
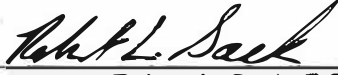


<b>SUPERSEDED BY EB 23-024 EFFECTIVE 8/3/23</b>		<i>New York State Department of Transportation</i> <b>ENGINEERING INSTRUCTION</b>	<b>EI</b> <b>08-007</b>
<b>Title: SPECIAL SPECIFICATIONS INVOLVING GEOSYNTHETICS</b>			
<b>Distribution:</b> <input type="checkbox"/> Manufacturers (18) <input type="checkbox"/> Surveyors (33) <input checked="" type="checkbox"/> Main Office (30) <input checked="" type="checkbox"/> Consultants (34) <input checked="" type="checkbox"/> Local Govt. (31) <input checked="" type="checkbox"/> Contractors (39) <input checked="" type="checkbox"/> Regional/Agencies (32) <input type="checkbox"/> _____ ( )		<b>Approved:</b>  Robert L. Sack, P.E. Deputy Chief Engineer (Research) <span style="float: right;"> <b>14 Feb 08</b>          Date       </span>	

**ADMINISTRATIVE INFORMATION:**

- This Engineering Instruction (EI) is effective beginning with projects submitted for the letting of September 4, 2008.
- This EI supersedes the following previous issuance:  
 EI 01-002 Prefabricated Geocomposite Edge Drain – New Special Specification  
 EI 05-023 Turbidity Curtain
- The information transmitted by this issuance will reside in the Special Specifications directory of the Toolbox Server.

**PURPOSE:** The purpose of this EI is to issue revised special specifications involving geosynthetics.

**TECHNICAL INFORMATION:**

- As outlined in EI 08-005, Section 737 has been assigned the material specifications related to Geosynthetics. The revision to each of the special specifications listed below includes changing the Materials Section to refer to the appropriate subsections of Section 737 - Geosynthetics.

**TRANSMITTED MATERIALS:**

- The following revised special specifications:
 

Item 203.12030017	Prefabricated Vertical Drains
Item 209.02000010	Temporary Silt Fence with Straw Bales
Item 209.11000011	Inlet Filter Sediment Control for New Catch Basins
Item 209.11010010	Field Basin Silt Diaper
Item 209.12000010	Silt Protection for Drainage Structures
Item 209.12000011	Inlet Filter Sediment Control For Existing Catch Basins
Item 209.15010024	Turbidity Curtain
Item 605.24100017	Prefabricated Composite Edge Drain (Underdrain Filter Material Backfill)
Item 605.24110017	Prefabricated Composite Edge Drain (Existing Material Backfill)
Item 605.60000017	Tire Shred Sampling & Collection Point
Item 605.97000017	Installing Weep Holes in Existing Wall

**BACKGROUND:** The NYS Department of Transportation is implementing Transport SiteManager, including both Construction and Materials functionality. Implementation of standard AASHTO software enables SiteManager to allow revising business practices to be more consistent with industry-accepted best practices. The revisions to the Standard Specifications are to conform to SiteManager’s methodology in defining its Material Codes and Pay Items.

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**CONTACT:** Questions or comments regarding this issuance should be directed to Randall J. Romer, P.E. of the Geotechnical Engineering Bureau at (518) 457-4714, [rromer@dot.state.ny.us](mailto:rromer@dot.state.ny.us).

**ITEM 203.12030017- PREFABRICATED VERTICAL DRAINS**

**DESCRIPTION**

This work shall consist of staking out, furnishing and installing Prefabricated Vertical Drains (PVD) to the depths and locations in accordance with the contract documents and as directed by the Engineer.

**MATERIALS**

Provide PVD having a continuous plastic drainage core wrapped in a non-woven geotextile material. Materials shall meet the requirements specified in §737-03 Prefabricated Vertical Drains.

**CONSTRUCTION DETAILS**

**General:**

Stake out the proposed locations of the drains within 150 mm of the locations indicated on the plans and take all reasonable precautions to preserve the stakes.

(Note: Verify location of existing utilities and instrumentation devices prior to installing the PVD's.)

**Installation:**

Install each drain in a nominal vertical position (within 20 mm per meter from vertical) from the top of drainage blanket to the depth or elevation shown in the contract documents or as ordered in writing by the Engineer. Provide the Engineer with a suitable means of determining the depth of the drain at any time, the final length of drain material used at each location, and the plumbness of the equipment.

Advance the drain using a protective mandrel or sleeve through the compressible soils to the required depth using vibratory or static methods and provide anchorage to keep the drain at the required depth as the mandrel or sleeve is withdrawn. Impact hammers are not permitted. Cut the drain at the top surface of the drainage blanket.

Install the drains in a sequence so as to minimize equipment travel over those previously installed. Replace drains that are installed out of their plan location by more than 150 mm or damaged by the Contractor's operations.

Splices are permitted with a minimum overlap of 150 mm as long as continuity of flow through the drain material is provided and the method is approved by the Engineer.

If a drain cannot be properly installed using conventional drilling procedures, such as pre-augering or spudding through the surface to a maximum depth shown on the plans, relocate the drain one-half (1/2) of the drain spacing to the right, left, up-station or down station. If each of the four (4) attempts are unsuccessful then an obstruction has been encountered which requires the Contractor to stop work at this location. The Engineer along with the Regional Geotechnical Engineer defines the extent of the obstruction by requiring the Contractor to install proposed adjacent drains.

**ITEM 203.12030017- PREFABRICATED VERTICAL DRAINS**

The Engineer determines if the obstructed drains are to be abandoned or installed to the required tip elevation.

No additional work is required for obstructed drains that are abandoned.

Install obstructed drains directed by the Engineer to be completed to the required tip elevation using drills or other necessary equipment under force account.

**METHOD OF MEASUREMENT**

This work will be measured as the number of meters of prefabricated vertical drains, as measured from the top of the drainage blanket to the tip of the drain, satisfactorily installed or abandoned in accordance with the contract documents and as directed by the Engineer.

**BASIS OF PAYMENT**

The unit price bid shall include the cost of furnishing all labor and materials necessary to properly stake out and satisfactorily complete the work, except those installed under force account.

**DESCRIPTION**

This work shall consist of furnishing, installing, maintaining, and removing Temporary Silt Fence with Straw Bales placed at locations shown on the plans or as directed by the Engineer. This work shall consist of temporary control measures during the life of the contract to control soil erosion. The temporary control provisions contained herein shall be coordinated with the permanent erosion control features specified elsewhere in the contract to the extent practical to assure economical, effective and continuous erosion control throughout the construction and post construction period.

