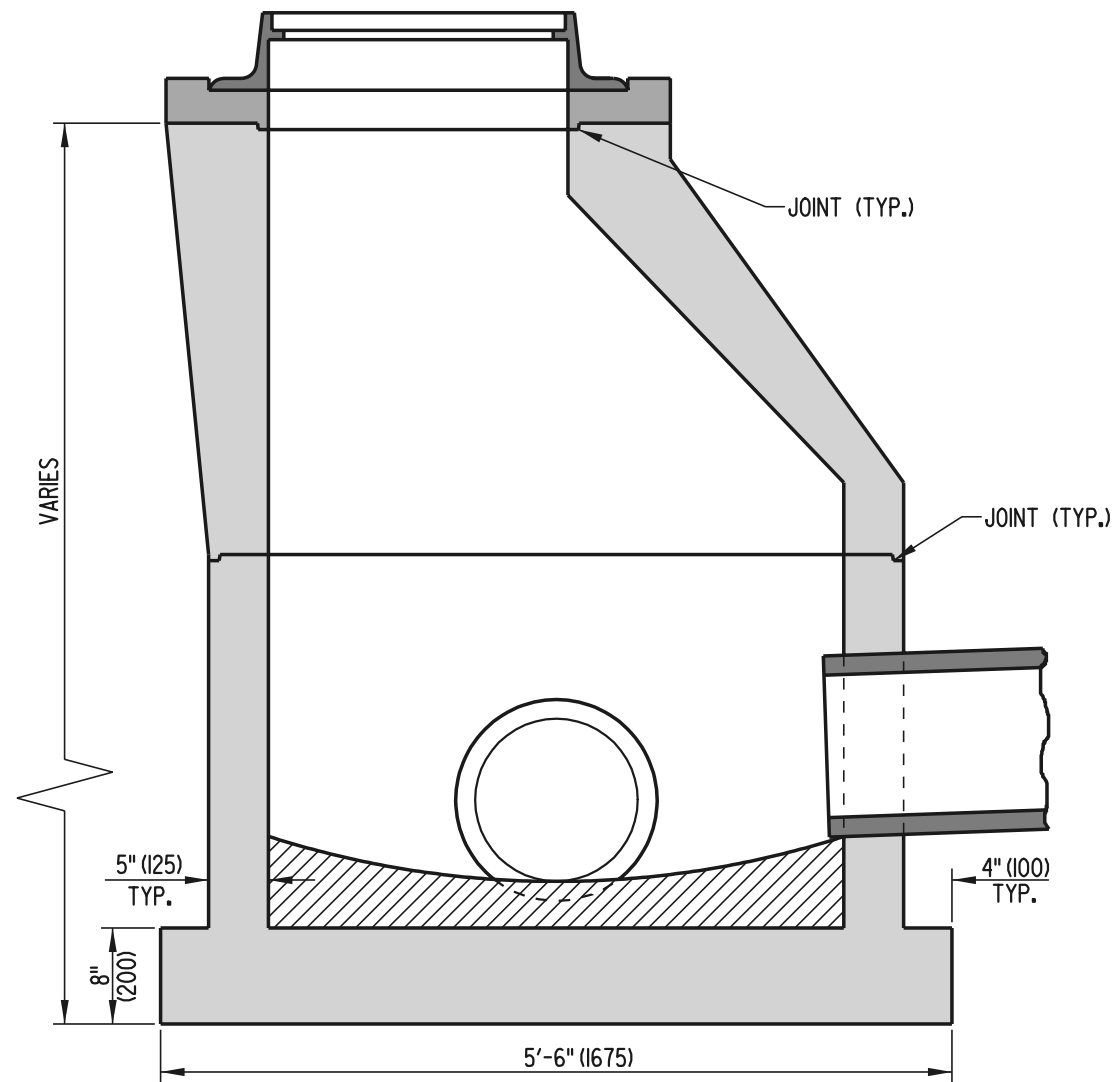


PLAN



SECTION A-A

ROUND MANHOLE ASSEMBLY

NOTE: ROUND MANHOLES SHALL BE CONSTRUCTED IN ACCORDANCE WITH AASHTO M 199.



DELAWARE
DEPARTMENT OF TRANSPORTATION

MANHOLE DETAILS

STANDARD NO.

D-6 (2001)

SHT. 2

OF 4

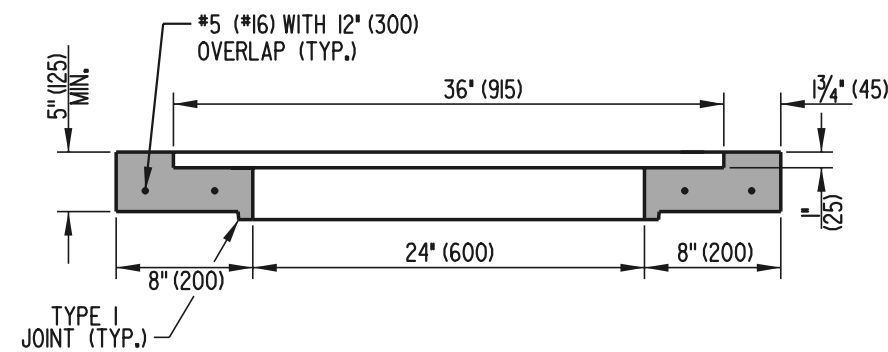
APPROVED

Ryan M. Harkness
CHIEF ENGINEER
DATE 6/18/01

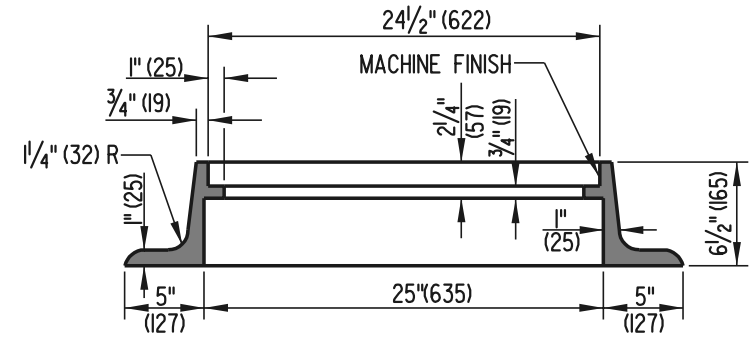
RECOMMENDED

Michael P. Gotsch
DESIGN ENGINEER
DATE 6/18/01

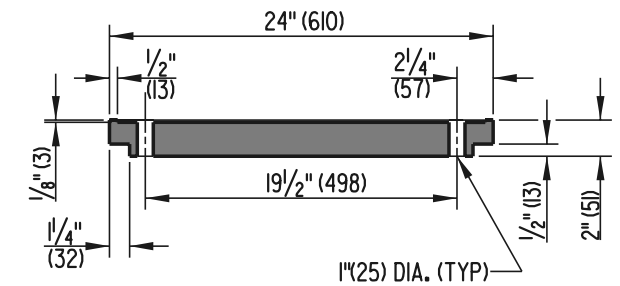
NOTE: TOP UNIT IS TO BE CAST IN PLACE TO GRADE AS SPECIFIED ON PLAN SHEETS OR AS DIRECTED BY ENGINEER.



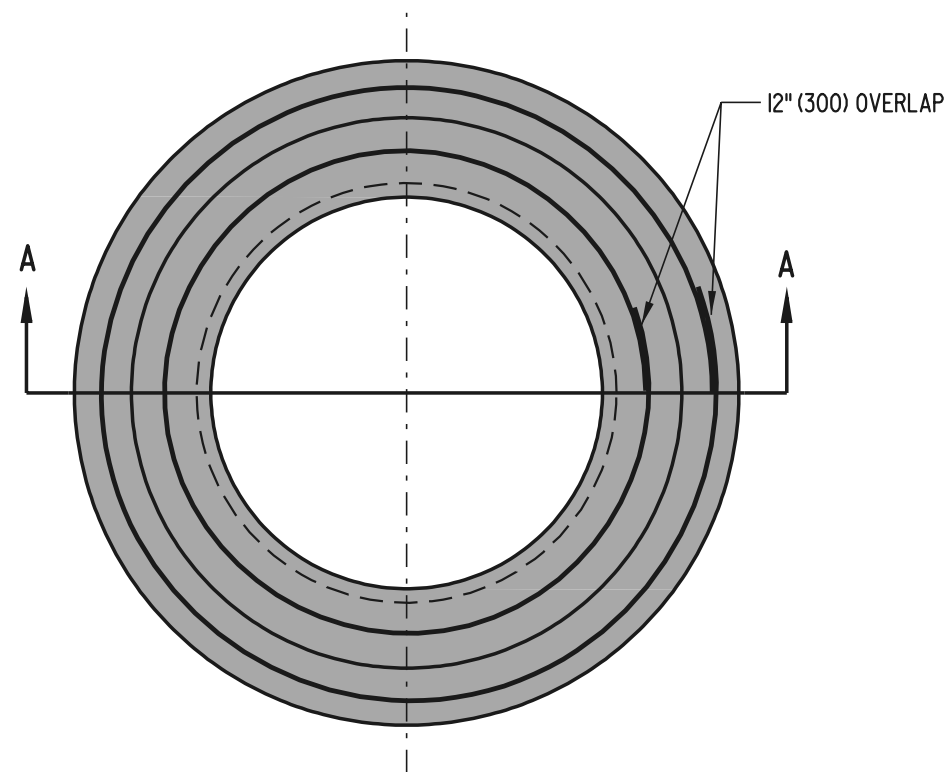
SECTION A-A



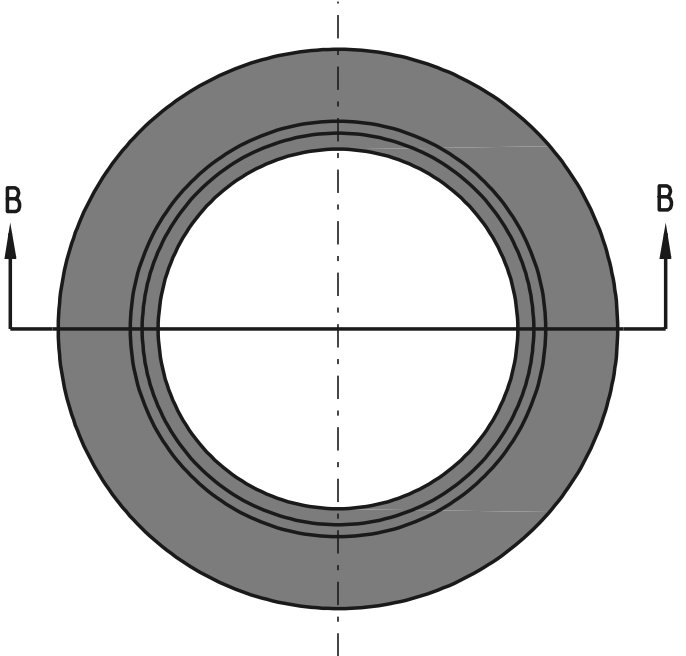
SECTION B-B



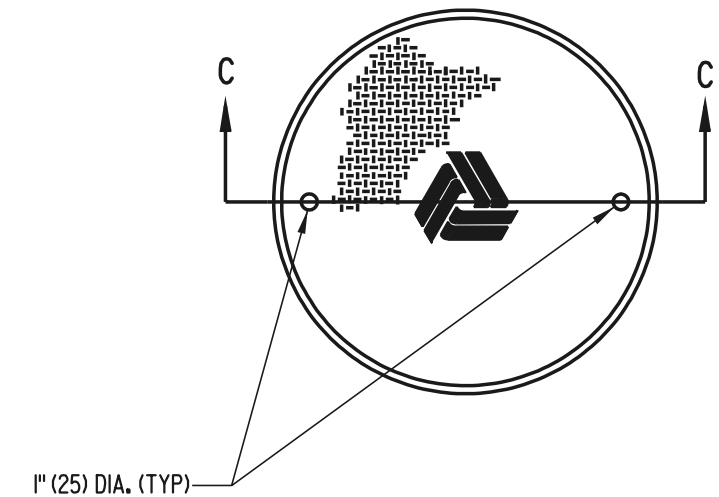
SECTION C-C



TOP UNIT



FRAME



COVER



**DELAWARE
DEPARTMENT OF TRANSPORTATION**

MANHOLE DETAILS

STANDARD NO.

D-6 (2001)

SHT. 3

OF 4

APPROVED

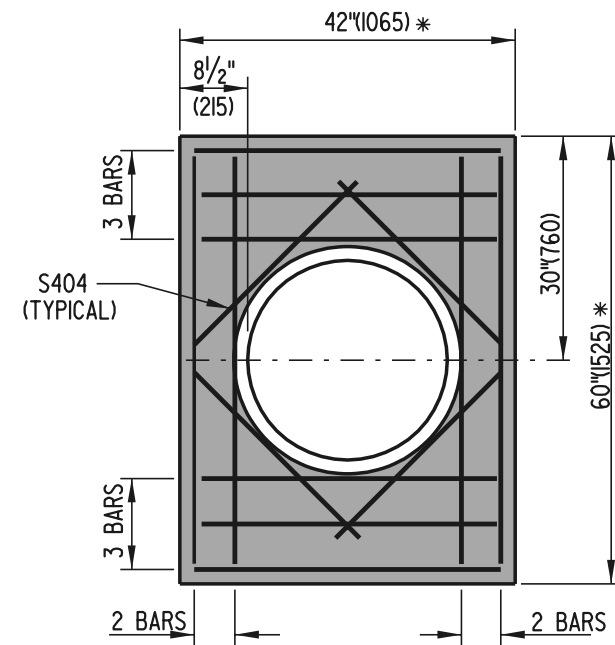
Ryan M. Harkness
CHIEF ENGINEER

6/18/01
DATE

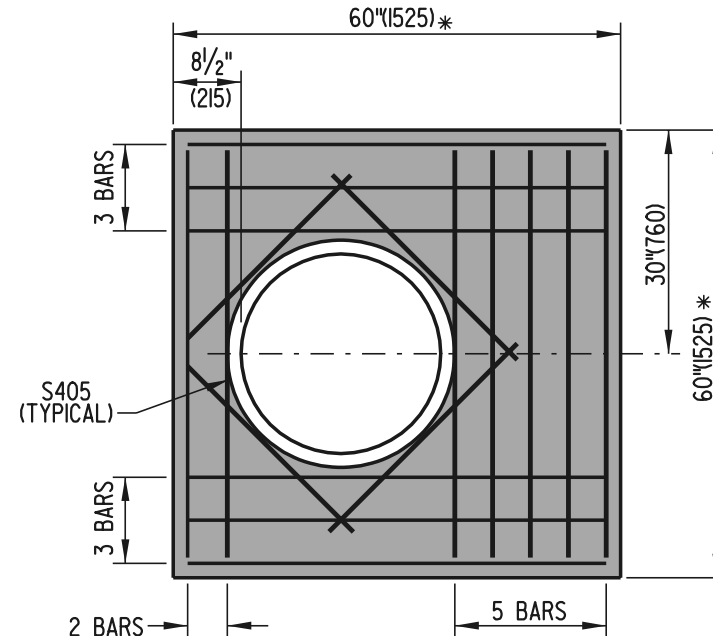
RECOMMENDED

Michael J. Glick
DESIGN ENGINEER

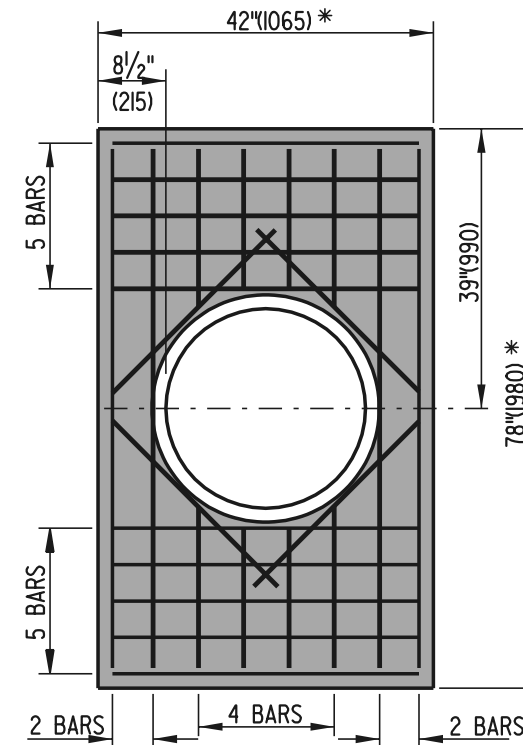
6/18/01
DATE



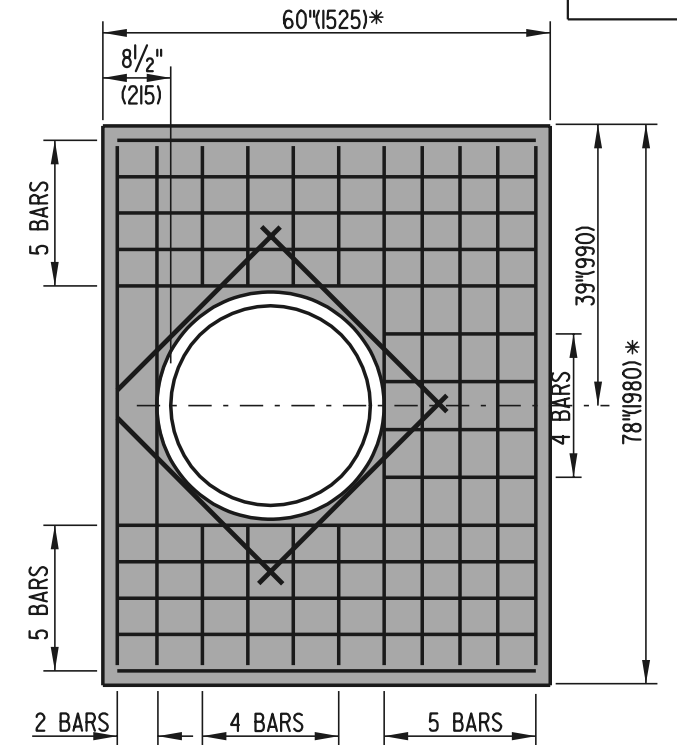
48" (1220) X 30" (760) MANHOLE



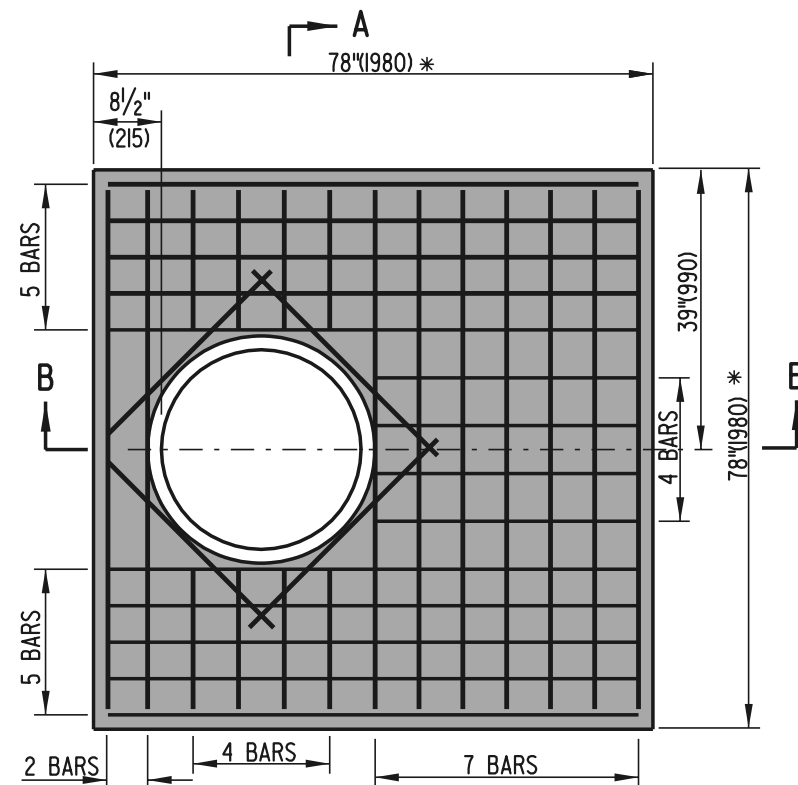
48" (1220) X 48" (1220) MANHOLE



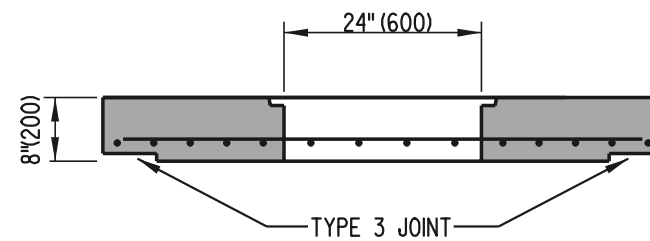
66" (1675) X 30" (760) MANHOLE



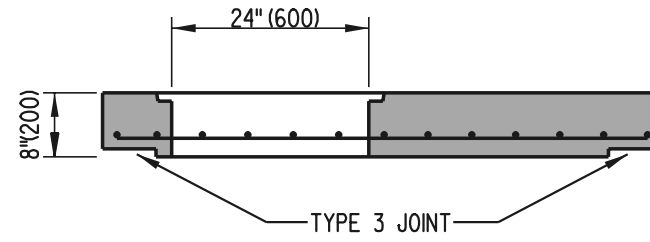
66" (1675) X 48" (1220) MANHOLE



66" (1675) X 66" (1675) MANHOLE



SECTION A-A



SECTION B-B

BOX MANHOLE COVER SLAB DETAILS

NOTES:

1. COVER SLABS SHALL BE PRE-CAST.
 2. ALL BARS SHALL BE #5 (*16) SPACED AT 6" (150) ± UNLESS NOTED OTHERWISE.
 3. MINIMUM BAR COVER = 1 1/2" (38).
- * - DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.



