

Chapter 11 - Structural Repairs

SECTION 06

**SCOUR / EROSION  
REPAIRS  
(SR-SCOUR)**

GENERAL NOTES

1. It is preferable to place a single layer of grout bags instead of stacking. Place filter fabric under all grout bags including a single layer of bags.
2. If bags are stacked, overlap the joints of the preceding layer.
3. If possible, bags should be placed so that the top of the bag is at or below the stream bottom. (When filling a scour hole, keep the top of the bag at or below the stream bottom).
4. If the stream bed consists of soils that allow for settlement of the grout bags, do not tie the bags together. If the stream bed consists of a hard stiff soil/clay or an erodable rock, which the grout bags will never be able to settle, tie the grout bags together so they do not get washed away.
5. Grout bags should be no larger than 3' wide, 4' long and 1' thick.
6. The bag placed directly in front of the nose of the pier should be the width of the exposed portion of the pier. Similarly, make sure no gaps form between the bags and the front face of the footing.
7. Do not overfill the bags or allow grout to be poured between the seams of two bags.

\* FOR OFFICE USE ONLY \*

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DATE: 06/28/2017
VERSION
1.0

STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
GROUT BAG INSTALLATION GENERAL NOTES
DETAIL NO. SR-SCOUR-101 <span style="float: right;">SHEET <u> 1 </u> OF <u> 1 </u></span>

STRUCTURAL REPAIRS

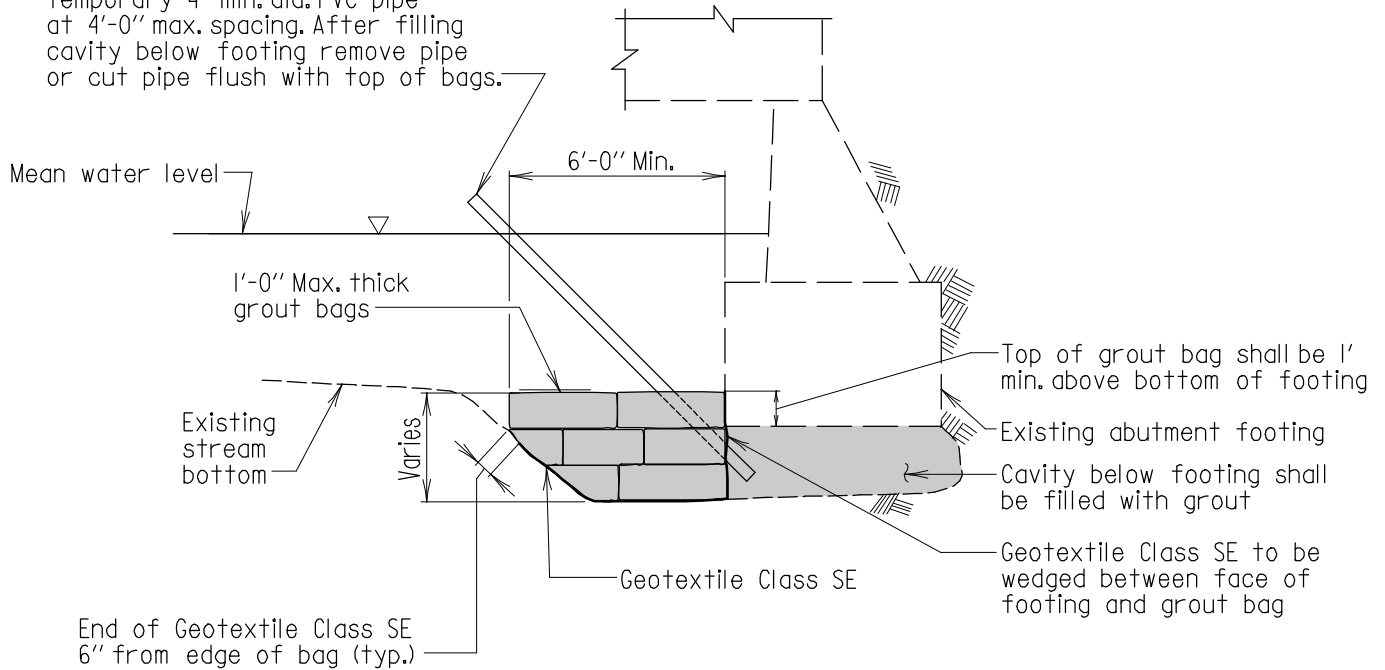
GENERAL NOTES

1. Depending on the depth of the undermining, place one grout bag or stack several layers of grout bags along the face of the abutment or pier in front of the undermined area. If bags are stacked, bags in successive rows and tiers shall be staggered.
2. Once the vent/fill pipes have been installed and the bags are filled, pump the grout into the undermined area until grout appears in the top of adjacent vent pipes. Cut or remove the vent/fill pipes flush with the top of the bags after the pumping operation is complete.
3. Adequate venting of the water to be displaced in the undermined area is important. The water must be able to escape when it is displaced by the grout pumped into the cavity. A 4' maximum spacing of the vent/fill pipes is recommended.
4. It is important to keep the nozzle buried in the grout during the pumping. This is to reduce the amount of mixing of the grout and the water to be displaced.
5. Debonding jackets should be placed around piles to prevent the grout from adhering to the piles if the exposed height is 3'-0" or greater. This is to prevent the additional weight of the grout from reducing the piles capacity.
6. If possible, clean out unstable material along the bottom of the undermined area prior to filling with grout.