**MATERIALS**

The fabricated fence assembly shall consist of Filter Fabric, Posts, Mesh Reinforcement Backing, and Fasteners for attachment.

**Filter Fabric:** Materials shall meet the requirements specified in §737-01G. Silt Fence.

**Posts:** Posts shall be straight, have a minimum length as shown on the plans, and shall be wood or steel, unless otherwise shown on the plans. Softwood posts shall be at least 75 mm in diameter or 38 mm x 89 mm. Hardwood posts shall be a minimum 38 mm x 38 mm. Steel posts shall be "T" or "L" shaped with a minimum weight of 1.5 kg/m.

**Mesh Reinforcement:** Reinforcement shall be poly-propylene with a max. 51 mm x 51 mm opening or a wire diameter of 2.03 mm welded wire mesh with a max. 51 mm x 102 mm opening. Either shall be a minimum 900 mm wide, unless otherwise shown on the plans.

**Fasteners:** Staples used for attachment shall have a 19 mm crown and a minimum 12 mm legs. Wire used for attachment shall be a minimum No. 16 AWG. "T" clips may be used for attachment with steel posts. Locking plastic tie/wraps used for attachment shall be ultraviolet resistant.

**Prefabricated Units:** The following prefabricated units may be used in lieu of the above assembly:

<u>Product</u>	<u>Manufacturer</u>	<u>Address</u>
Envirofence	Mirafi, Nicolon Corp.	Charlotte, N.C.
Econofence	Webtec, Inc.	Charlotte, N.C.
GTF-105	Exxon Chemical Co.	Atlanta, GA

An equal may be substituted for the above prefabricated units with the approval of the Regional Landscape Architect and the Engineer.

Straw bales shall be wire bound, with minimum dimensions of 450 mm square by 900 mm, a minimum weight of 21.7 kg, dry weight, as approved by the Engineer. The bales shall be reasonably clean and free of noxious weeds and deleterious materials.

Stakes shall be untreated wood, with a minimum dimension of 50 mm by 50 mm by 0.9 m, pointed on one end.

**CONSTRUCTION DETAILS**

The temporary silt fence with straw bales shall be installed in accordance with the details shown on the plans.

**Installation of posts:** Posts for the silt fence shall be imbedded 0.45 m (min.), or adequately anchored if in rock, with a maximum spacing of 2 m or as detailed in the plans.

**Fabric Anchoring:** Trenches shall be dug along the uphill side of the fence to anchor the fabric. The trench shall have a minimum cross section of 150 mm x 150 mm. The fabric shall be installed in the trench such that 150 mm is under the grade and 100 mm is across the bottom of the trench. The trench shall then be backfilled and hand tamped.

**Fabric Attachment:** The fabric shall be attached to each post in no less than four locations with approved fasteners. The fabric shall be attached to the top strand of mesh reinforcement at a minimum 0.6 m interval. When two sections of fabric adjoin each other, they shall be overlapped by 0.2 m, folded together, and attached at a post.

**Mesh Reinforcement:** The material is to be attached to each post at the top, bottom and two additional evenly spaced locations. Attachment is to be made with approved fasteners.

When two sections of fence are to adjoin each other, the overlap shall occur at posts and be no less than 0.3 m.

The straw bales shall be installed, including excavation, as shown on the plans and as directed by the Engineer. Two stakes shall be located on the center line of each straw bale, one at each end within 150 mm of the end, and driven firmly into the ground until the top of the stake is flush with the top of the bale. The first stake in each bale shall be driven towards the previously laid bale at an angle to force the bales together. Straw bales shall be oriented so the bindings are around the sides rather than the bottom of the bales. Wire bindings that are placed in contact with the soil soon disintegrate and may allow the bales to fall apart.

The schedule of work shall be as approved by the Engineer as to best insure coordination of this work with the other erosion control work specified elsewhere in the contract.

The silt fence with straw bales shall be maintained, in a good functional condition, by the contractor. All necessary work and materials to maintain the integrity of the installation shall be provided until earthwork construction and permanent erosion control features are in place, and show that they are functioning effectively.

The silt fence shall be inspected, by the contractor, weekly or after each significant rainfall to determine if the structure is functioning as designed. Periodic removal of sediment and debris buildup shall occur when "Bulges" develop in the fence or more than

**ITEM 209.02000010- TEMPORARY SILT FENCE WITH STRAW BALES**

150 mm of material has accumulated. Additional maintenance shall be performed as directed by the Engineer.

The Contractor shall immediately repair or replace defective or damaged portions of the fence or straw bales assembly. Torn or punctured fabric shall be repaired by the placement of a patch, on the up slope side, consisting of an additional layer of fabric over the damaged area. The patch shall have a minimum overlap of 0.5 m in all directions and be securely attached to the repaired fabric and reinforcement with approved fasteners.

The straw bales shall be removed and replaced when they have deteriorated beyond their usefulness so as not to block or impede storm drainage flow. The replacement of the straw bales shall be included in the bid price for this item.

The removal of the silt fence, accumulated soils, debris and restoration of the area shall be done at the completion of the contract or as ordered by the Engineer. The fence and associated materials shall become the property of the Contractor and removed from the site.

The straw bales shall also be removed from the site at the completion of the contract unless the Engineer directs that they be left in place.

**METHOD OF MEASUREMENT**

This work will be measured by the number of meters (measured horizontally between the extreme outer limits of the silt fence with straw bales installed in accordance to the plans) which was originally installed as shown on the plans or as ordered by the Engineer. No measurement will be made for maintenance, repairs, or replacement of defective material, seams, overlaps, or removal.

**BASIS OF PAYMENT**

The unit price bid per meter shall include the cost of furnishing all labor, materials, and equipment necessary to complete the work. Excavation shall be included in this item. Any maintenance, repair, or replacement of damaged or defective fence shall be done at no additional cost to the State. The Contractor will be paid 80% of the bid price upon the installation of the silt fence with straw bales and the remaining 20% upon the removal of the silt fence when no longer needed A.O.B.E.

**ITEM 209.11000011- INLET FILTER SEDIMENT CONTROL FOR NEW  
CATCH BASINS**

**ITEM 209.12000011- INLET FILTER SEDIMENT CONTROL FOR  
EXISTING CATCH BASINS**

**DESCRIPTION**

This work shall consist of installing, maintaining, and removing the sediment control filters as shown on the plans for all existing and proposed drainage structures shown in the contract documents.