DELAWARE
DEPARTMENT OF TRANSPORTATION

MANHOLE DETAILS

STANDARD NO.

D-6 (2002)

SHT. 4

OF 4

APPROVED

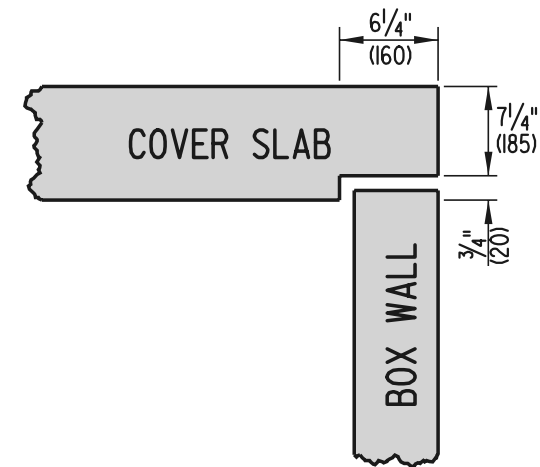
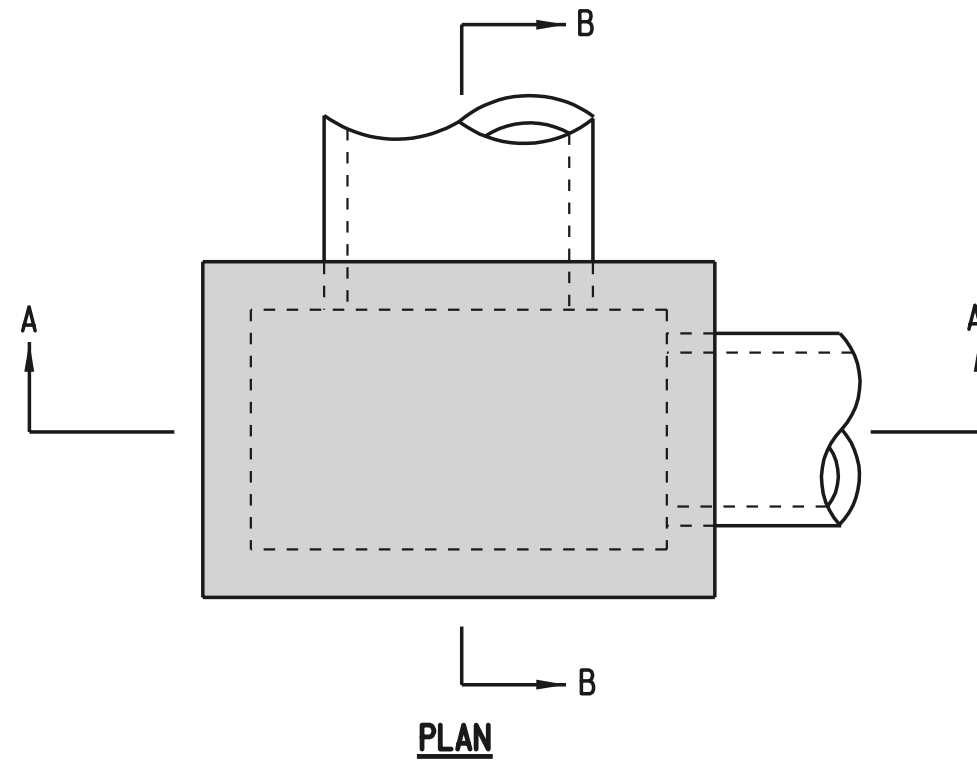
Caroleen Wicks
CHIEF ENGINEER

9/6/02
DATE

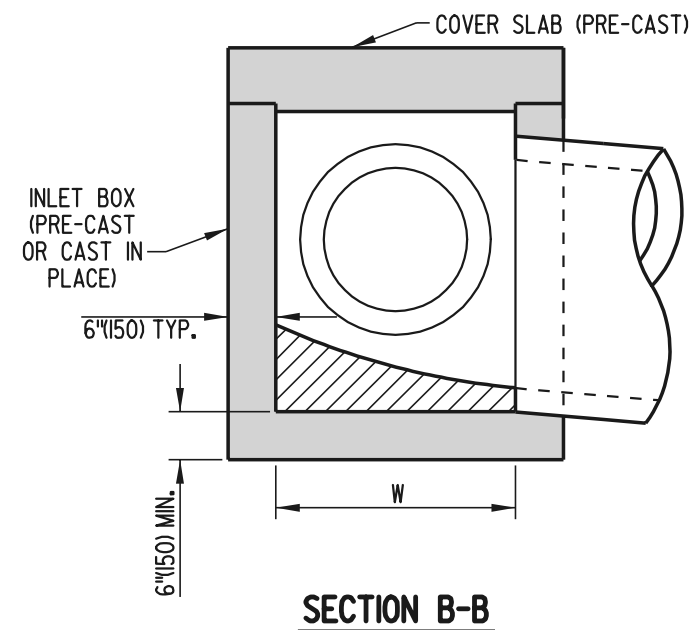
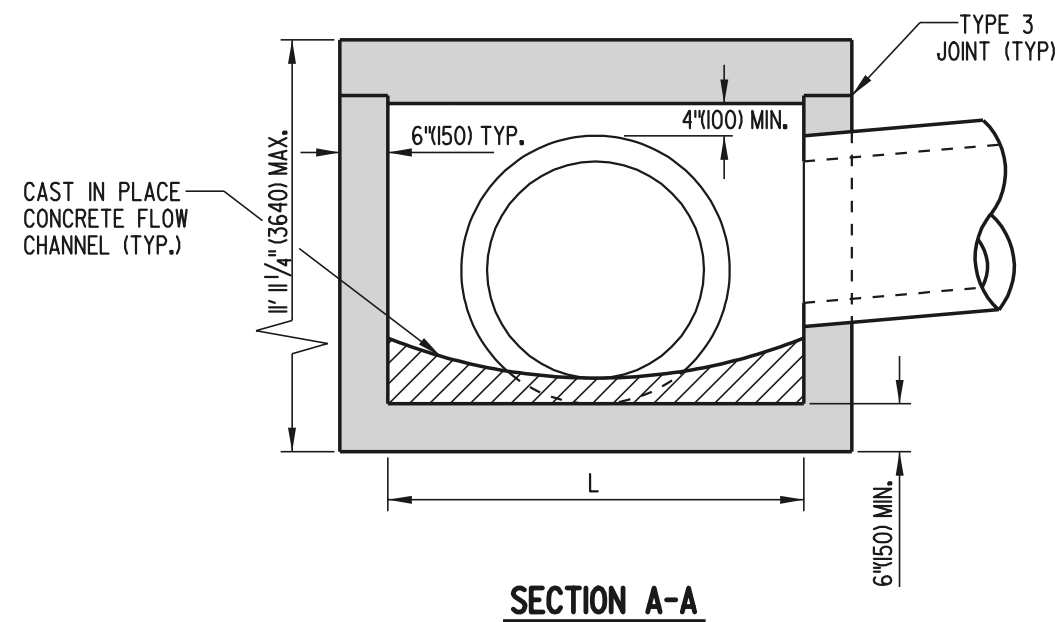
RECOMMENDED

Theresa Delph
DESIGN ENGINEER

8/19/02
DATE



TYPE 3 JOINT DETAIL



JUNCTION BOX ASSEMBLY



DELAWARE
DEPARTMENT OF TRANSPORTATION

JUNCTION BOX DETAILS

STANDARD NO.

D-7 (2002)

SHT. 1

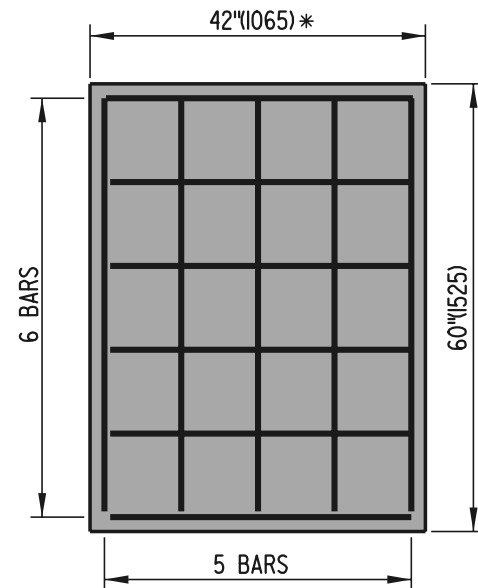
OF 2

APPROVED

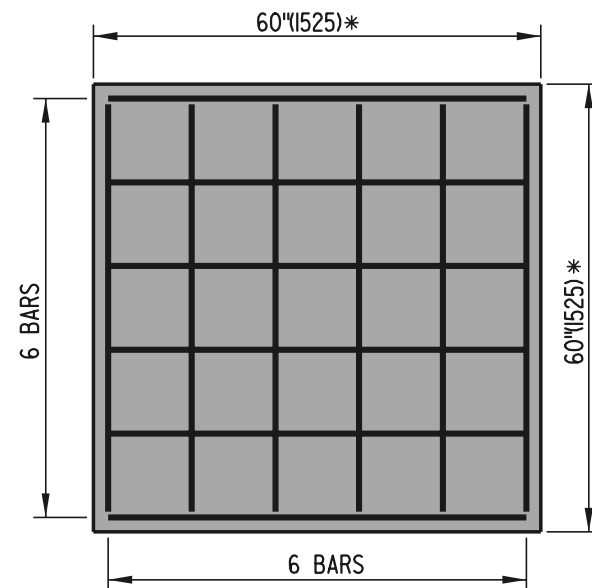
Caution Wicks 9/6/02
CHIEF ENGINEER DATE

RECOMMENDED

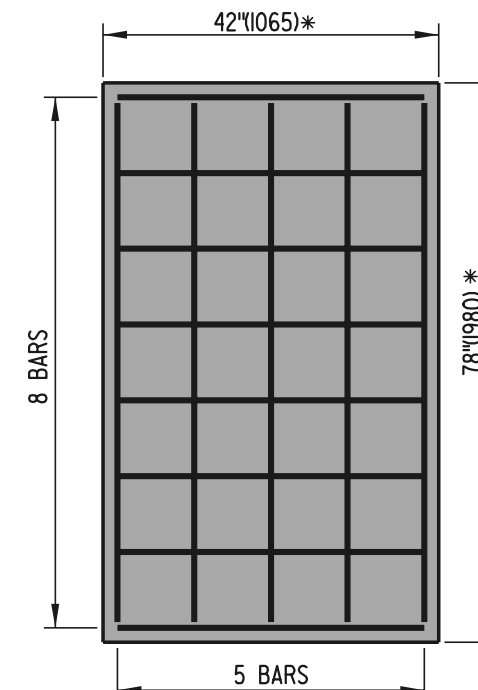
Theresa Delph 8/19/02
DESIGN ENGINEER DATE



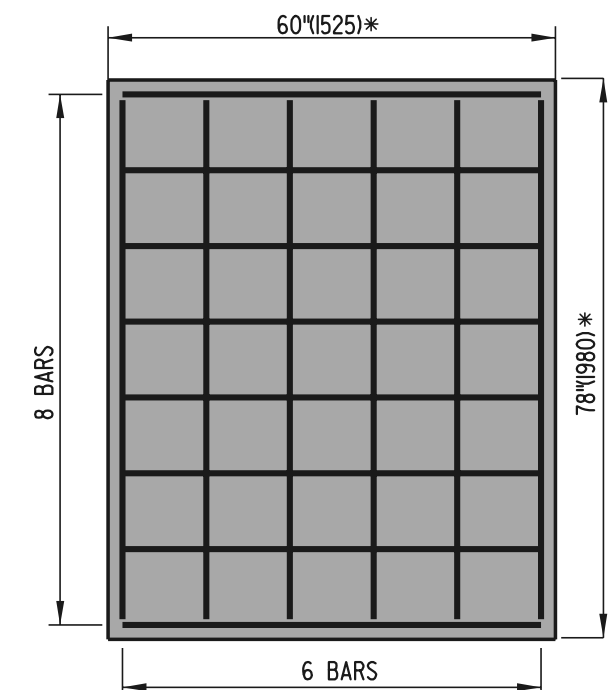
**48" (1220) x 30" (760)
JUNCTION BOX**



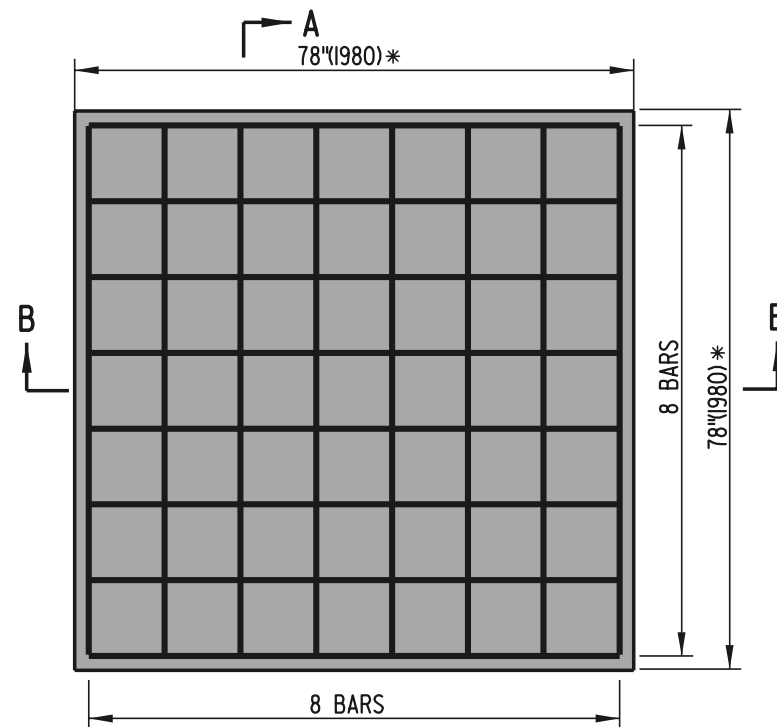
**48" (1220) x 48" (1220)
JUNCTION BOX**



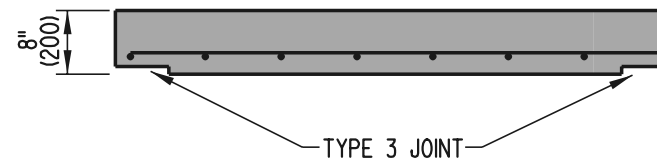
**66" (1675) x 30" (760)
JUNCTION BOX**



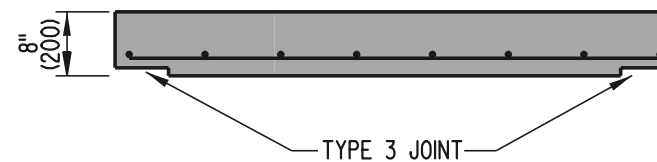
**66" (1675) x 48" (1220)
JUNCTION BOX**



**66" (1675) x 66" (1675)
JUNCTION BOX**



SECTION A-A



SECTION B-B

JUNCTION BOX COVER SLAB DETAILS

NOTES :

1. COVER SLABS ARE TO BE PRE-CAST.
 2. ALL BARS ARE TO BE #5 (*16) SPACED @ 12" (305) ± UNLESS NOTED OTHERWISE.
 3. MINIMUM BAR COVER = 1 1/2" (38).
- * - DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX



DELAWARE
DEPARTMENT OF TRANSPORTATION

JUNCTION BOX DETAILS

STANDARD NO.

D-7 (2002)

SHT. 2

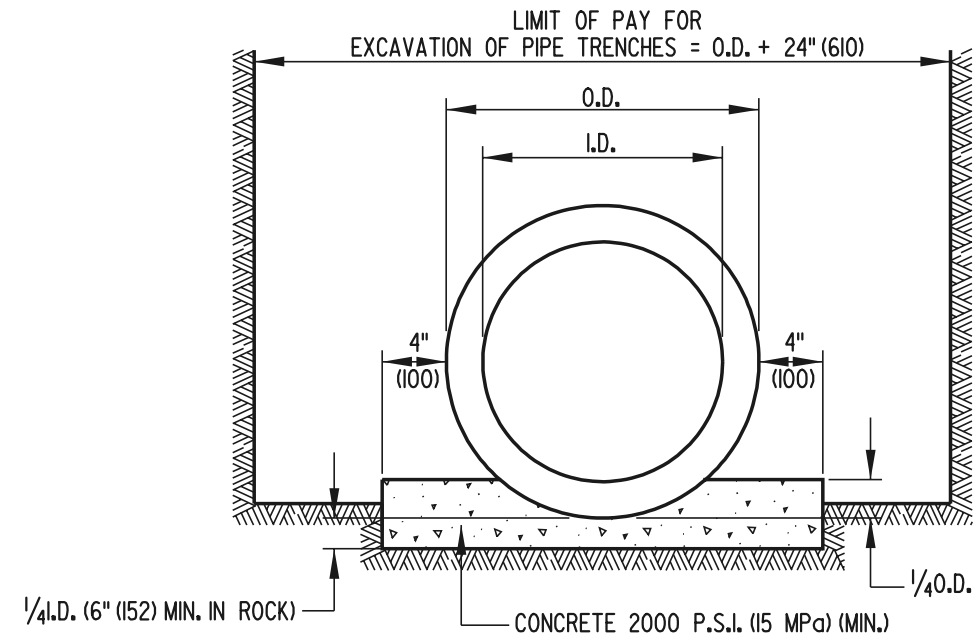
OF 2

APPROVED

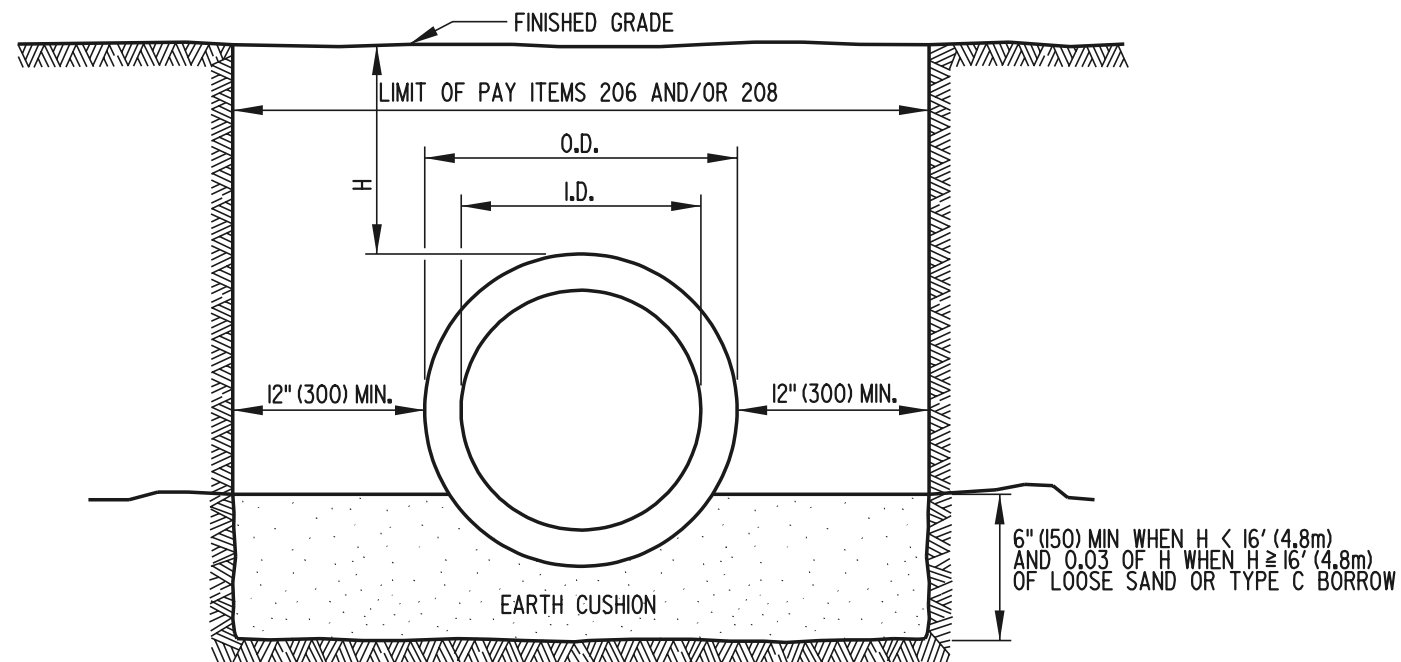
Caroleen Wicks 9/6/02
CHIEF ENGINEER DATE

RECOMMENDED

Theresa Delph 8/19/02
DESIGN ENGINEER DATE



CLASS A BEDDING



CLASS C BEDDING

NOTE: USE CLASS C BEDDING UNLESS OTHERWISE INDICATED



DELAWARE
DEPARTMENT OF TRANSPORTATION

PIPE BEDDING

STANDARD NO.