<p style="text-align: center; margin: 0;"><b>APPROVAL</b></p> <p style="margin: 0;"><i>Gene C. [Signature]</i> DIRECTOR OFFICE OF STRUCTURES</p> <p style="margin: 0;">DATE: 06/28/2017</p>	<p>STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES</p> <p>GROUT BAG INSTALLATION FOR UNDERMINED AREAS AT PIERS AND ABUTMENTS GENERAL NOTES</p>
<p style="text-align: center; margin: 0;"><b>VERSION</b></p> <p style="text-align: center; margin: 0;">1.0</p>	<p style="margin: 0;">DETAIL NO. SR-SCOUR-102</p> <p style="text-align: right; margin: 0;">SHEET <u>  1  </u> OF <u>  1  </u></p>

STRUCTURAL REPAIRS

Temporary 4" min. dia. PVC pipe at 4'-0" max. spacing. After filling cavity below footing remove pipe or cut pipe flush with top of bags.



SECTION THRU ABUTMENT  
Scale:  $\frac{3}{16}'' = 1'-0''$

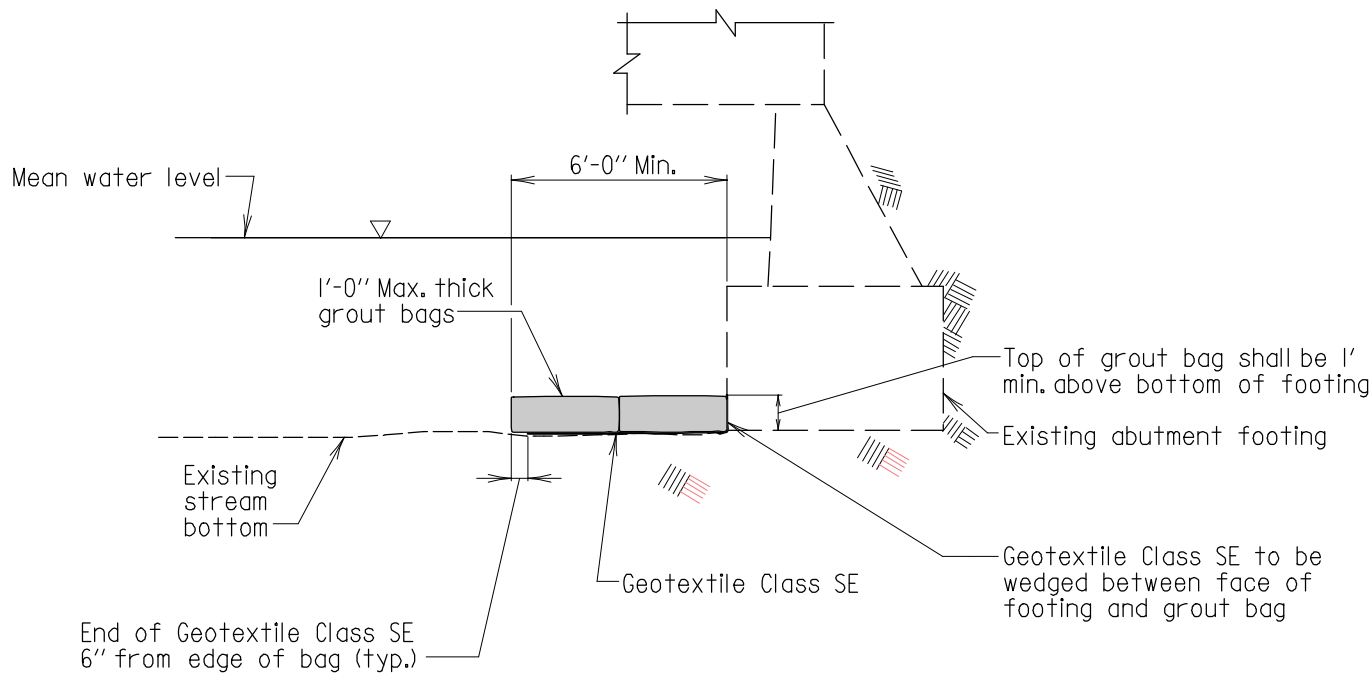
Notes:

1. Stack bags as required. Joints between bags in successive rows and tiers shall be staggered.
2. Refer to General Plan for any excavation requirements.
3. Place top bag flush with face of footing.
4. If on piles, place debonding material around piles with greater than 3'-0" exposure.
5. All bags shall be 1 ft. max. thick, 3 ft. max. wide, and 4 ft. max. length.
6. Remove debris before installation of bags.