Inlet filters, consisting of welded mesh and geotextile fabric, shall be installed to control sedimentation at new inlet drainage structures. Inlet filters of geotextile fabric alone shall be installed to control sedimentation at existing inlet drainage structures.

**MATERIALS**

The materials used to construct the sediment control filters as shown in the details and in the contract documents shall meet the requirements of the following:

The filter fabric shall conform to the requirements specified in §737-01A.  
Geotextile Bedding.

The 150 mm x 150 mm wire mesh used to support the silt protection screening shall be steel wire cloth with a diameter of 2.0 mm.

Coarse aggregate shall be Size Designation 1A in accordance with §703-02  
Coarse Aggregate.

**CONSTRUCTION DETAILS**

All construction of the sediment control filters shall be done in accordance to the specifications, details and A. O. B. E.

For new inlet structures, welded steel wire mesh shall be molded around the inlet frames and grates, or inlet structures, and extend a minimum of 150 mm down each side of the new structures. Geotextile fabric shall then be secured to the welded wire mesh. Coarse aggregate Size Designation 1A shall be placed against the inlet structures to hold the inlet filter in place.

For existing inlet structures, geotextile fabric shall be placed under the grates, over the curb pieces and extend a minimum of 150 mm beyond. Coarse aggregate Size Designation 1A shall be placed behind each curb piece and on the geotextile fabric to secure the fabric in place.

The Geotextile Filter Material shall be attached to the wire frame by using wire ties. The ties shall be placed every 300 mm on center A. O. B. E.

The purpose of the coarse aggregate will be to hold the filtering system in place and divert the runoff that occurs along the curb into the drainage grate. The placement of the coarse aggregate shall be done at the same time that the filtering system is installed.

**ITEM 209.11000011- INLET FILTER SEDIMENT CONTROL FOR NEW  
CATCH BASINS**

**ITEM 209.12000011- INLET FILTER SEDIMENT CONTROL FOR  
EXISTING CATCH BASINS**

The installation of the sediment control filters shall be done as soon as any excavation is started on the job that could result in erosion runoff into the existing or proposed drainage system and A. O. B. E.

It shall be the Contractor's responsibility to inspect the basins weekly and after each rainfall. The Contractor shall be required to clean all sediment that is accumulated in the drainage grate. The filtering system shall be cleaned by using methods approved by the Engineer.

The sediment material that is removed from the drainage grate shall be removed from the site. All material that accumulates shall be disposed of by the Contractor in accordance with any State and Federal requirements at the time of removal. The silt protection screening shall then be reinstalled in the same basin unless ordered to be disposed of by the Engineer. In the event that any part of the silt protection screening is determined unusable, the Contractor shall reconstruct or refurbish the silt protection at no additional cost to the State.

Inlet Filters shall be removed the same day as scheduled paving operations.

**METHOD OF MEASUREMENT**

The work will be measured as the number of inlet filter sediment control units that are installed.

**BASIS OF PAYMENT**

The unit price bid for each inlet filter sediment control unit shall include the cost of equipment, labor, materials, installation, cleaning and removal necessary to complete the work. The placement of the coarse aggregate shall be included in this item. The Contractor will be paid 50% of the bid price upon the installation of the silt protection screening units and the remaining 50% upon the removal of the units when no longer needed as determined by the Engineer.

**ITEM 209.11010010- FIELD BASIN SILT DIAPER**

**DESCRIPTION**

This work consists of furnishing, installing, maintaining and removing field basin silt diaper at the locations shown on the plans or where directed by the Engineer, in accordance with the requirements indicated herein.

**MATERIALS**

The following material shall be used in the fabrication of the silt diaper:

**Reinforcing Wire:** 50 mm x 50 mm PVC coated or galvanized steel 14 gauge wire fencing.

**Geotextile Fabric:** shall conform to the requirements specified in §737-01C. Geotextile Drainage.

**Stone fill:** equal to (light) mix meeting the requirements of §620-2.02.

**Wire Staples:** shall be #11 gauge wire and between 150 mm to 210 mm long.

**CONSTRUCTION DETAILS**

The Contractor shall place the field basin silt diaper in accordance to the specifications and details.

The one piece geotextile filter material shall be attached to the wire fence by using wire ties. The ties shall be placed evenly 0.3 m on center. The Contractor has the option either to staple the ground cloth (Geotextile) fabric to the ground or use the stone blend.

The purpose of the stone will be to act as a pre-filtering agent and hold to the filtering fabric in place and to prevent the fabric from moving. If staples are used to secure the Geotextile to the ground, they shall be placed every 450 mm.

The Contractor shall determine the height at which the relief drain holes are to be cut into the vertical section of the cylinder to which ponded water will drain.

The installation of the fabric basin silt diaper shall be done as soon as any excavation is started on the job and could result in erosion runoff into the existing or proposed drainage system and as ordered by the Engineer.

It shall be the Contractor's responsibility to inspect the basins weekly and after each rainfall. The Contractor shall be required to clean and remove all sediment that is accumulated in the field basin silt diaper. The filtering system shall be cleaned by using methods approved by the manufacturer.

The sediment material that is removed from the drainage grate shall be removed from the site. All material that accumulates shall be disposed of by the Contractor in accordance with any State and Federal requirements at the time of removal. The silt protection screening shall then be reinstalled on the basin unless ordered to be disposed of by the Engineer. In the event that any part of the silt protection screening is determined unusable, the Contractor shall reconstruct or refurbish the silt protection screening at no

**ITEM 209.11010010- FIELD BASIN SILT DIAPER**

additional cost to the State. The field basin silt diaper shall be removed after turf has been established or as ordered by the Engineer.

**METHOD OF MEASUREMENT**

The work will be measured as the number of fabric basin silt diaper units that are installed.

**BASIS OF PAYMENT**

The unit price bid for each fabric basin silt diaper unit shall include the cost of equipment, labor, materials, installation, cleaning and removal necessary to complete the work. The Contractor will be paid 50% upon the installation of the fabric basin silt diaper and the remaining 50% upon the removal of the units when no longer needed as determined by the Engineer.

**ITEM 209.12000010- SILT PROTECTION FOR DRAINAGE STRUCTURES**

**DESCRIPTION**

This work shall consist of installing, maintaining, and removing the protection screening as shown on the plans for all existing and proposed drainage structures shown in the contract documents.