D-8 (2001)

SHT. 1

OF 1

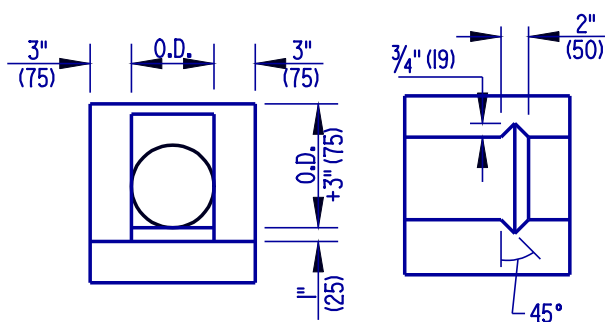
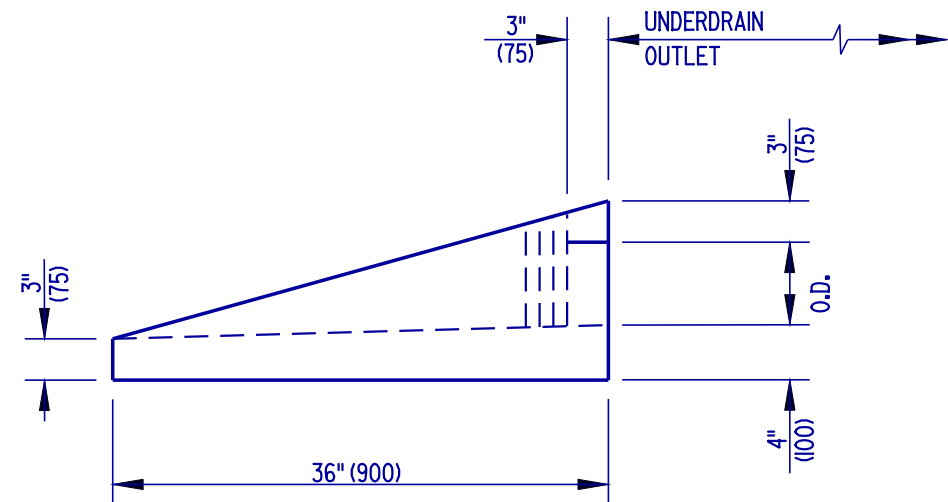
APPROVED

Ryan M. Harkness 6/18/01
CHIEF ENGINEER DATE

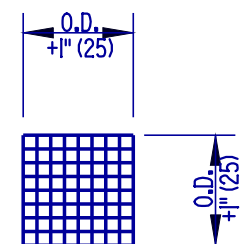
RECOMMENDED

Michael P. Gotsch 6/18/01
DESIGN ENGINEER DATE

SCALE : N.T.S.



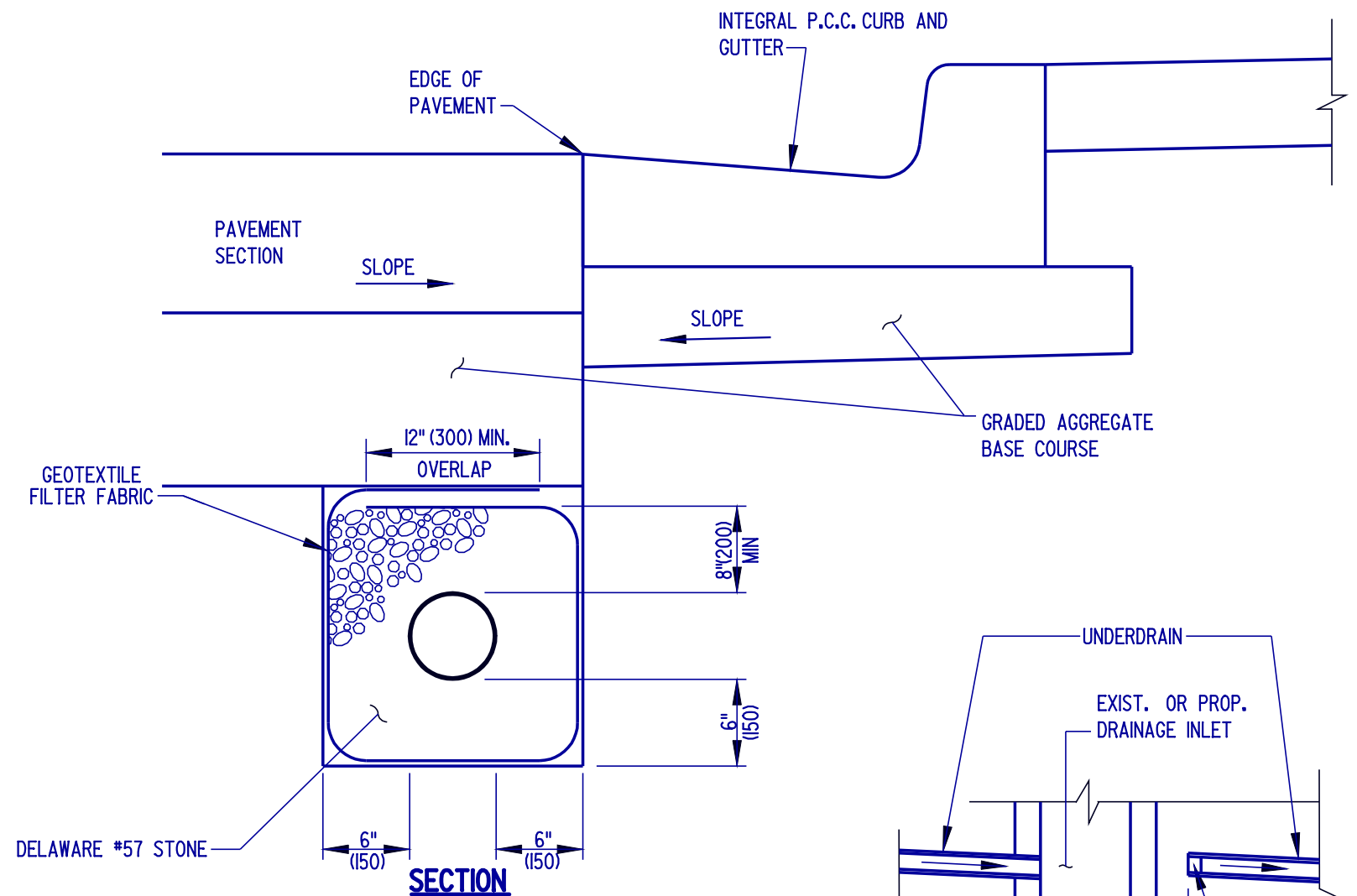
FRONT VIEW
TOP VIEW
SLOTTED HEADWALL DETAIL



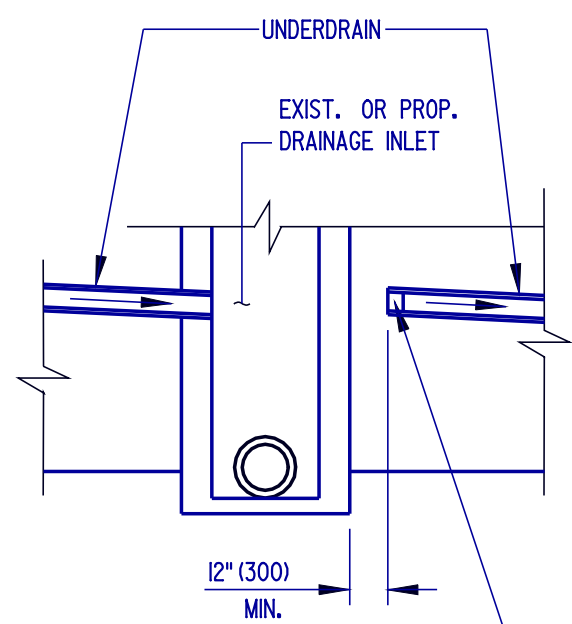
FRONT VIEW
RODENT SCREEN

CONCRETE HEADWALL FOR UNDERDRAIN OUTLET
NOT TO SCALE

- NOTES:**
1. GEOTEXTILE FILTER FABRIC SHALL BE PLACED ENTIRELY OVER THE TOP OF UNDERDRAIN TRENCH AND LAPPED AS SHOWN.
 2. SLOPE OF UNDERDRAINS SHALL MATCH ROADWAY GRADE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
 3. OUTLET PIPE CONFIGURATIONS SHALL USE 45 DEGREE ELBOWS OR SHALL USE STRAIGHT PIPE WITH A MINIMUM RADIUS OF 3' (900) TO DIRECT UNDERDRAIN PIPE INTO SIDE OF DRAINAGE INLET OR TO POSITIVE GRADE. PIPE SHALL ALSO BE NON-PERFORATED AND HAVE A SMOOTH INTERIOR.
 4. RODENT SCREEN SHALL SNUGLY FIT THE PROVIDED SLOT WITH THE SCREEN LIP FITTING TIGHT TO THE BOTTOM FLOW LINE.
 5. A 4' (1200) FLEXIBLE DELINEATOR SHALL BE FURNISHED AND INSTALLED AT THE DIRECTION OF THE ENGINEER TO MARK THE LOCATION OF THE CONCRETE HEADWALL. COST INCIDENTAL TO DOWNSPOUT SPLASH APRONS ITEM.
 6. WHEN TWO LINES OF PIPE UNDERDRAIN DRAIN TO A LOW POINT, EACH PIPE MUST HAVE ITS OWN OUTLET.




SECTION

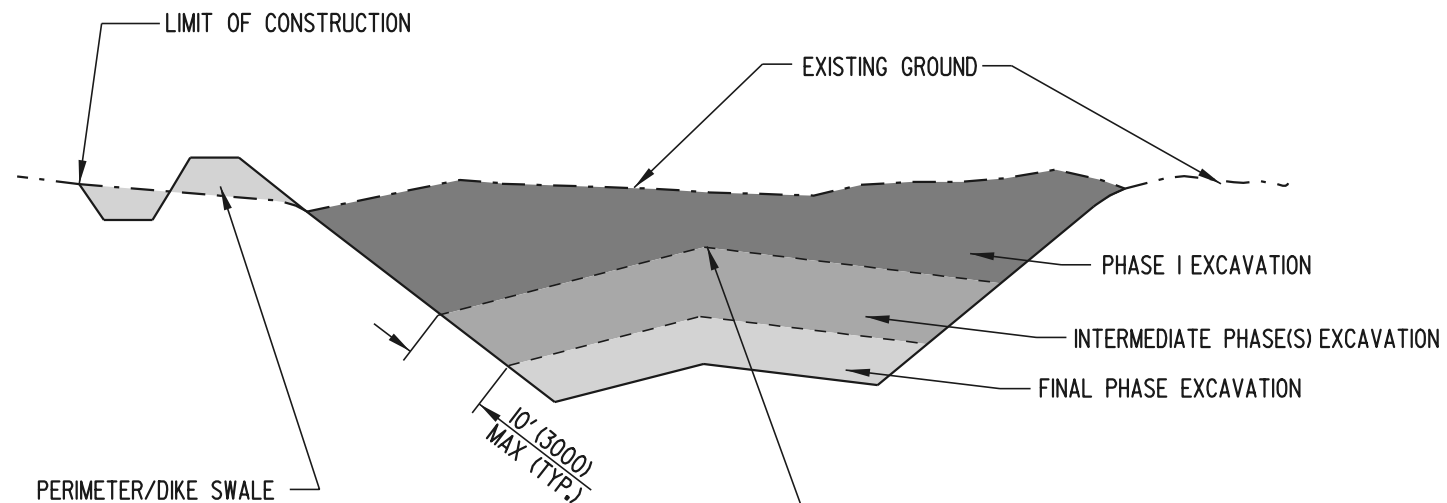


PIPE END CAP TO BE INCLUDED IN THE UNIT PRICE BID FOR PERFORATED PIPE UNDERDRAIN ITEM.

ELEVATION

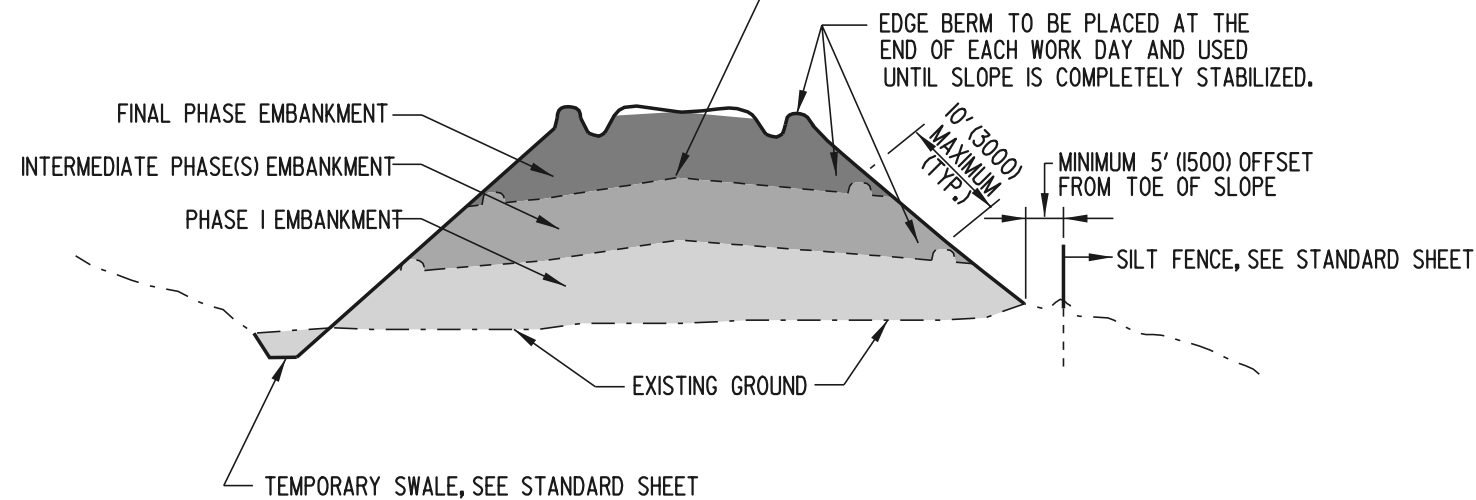
PERFORATED PIPE UNDERDRAIN
NOT TO SCALE

 DELAWARE DEPARTMENT OF TRANSPORTATION	PERFORATED PIPE UNDERDRAIN DETAIL			APPROVED <i>Carolann Wick</i> 1/10/05 CHIEF ENGINEER DATE	
	STANDARD NO. D-9 (2004)	SHT. 1	OF 1	RECOMMENDED <i>Dennis M. O'Flaherty</i> 1/3/05 DESIGN ENGINEER DATE	



CUT SECTION

BREAK IN CROSS SLOPE MAY BE ELIMINATED TO DIRECT SURFACE FLOW LEFT OR RIGHT OR AS DIRECTED BY THE ENGINEER.



FILL SECTION

- NOTES:**
- 1.) EDGE BERMS AND TEMPORARY SLOPE DRAINS SHALL BE CONSTRUCTED ALONG THE TOP OF ALL SLOPES TO INTERCEPT RUNOFF AND CONVEY IT DOWN THE SLOPE FACES WITHOUT CREATING GULLIES OR WASHOUTS.
 - 2.) SLOPE FACES SHALL BE TRACKED WITH CLEATED EQUIPMENT SUCH THAT THE CLEAT MARKS ARE ORIENTED HORIZONTALLY.
 - 3.) ALL CUT AND FILL SLOPES OF THE HIGHWAY EMBANKMENT SHALL BE PERMANENTLY STABILIZED AS THE WORK PROGRESSES IN INCREMENTS NOT TO EXCEED 10' (3000) MEASURED ALONG THE SLOPE.
 - 4.) CROSS SLOPES SHALL BE 2% MINIMUM, 6% MAXIMUM.



**DELAWARE
DEPARTMENT OF TRANSPORTATION**

INCREMENTAL STABILIZATION

STANDARD NO.

E-1 (2001)

SHT.

