

Design Assumptions for  
Nebraska Base Drawing NE300-10-002  
Seepage Protection Filter

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Revised: 12/04 Replaces: 5001-25

**Seepage Protection Filter**

Use of the seepage protection filter is determined by criteria in Standard 378.

Protection filter and envelope material compaction as stated on the drawing shall be given continuous inspection during the compaction process.

# Instructions for Nebraska Base Drawing NE300-10-002 Seepage Protection Filter

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Fill in the following data fields to automatically fill in the necessary data fields on the drawing.

## **Title block**

Title line(s)

Subtitle line

County, State

Sheet number                      of

## **Who / When**

Designed

Drawn

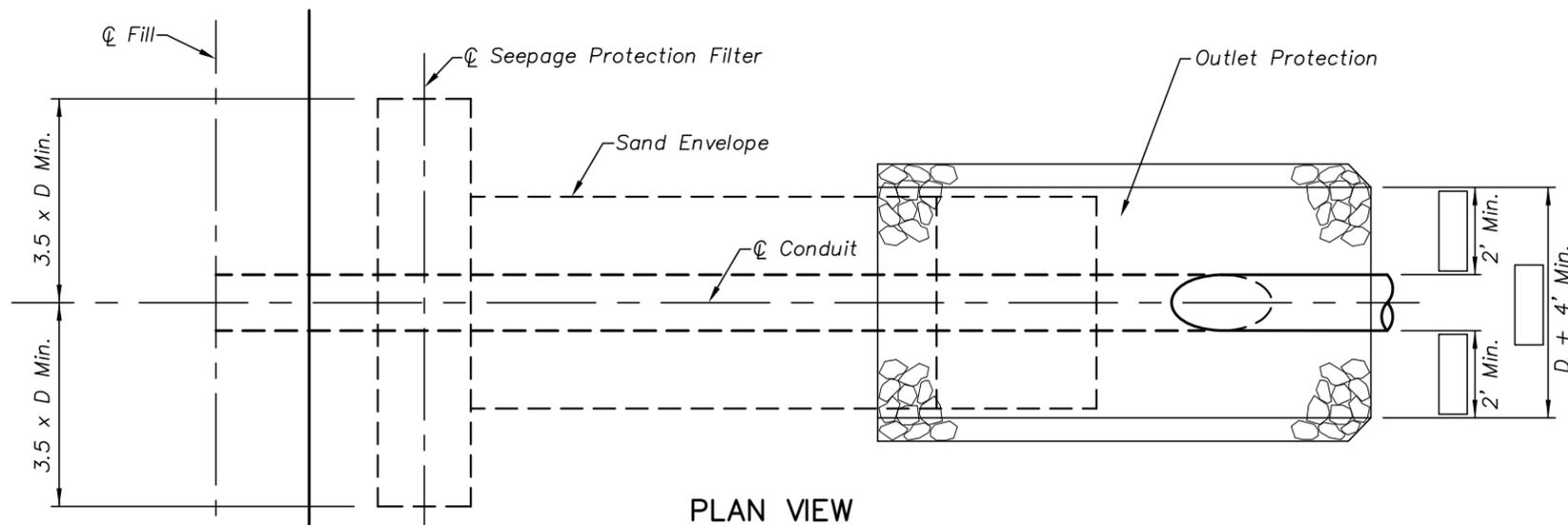
Checked

## **Enter directly on drawing**

Left click on yellow boxes on drawing to mark with X as required.  
Left click blue data fields to enter required information.

