

ITEM 554.15	17 -	LAUNCHED SOIL NAIL SHALLOW SLOUGH TREATMENT
ITEM 554.17	17 -	SHOTCRETE COVER FOR LAUNCHED SOIL NAIL SLOPE
ITEM 554.18	17 -	COMPOSITE REINFORCED EROSION CONTROL MATERIAL COVER FOR LAUNCHED SOIL NAIL SLOPE

DESCRIPTION

This work shall consist of installing Launched Soil Nails and furnishing all equipment and materials for the installation. The Launched Soil Nails may be left exposed or may incorporate a cover, as described below, in accordance with the contract documents.

Launched soil nails shall be inserted into existing soil masses by high-pressure air. The soil nails reinforce locally unstable shallow soil sloughs by transferring the tensile and shear resistance developed by the soil nail from the stable side of the slip plane to the unstable side.

The Contractor or Subcontractor performing this work shall have prior experience installing launched soil nails.

MATERIALS

Soil Nails: Soil Nails to be furnished shall have a nominal outside diameter of 38 mm and a minimum length of 5.5 m. The contractor shall provide certification that the tensile strength of the nails is a minimum of 200 MPa. The soil nails shall be solid steel, perforated hollow steel bars with a smooth outer surface and a minimum wall thickness of 3.05 mm, or fiberglass nails as specified by a note in the contract documents entitled “Launched Soil Nails.” Remaining lengths from previously installed Soil Nails shall not be accepted for reuse.

Perforations shall be two 9.5 mm holes every 150 mm on the bottom 2.4 m or as directed by the Engineer.

Shotcrete: Provide shotcrete conforming to the requirements of Section 583- Shotcrete.

Wire Fabric: Provide wire fabric conforming to the requirements of § 709-02, Wire Fabric For Concrete Reinforcement.

Composite Reinforced Erosion Control Material: Provide a synthetic erosion control material which promotes vegetative growth, and is internally reinforced by a double-twisted steel wire mesh with a wire diameter of at least 2.20 mm and a nominal mesh opening between the angles of twist of 83 mm. Acceptance will be based on the submission to the Engineer of a nominal sample and copy of the manufacturer’s specifications. The sample shall be submitted one week prior to application.

CONSTRUCTION DETAILS

At least 30 days prior to the scheduled start of work, the contractor shall submit proof to the Engineer that whoever will perform the work has successfully installed launched soil nails on at least two projects within the past five years.

ITEM 554.15 17 - LAUNCHED SOIL NAIL SHALLOW SLOUGH TREATMENT
ITEM 554.17 17 - SHOTCRETE COVER FOR LAUNCHED SOIL NAIL SLOPE
ITEM 554.18 17 - COMPOSITE REINFORCED EROSION CONTROL MATERIAL
COVER FOR LAUNCHED SOIL NAIL SLOPE

Furnish soil nails, launching equipment, and incidentals necessary to complete the work. Install soil nails using a launcher with a single stroke at initial velocities in excess of 322 km/h or at a launcher chamber pressure of 17.2 MPa. The location limits of the launched soil nail application(s) shall be shown in the contract documents.

Launched Soil Nails may be two or more rows as shown in the contract documents. Install nails in subsequent rows offset from the nails in the previous row.

The exposed portion of installed soil nails shall be cut off flush with the final slope face. The final slope face may be bare slope, shotcrete, or other slope face protection as shown in the contract documents. Cut off the exposed portion of the soil nails using a method which does not leave an exposed sharp, pointed end.

Soil nails that do not penetrate a minimum of 3.0 m from the slope surface will be rejected. Do not remove nails which do not meet the minimum penetration embedment. An additional nail will be installed within a 450 mm radius of the rejected soil nail. If the additional nail does not reach the minimum penetration depth of 3.0 m, then the area shall be evaluated by the Geotechnical Engineering Bureau for remedial action.

If a soil nail which penetrates beyond the maximum soil nail length of 6.0 m, then the contractor shall reduce the installation pressure to allow for embedment within 5.5 to 6.0 m.

If noted in the contract documents, apply shotcrete to the limits of the installed soil nailed surface. Reinforce the shotcrete with wire fabric. Positively anchor the wire fabric to the installed soil nails. Contour the wire fabric to the surface profiles. After the wire fabric is in place, apply a 100 mm thick application of shotcrete, encapsulating the wire fabric. Keep ungrouted hollow soil nail heads free of debris to facilitate drainage.

Provide shotcrete equipment capable of delivering the premixed material accurately, uniformly and continuously through the delivery hose. Control shotcrete application thickness, nozzle technique, air pressure, and rate of shotcrete placement to prevent sagging or sloughing of freshly applied shotcrete.

If noted in the contract plans, provide composite reinforced erosion control material internally reinforced with double-twisted steel wire mesh in lieu of shotcrete. Secure the composite reinforced erosion material onto the slope face in accordance with the manufacturer's recommendations or as amended by the contract plans.

Turf establishment of the slope shall be paid for separately. Use of erosion control material other than that described above shall be placed under a separate specification.

METHOD OF MEASUREMENT

The launched soil nail slope reinforcement work measured for payment will be the nearest whole number of square meters of treated slope face between the payment lines shown in the contract documents.

<u>ITEM 554.15</u>	<u>17 -</u>	<u>LAUNCHED SOIL NAIL SHALLOW SLOUGH TREATMENT</u>
<u>ITEM 554.17</u>	<u>17 -</u>	<u>SHOTCRETE COVER FOR LAUNCHED SOIL NAIL SLOPE</u>
<u>ITEM 554.18</u>	<u>17 -</u>	<u>COMPOSITE REINFORCED EROSION CONTROL MATERIAL COVER FOR LAUNCHED SOIL NAIL SLOPE</u>

Shotcrete and wire fabric reinforcement work will be measured for payment in square meters measured to the nearest whole square meter of slope face.

Composite reinforced erosion control material will be measured for payment in square meters to the nearest whole square meter.

BASIS OF PAYMENT

The unit price bid per square meter of slope treated with launched soil nails shall include the cost of furnishing all labor, materials, and equipment required to install the launched soil nails to the minimum embedment.

The unit price bid per square meter of shotcrete, wire fabric reinforcement, and connector plates shall include the cost of furnishing all labor, materials, and equipment required for the installation.

The unit price bid per square meter of composite reinforced erosion control material shall include the cost of furnishing all labor, materials, and equipment required for the installation.