1

OF

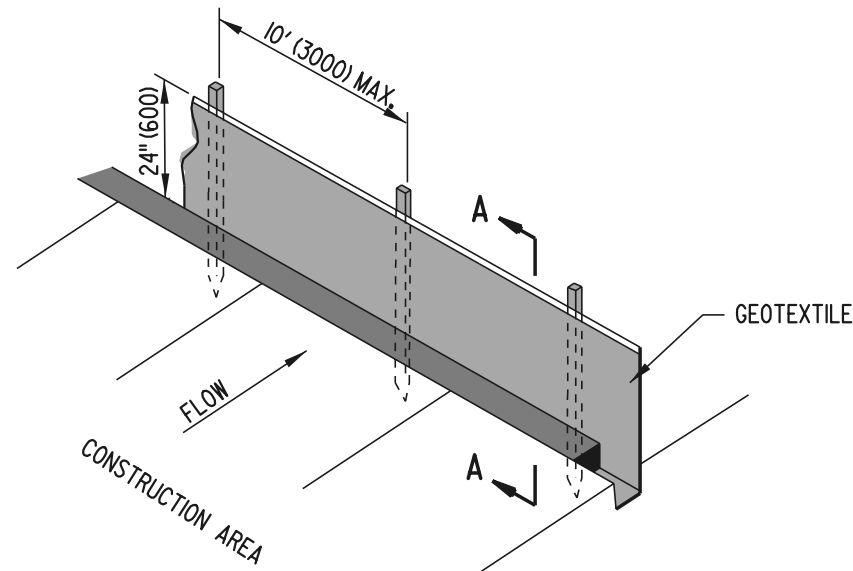
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APPROVED

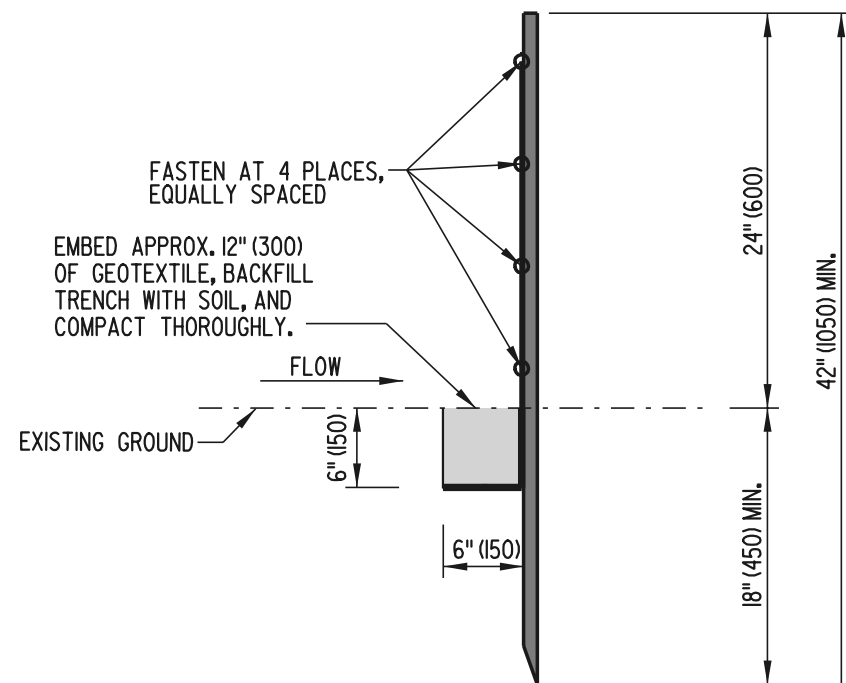
Ryan M. Harkness
CHIEF ENGINEER
DATE 6/18/01

RECOMMENDED

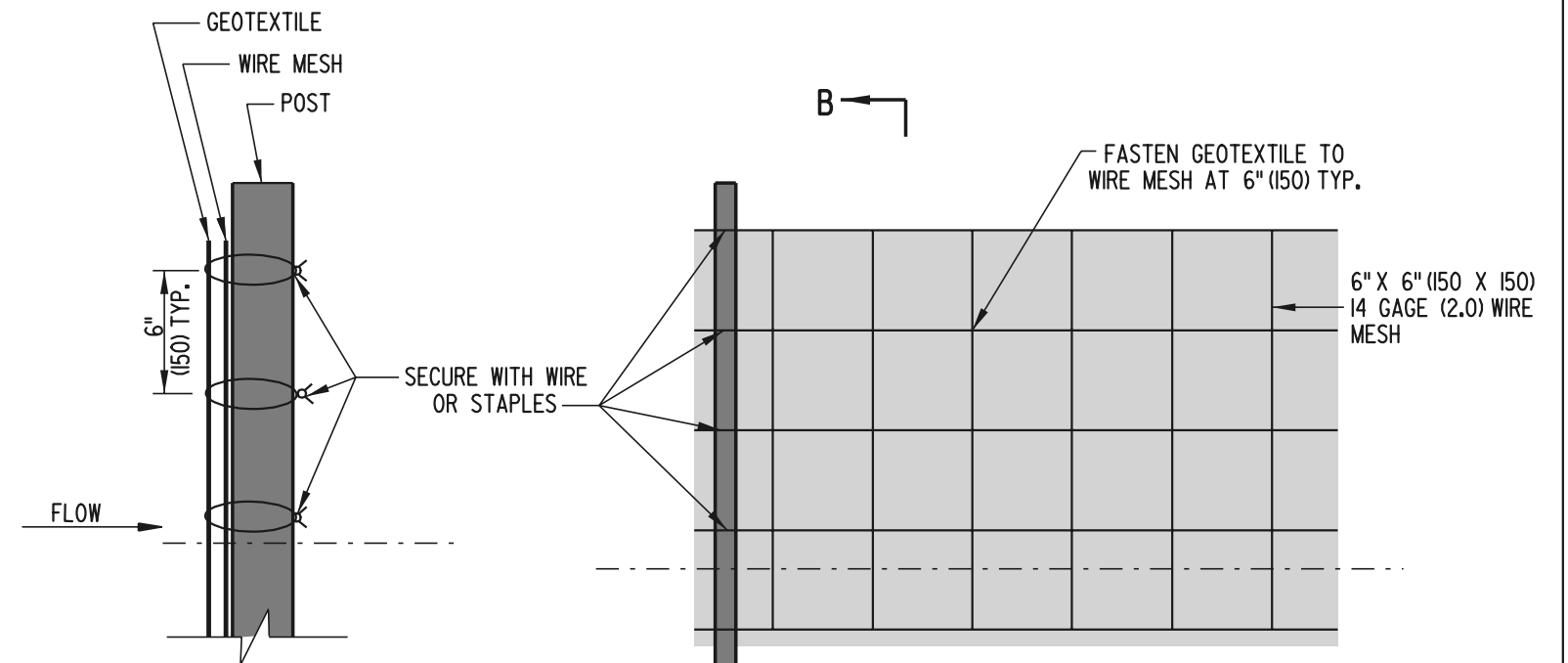
Michael P. Gotsch
DESIGN ENGINEER
DATE 6/18/01



ISOMETRIC VIEW



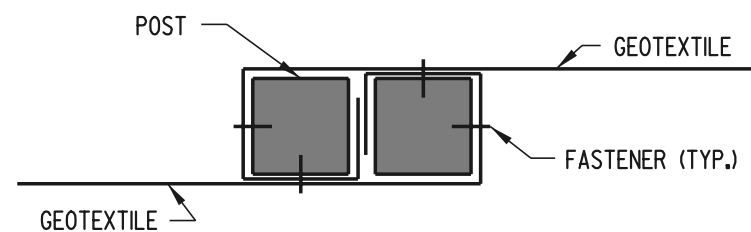
SECTION A-A



SECTION B-B

ELEVATION

**WIRE MESH DETAIL
(REINFORCED SILT FENCE ONLY)**



CONNECTON DETAIL

FOR USE WITH JOINING TWO
ADJACENT SILT FENCE SECTIONS

NOTE: THIS DEVICE IS INTENDED TO CONTROL SHEET FLOW ONLY.
IT SHALL NOT BE USED IN AREAS OF CONCENTRATED FLOW.

PLAN SYMBOL

_____ S.F. _____ S.F. _____
 (REINFORCED) _____ R.S.F. _____ R.S.F. _____



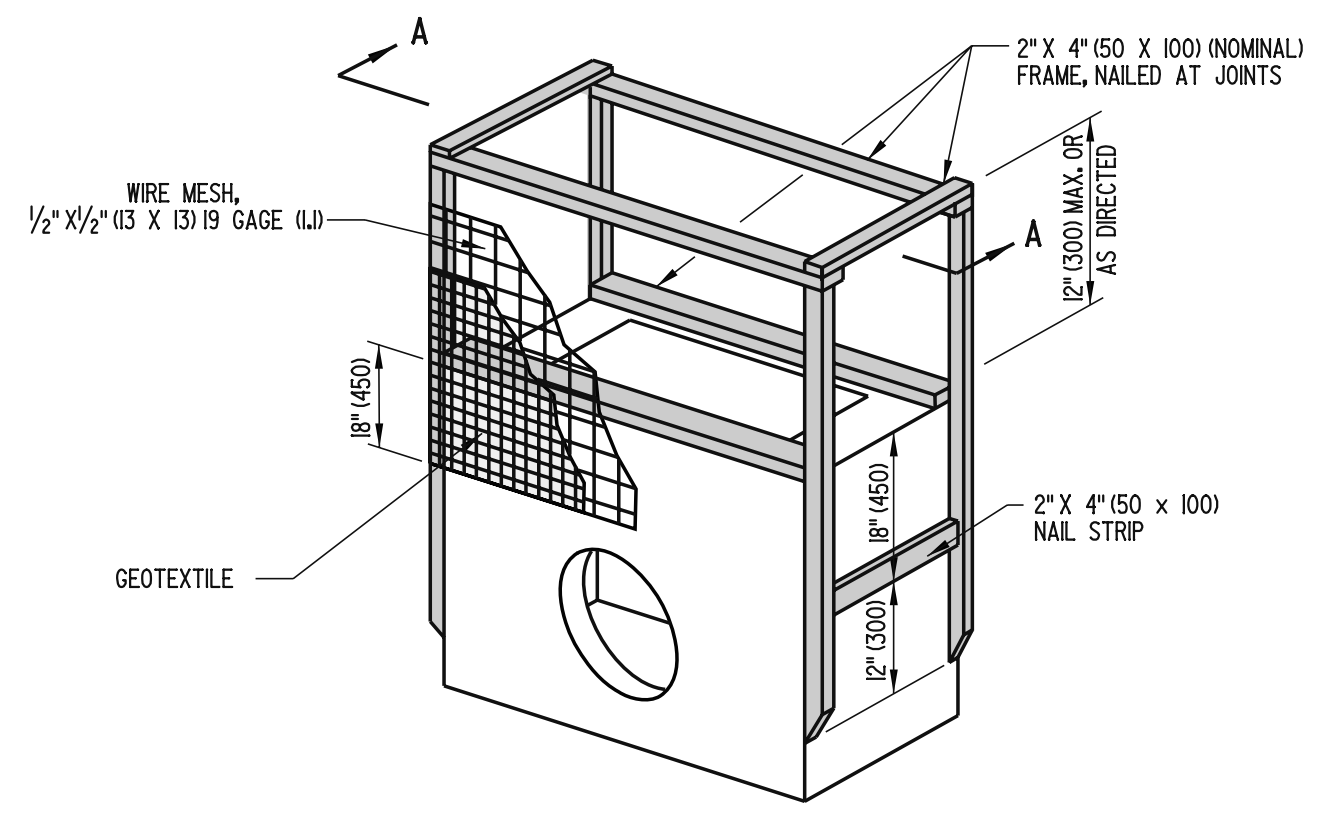
**DELAWARE
DEPARTMENT OF TRANSPORTATION**

SILT FENCE

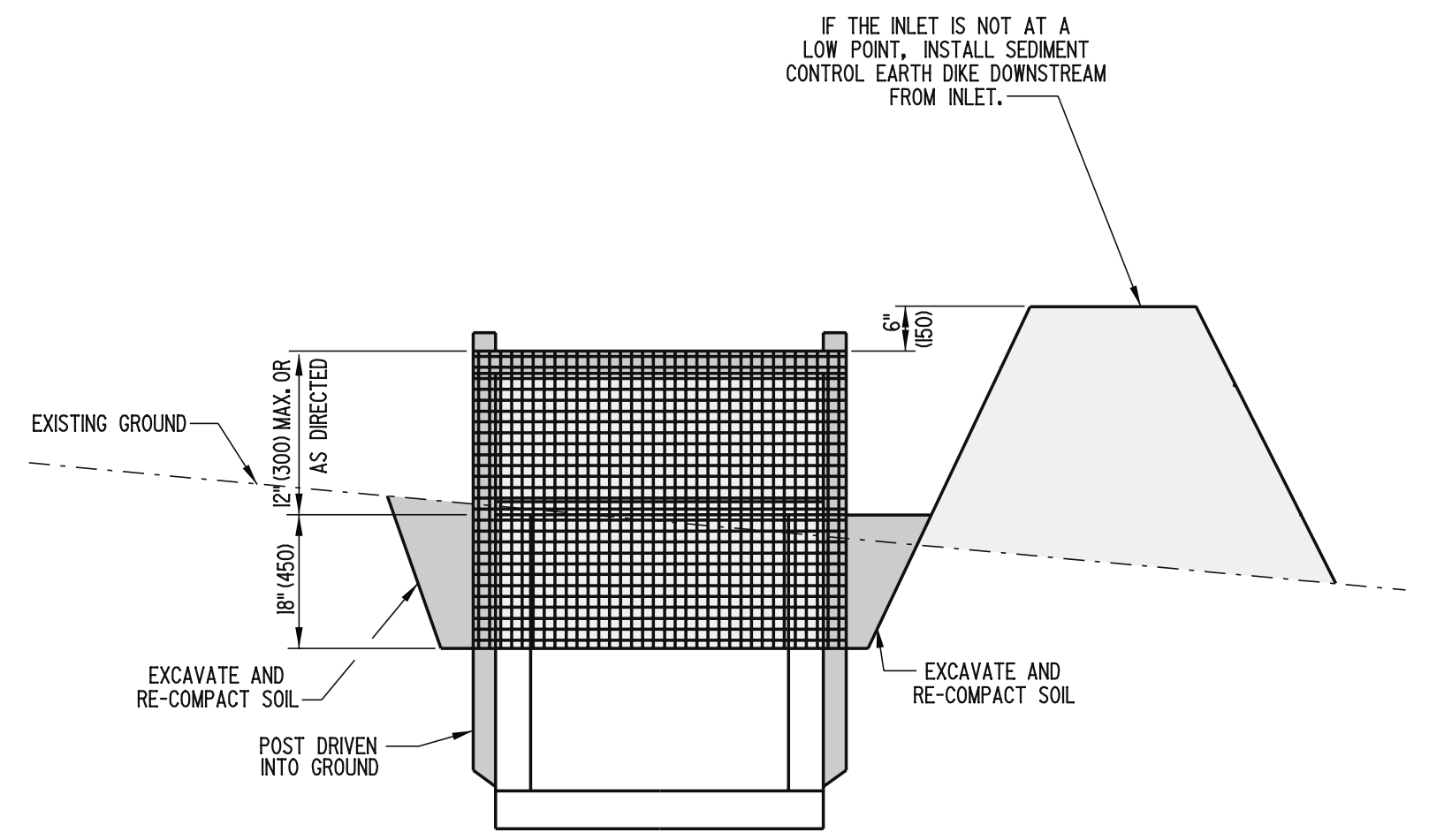
STANDARD NO. **E-2 (2001)**

SHT. **1** OF **1**

APPROVED *Ryan M. Hershman* **6/18/01**
CHIEF ENGINEER DATE
RECOMMENDED *Michael P. Gotsch* **6/18/01**
DESIGN ENGINEER DATE



ISOMETRIC VIEW



SECTION A-A



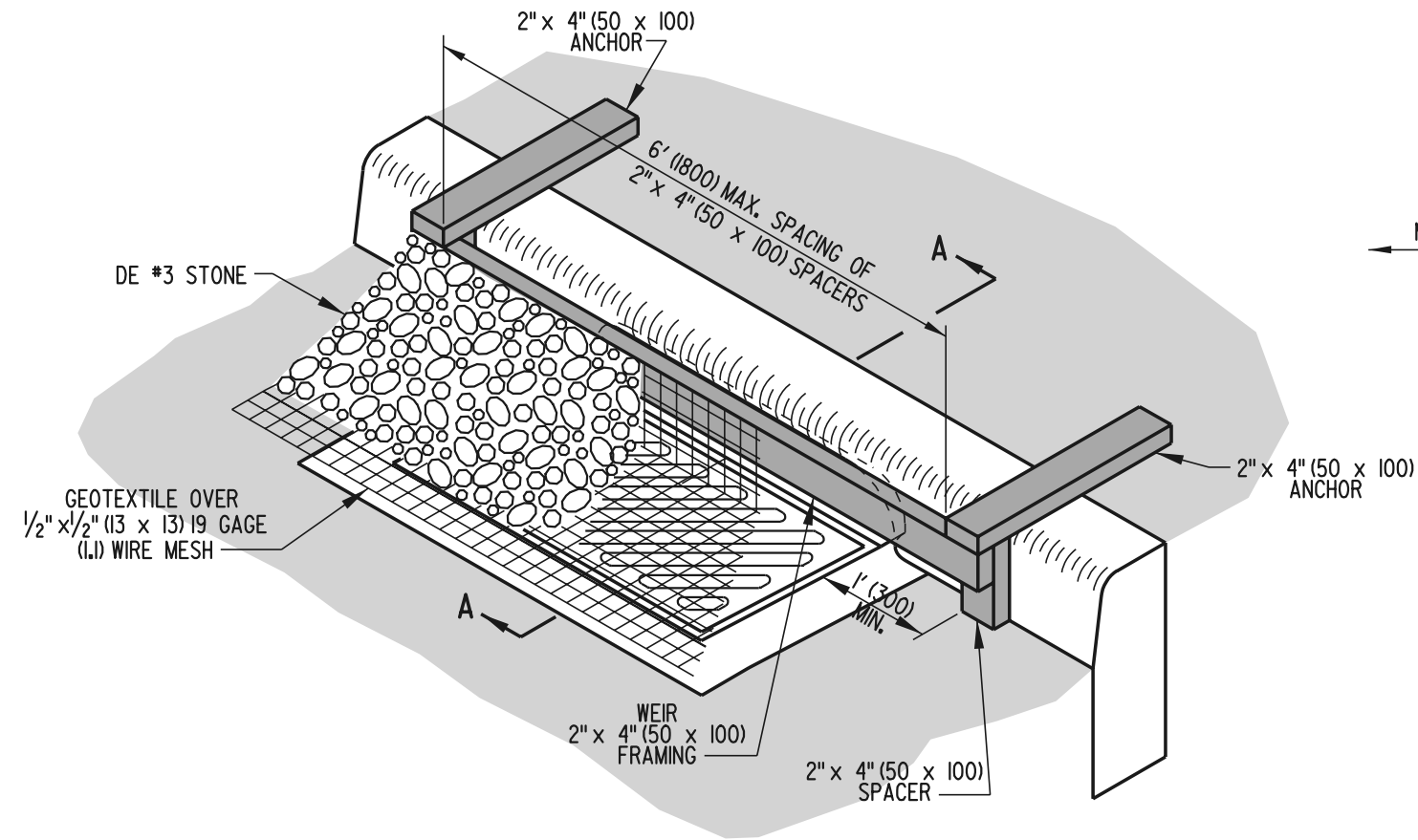
DELAWARE
DEPARTMENT OF TRANSPORTATION

DRAINAGE INLET SEDIMENT CONTROL

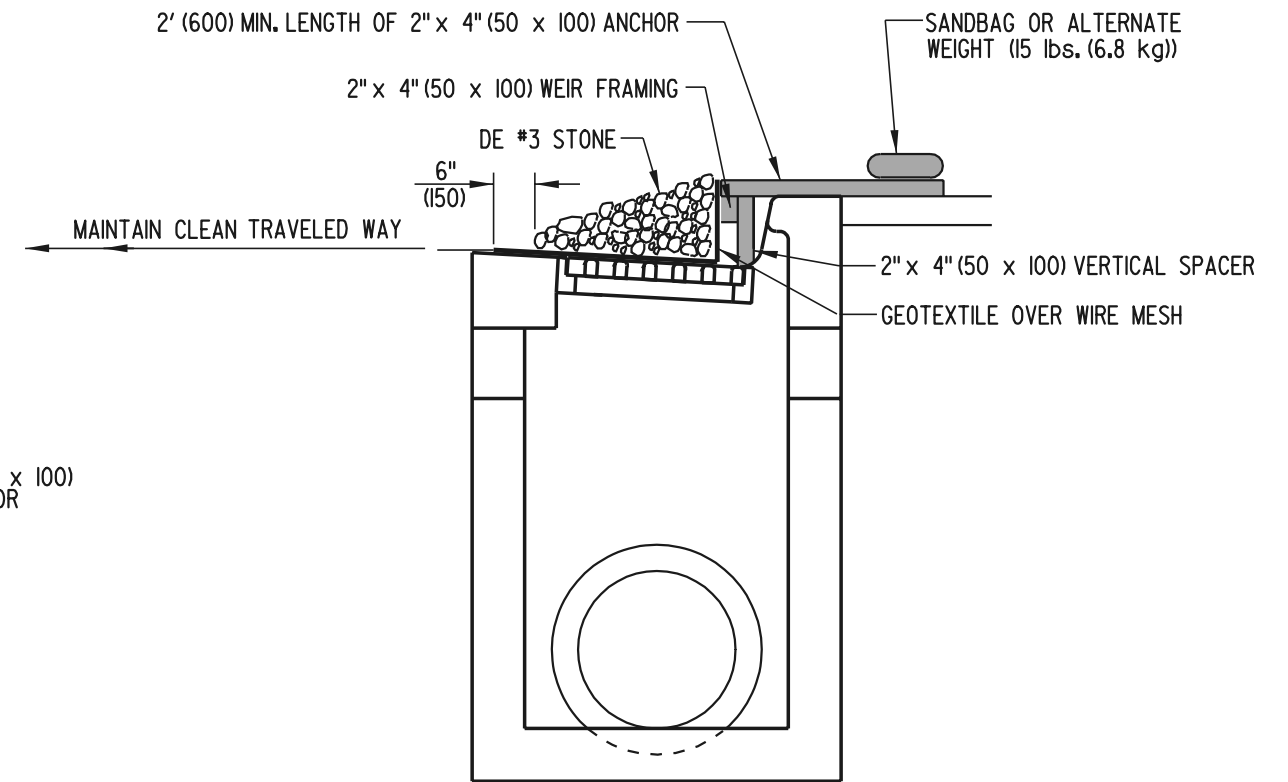
STANDARD NO. E-3 (2005)