**MATERIALS**

The material used to construct the silt protection screening as shown in the details and in the contract documents shall meet the requirements of the following:

**Filter Fabric:** The filter fabric shall conform to the requirements specified in §737-01A. Geotextile Bedding.

**Sand Bags:** The sand bags shall have a minimum weight of 4.5 kg.

**Lumber:** The lumber shall be a construction grade pine in accordance with §712-13.

**Nails:** All nails used shall be galvanized.

**Wire Mesh:** The 150 mm x 150 mm nominal wire mesh used to support the silt protection screening shall be steel wire cloth with a wire diameter of 2.03 mm.

**CONSTRUCTION DETAILS**

All construction of the silt protection screening shall be done in accordance to the specifications, details and A.O.B.E.

The Geotextile Filter Material shall be attached to the wire frame by using wire ties. The ties shall be placed every 0.3 m on center A.O.B.E.

The purpose of the sand bags will be to hold the filtering system in place and divert the runoff that occurs along the curb into the drainage grate. The placement of the sand bags shall be done at the same time that the filtering system is installed.

The installation of the silt protection screening shall be done as soon as any excavation is started on the job that could result in erosion runoff into the existing or proposed drainage system and A.O.B.E.

It shall be the Contractor's responsibility to inspect the basins weekly and after each rainfall. The Contractor shall be required to clean all sediment that is accumulated in the drainage grate. The filtering system shall be cleaned by using methods approved by the Engineer.

The sediment material that is removed from the drainage grate shall be removed from the site. All material that accumulates shall be disposed of by the Contractor in accordance with any State and Federal requirements at the time of removal. The silt protection screening shall then be reinstalled in the same basin unless ordered to be disposed of by the Engineer. In the event that any part of the silt protection screening is determined unusable, the Contractor shall reconstruct or refurbish the silt protection screening at no additional cost to the State.

**ITEM 209.12000010- SILT PROTECTION FOR DRAINAGE STRUCTURES**

**METHOD OF MEASUREMENT**

The work will be measured as the number of silt protection screening units that are installed.

**BASIS OF PAYMENT**

The unit price bid for each silt protection screening unit shall include the cost of equipment, labor, materials, installation, cleaning and removal necessary to complete the work. The placement of the sand bags and cones shall be included in this item. The Contractor will be paid 50% of the bid price upon the installation of the silt protection screening units and the remaining 50% upon the removal of the units when no longer needed as determined by the Engineer.

## ITEM 209.15010024- TURBIDITY CURTAIN

### DESCRIPTION

This work shall consist of furnishing, installing, repairing, maintaining, and removing turbidity curtains in accordance with the contract documents and as directed by the Engineer.

### MATERIALS

The turbidity curtain shall be a commercially available, preassembled system, including a geotextile, flotation system, bottom weight, and anchoring and securing mechanism. If assembled in panels, it shall include a secure mechanism for joining panels together.

Geotextiles shall conform to the requirements specified in §737-01F. Turbidity Curtain.

Hemmed pockets shall be sewn or heat bonded to contain flotation material, bottom weights, and for anchor lines. The flotation material shall maintain buoyancy if punctured or cut. The bottom weight shall be sufficient to hold the curtain in a vertical position. For sites not subject to tidal or heavy wave action, the curtain shall be capable of molding to conform to bottom contours so that suspended sediment is prevented from escaping underneath the curtain.

Anchorage lines shall be provided of sufficient strength and number to support the curtain and maintain it in position under normally expected conditions. End anchors shall be provided, with intermediate anchor points (for stakes or anchors) such that unanchored spans do not exceed 30 m, sufficient to maintain the turbidity curtain in place. Where the turbidity curtain is constructed in panels, anchor-line and shackle connections securing the panels together shall be sufficient for normally expected current, wind, or wave conditions.

### CONSTRUCTION DETAILS

#### A. Systems Requirements.

1. Perform all work in accordance with Section 209 except as modified herein.
2. For sites not subject to tidal or heavy wave action the curtain height shall provide sufficient slack to allow the top of the curtain to rise to the maximum expected high-water level (including waves) while the bottom maintains continuous contact with the bottom of the water body. The bottom edge of the curtain shall have a weight system capable of holding the bottom of the curtain down and conforming to the bottom of the water body, so as to prohibit escape of turbid water under the curtain.
3. For sites subject to tidal or heavy wave action, the curtain height shall provide sufficient slack to allow the top of the curtain to rise to the maximum expected high-water level (including waves) while the bottom remains 300 mm above the bottom. The weight system shall hold the lower edge of the curtain in place so as to allow 300 mm of clearance above the bottom at mean low water, so that the curtain does not stir up sediment by repeatedly striking the bottom.
4. If constructed in panels, panels shall be connected in such a manner as to prevent suspended particles passing through joints. Load lines shall be connected so as to develop the full strength of the line across the joint.

**ITEM 209.15010024- TURBIDITY CURTAIN**

5. Flotation material shall be arranged so as to be flexible and to provide continuous support.
6. The flotation and curtain top shall be such as to provide a minimum of 100 mm of freeboard along the entire length of the curtain, to prohibit escape of turbid water over the top.

**B. Installation**

1. The turbidity curtain shall be installed as shown in the contract documents in accordance with the manufacturer's instructions. It shall be placed as close to the site of disturbance as possible without interfering with construction activity.
2. Turbidity curtain shall be installed and maintained in a manner that precludes entry of equipment, other than hand-held equipment or boats, to the water body outside the protected area.
3. The fully assembled turbidity curtain shall be prepared for installation by being furled and tied at intervals of 1.5 m for the length of the curtain. It shall be placed and secured in the furled condition, then released to allow the bottom edge to sink.
4. At sites subject to tidal or heavy wave action, adjustment lines may be used to achieve the required height of the curtain.
5. At sites not subject to tidal or heavy wave action, excess curtain material shall lay on the bottom, away from construction activity.
6. Turbidity curtain shall be placed as nearly as possible parallel to current flow. It shall not be deployed across a flowing water course.
7. The ends of the installation shall be anchored securely well up the bank. Intermediate anchors of a type and number sufficient to hold the curtain in place under expected conditions shall be placed, and firmly fastened to the top of the curtain assembly. Maximum spacing between anchorage points shall not exceed 30 m.
8. In situations with flow velocities that exceed 1.5 m/sec use a redirection barrier. The redirection barrier shall be installed prior to installation of the turbidity curtain wherever possible, and care should be exercised in order to minimize disturbance of the bottom of the water body during installation of the redirection barrier.

