003

Title: **Special Specifications for Soldier Pile and Lagging Walls and Sta-Pod Armor Units**

Distribution:

- ☐ Manufacturers (18)
- ☐ Surveyors (33)
- ☒ Main Office (30)
- ☒ Consultants (34)
- ☒ Local Govt. (31)
- ☒ Contractors (39)
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Approved:

Robert L. Sack — Robert L. Sack, Deputy Chief Engineer, Technical Services Division

24 JAN 03 — Date

ADMINISTRATIVE INFORMATION: **SUPERSEDED BY EB 23-024 EFFECTIVE 8/3/23**

- This Engineering Instruction (EI) is effective for projects submitted for the letting of May 8, 2003.
- Superseded issuance(s): This EI does not supersede any previous issuances. However, this EI modifies EI 02-039.
- Disposition of issued materials: The information transmitted by this issuance will reside in the special specifications directory of the toolbox server.

PURPOSE: The purpose of issuing this EI is to re-instate the special specifications for the construction of soldier pile and lagging walls and Sta-Pod units (discontinued under EI 02-039) and revise these specifications to conform with the revised Materials Bureau's specifications for the implementation of precast concrete QC/QA procedures.

TECHNICAL INFORMATION:

- PIN Approval: The soldier pile and lagging special specifications are approved on a project -by-project basis and they are used very frequently. In the TRNS-PORT database, in lieu of changing the PIN for every job that they are approved for, DQAB will identify these items as "PINONLY" in the ID field. Designers will still need to send their request for approval to DQAB.
- Actions by Main Office DQAB: Main Office DQAB will insert these specifications into projects that call for their use. §704-03 as modified by EI 02-039 will also be inserted.

TRANSMITTED MATERIALS:

- Attached are the following special specifications:

Item 17551.0460nn M - Holes in Earth for Soldier Pile and Lagging Wall
Item 17551.0461nn M - Rock Sockets for Soldier Pile and Lagging Wall
Item 17551.0462nn M - Installing Soldier Piles for Soldier Pile and Lagging Wall
Item 17551.0463nn M - Installing Lagging for Soldier Pile and Lagging Wall

Item 17620.20 M - Armor Units (Sta-Pods) 2 Metric Ton Class
Item 17620.21 M - Armor Units (Sta-Pods) 5 Metric Ton Class

BACKGROUND: The Engineering Instruction EI 02-039 inadvertently discontinued the use of the special specifications for the construction of soldier pile and lagging walls and the installation of Sta-Pods. These specifications are the most current and appropriate for these walls and erosion control systems. The Geotechnical Engineering Bureau has contacted the Materials Bureau to discuss the aspects of the specifications that required revisions. The following sections of the special specifications were revised to conform to the Materials Bureau's procedures:

1. Soldier Pile and Lagging Walls:
   CONSTRUCTION DETAILS Section E: Lagging - Eliminated "and inspection assignments." at the end of the third paragraph and "and without inspection in accordance with the procedural directives of the Materials Bureau" from the fifth paragraph.
2. Sta-Pods:
   PRECAST ARMOR UNITS Materials - Eliminated "The requirements for concrete inspection facilities, automated batching controls and recordation do not apply. Use concrete batching and mixing methods and inspection facilities approved by the Materials Bureau." from the paragraph.

CONTACT: Questions or comments regarding this issuance should be directed to Randy Romer of the Geotechnical Engineering Bureau at (518) 457-4714, rromer@dot.state.ny.us.

ITEM 17551.0460nn M - HOLES IN EARTH FOR SOLDIER PILE AND LAGGING WALL

ITEM 17551.0461nn M - ROCK SOCKETS FOR SOLDIER PILE AND LAGGING WALL

ITEM 17551.0462nn M - INSTALLING SOLDIER PILES FOR SOLDIER PILE AND LAGGING WALL

ITEM 17551.0463nn M - INSTALLING LAGGING FOR SOLDIER PILE AND LAGGING WALL

DESCRIPTION

Furnish, install and maintain a wall as indicated on the plans. Cut off walls within the roadway limits and leave in place. Completely remove walls outside the roadway limits if noted on the plans. Dispose of removed material.

All proposed changes to details shown on the plans must be approved, in writing, by the Deputy Chief Engineer of the Technical Services Division.

MATERIALS

Structural Steel

Provide soldier piles, waling and bracing as shown on the plans conforming to the provisions of subsection 715-01 Structural Steel.

Used material is permitted for walls unless otherwise noted on the plans, provided the material is in conformance with the specification and is acceptable to the Engineer.