SHT. 1 OF 1

APPROVED *Carolann Wick* 12/5/05
CHIEF ENGINEER DATE
RECOMMENDED *James M. O'Brien* 11/29/05
DESIGN ENGINEER DATE



ISOMETRIC VIEW



SECTION A-A

PLAN SYMBOL



**DELAWARE
DEPARTMENT OF TRANSPORTATION**

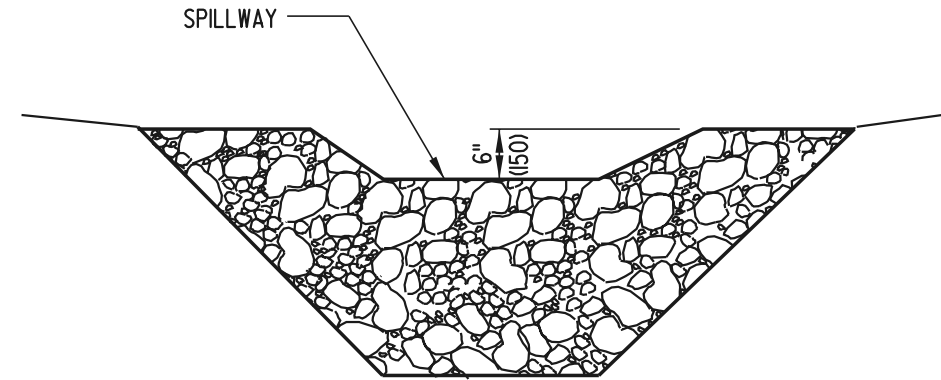
CURB INLET SEDIMENT CONTROL

STANDARD NO. E-4 (2001)

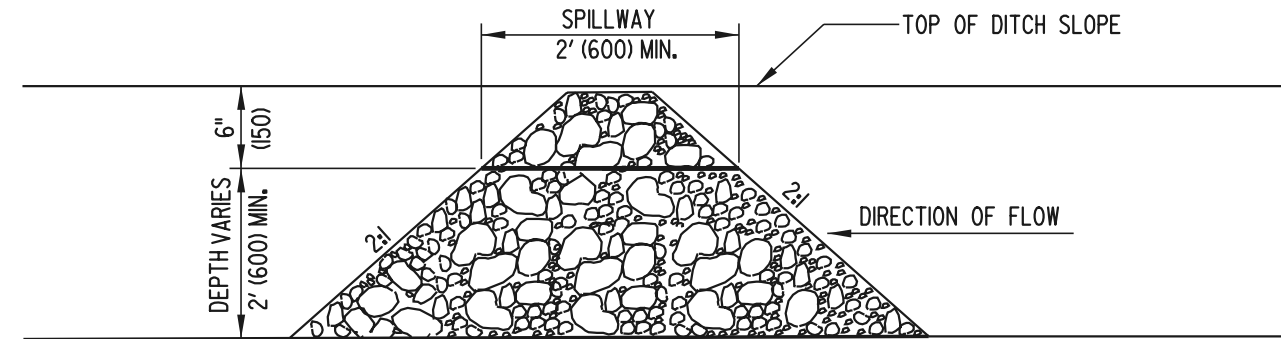
SHT. 1 OF 1

APPROVED *Ryan M. Harkness* **6/18/01**
CHIEF ENGINEER DATE

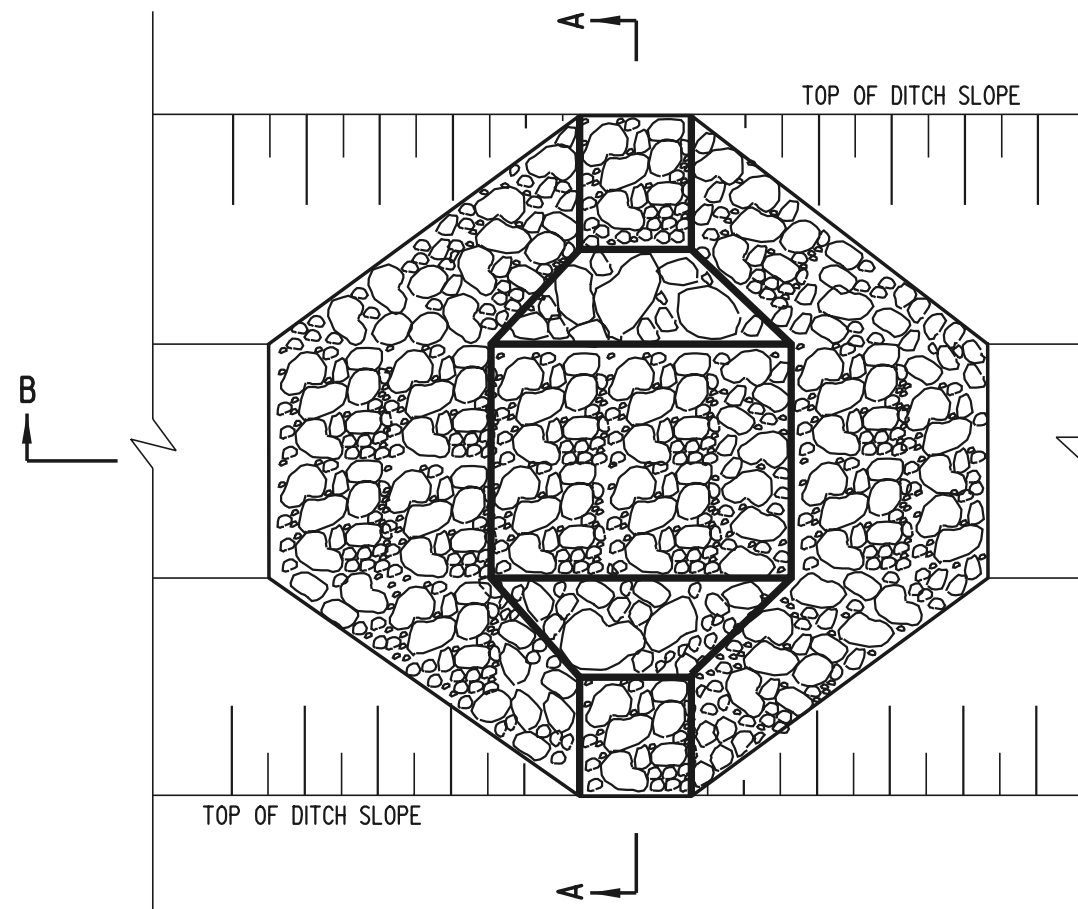
RECOMMENDED *Michael P. Gotsch* **6/18/01**
DESIGN ENGINEER DATE



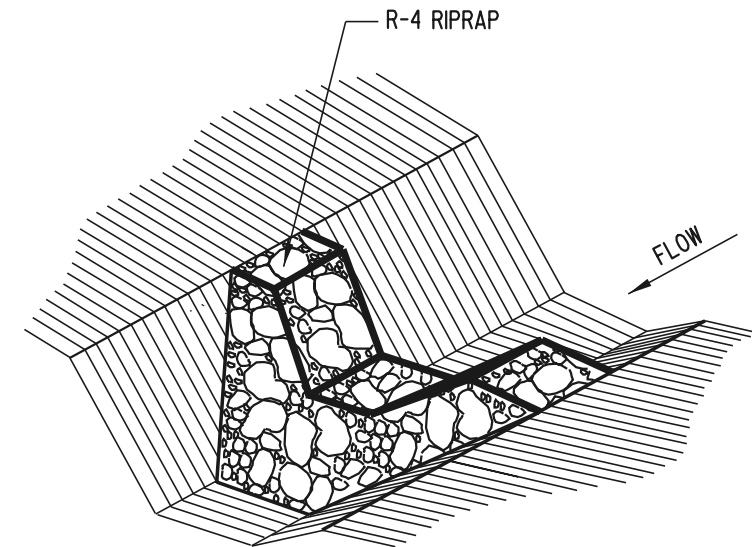
SECTION A-A



SECTION B-B



PLAN



ISOMETRIC VIEW

- NOTES:** 1). STONE CHECK DAMS ARE INTENDED FOR USE IN EXISTING, PROPOSED, AND TEMPORARY DITCHES OF ALL TYPES AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.
2). FOR DITCHES LESS THAN 30" (750) IN DEPTH, PLACE DAM AS DIRECTED.

PLAN SYMBOL



**DELAWARE
DEPARTMENT OF TRANSPORTATION**

STONE CHECK DAM

STANDARD NO.

E-5 (2001)

SHT.

1

OF

1

APPROVED

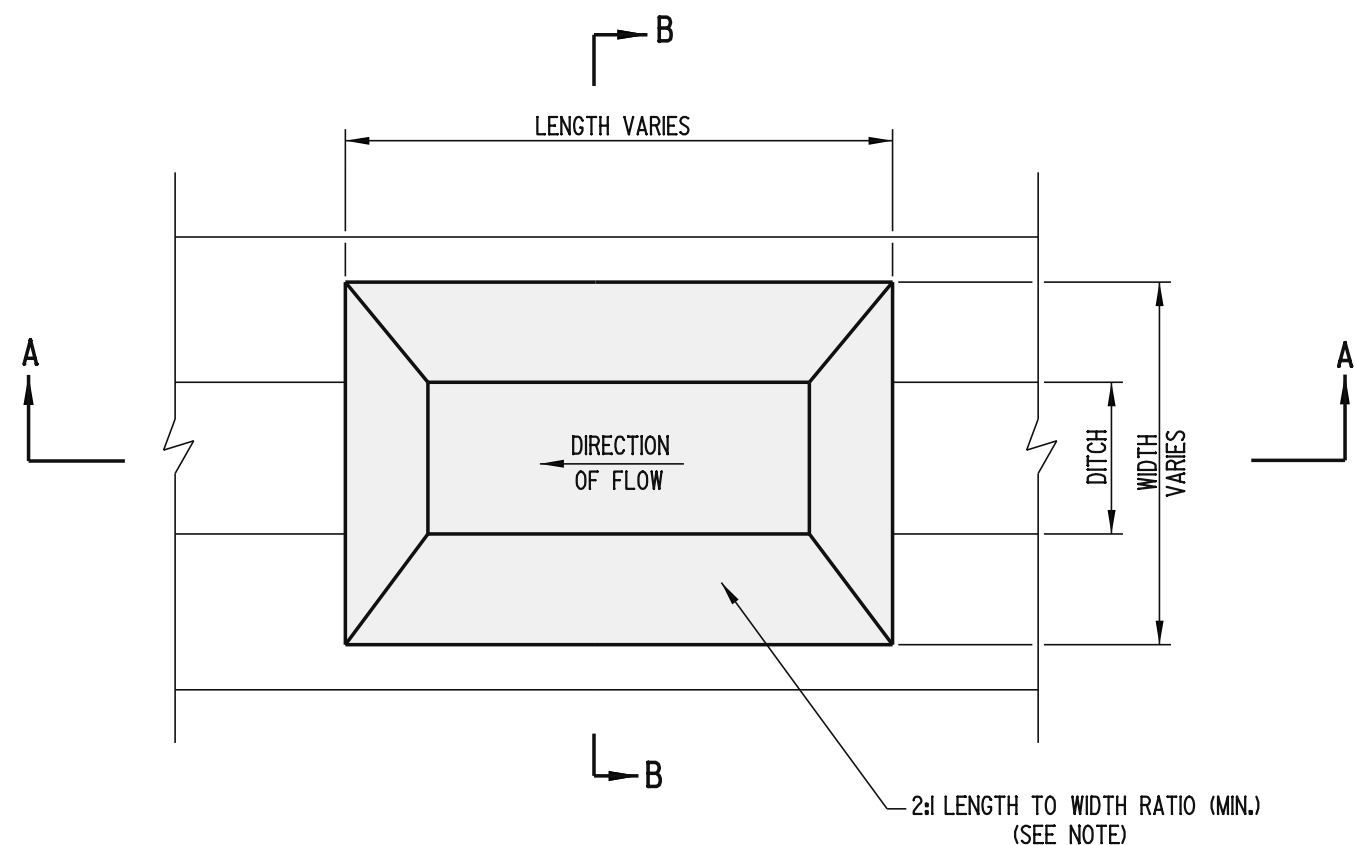
Ryan M. Hershman
CHIEF ENGINEER

6/18/01
DATE

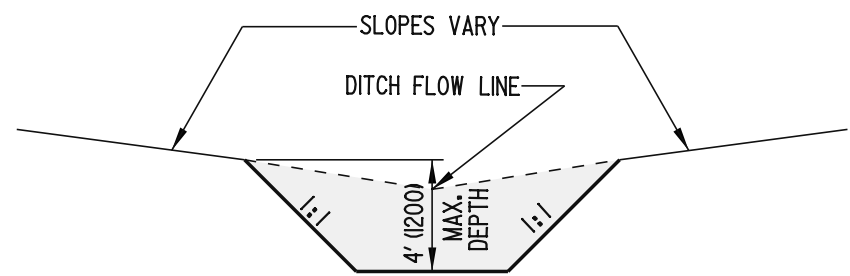
RECOMMENDED

Michael P. Gotsch
DESIGN ENGINEER

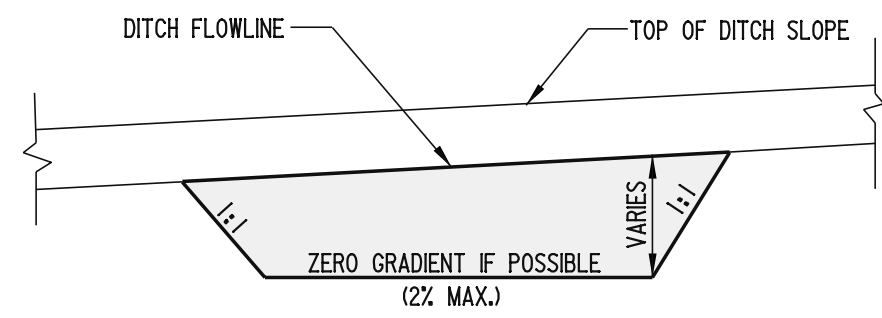
6/18/01
DATE



PLAN



SECTION B-B



SECTION A-A

- NOTES:**
- 1). SEDIMENT TRAPS ARE INTENDED FOR USE IN EXISTING, PROPOSED, AND TEMPORARY DITCHES OF ALL TYPES WITH A MAXIMUM DRAINAGE AREA OF 15 ACRES (6 HECTARES), AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.
 - 2). SIDE SLOPES SHALL BE STABILIZED WITH "TEMPORARY GRASS SEEDING, DRY GROUND" AND STRAW MULCH.
 - 3). AN OUTLET STRUCTURE IS REQUIRED. STONE CHECK DAMS, PERFORATED RISER PIPES, SKIMMER DEWATERING DEVICES, OR DRAINAGE INLETS MAY BE USED. SEE APPROPRIATE STANDARD SHEET FOR ADDITIONAL INFORMATION.
 - 4). FOR SIZE, LOCATION, ETC. OF SEDIMENT TRAP, SEE CONSTRUCTION PHASING, M.O.T., AND EROSION CONTROL PLANS.
 - 5). ALL FILL SLOPES SHALL BE 2:1.
 - 6). A 2:1 LENGTH TO WIDTH RATIO SHOULD BE ACHIEVED WHERE POSSIBLE. IF THIS IS NOT POSSIBLE, THE USE OF BAFFLES OR OTHER SPECIAL DESIGNS SHOULD BE INCORPORATED TO INCREASE FLOW TIME.



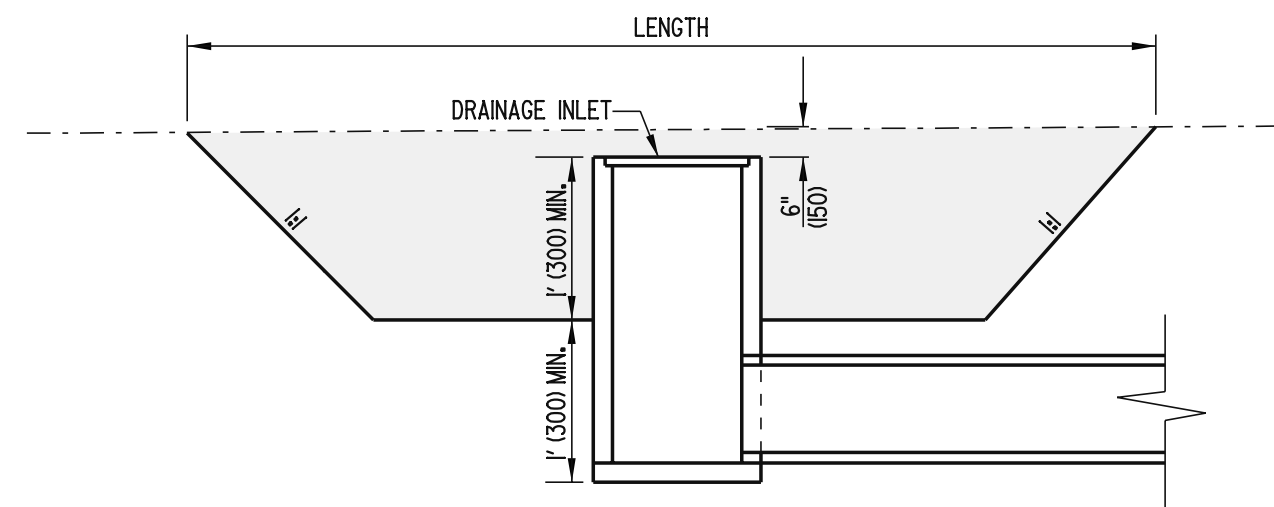
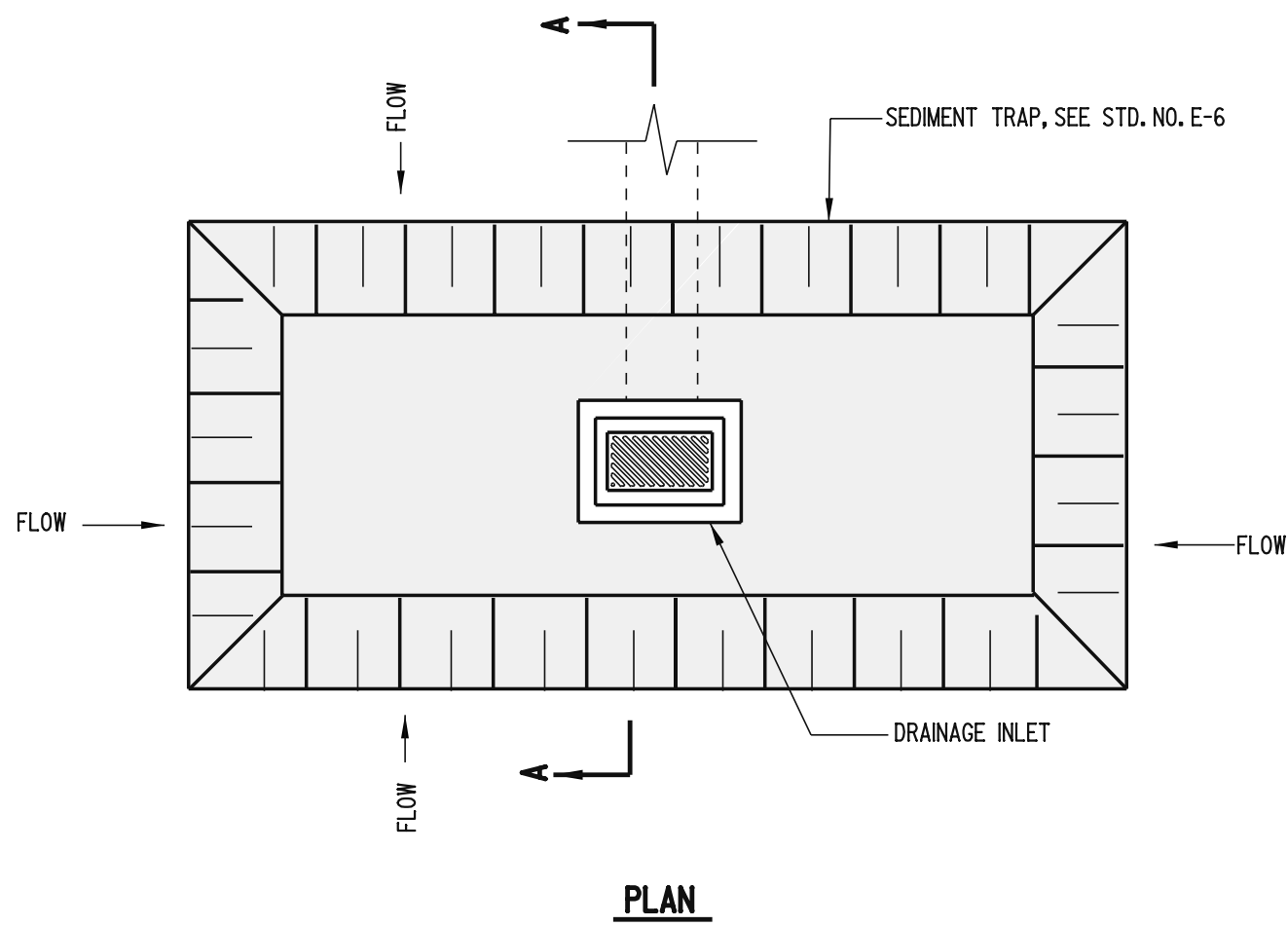
DELAWARE
DEPARTMENT OF TRANSPORTATION