**C. Maintenance**

1. The turbidity curtain shall be inspected daily, with additional monitoring of performance during storms or significant flow events.
2. Any visible plume of cloudy water passing beyond the curtain from the enclosed construction area shall constitute inadequate performance of the turbidity curtain. The Contractor shall immediately modify, adjust, or repair any portion of the turbidity curtain to correct inadequate performance.
3. The turbidity curtain shall remain in place until the protected construction activities have ceased and the turbidity of the water enclosed is reduced to acceptable levels. The curtain shall be removed within 72 hours of this condition being met.

**D. Removal**

1. The turbidity curtain shall be removed in such a way as to minimize release of sediment.

**ITEM 209.15010024- TURBIDITY CURTAIN**

2. Sediment behind the curtain shall be removed before removal of the curtain, if directed by the Engineer. If so, any resulting turbidity shall be allowed to settle before removal proceeds.

**METHOD OF MEASUREMENT**

This work will be measured in meters, measured to the nearest whole meter, for turbidity curtain satisfactorily installed, or reinstalled.

**BASIS OF PAYMENT**

The unit price bid shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work, including redirection barrier and the cost of removal associated with the removal of accumulated sediment.

Progress payments of fifty percent of the price bid will be paid after installation, and the remaining percentage will be paid when the turbidity curtain is removed.

Payment will not be made for work which is attributed to the Contractor's negligence, carelessness or failure to install temporary or permanent controls in accordance with the contract documents.

- ITEM 605.24100017- PREFABRICATED COMPOSITE EDGE DRAIN  
(UNDERDRAIN FILTER MATERIAL BACKFILL)**  
**ITEM 605.24110017- PREFABRICATED COMPOSITE EDGE DRAIN  
(EXISTING MATERIAL BACKFILL)**

**DESCRIPTION**

The work consists of furnishing and installing an approved Prefabricated Composite Edge Drain (PCED) as specified at the locations shown on the plans or specified by the Engineer. This work includes excavating and backfilling the trench.

Prior to installation, furnish the Engineer with copies of the manufacturer's literature with details and installation requirements for the PCED. In addition, provide information on the type of trenching equipment to be used and the proposed procedure for installation of the PCED and outlets.

Provide a manufacturer's representative experienced in the installation of PCED on the project during the start-up of installation of the PCED and until such time as trouble free installation is achieved to the satisfaction of the Engineer.

**MATERIALS**

Materials shall meet the requirements specified in §737-06 Prefabricated Composite Edge Drains.

A. **General**

Provide PCED that is a flexible product consisting of a geotextile bonded to or tightly wrapped around an internal supporting core.

Provide PCED that is resistant to deterioration from salts, road oils, fuels and other deleterious substances encountered in the type of application.

B. **Backfill Material**

Provide backfill material meeting the following requirements:

For existing material backfill, provide suitable material.

For underdrain filter material backfill, provide material that meets the requirements of Item 605.1001 M, Underdrain Filter, Type II.

C. **Fittings**

Provide fittings and materials necessary to make splices and connections of the PCED to outlet piping that conform to the manufacturers requirements. Design all fittings and materials to prevent soil intrusion into the PCED or outlet piping.

Provide fittings that allow for outletting the continuous PCED in a sag area; i.e., a tee; and for outletting the individual run length segments as shown in the contract documents or as ordered by the Engineer.

In cases where the PCED is terminated without an outlet, provide a fitting to prevent soil intrusion into the end of the PCED.

- ITEM 605.24100017- PREFABRICATED COMPOSITE EDGE DRAIN  
(UNDERDRAIN FILTER MATERIAL BACKFILL)
- ITEM 605.24110017- PREFABRICATED COMPOSITE EDGE DRAIN  
(EXISTING MATERIAL BACKFILL)

### **CONSTRUCTION DETAILS**

Excavate a trench in the location and to the limits shown in the contract documents or as directed by the Engineer.

Where existing material backfill is used, place the PCED abutting the side of the trench closest to the centerline of pavement (the inside of the trench). Where underdrain filter material backfill is used, place the PCED abutting the side of the trench farthest away from the centerline of pavement (the outside of the trench). Place the PCED in an upright vertical position so that it has no bends, crimps or sags in its final position. Be aware that many PCED's provide drainage on only one side. Place the PCED so the side that provides drainage faces the pavement.

Backfill and compact the trench. Where underdrain filter material backfill is used, place the backfill in one lift. Where existing material backfill is used, place backfill in three approximately equal lifts. For existing material backfill, perform the trenching, PCED placement, and first lift backfill and compaction operations in one continuous operation.

Compact each lift with at least two passes of an approved vibrating pad, plate, or drum-type compactor. Other vibratory compaction systems may be used as approved by the Engineer. Remove the surplus excavated material from the work area and dispose of it as required in §203-3.08, Disposal of Surplus Excavated Materials.

For any given PCED run, install outlets no later than 48 hours after PCED placement. Do not backfill the outlet trench until the installation of the fitting and connection to the outlet pipe is inspected and approved by the Engineer. Backfill all trenches before the end of the workday.

Install splices required in the PCED prior to placement of the PCED. Install splices and connections in the PCED in accordance with the manufacturer's recommendations to ensure continuity of the PCED.

During all periods of shipment and storage, keep the PCED wrapped and protected from direct exposure to sunlight, mud, dirt and debris. Repair or replace any damaged portion of the PCED to the satisfaction of the Engineer. Payment will not be made for repairing or replacing the damaged portions caused by the Contractor's operations.

Backfill and compact all portions of the trench which are overcut in length to facilitate the operation of the trench cutting equipment in accordance with the same requirements as for the trench containing the installed PCED.

### **METHOD OF MEASUREMENT**

The quantity of the PCED to be paid will be the number of linear meters satisfactorily installed and approved by the Engineer.

ITEM 605.24100017- PREFABRICATED COMPOSITE EDGE DRAIN  
(UNDERDRAIN FILTER MATERIAL BACKFILL)  
ITEM 605.24110017- PREFABRICATED COMPOSITE EDGE DRAIN  
(EXISTING MATERIAL BACKFILL)

**BASIS OF PAYMENT**

Include in the unit price bid per linear meter the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work, including excavation, installation, underdrain filter material, backfilling and compacting, repair of overcuts, and removal of surplus excavated material. Payment will not be made for repairs of damage caused by the Contractor's operations.

Payment for outlets are not included, and will be made under the appropriate, separate pay items.

**ITEM 605.60000017- TIRE SHRED SAMPLING & COLLECTION POINT**

**DESCRIPTION**

The work consists of furnishing and installing Tire Shred Sampling Collection Point(s) at locations shown on the plans or established by the Engineer.