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DETAIL NO. SR-SCOUR-103
SHEET <u>1</u> OF <u>7</u>

STRUCTURAL REPAIRS



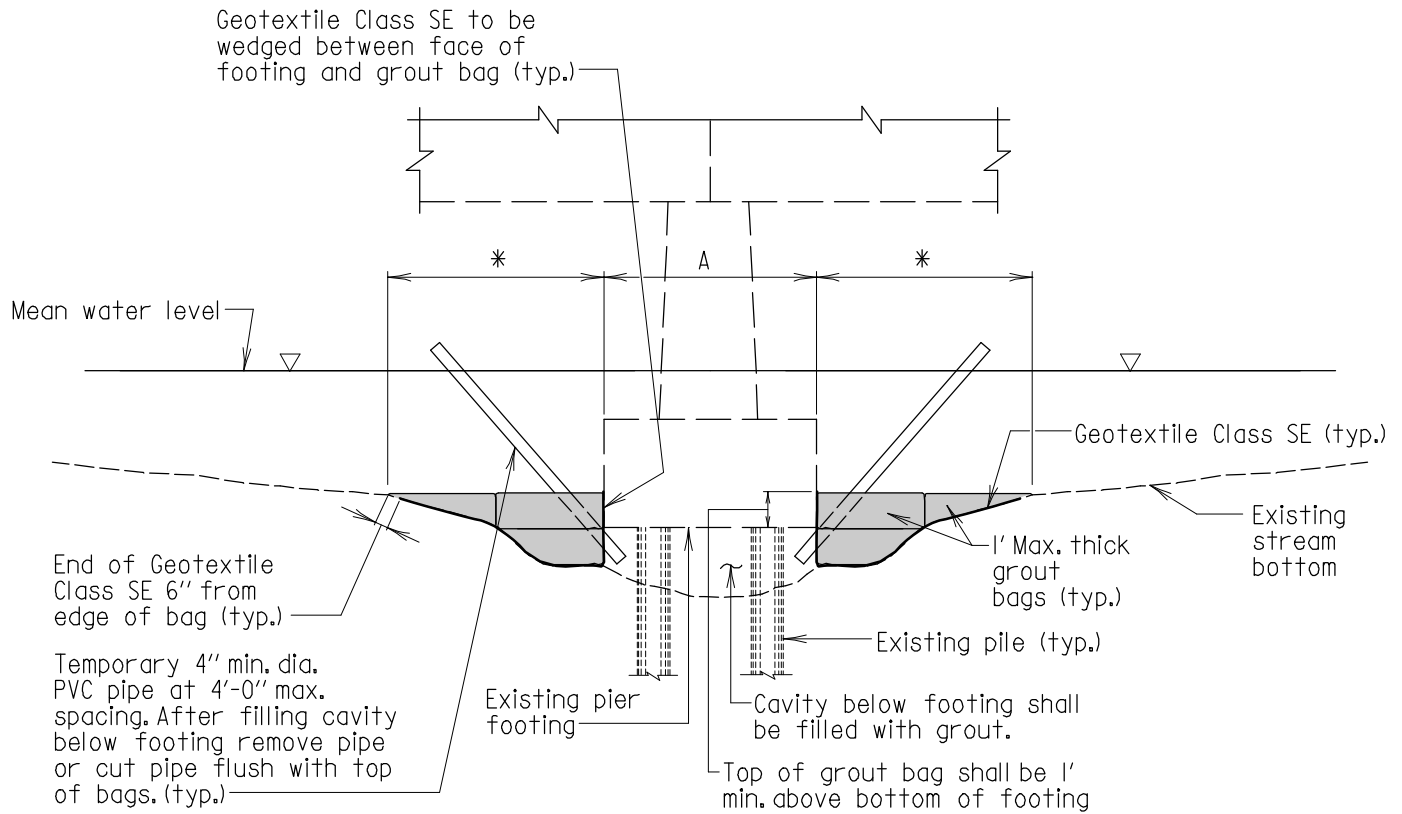
SECTION THRU ABUTMENT  
 Scale:  $\frac{3}{16}'' = 1'-0''$

- Notes:
1. Refer to General Plan for any excavation requirements.
  2. Place bags flush with face of footing.
  3. All bags shall be 1 ft. max. thick, 3 ft. max. wide, and 4 ft. max. length.

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DETAIL NO. SR-SCOUR-103
SHEET <u>2</u> OF <u>7</u>

STRUCTURAL REPAIRS



SECTION THRU PIER - ON PILES  
 Scale:  $\frac{3}{16}'' = 1'-0''$

\*2A or 6'-0", whichever is greater, with a maximum of 12'-0".