SEDIMENT TRAP


STANDARD NO. E-6 (2005)

SHT. 1 OF 1

APPROVED *Carolann Wick* 12/5/05
CHIEF ENGINEER DATE
RECOMMENDED *James M. O'Brien* 11/29/05
DESIGN ENGINEER DATE

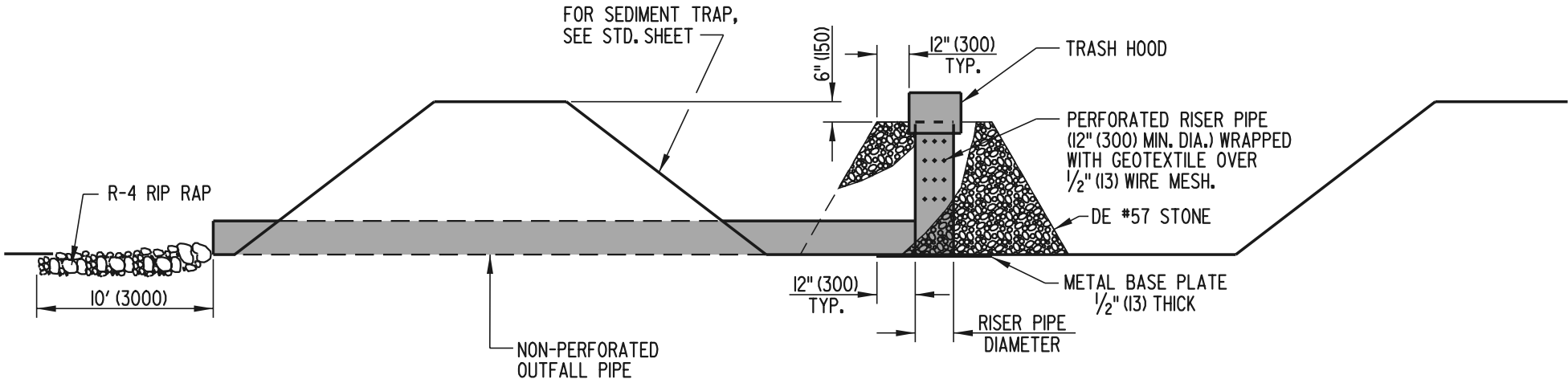


- NOTES:
- 1). THE WORK SHALL CONSIST OF THE CONSTRUCTION OF A SEDIMENT TRAP AROUND A DRAINAGE INLET TO ALLOW SEDIMENTATION TO OCCUR BEFORE RUNOFF ENTERS THE DRAINAGE INLET.
 - 2). DRAINAGE INLET SEDIMENT TRAPS SHALL BE LIMITED TO A THREE (3) ACRE (1.2 HECTRARE) MAXIMUM DRAINAGE AREA.
 - 3). THE DIMENSIONS OF THE DRAINAGE INLET SEDIMENT TRAP ARE TO BE AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

 DELAWARE DEPARTMENT OF TRANSPORTATION	SEDIMENT TRAP, USING DRAINAGE INLET AS OUTLET			APPROVED <i>Carolann Wick</i> 12/5/05 CHIEF ENGINEER DATE
	STANDARD NO. E-7 (2005)	SHT. 1	OF 1	RECOMMENDED <i>James M. O'Brien</i> 11/29/05 DESIGN ENGINEER DATE

MIN. * OUTFALL PIPE DIA.	MIN. RISER DIA.	MAX. DRAINAGE AREA ACRES (ha)
12" (300)	15" (375)	1 (0.4)
15" (375)	18" (450)	2 (0.8)
18" (450)	21" (525)	3 (1.2)
21" (525)	24" (600)	4 (1.6)
24" (600)	27" (675)	5 (2.0)

* OUTFALL PIPE DIAMETER MAY BE SAME SIZE AS RISER DIAMETER.



ELEVATION

- NOTES:**
- 1). THIS DEVICE IS INTENDED TO BE USED AS AN OUTLET FOR SEDIMENT TRAPS.
 - 2). PERFORATIONS SHALL BE 1" (25) IN DIAMETER, LOCATED IN CONCAVE PORTIONS OF PIPE, SPACED 6" (150) HORIZONTALLY AND VERTICALLY, AND SHALL NOT BE MADE ANY LOWER THAN 6" (150) ABOVE THE TOP OF THE OUTFALL PIPE.
 - 3). THE PIPE OUTLET SHOWN SHALL ONLY BE USED WITH SEDIMENT TRAPS WITH DRAINAGE AREAS OF 5 ACRES (2.0 HECTARES) OR LESS. LARGER DRAINAGE AREAS WILL REQUIRE AN ENGINEERED DESIGN.

PLAN SYMBOL



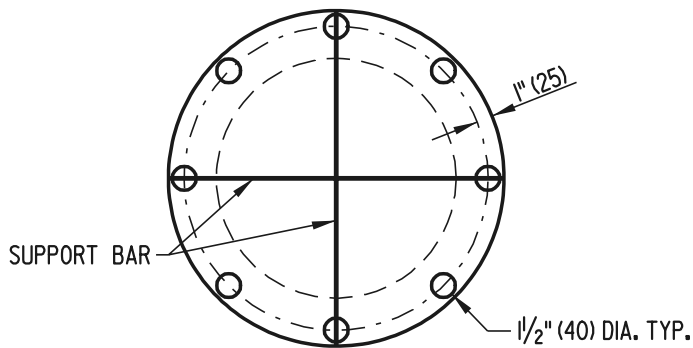
DELAWARE
DEPARTMENT OF TRANSPORTATION

RISER PIPE ASSEMBLY FOR SEDIMENT TRAP

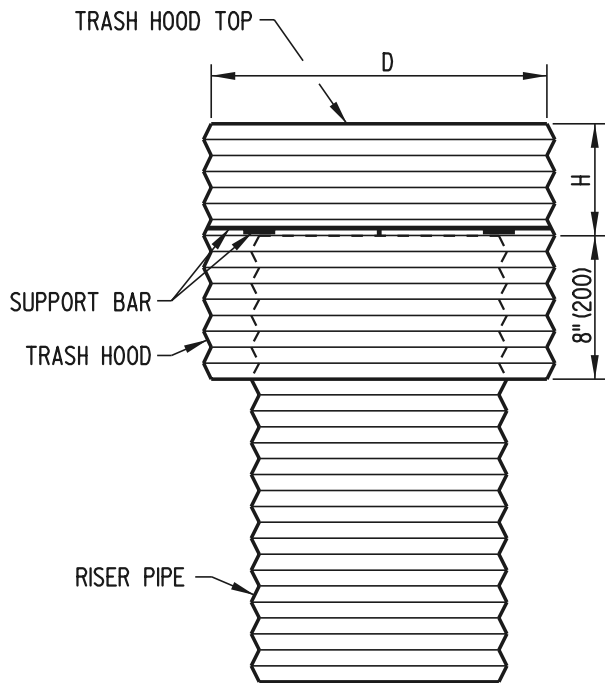
STANDARD NO. E-8 (2001)

SHT. 1 OF 2

APPROVED *Ryan M. Harkins* 6/18/01
CHIEF ENGINEER DATE
RECOMMENDED *Michael P. Gotsch* 6/18/01
DESIGN ENGINEER DATE

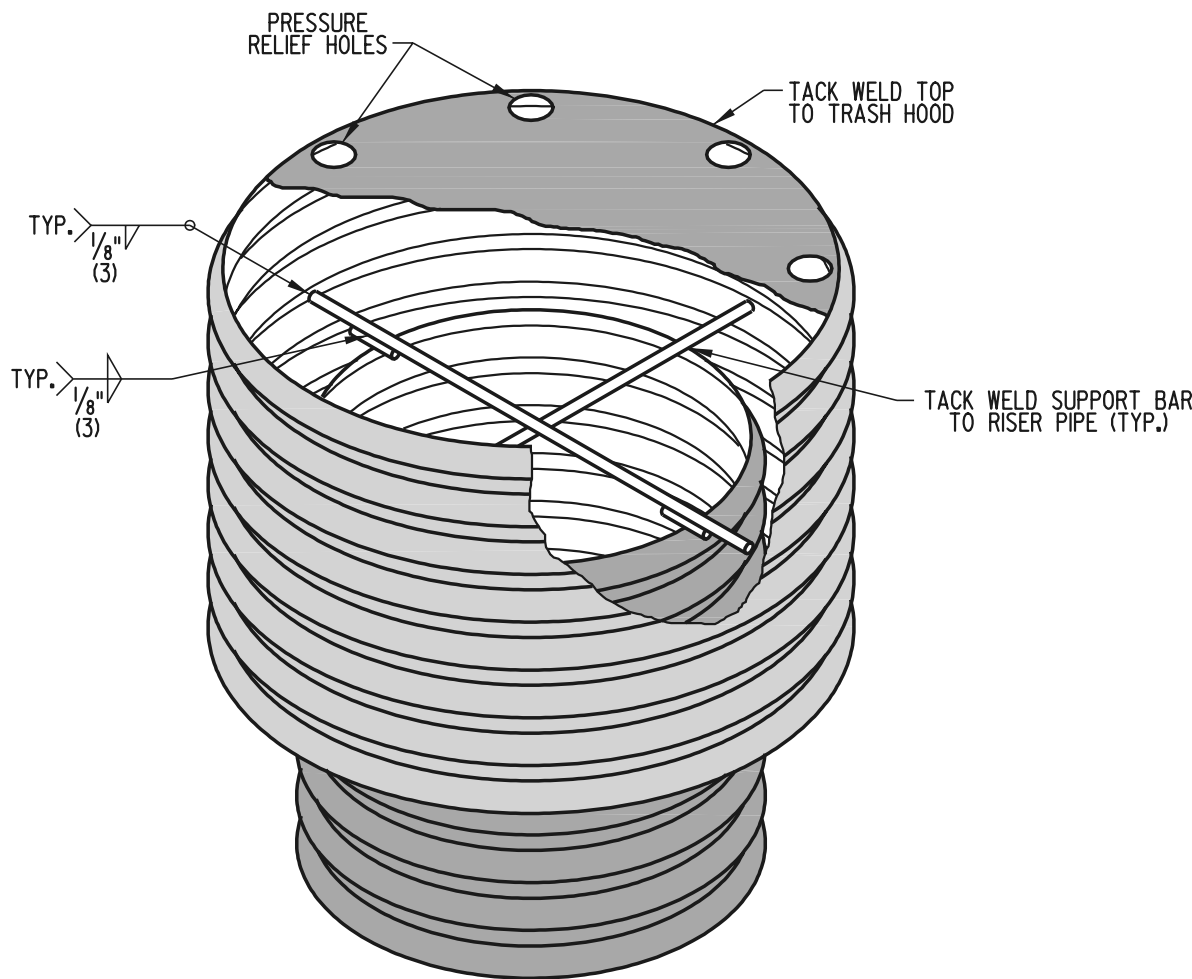


PLAN



FRONT

TRASH HOOD CHART					
RISER PIPE DIAMETER	D	H	TRASH HOOD THICK. (GAGE)	MINIMUM SIZE SUPPORT BAR	MINIMUM TOP THICK. (GAGE)
15" (375)	21" (525)	7" (175)	16 (1.6)	#6 (#19) REBAR	16 (1.6)
18" (450)	27" (675)	8" (200)	16 (1.6)	#6 (#19) REBAR	16 (1.6)
21" (525)	30" (750)	11" (275)	16 (1.6)	#6 (#19) REBAR	16 (1.6)
24" (600)	36" (900)	13" (330)	16 (1.6)	#6 (#19) REBAR	14 (2.0)
27" (675)	42" (1050)	15" (380)	16 (1.6)	#6 (#19) REBAR	14 (2.0)
36" (900)	54" (1350)	17" (430)	14 (2.0)	#8 (#25) REBAR	12 (2.7)



ISOMETRIC VIEW

PLAN SYMBOL



TRASH HOOD DETAILS



DELAWARE
DEPARTMENT OF TRANSPORTATION

RISER PIPE ASSEMBLY FOR SEDIMENT TRAP

STANDARD NO. E-8 (2001)

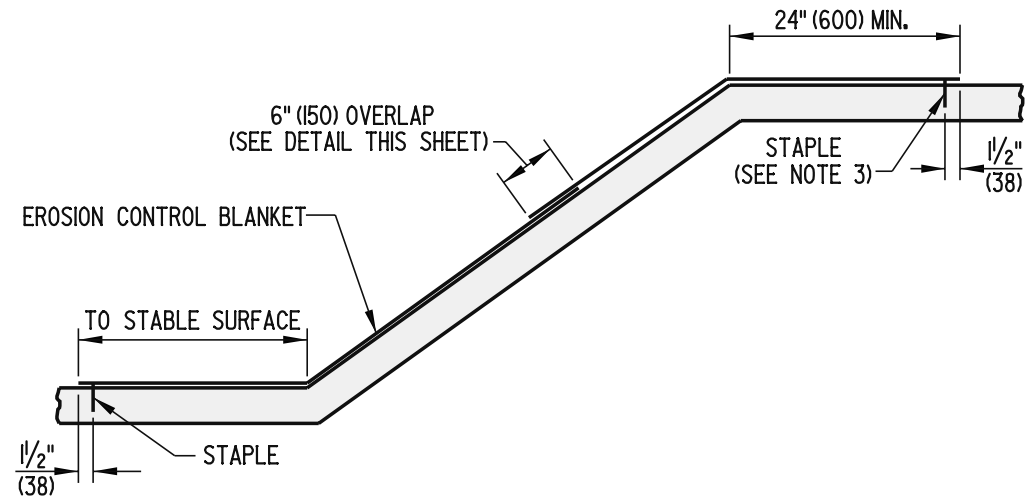
SHT. 2 OF 2

APPROVED

Ryan M. Harkness
CHIEF ENGINEER
DATE 6/18/01

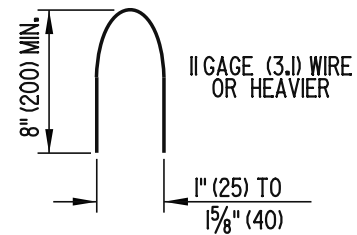
RECOMMENDED

Mehal Akbar
DESIGN ENGINEER
DATE 6/18/01

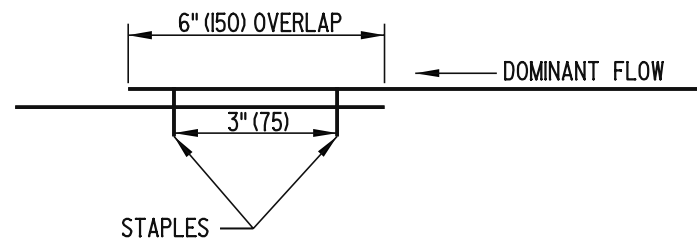


STABILIZATION OF EMBANKMENTS

- NOTES:**
1. STAPLES TO BE STAGGERED AT 18" (450) SPACING.
 2. TOPSOIL UNDER EROSION CONTROL BLANKET IS TO BE TRACKED AND SEEDED.
 3. WHEN OFFSITE RUNOFF OCCURS, ADDITIONAL MEASURES AS DIRECTED BY THE ENGINEER SHALL BE USED TO ENSURE STABILITY OF EMBANKMENT.

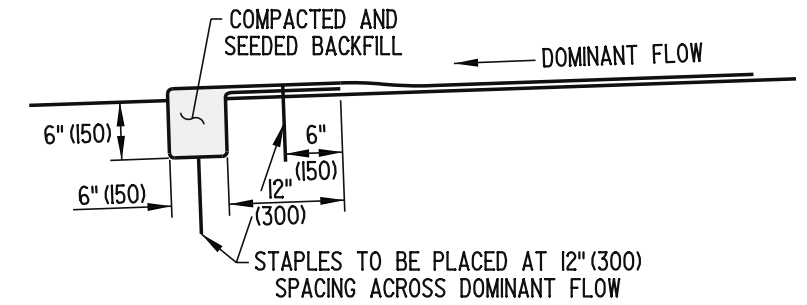


STAPLE DETAIL



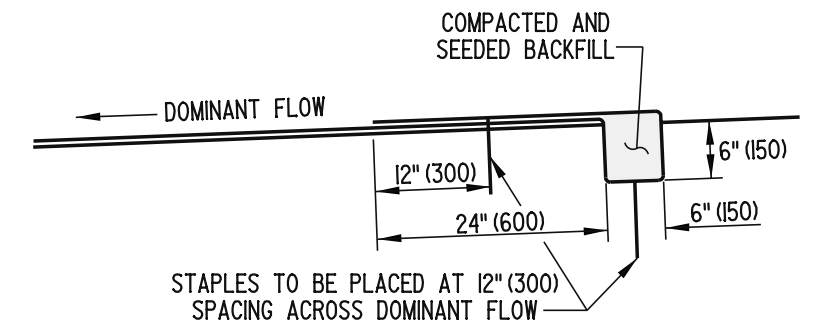
OVERLAP DETAIL

STAPLES TO BE STAGGERED AT 6" (150) SPACING.