Lagging

Provide the lagging type(s) shown on the plans:

Treated wood graded for an extreme fiber stress of at least 6.9 MPa conforming to the provisions of subsection 712-14 Stress Graded Timber and Lumber with the full dimension thickness shown on the plans.

Provide preservative treatment conforming to the American Wood Preserves Institute (AWPA) Standard C-2, Soil Contact.

Untreated wood graded for an extreme fiber stress of at least 6.9 MPa conforming to the provisions of subsection 712-14 Stress Graded Timber and Lumber with the full dimension thickness shown on the plans.

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Precast concrete panels conforming to the provisions of subsection 704-03 Precast Concrete-General.

Steel sheeting with a minimum section modulus conforming to the provisions of subsection 552-2 Materials.

Backfill for Holes

Provide backfill material shown on the plans:

Concrete Backfill: Class G concrete conforming to the provisions of Section 555 - Structural Concrete.

Grout Backfill: Provide a workable mixture of cement, concrete sand and water capable of stabilizing the hole and being excavated. Use cement, concrete sand and water conforming to the following provisions:

Material	Subsection
Portland Cement Type 2	701-01
Concrete Sand	703-07
Water	712-01

The current Departmental Controlled Low Strength Material specification is an acceptable alternative to the grout backfill.

CONSTRUCTION DETAILS

A. General

Perform work in a manner that causes no subsidence of the surrounding ground surface. If subsidence should occur, cease work and provide a written plan to prevent subsidence to the Engineer for review. Resume work after the Engineer has approved the plan in writing.

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Repair all damage that resulted from the subsidence at no additional cost to the State.

Provide splices for soldier piles conforming to the provisions of subsection 551-3.01 C.2.a. Preparation of Piles, Splices, General.

Install the Soldier Piles either by driving or by placing them in holes as indicated on the plans in accordance with the following tolerances:

1. Plan tolerance of 75 mm at the top of pile, verified by survey methods.

2. Vertical tolerance of one (1) mm per 100 mm on each axis of the soldier pile shown on the plans. Verify the axes on the top 1.5 m of the soldier pile with a straight edge (1.5 m minimum length) and a level (1.2 m minimum length).

For each pile out of tolerance, provide a satisfactory replacement or provide a modification approved by the Engineer prior to proceeding.

B. Driving Piles

Equip soldier piles with shoes in conformance with provisions of subsection 551-3.01 C.1.a. Preparation of Piles, Shoes, Steel Bearing Piles, and drive in conformance with provisions of subsection 551-3.01 D. Equipment for Driving Piles, except that submission of Form BD 138 is not required.

C. Placing Piles in Holes

Provide equipment capable of establishing holes of the minimum diameter and to the depth or elevation shown on the plans. Temporary sleeves or casings are permitted and may be required as per the plans. Jetting is not permitted.

If the assumed top of socket elevation shown on the plans varies by more than 0.6 m, stop work and notify the Engineer. The Engineer will notify the Geotechnical Engineering Bureau and obtain written recommendations prior to allowing the work to proceed.

After placing the piles, backfill holes with the backfill(s) indicated on the plans.

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D. Backfilling

Concrete Backfill: Place backfill in accordance with the provisions of subsections 555-3.04 Handling and Placing Concrete and 555-3.05 Depositing Structural Concrete Under Water in all rock sockets shown on the plans. Provide a minimum curing time of one (1) day before placing any lagging.

Grout Backfill: Place backfill in accordance with the provisions of subsections 555-3.04 Handling and Placing Concrete and 555-3.05 Depositing Structural Concrete Under Water. Provide a minimum curing time of one (1) day before placing any lagging.

E. Lagging

Install horizontal lagging in a manner approved by the Engineer so that the unsupported soil height is a maximum of one (1) meter at all times. If the method chosen for attaching the lagging to the soldier piles requires reattachment of lagging to the soldier piles due to planned excavation on both sides of the wall, reattach the lagging at no additional cost to the State.

Fabricate the precast concrete lagging to the shape and size shown on the plans.

Precast panels manufactured in strict conformance with the plans do not require shop drawings. When shop drawings are not required, notify the Engineer, in writing, of the Fabricator's intention to manufacture the panels in accordance with the plans. The Director of the Materials Bureau will be notified by the Engineer of the Contractor's/Fabricator's intention and will institute appropriate approval notifications.

If the precast panels are not fabricated in strict conformance with the plans, submit shop drawings through the Engineer to the Materials Bureau for written approval a minimum of 30 working days before beginning fabrication. Shop drawings must conform to the requirements of subsection 704-03, Precast Concrete-General.