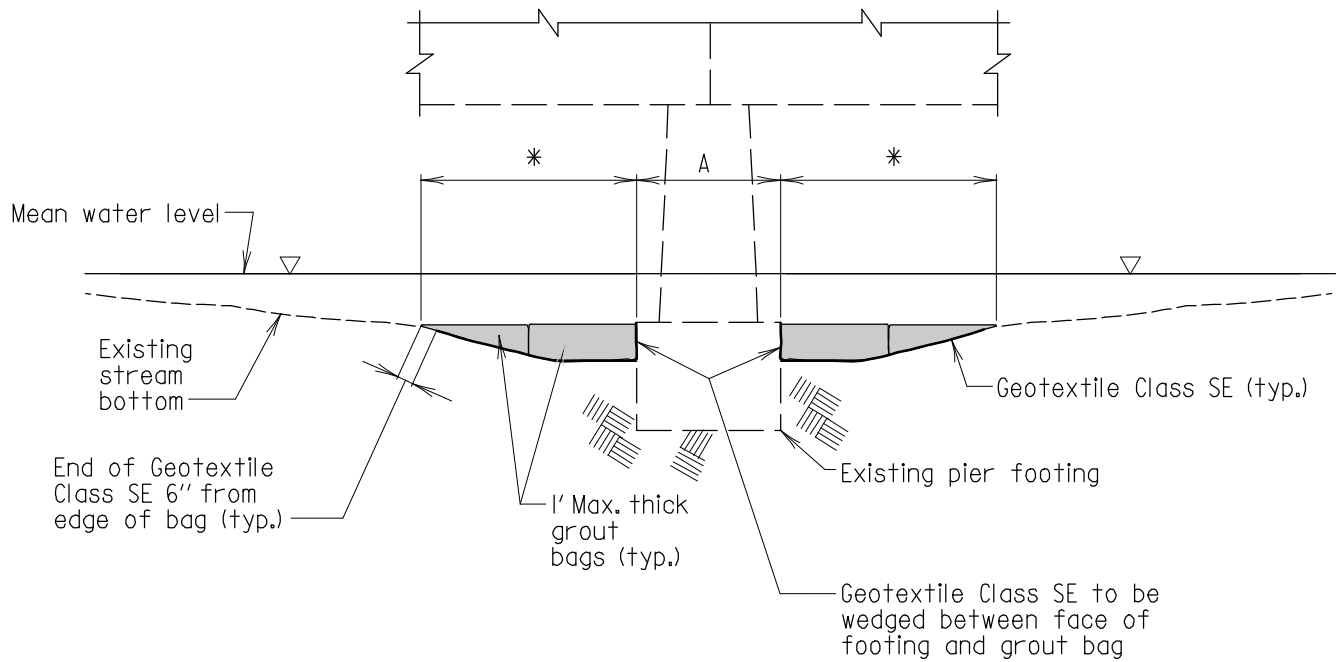
Notes:

1. Stack bags as required. Joints between bags in successive rows and tiers shall be staggered.
2. Refer to General Plan for any excavation requirements.
3. Place top bag flush with face of footing.
4. If on piles, place debonding material around piles with greater than 3'-0" exposure.
5. All bags shall be 1 ft. max. thick, 3 ft. max. wide, and 4 ft. max. length.
6. Remove debris before installation of bags.

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STRUCTURAL REPAIRS




SECTION THRU PIER

Scale:  $\frac{3}{16}'' = 1'-0''$

\* 2A or 6'-0'', whichever is greater, with a maximum of 12'-0''.

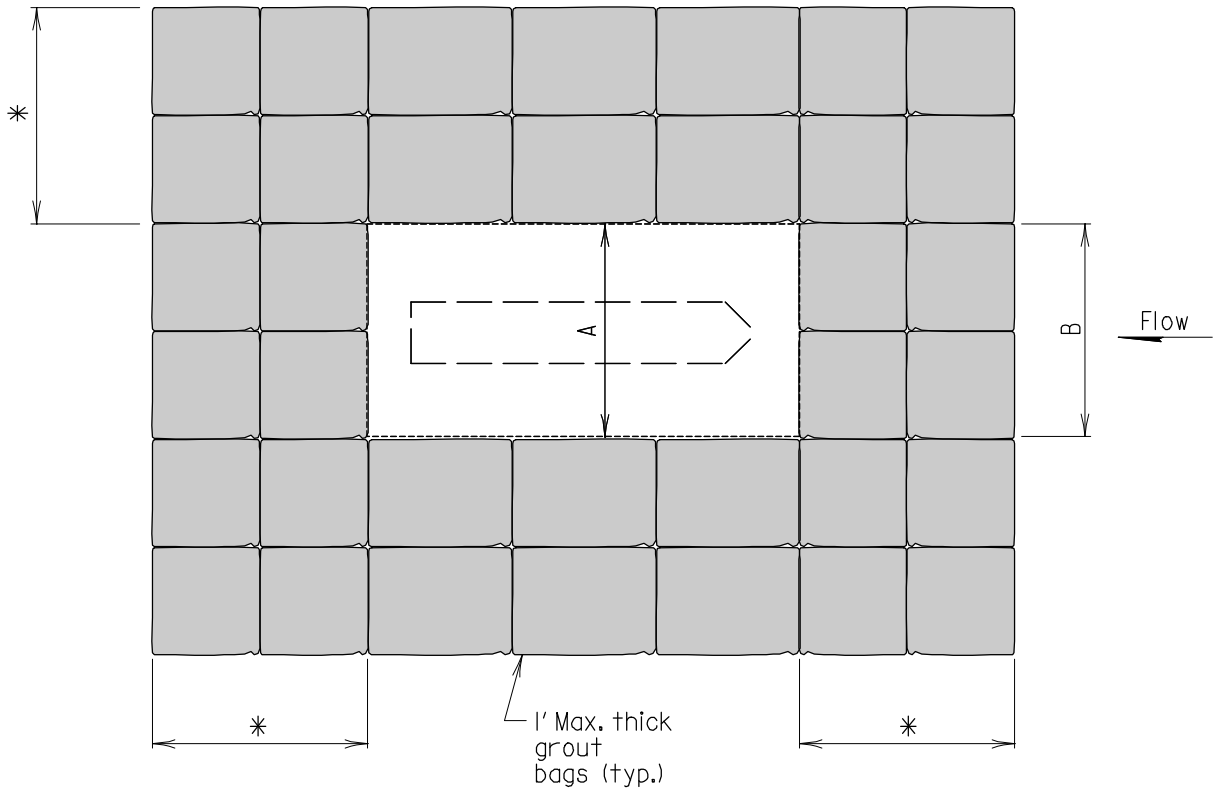
Notes:

1. Refer to General Plan for any excavation requirements.
2. Place bags flush with face of footing.
3. All bags shall be 1 ft. max. thick, 3 ft. max. wide, and 4 ft. max. length.
4. Top of grout bags shall be 1 ft. min. above bottom of footing.
5. Refer to sheet 5 of 7 for plan view of grout bag installation at pier.