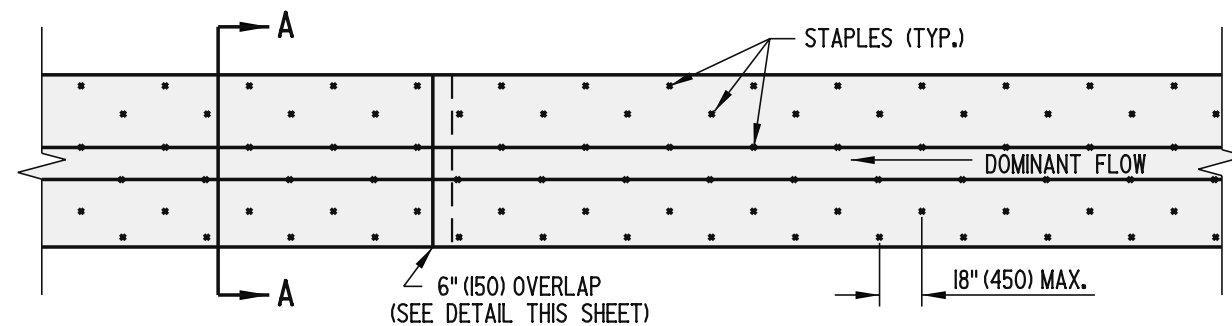
INITIAL TRENCH ANCHOR DETAIL

APPLIED AT THE DOWNSTREAM END OF DITCH



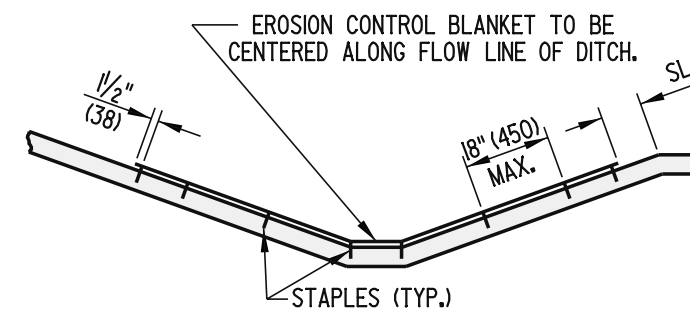
TERMINAL TRENCH ANCHOR DETAIL

APPLIED AT THE UPSTREAM END OF DITCH



STABILIZATION OF DITCHES PLAN

- NOTES:**
1. ADDITIONAL STAPLES NOT SHOWN ARE REQUIRED AT OVERLAPS. SEE OVERLAP DETAIL FOR STAPLE PLACEMENT.
 2. STAPLES ARE TO BE STAGGERED.
 3. TOPSOIL UNDER EROSION CONTROL BLANKET IS TO BE TRACKED AND SEEDED.



STABILIZATION OF DITCHES SECTION A-A

STAPLES ALONG LONGITUDINAL EDGES SHALL BE SPACED AS FOLLOWS:
18" (450) WHEN SL ≤ 20' (6000)
9" (225) WHEN SL > 20' (6000)



DELAWARE
DEPARTMENT OF TRANSPORTATION

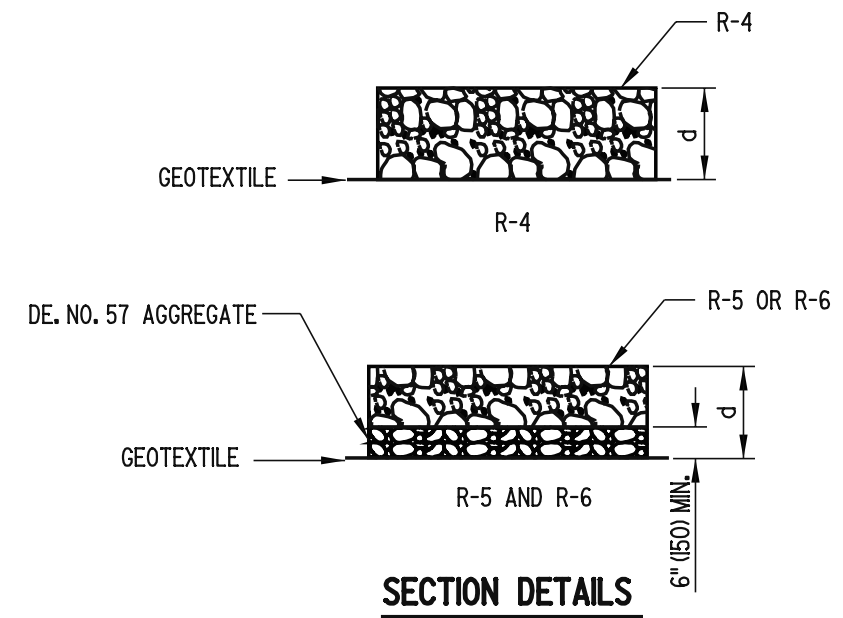
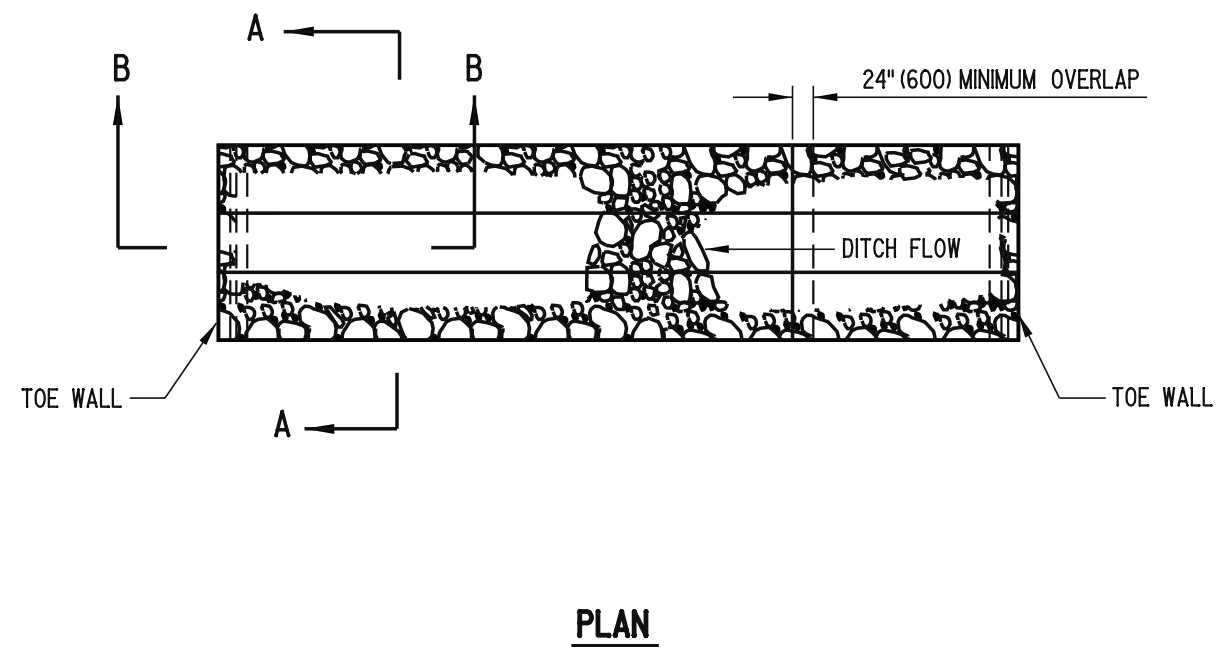
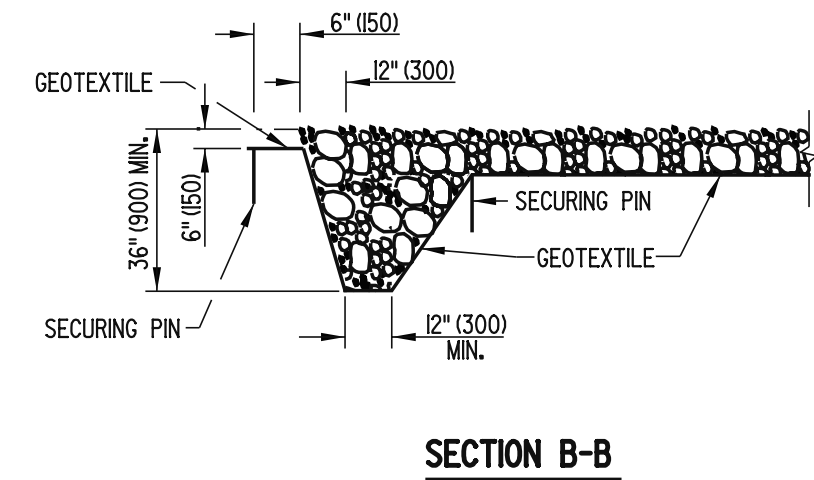
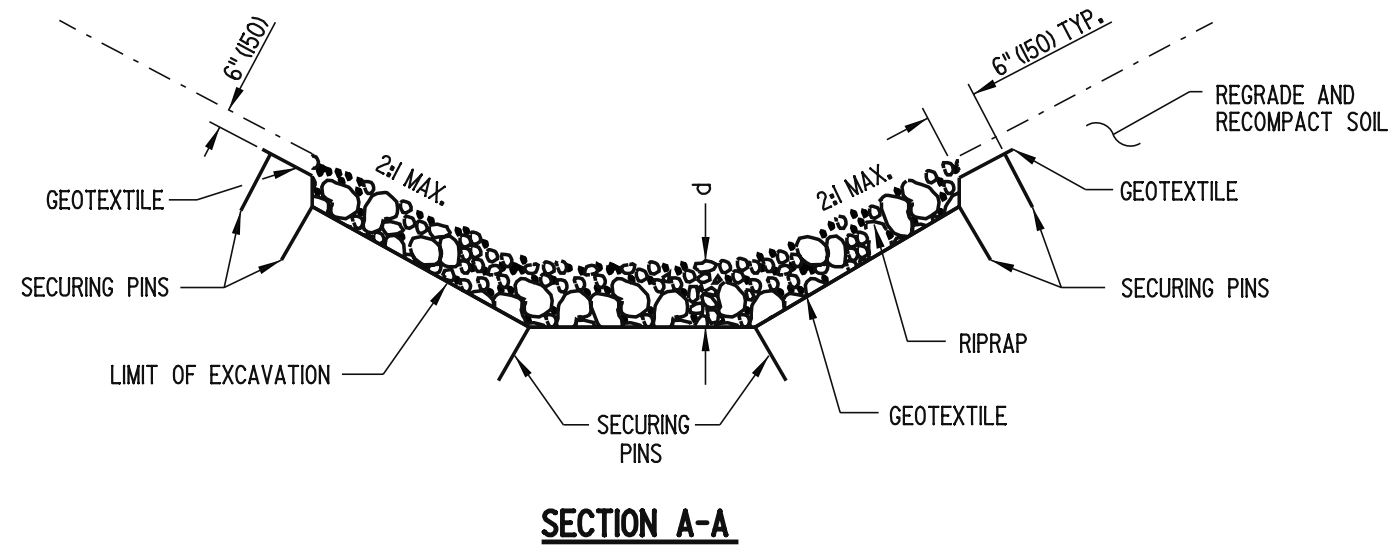
EROSION CONTROL BLANKET APPLICATIONS

STANDARD NO. E-9 (2005)

SHT. 1 OF 1

APPROVED *Carolann Wick* 12/5/05
CHIEF ENGINEER DATE

RECOMMENDED *James M. O'Brien* 11/29/05
DESIGN ENGINEER DATE



CLASS RIPRAP

R-4 d = 14" (350) MIN.
R-5 d = 26" (650) MIN.
R-6 d = 34" (850) MIN.

- NOTES:**
- 1). SECURING PINS ARE TO BE PLACED AT LOCATIONS SHOWN AND AT 24"(600) LONGITUDINAL AND LATERAL SPACING.
 - 2). SEE PLANS FOR LOCATION, DIMENSIONS, GRADES, ETC.
 - 3). USE OF R-7 RIPRAP WILL REQUIRE A SEPARATE PROFESSIONAL ENGINEERING DESIGN FOR SIGHT SPECIFIC CONDITIONS.



DELAWARE
DEPARTMENT OF TRANSPORTATION

RIPRAP DITCH

STANDARD NO.

E-10 (2005)

SHT.

OF 1

APPROVED

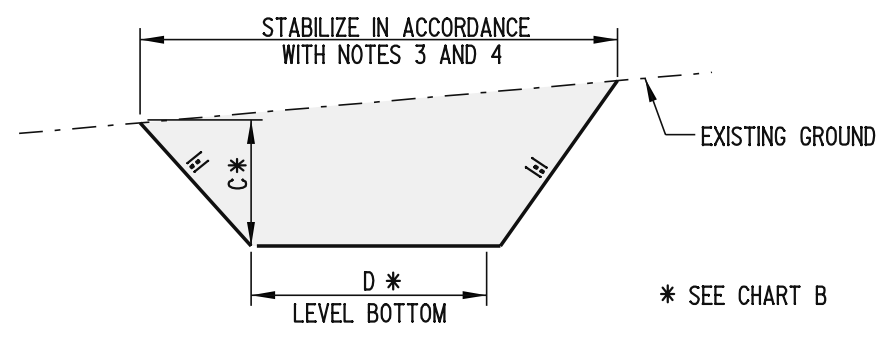
Carolann Wick
CHIEF ENGINEER

DATE 12/5/05

RECOMMENDED

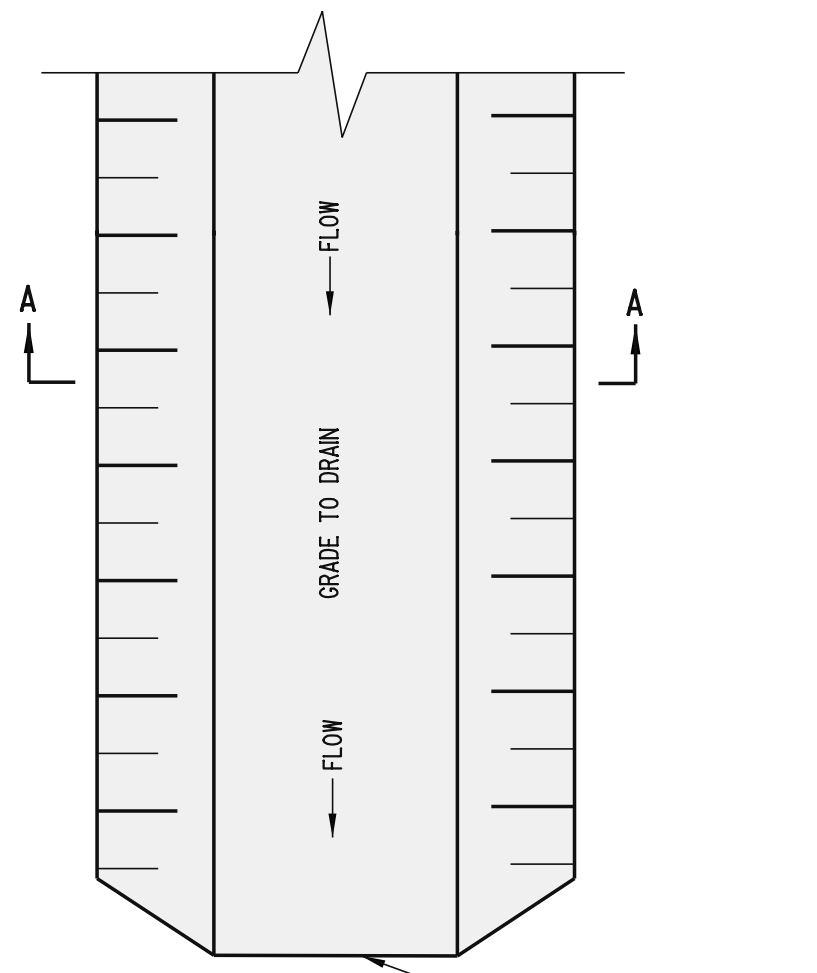
Robert M. O'Brien
DESIGN ENGINEER

11/29/05
DATE



SECTION A-A

CHART A - STABILIZATION			
SYMBOL	SWALE GRADE	TYPE OF TREATMENT	
		DRAINAGE AREA A (5 AC (2 ha) OR LESS)	DRAINAGE AREA B (5 AC - 10 AC (2 ha - 4 ha))
1	0.5-2.0%	SEED USED WITH EROSION CONTROL BLANKET	SEED USED WITH EROSION CONTROL BL.
2	2.1-8.0%	R-4 RIRRAP	R-4 RIRRAP
3	8.1-20%	ENGINEERED DESIGN	ENGINEERED DESIGN




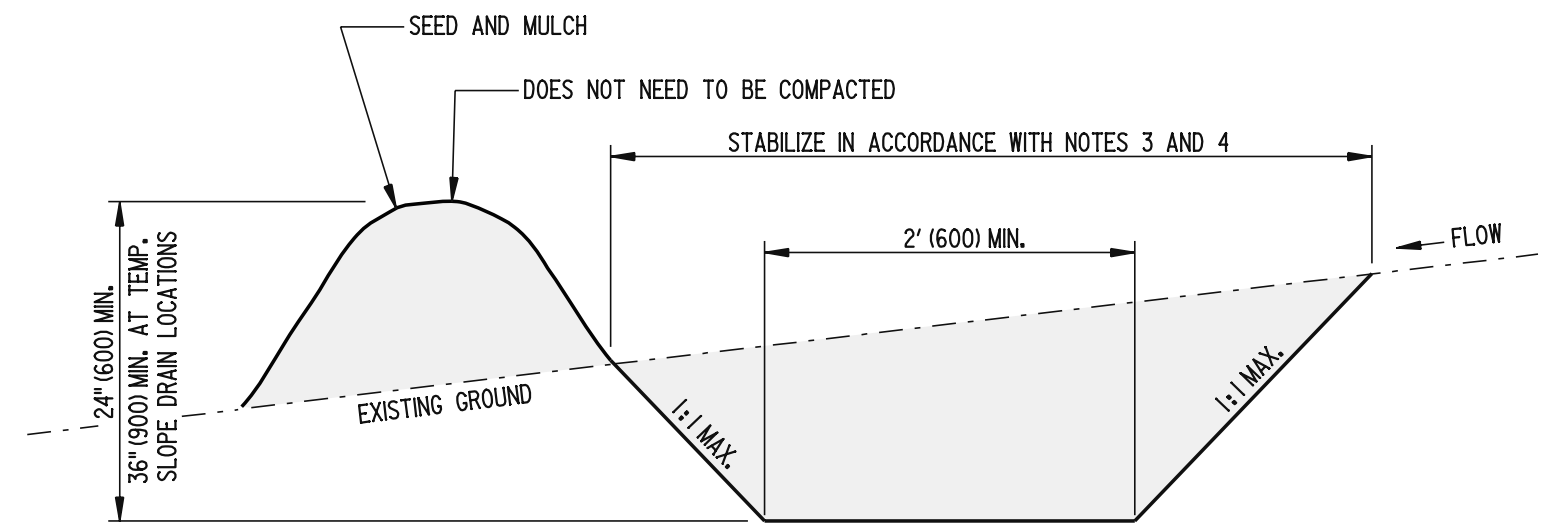
PLAN

CHART B - SWALE DIMENSIONS		
SYMBOL	SWALE A	SWALE B
C	1' (300) MIN.	1' (300) MIN.
D	4' (1200) MIN.	6' (1800) MIN.

SEE SECTION A - A

- NOTES:**
- 1). DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
 - 2). DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
 - 3). IF TEMPORARY SWALES OR CLEAN WATER DIVERSIONS ARE TO BE OPERATIONAL FOR MORE THAN 14 DAYS, THEY SHALL BE STABILIZED IN ACCORDANCE WITH CHART A PRIOR TO BECOMING OPERATIONAL.
 - 4). IF TEMPORARY SWALES OR CLEAN WATER DIVERSIONS ARE TO BE OPERATIONAL FOR LESS THAN 14 DAYS, THEY SHALL BE STABILIZED WITH GEOTEXTILE IN ACCORDANCE WITH THE STANDARD DETAIL, "GEOTEXTILE-LINED CHANNEL DIVERSION".