A Tire Shred Sampling Collection Point is a basin used to collect, sample and monitor the quality of the water that migrates through the tire shred embankment.

The following figures are included as part of this specification for reference and the detailing of the Tire Shred Sampling Collection Point:

- |          |   |
|----------|---|
| Figure 1 | Tire Shred Sampling Collection Point Detail |
| Figure 2 | Outlet Boot Connection Details              |
| Figure 3 | Outlet Boot Fabrication Detail              |

**MATERIALS**

- A. **Underdrain Filter**  
Provide underdrain filter conforming to the provisions of Section 605-Underdrains, §605-2.02 Granular Filter Materials, B. Underdrain Filter Type II.
- B. **Geotextile**  
Provide geotextile stabilization conforming to the requirements specified in §737-01E. Geotextile Stabilization.
- C. **Cushion Sand**  
Provide cushion sand conforming to the provisions of Section 703 - Aggregates, §703-06, Cushion Sand.
- D. **Concrete**  
Provide Class A concrete conforming to the provisions of Section 501 - Portland Cement Concrete - General.
- E. **PVC Pipe**  
Provide PVC pipe conforming to the provisions of Section 706 - Concrete, Clay and Plastic Pipe, §706-15, PVC Drain Pipe System.
- F. **Gaskets**  
Provide gaskets conforming to the provisions of ASTM D23212.

**CONSTRUCTION DETAILS**

- A. **General**  
Construct Tire Shred Sampling Collection Point(s) at the locations indicated on the Contract Plans. The collection points outside of the tire shred embankment are the control sections. Construct these collection points so that their tops are 125 mm ± 25 mm below existing ground surface. The collection points within the limits of the tire shred embankment are the monitoring sections. Construct these collection points so that they are immediately beneath the bottom of the geotextile underdrain that is used to surround the tire shred course.

**B. PVC Pipe System Installation**

Install a polyvinyl chloride (PVC) pipe system in a trench leading from the center of the collection point to the face of the side slope as shown on the tire shred sampling collection point detail (Figure 1). Supply all pipes and fittings with gasket type joints. In no case will glues, solvents or adhesives be allowed to assemble the PVC pipe system by installing a temporary plug in the end of the discharge pipe and filling the completed PVC pipe system with potable water for a period of not less than 24 hours. Upon completion of the leak test, repair any leaks and then retest the PVC pipe system at no additional cost to the State. Once a successful leak test has been obtained, remove the water from the PVC pipe system.

Backfill the trenches with the same soil that was excavated from the trenches, except no material greater than 50 mm in size will be allowed in contact with the PVC pipe system. Compact the backfill in conformance with the provisions of §203-3.15 Fill and Backfill and Structures, Culverts, Pipes, Conduits and Direct Buried Cables. Cast the concrete collar around the inlet to the PVC pipe system as shown on the tire shred sampling collection point detail (Figure 1). The top of the cast-in-place collar will have a slope of 5% towards the collection point inlet.

**C. Cushion Sand Installation**

Place a 150 mm thick layer of cushion sand as shown on the tire shred sampling collection point detail (Figure 1). The layer of cushion sand will have a slope of 5% toward the center of the collection point inlet. Compact the layer of cushion sand conforming to the provisions of §203-3.12 Compaction and to a density of not less than 90 percent of Standard Proctor Maximum.

**D. High Density Polyethylene (HDPE) Liner Installation**

Place a non-reinforced high density polyethylene (HDPE) liner on and flush to the prepared layer of cushion sand so that the perimeter of the liner extends a minimum of 0.3 meters beyond the edge of the basin. Construct an outlet boot integral to and locate it in the center of the liner. Fabricate the outlet boot from the same materials as the liner using extrusion welding. The dimensions of the outlet boot and the location of the extrusion welds are shown in the outlet boot fabrication detail (Figure 3). The outlet boot shall be attached to the liner using extrusion welding as shown on the outlet boot fabrication detail (Figure 3). In no case will glue, solvents or adhesives be used to attach the outlet boot to the liner. Slope the outlet boot inside the inlet of the drainage system and hold it in place with a retainer ring machined from PVC pipe as shown on the outlet boot connection detail (Figure 2). In no case will glues, solvents or adhesives be used to attach the outlet boot to the inlet of the drainage system.

**E. Geotextile and Underdrain Backfill Installation**

After placing the HDPE liner, cover it with a layer of geotextile undercut. Fill the collection point basin with underdrain filter. The first lift of backfill shall be 200 mm thick. Subsequent lifts shall be no greater than 200 mm thick. Compact the underdrain filter conforming to the revisions of §605-3.02, Underdrain Filter.

**ITEM 605.60000017- TIRE SHRED SAMPLING & COLLECTION POINT**

Take care not to damage the HDPE liner during compaction. Any damage must be repaired at no cost to the State.

For the collection points being used as control sections, place a layer of geotextile underdrain on top of the underdrain backfill prior to normal embankment construction.