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DETAIL NO. SR-SCOUR-103
SHEET <u>4</u> OF <u>7</u>

STRUCTURAL REPAIRS



PLAN OF PIER  
Scale:  $\frac{3}{16}'' = 1'-0''$

\* 2A or 6'-0", whichever is greater,  
with a maximum of 12'-0".

A= Width of pier footing.

B= Length of grout bags in front and  
behind pier to match pier footing width.

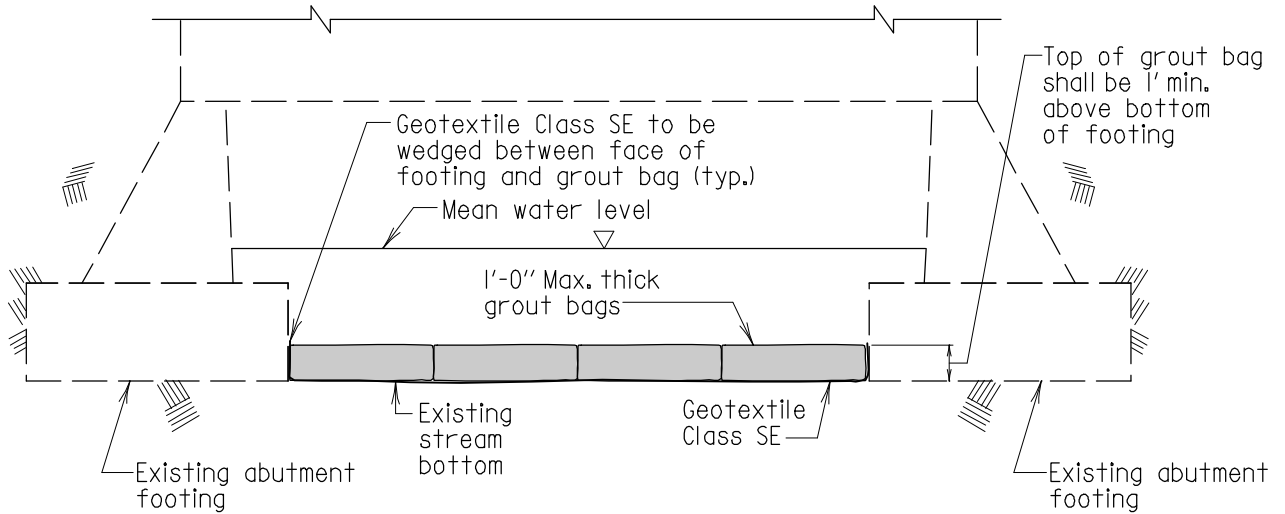
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STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
PLAN VIEW OF GROUT BAG INSTALLATION AT PIER
DETAIL NO. SR-SCOUR-103
SHEET <u>5</u> OF <u>7</u>

STRUCTURAL REPAIRS

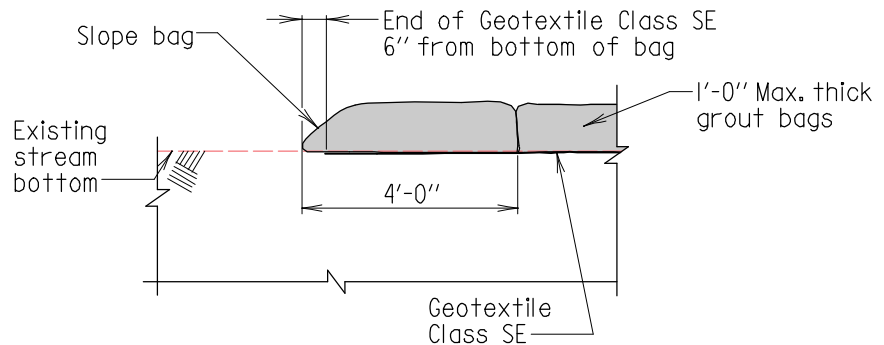


Note:  
Grout bag entire stream channel  
for clear spans measuring perpendicular  
between footings of 16 ft. and less.



SECTION THRU ABUTMENTS AND CHANNEL

Scale:  $\frac{3}{16}'' = 1'-0''$



Note:  
For location of Section A-A  
see sheet 7 of 7.

SECTION A-A

Scale:  $\frac{1}{4}'' = 1'-0''$

**NOTE TO ENGINEER** (to be deleted before placing in contracts)  
This repair may require a hydraulic evaluation  
and approval before installation.