Panels manufactured without prior written approval from the Materials Bureau will not be accepted.

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F. Wall Removal

Cut off soldier piles placed within the roadway limits at the subgrade surface unless otherwise noted on the plans.

Soldier piles placed outside the roadway limits may be removed or cut off a minimum of 0.6 m below final ground surface unless otherwise noted on the plans.

If lagging is to be removed, remove the lagging in a manner approved by the Engineer so that the unsupported soil height is a maximum of one (1) meter at all times. This maximum height may be reduced, based on specific site conditions, in order to prevent collapse and loss of ground.

METHOD OF MEASUREMENT

Holes in Earth

The number of linear meters satisfactorily installed as measured in the field. The upper payment limit, unless otherwise specified on the plans or revised in writing by the Engineer, is the actual intersected grade or ground line whichever is lower. For holes requiring rock sockets, the lower payment limit is the top of rock as shown on the plans or revised, in writing, by the Engineer. For holes without rock sockets, the lower payment limit is the pile tip elevation as shown on the plans or revised, in writing, by the Engineer.

Rock Sockets

The actual number of linear meters satisfactorily installed in rock as measured in the field. The upper payment limit is the top of rock as shown on the plans or revised, in writing, by the Engineer. The lower payment limit is the pile tip elevation as shown on the plans or as revised, in writing, by the Engineer.

Installing Soldier Piles

The number of linear meters satisfactorily installed as measured in the field. The upper payment limit is the pile top elevation as shown on the plans or as revised, in writing, by the Engineer. The lower payment limit is established as the tip of the soldier pile driven or placed to the elevation shown on the plans or as revised, in writing, by the Engineer.

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Installing Lagging

The number of square meters of wall satisfactorily installed between the payment lines shown on the plans or as revised, in writing, by the Engineer.

BASIS OF PAYMENT

Holes in Earth

Include in the unit price bid the cost of furnishing all labor, materials and equipment necessary to complete the work including progressing the hole through obstructions.

Rock Sockets

Include in the unit price bid the cost of furnishing all labor, materials and equipment necessary to complete the work.

Installing Soldier Piles

Include in the unit price bid the cost of furnishing all labor, materials and equipment necessary to complete the work, including pile driving equipment, equipment for excavating holes, pile shoes, splices, backfilling the hole and cutting off the soldier pile where required. No additional payment will be made for complete pile removal, where allowed, or for splices when the pile exceeds the estimated length.

Installing Lagging

Include in the unit price bid the cost of furnishing all labor, materials and equipment necessary to complete the work, including waling, bracing, connections and lagging removal, where required. No additional payment will be made when a wall is excavated on both sides. No additional payment will be made if wood lagging is placed behind concrete.

NOTE: nn denotes serialized pay item, see §101-53.

ITEM 17620.20 M - ARMOR UNITS (STA-PODS) 2 METRIC TON CLASS
ITEM 17620.21 M - ARMOR UNITS (STA-PODS) 5 METRIC TON CLASS

DESCRIPTION
Furnish and place armor units (Sta-Pods), or an equal approved by the Deputy Chief Engineer of the Technical Services Division, as shown on the plans. The Sta-Pod is a patented armor unit.

PRECAST ARMOR UNITS
Notify the Materials Bureau of the name and location of the precast armor unit fabricator at least 30 days before the start of production. Supply precast armor units meeting the requirements of §704-03, except as noted herein.

Materials -Use epoxy coated, bar or wire fabric reinforcement. Use concrete with a minimum compressive strength of 30 MPa at 28 days.

Dimensional Tolerances - Do not vary unit dimensions by more than 10 mm from those shown on the approved working drawings.

CONSTRUCTION DETAILS

Handling and Storage - Lift with a bridle or sling and move in a way that avoids damage to the units. Store units on a firm bed. The Engineer will reject units which are not true to line and grade or are defective in any respect. Replace, at no additional cost to the Department, all units rejected by the Engineer.

Erection of Armor Units - Insure that a representative of the patent holder is available for at least the first day of installation. Install armor units according to the representative's instructions. Obtain the Engineer's approval before putting construction equipment stresses on the armor units.

If the Engineer suspects damage has occurred to an armor unit, provide a safe means for inspection. Replace, at no additional cost to the Department, all units rejected by the Engineer.

METHOD OF MEASUREMENT
Armor units will be measured by the number of units supplied and installed in accordance with the contract documents.

BASIS OF PAYMENT
Include the cost of all labor, royalties, materials, installation equipment and installation supervision by the patent holder's representative in the unit price bid per armor unit.

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1/15/97 EI 03-003
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