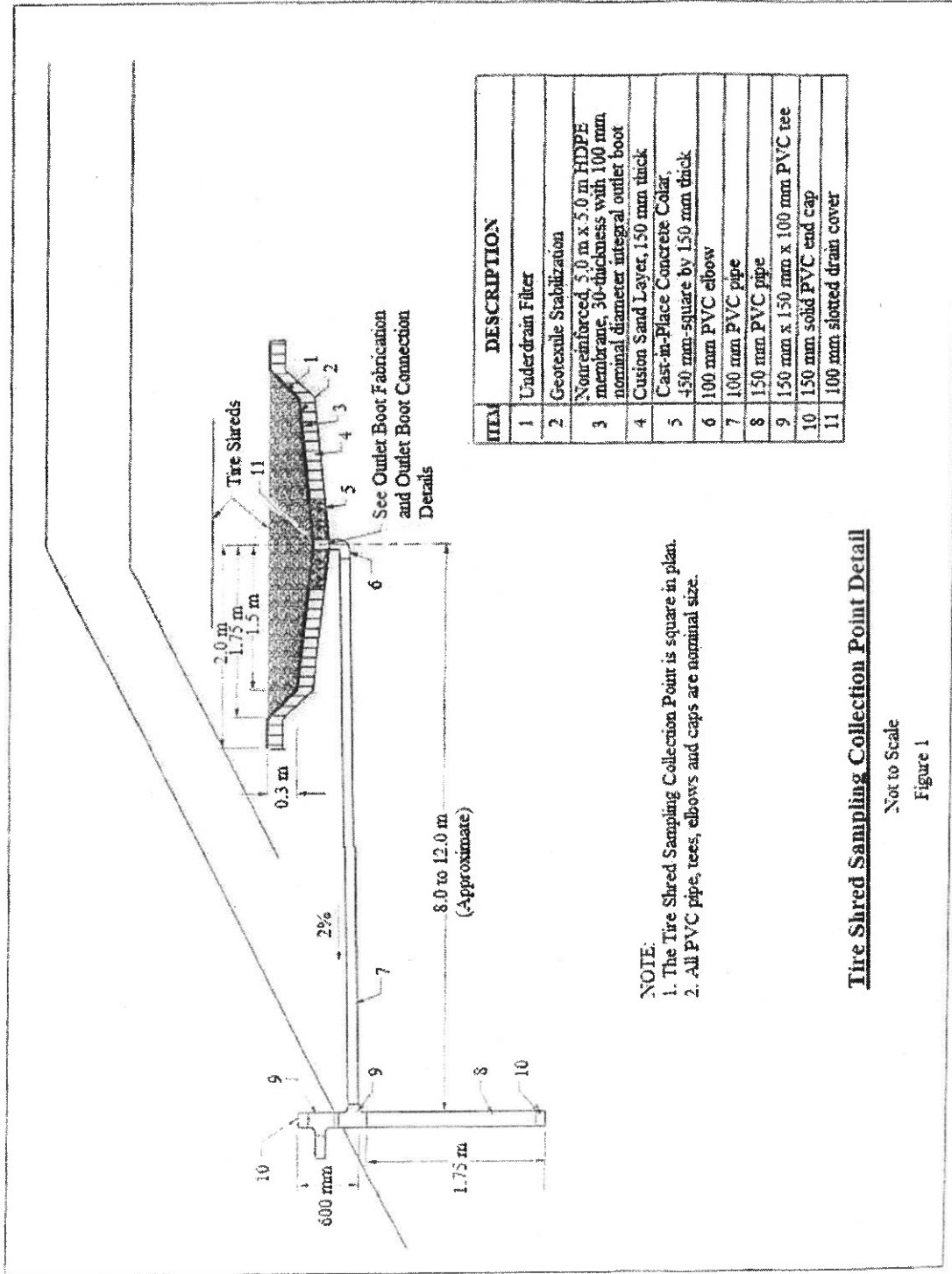
**METHOD OF MEASUREMENT**

The quantity of Tire Shred Sampling Collection Points to be paid is the number of each collection point installed, leak tested and accepted by the Engineer.

**BASIS OF PAYMENT**

Include in the unit price bid per collection point the cost of furnishing all labor materials and equipment necessary to satisfactorily complete the work in conformance with the provision of the Tires Shred Sampling Collection Point details and specifications.

**ITEM 605.60000017- TIRE SHRED SAMPLING & COLLECTION POINT**

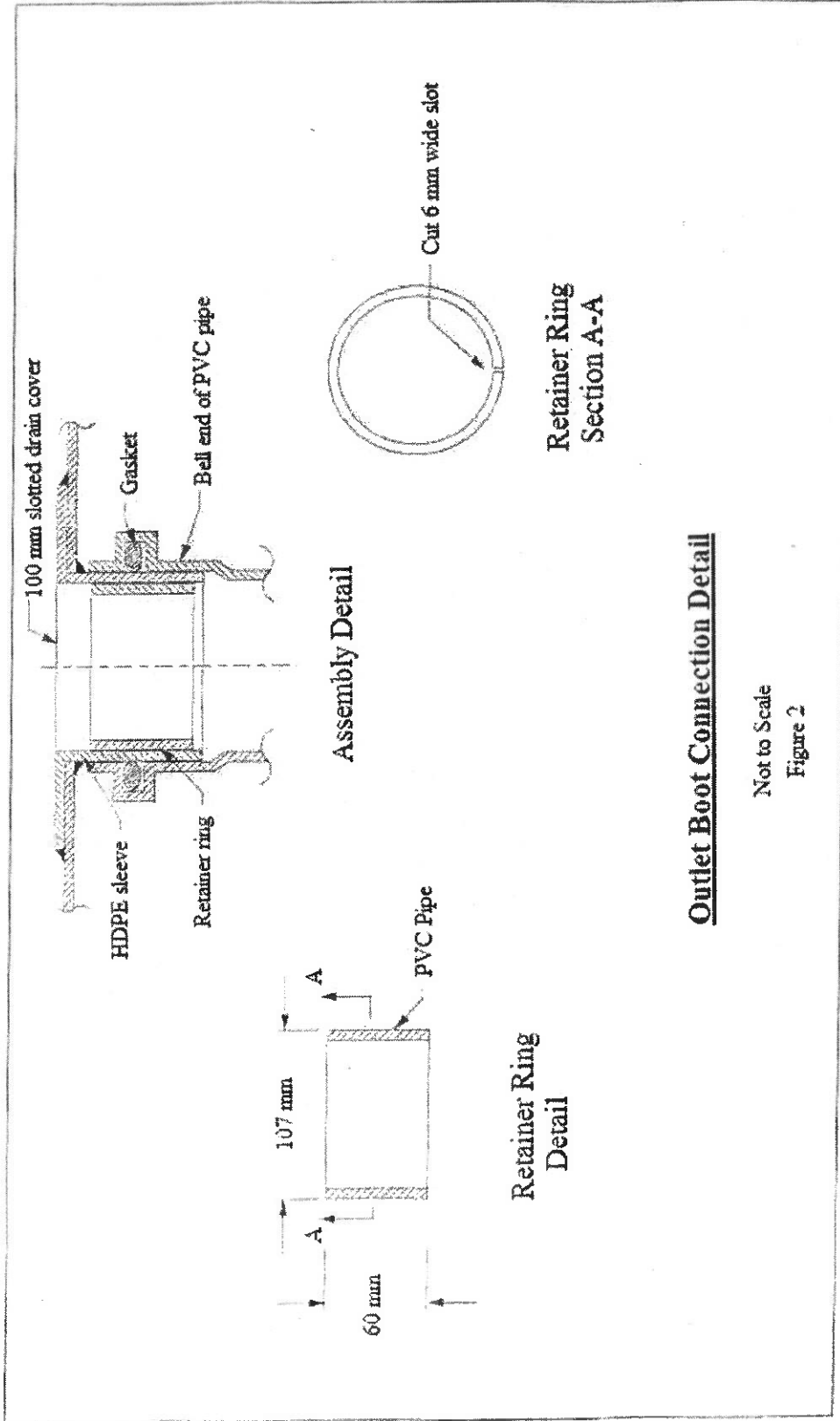


ITEM	DESCRIPTION
1	Underdrain Filter
2	Geotextile Stabilization
3	Nonreinforced, 5.0 m x 5.0 m HDPE membrane, 30-thickness with 100 mm nominal diameter integral outlet boot
4	Custom Sand Layer, 150 mm thick
5	Cast-in-Place Concrete Collar
6	150 mm square by 150 mm thick
7	100 mm PVC elbow
8	100 mm PVC pipe
9	150 mm x 150 mm x 100 mm PVC tee
10	150 mm solid PVC end cap
11	100 mm slotted drain cover

NOTE:  
 1. The Tire Shred Sampling Collection Point is square in plan.  
 2. All PVC pipe, tees, elbows and caps are nominal size.