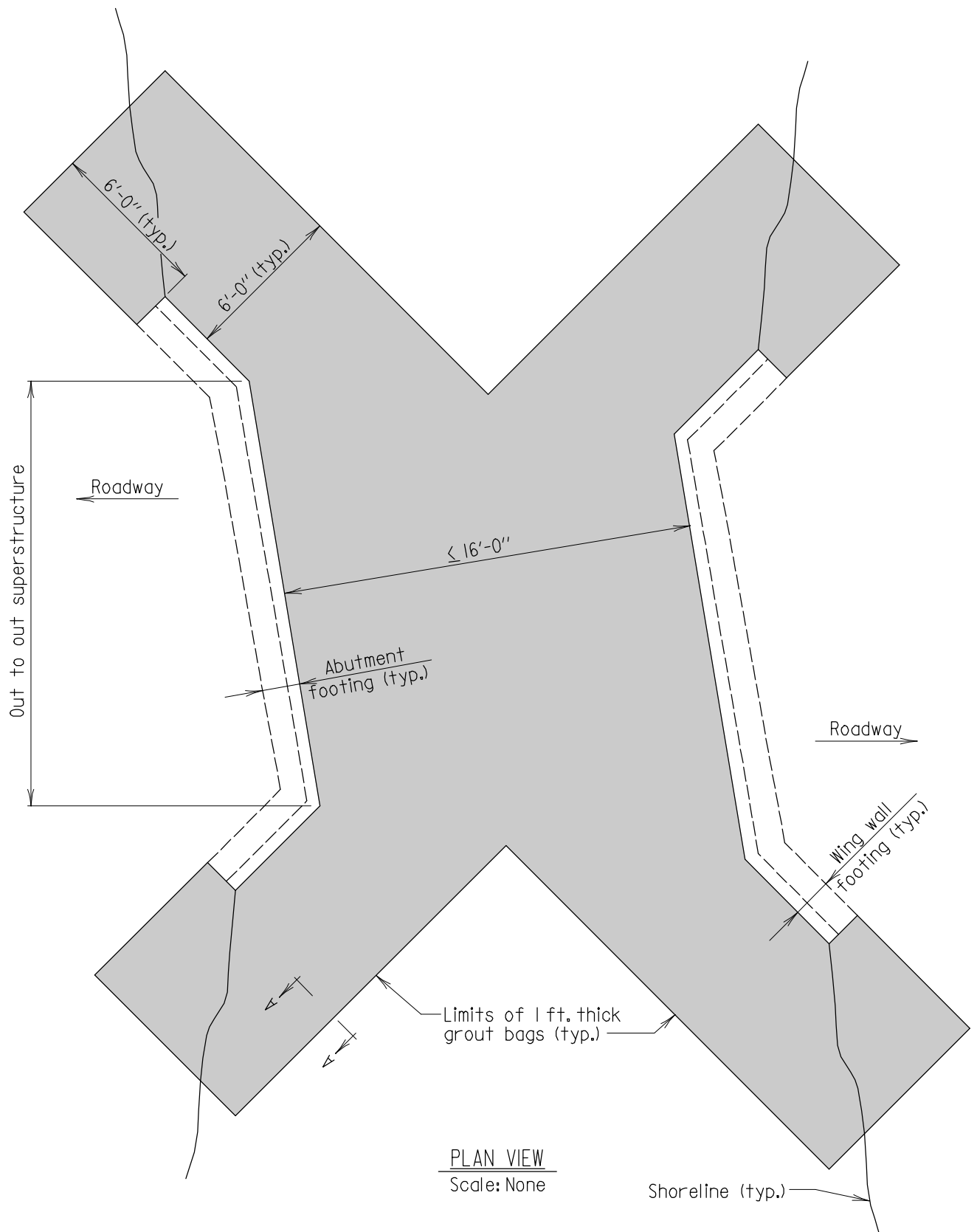
Notes:

1. Lay bags on top of existing stream bottom.
2. Bags shall be buried at the inlet and outlet end of the structure.
3. Refer to General Plan for any excavation requirements.
4. Place bag flush with face of footing.

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STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES  SECTION VIEW OF GROUT BAGS CASE WHERE SCOUR POTENTIAL EXISTS FOR FULL CHANNEL WIDTH  DETAIL NO. SR-SCOUR-103	SHEET <u>6</u> OF <u>7</u>
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STRUCTURAL REPAIRS