### CONSTRUCTION NOTES

- NATURAL GROUND OR EARTH FILL SHALL BE COMPLETED TO ABOVE THE TOP OF THE SAND ENVELOPE AND A TRENCH EXCAVATED (PER DETAIL) FOR THE PIPE AND SAND ENVELOPE PLACEMENT.
- THE SAND ENVELOPE WILL BE PROTECTED FROM SURFACE EROSION BY 12 INCHES OF CRUSHED ROCK AGGREGATE (MAX. SIZE 1 INCH) COVERED WITH 12 INCHES OF OUTLET PROTECTION MATERIAL. THIS MATERIAL MAY BE ROCK RIPRAP, BROKEN CONCRETE DEBRIS, OR NATIVE STONE (MAXIMUM SIZE 8 INCHES).
- SEEPAGE PROTECTION FILTER AND ENVELOPE MATERIAL SHALL BE COMPACTED AS SPECIFIED IN NE-24 DRAINFILL CONSTRUCTION SPECIFICATION.
  - EACH LAYER OF SAND MATERIAL SHALL BE FLOODED PRIOR TO COMPACTION.
  - COMPACTION SHALL BE ACCOMPLISHED WHILE THE MATERIAL IS WET FROM STEP (1) ABOVE.
  - EACH LAYER SHALL BE COMPACTED BY 2 (MINIMUM) PASSES OF A HAND-DIRECTED, VIBRATORY COMPACTOR OVER THE ENTIRE LAYER SURFACE.
  - LAYER THICKNESS SHALL NOT EXCEED 12 INCHES AFTER COMPACTION.