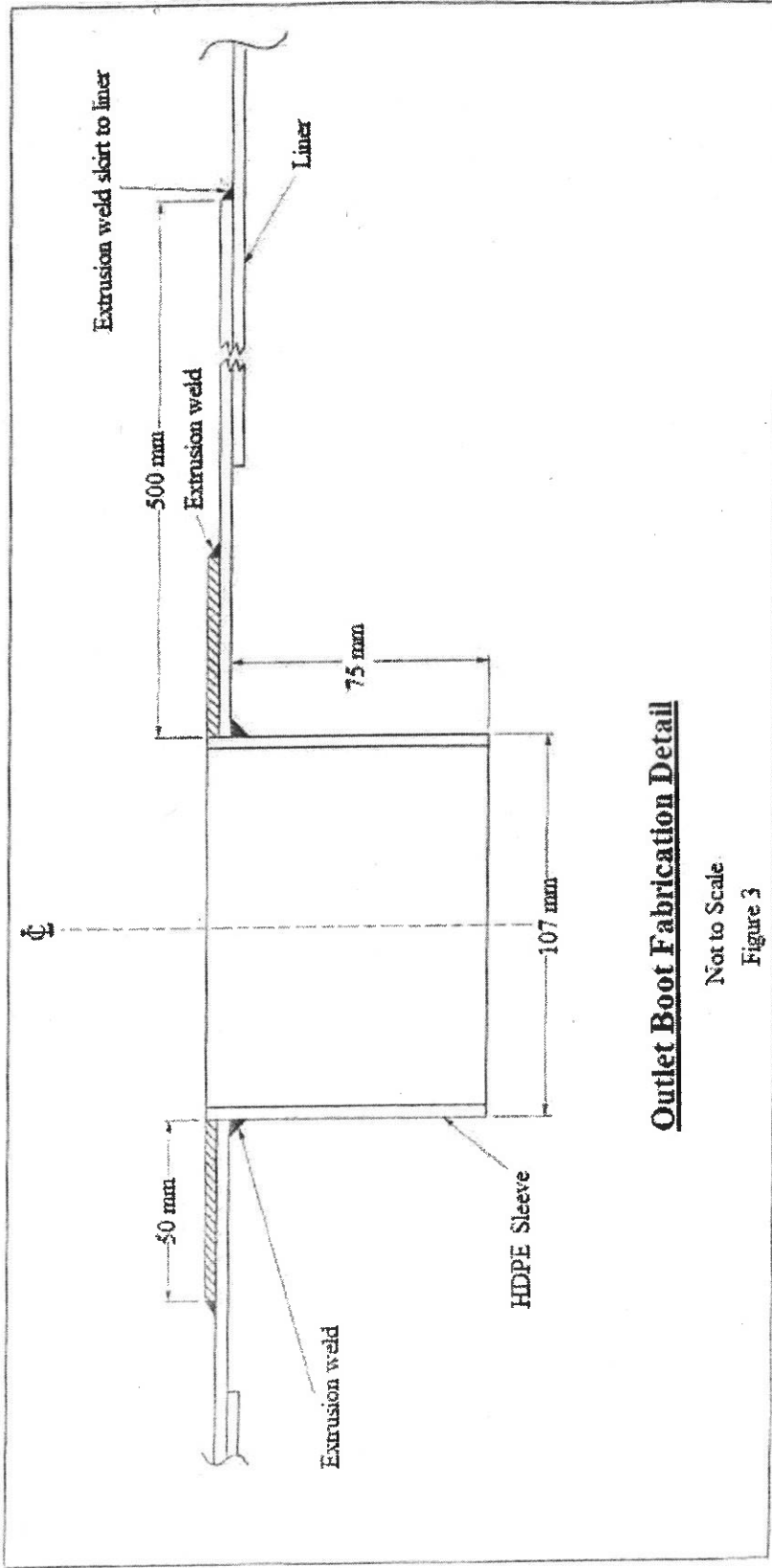
**Tire Shred Sampling Collection Point Detail**

Not to Scale  
 Figure 1



Outlet Boot Connection Detail

Not to Scale  
Figure 2



**Outlet Boot Fabrication Detail**

Not to Scale

Figure 3

**ITEM 605.97000017- INSTALLING WEEP HOLE(S) IN EXISTING WALL**

**DESCRIPTION**

The work consists of coring holes through an existing wall and installing weep pipes at locations shown on the plans or established by the Engineer.

**MATERIALS**

Provide Schedule 40 Polyvinyl Chloride (PVC) pipe or as approved by the Engineer.

Provide Geotextile Drainage conforming to the requirements specified in §737-01C.  
Geotextile Drainage.

Provide Portland cement conforming to the requirements of §701-01, Type 1 or 2 of the Standard Specifications.

Provide water conforming to §712-01 of the Standard Specifications.

**CONSTRUCTION DETAILS**

Core hole(s) through the wall at the location(s) shown on the contract plans or as directed by the Engineer. Wrap Geotextile around one end of the pipe and glue to the out side of the pipe with a minimum 150mm overlap. Place Geotextile wrapped end of the pipe through the cored hole and into the backfill to the depth shown on the plans or as directed by the Engineer. Grout the annular space between the pipe and cored wall.

**METHOD OF MEASUREMENT**

The quantity of weep holes to be paid is the number of linear meters of pipe placed, measured from the face of the wall to the backfill end of the pipe.

**BASIS OF PAYMENT**

Include in the unit price bid per linear meter the cost of furnishing all labor materials and equipment necessary to satisfactorily complete the work.