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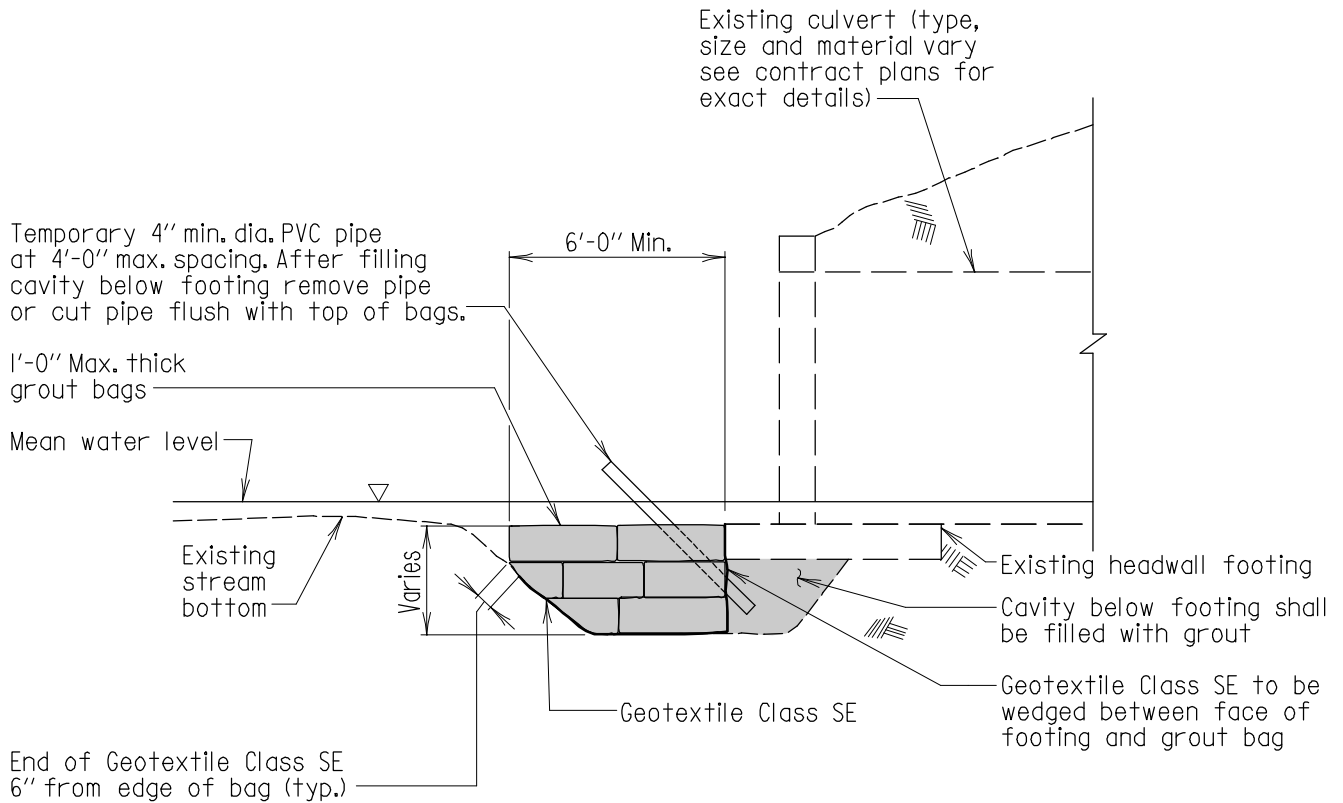
STATE OF MARYLAND  
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OFFICE OF STRUCTURES

PLAN VIEW OF GROUT BAGS  
CASE WHERE SCOUR POTENTIAL EXISTS  
FOR FULL CHANNEL WIDTH

DETAIL NO. SR-SCOUR-103

SHEET 7 OF 7

STRUCTURAL REPAIRS



SECTION THRU HEADWALL (WITHOUT APRON)

Scale:  $\frac{3}{16}'' = 1'-0''$

Notes:

1. Stack bags as required. Joints between bags in successive rows and tiers shall be staggered.
2. Excavation of material or removal of debris to allow for proper installation of grout bags shall be at no additional cost to the Administration.
3. Place top bag flush with face of footing.
4. All bags shall be 1 ft. max. thick, 3 ft. max. wide, and 4 ft. max. length.

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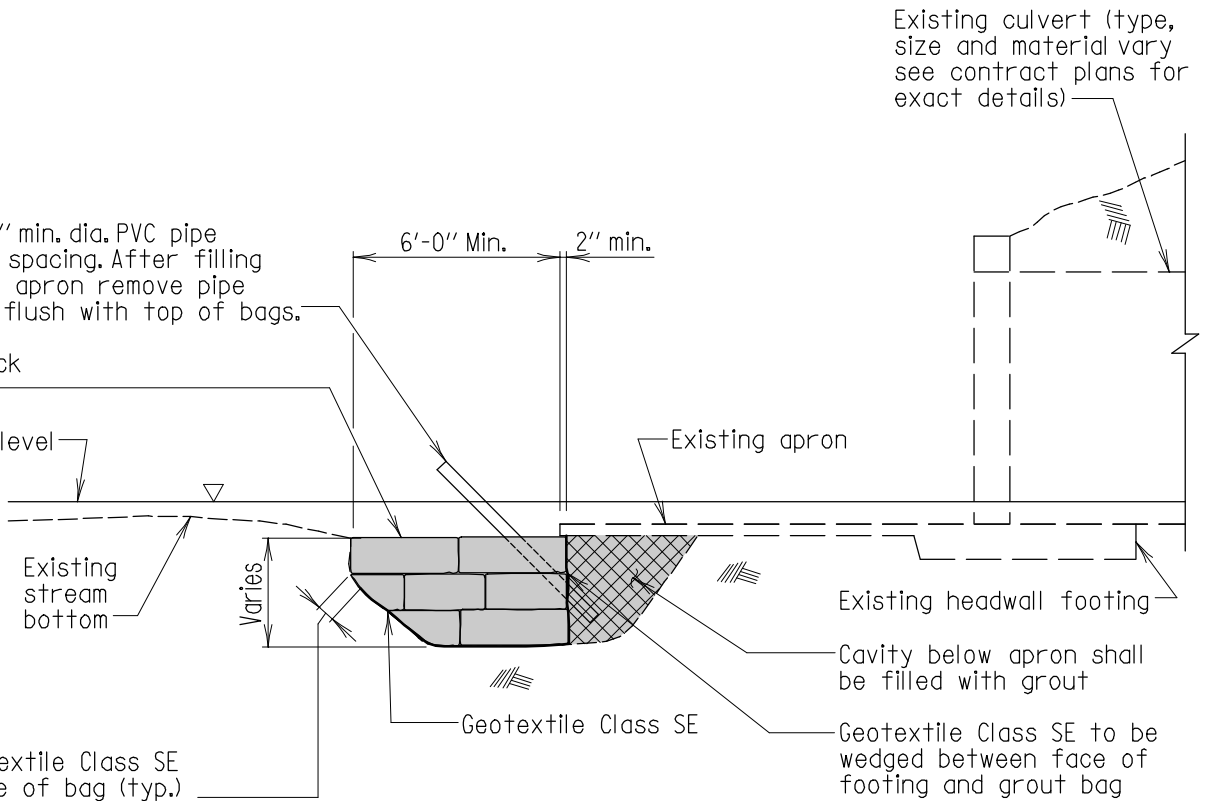
STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES  GROUT BAG SECTION CASE WHERE SCOUR AND UNDERMINING HAS OCCURRED AT HEADWALL (WITHOUT APRON)
DETAIL NO. SR-SCOUR-201
SHEET <u>1</u> OF <u>1</u>