PLAN VIEW

#### MULTIPLIER FOR CRUSHED ROCK & PROTECTION MATERIAL

FILL SLOPE	MULTIPLIER "M"
Z	$(Z^2 + 1)^{0.5}$
2.5	2.69
3.0	3.16
4.0	4.12

#### NEBRASKA 47B FINE AGGREGATE GRADATION

SIEVE SIZE	PERCENT PASSING
3/8	95-100
4	75-95
10	45-65
20	20-40
30	15-30
50	5-15
100	0-5

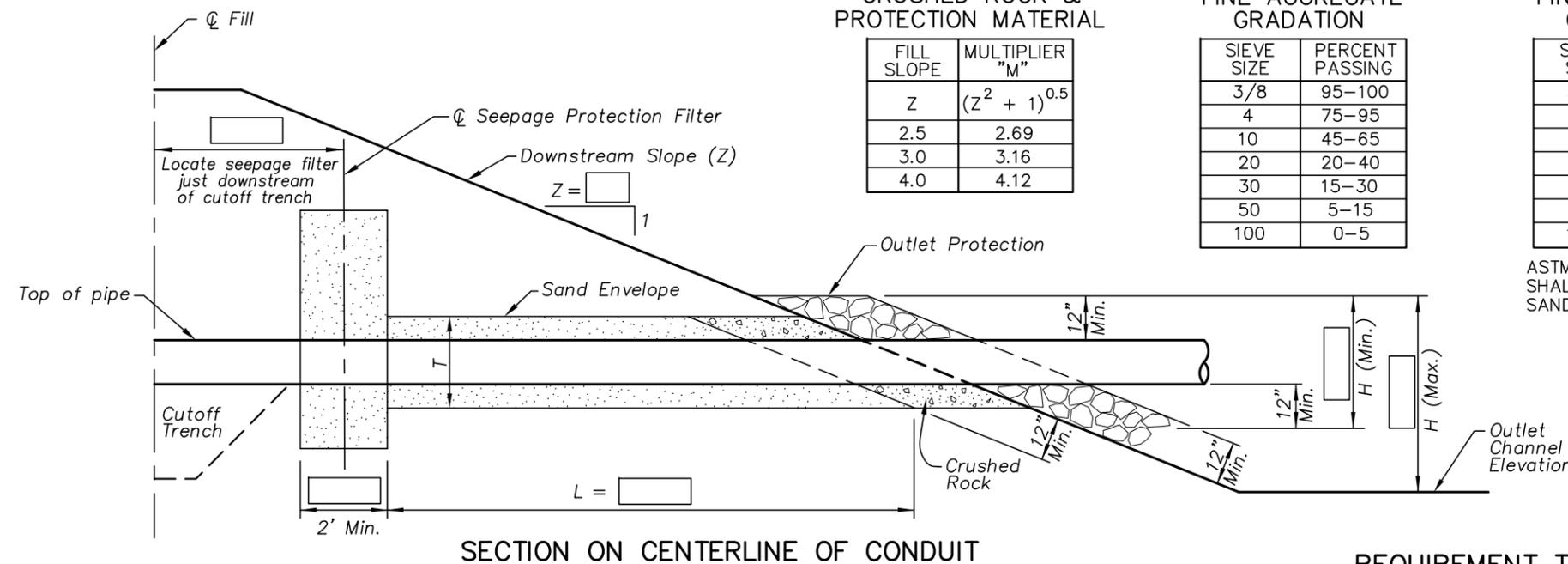
#### ASTM C33 FINE AGGREGATE GRADATION

SIEVE SIZE	PERCENT PASSING
3/8	100
4	95-100
10	74-94
20	35-75
30	25-60
50	10-30
100	2-10

ASTM C33 FINE AGGREGATE SHALL BE USED IN THE SAND DIAPHRAGM

#### QUANTITIES

PIPE DIAMETER "D"	MIN. DRAIN FILL-CU. FT.	
	SEEPAGE PROTECTION FILTER	ENVELOPE PER LIN. FT. OF "L"
6"	25	6.6
8"	40	7.5
10"	56	8.3
12"	77	9.2
15"	114	10.7
18"	158	12.0
24"	266	14.9
30"	403	17.8
36"	567	20.9
42"	760	24.1
48"	980	27.4

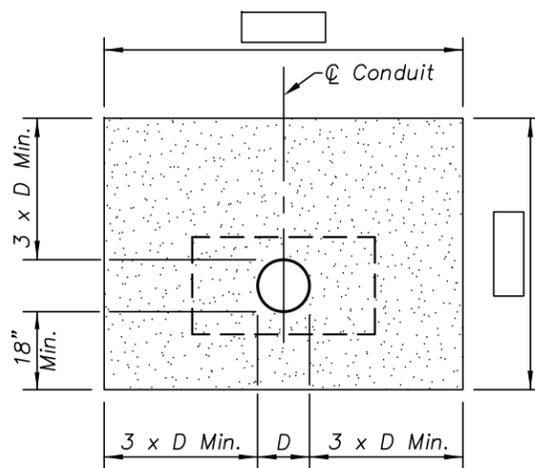


SECTION ON CENTERLINE OF CONDUIT

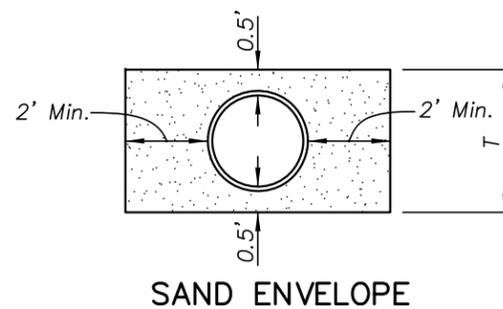
#### REQUIREMENT TABLE

IN BOX INDICATES REQUIREMENTS THAT APPLY TO STRUCTURE

SEEPAGE PROTECTION FILTER:	ENVELOPE:
<input type="checkbox"/> ASTM C-33 FINE AGGREGATE	<input type="checkbox"/> ASTM C33 FINE AGGREGATE
	<input type="checkbox"/> NE 47B FINE AGGREGATE
DRAIN FILL:	
PROTECTION FILTER = $E \times \left( L - \frac{(Z \times T)}{2} \right) =$ _____ CU. FT./27 = _____ CU. YDS.	
ENVELOPE = $(E \times L) =$ _____ CU. FT./27 = _____ CU. YDS.	
CRUSHED ROCK = $(E \times M) =$ _____ CU. FT./27 = _____ CU. YDS.	
CU. YDS. x 1.35 = _____ TONS	
OUTLET PROTECTION = $\left( (D+4) \times H \times M \right) - \left( \frac{\pi D^2}{4} \times M \right) =$ _____ CU.FT./27 = _____ CU.YDS.	
CU.YD. x 1.35 = _____ TONS	



SECTION ON CENTERLINE OF SEEPAGE PROTECTION FILTER



SAND ENVELOPE

EITHER ASTM C33 FINE AGGREGATE OR NE 47B FINE AGGREGATE MAY BE USED IN THE ENVELOPE.