STRUCTURAL REPAIRS

Temporary 4" min. dia. PVC pipe at 4'-0" max. spacing. After filling cavity below apron remove pipe or cut pipe flush with top of bags.

1'-0" Max. thick grout bags

Mean water level



SECTION THRU HEADWALL (WITH APRON)

Scale:  $\frac{3}{16}'' = 1'-0''$

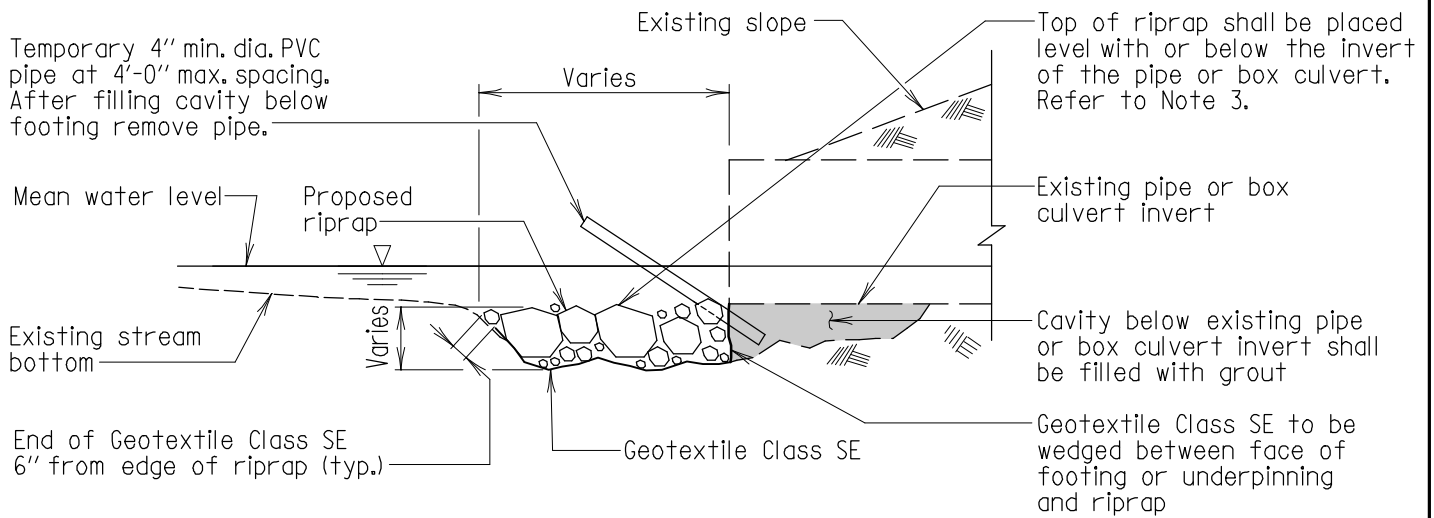
Notes:

1. Stack bags as required. Joints between bags in successive rows and tiers shall be staggered.
2. Refer to general Plan for any excavation requirements.
3. All bags shall be 1 ft. max. thick, 3 ft. max. wide, and 4 ft. max. length.
4. Remove debris before installation of bags.

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STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES GROUT BAG SECTION CASE WHERE SCOUR AND UNDERMINING HAS OCCURRED AT HEADWALL (WITH APRON)
DETAIL NO. SR-SCOUR-202
SHEET <u>  </u> OF <u>  </u>

STRUCTURAL REPAIRS



SECTION THRU INLET/OUTLET INVERT

Scale:  $\frac{3}{16}'' = 1'-0''$

Notes:

1. Stack riprap as required.
2. Excavation of material or removal of debris to allow for proper installation of rip rap shall be at no additional cost to the Administration.
3. The elevation of riprap placed along inlets and/or outlets shall not be greater than the existing or proposed invert elevation.
4. Refer to Contract Documents for size of the proposed riprap to be used. See Section 901.02 for additional sizing details.

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STATE OF MARYLAND DEPARTMENT OF TRANSPORTATION STATE HIGHWAY ADMINISTRATION OFFICE OF STRUCTURES
RIPRAP UNDERPINNING AND ARMORING SECTION
DETAIL NO. SR-SCOUR-301
SHEET <u>  </u> OF <u>  </u>

STRUCTURAL REPAIRS