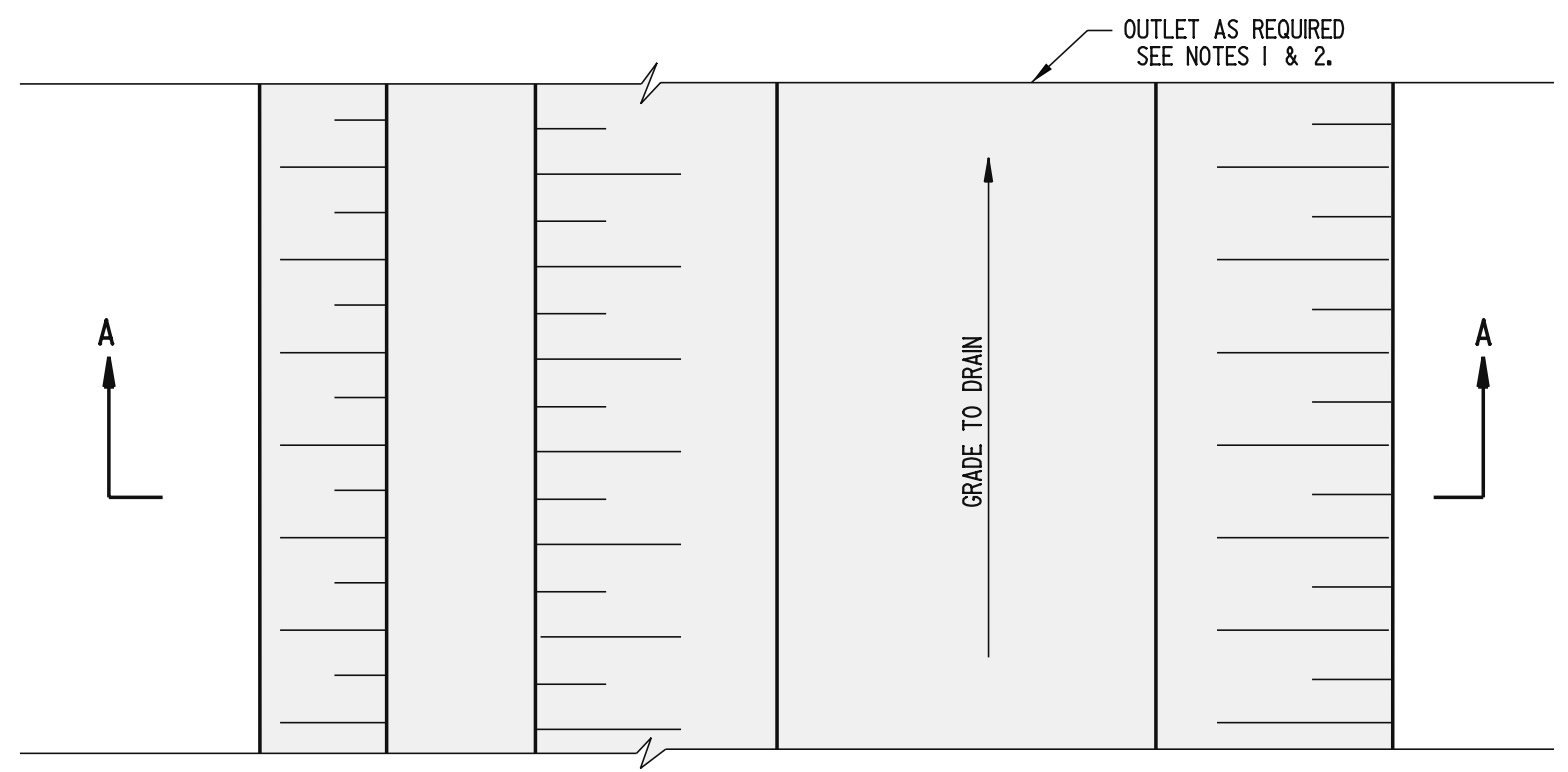
 DELAWARE DEPARTMENT OF TRANSPORTATION	TEMPORARY SWALE			APPROVED <i>Carolann Wick</i> 12/5/05 <small>CHIEF ENGINEER</small> DATE
	STANDARD NO. E-11 (2005)	SHT. 1	OF 1	RECOMMENDED <i>James M. O'Brien</i> 11/29/05 <small>DESIGN ENGINEER</small> DATE



SECTION A-A

CHART A - SWALE STABILIZATION		
SYMBOL	SWALE GRADE	TYPE OF TREATMENT
A-1	0.5-2.0%	SEED AND EROSION CONTROL BLANKET
A-2	2.1-8.0%	LINED R-4 RIPRAP
A-3	8.1-20%	ENGINEERED DESIGN

MAXIMUM DRAINAGE AREA: 2 ACRES (0.8 ha)



PLAN

- NOTES:**
- 1). DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
 - 2). DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
 - 3). IF PERIMETER DIKE SWALES ARE TO BE OPERATIONAL FOR MORE THAN 14 DAYS, THEY SHALL BE STABILIZED IN ACCORDANCE WITH CHART A PRIOR TO BECOMING OPERATIONAL.
 - 4). IF TEMPORARY SWALES OR CLEAN WATER DIVERSIONS ARE TO BE OPERATIONAL FOR LESS THAN 14 DAYS, THEY SHALL BE STABILIZED WITH GEOTEXTILE IN ACCORDANCE WITH THE STANDARD DETAIL, "GEOTEXTILE-LINED CHANNEL DIVERSION".

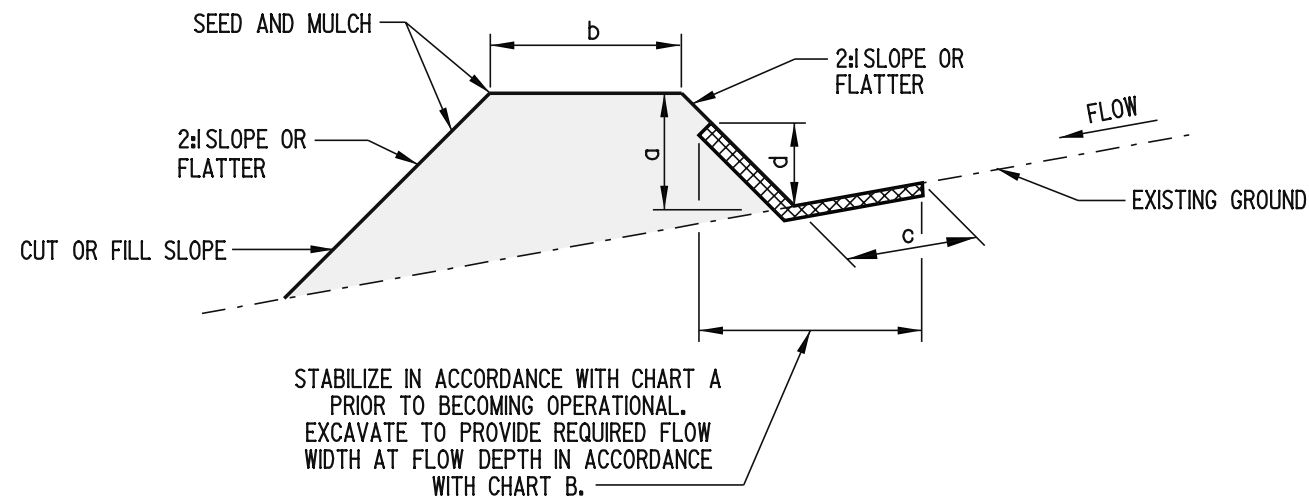


CHART A - FLOW CHANNEL STABILIZATION		
TYPE	CHANNEL GRADE	TYPE OF TREATMENT
1	0.5-2.0%	SEED AND EROSION CONTROL BLANKET
2	2.1-8.0%	R-4 RIPRAP
3	8.1-20%	ENGINEERED DESIGN

SECTION A-A

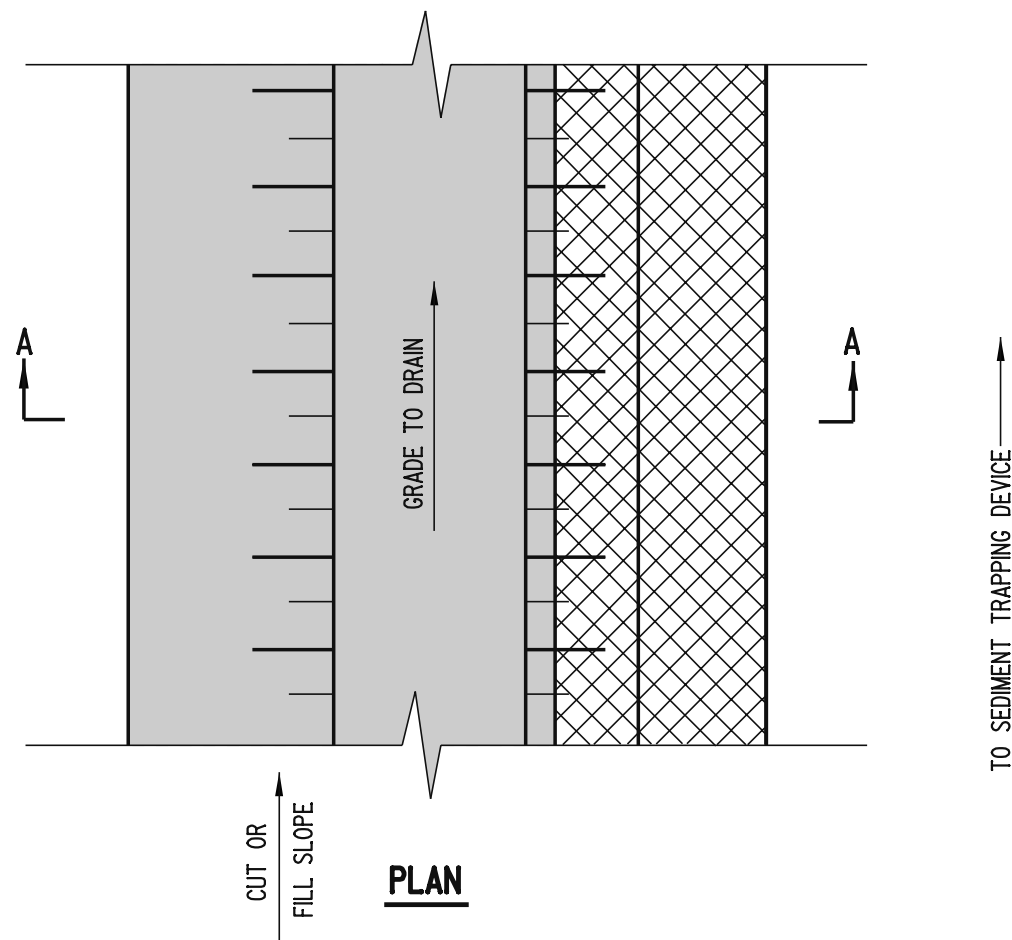
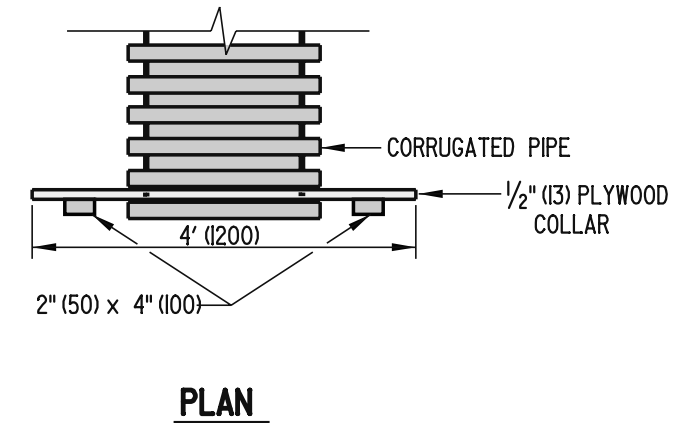
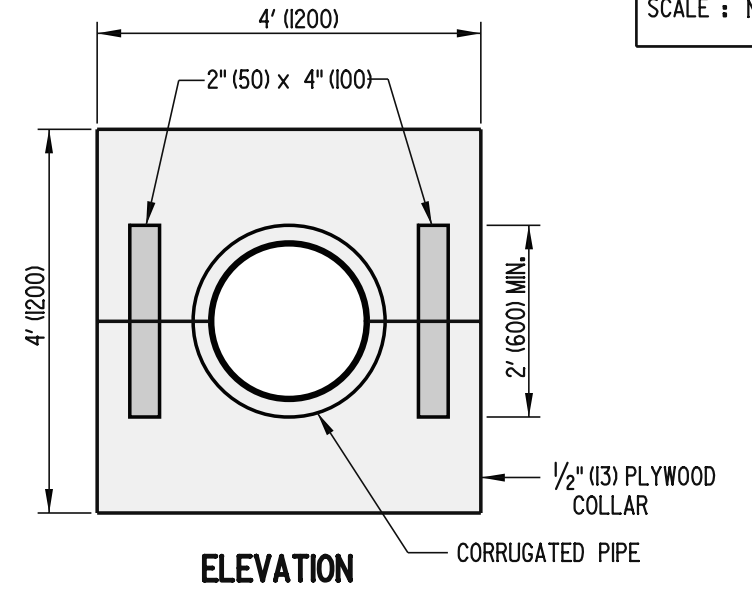
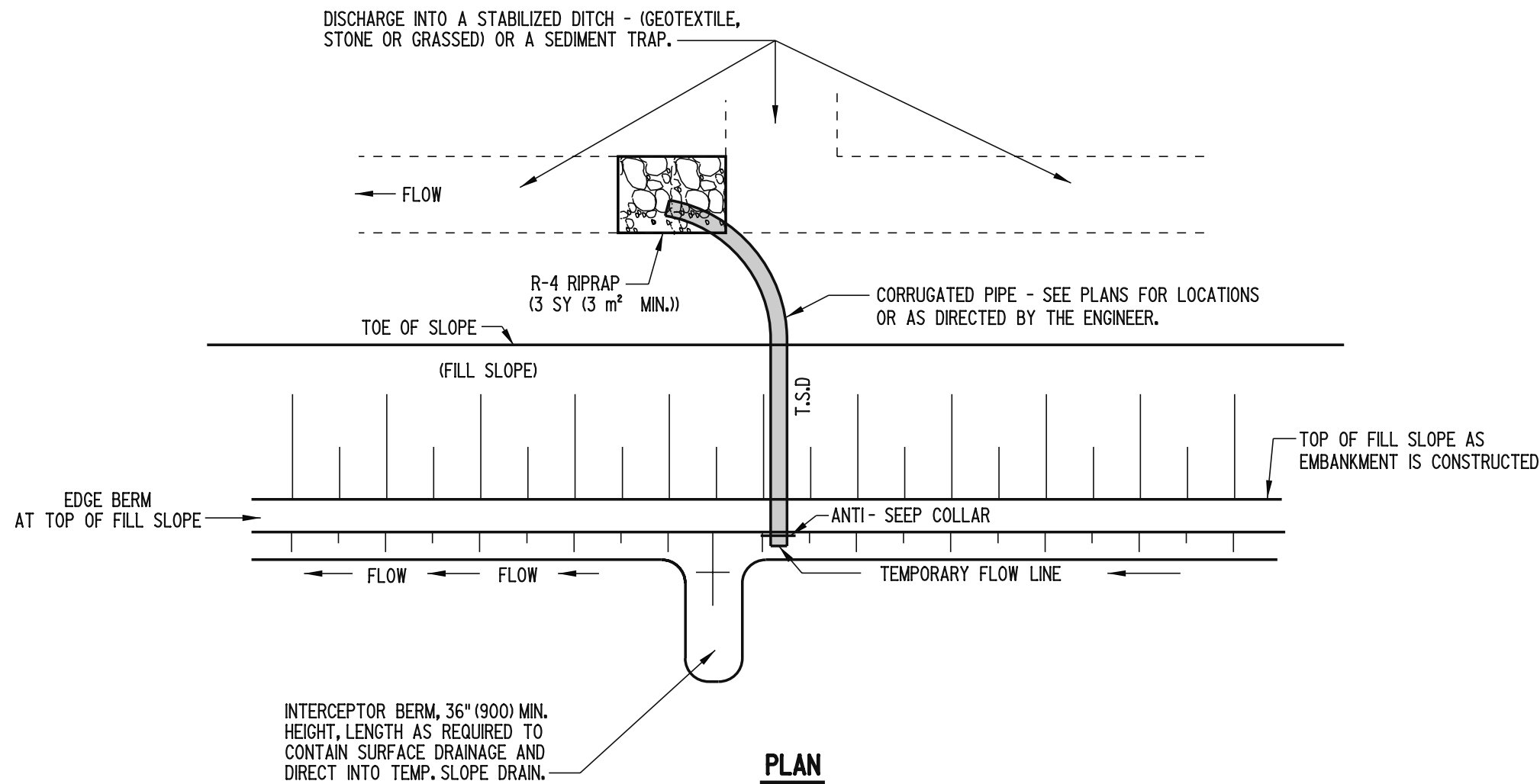


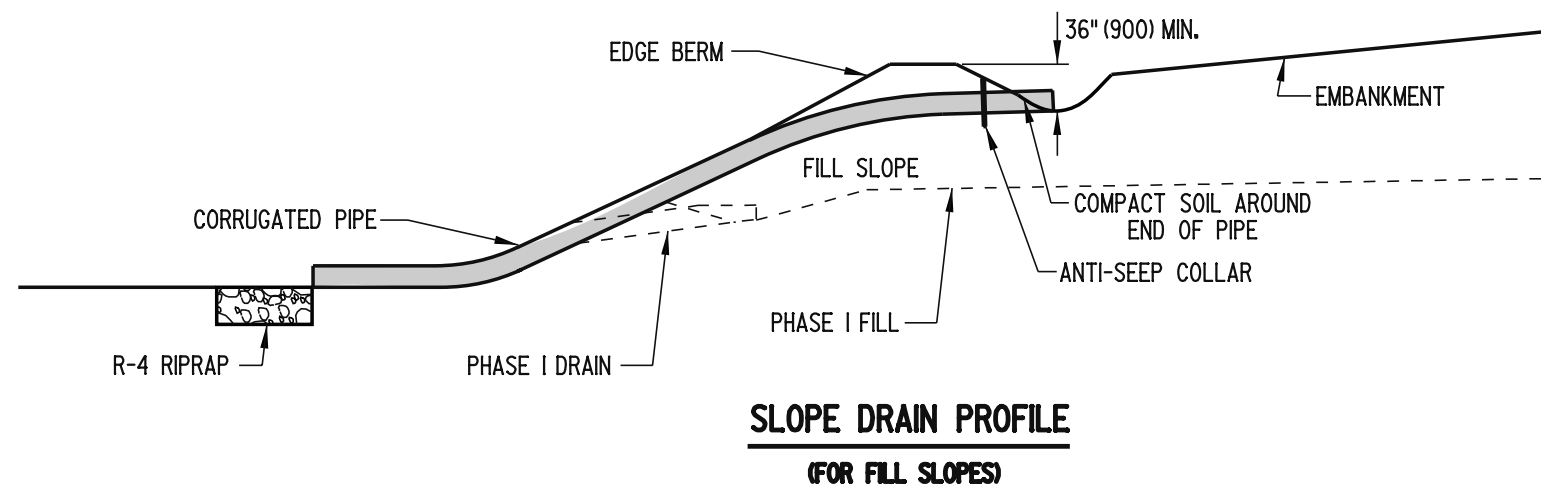
CHART B - EARTH DIKE DIMENSIONS		
SYMBOL	DIKE A (5 ac (2 ha) or less)	DIKE B (5-10ac(2-4 ha))
a-DIKE HEIGHT	12" (300)	18" (450)
b-DIKE WIDTH	12" (300)	24" (600)
c-FLOW WIDTH	48" (1200)	72" (1800)
d-FLOW DEPTH	14" (350)	27" (680)

- NOTES:
- 1). IF DESIRED, TOP WIDTH MAY BE WIDER AND SIDE SLOPES MAY BE FLATTER TO FACILITATE CROSSING BY CONSTRUCTION TRAFFIC.
 - 2). FIELD LOCATION SHOULD BE ADJUSTED AS NEEDED TO INSURE A STABILIZED OUTFALL.

SCALE : N.T.S.



ANTI-SEEP COLLAR



- NOTES:** 1). ALL TEMPORARY SLOPE DRAINS SHALL DISCHARGE INTO THE BACK OF SEDIMENT TRAPS, INTO SEDIMENT BASINS OR DITCHES DISCHARGING INTO TRAPS OR BASINS.
- 2). TEMPORARY SLOPE DRAINS SHALL BE USED AT THE TOP OF FILL SLOPES AS EMBANKMENT IS CONSTRUCTED, TO PREVENT EXCESSIVE EROSION UNTIL SHOULDERS ARE CONSTRUCTED AND THE SLOPES ARE SEEDED AND MULCHED.



DELAWARE
DEPARTMENT OF TRANSPORTATION

TEMPORARY SLOPE DRAIN

STANDARD NO.

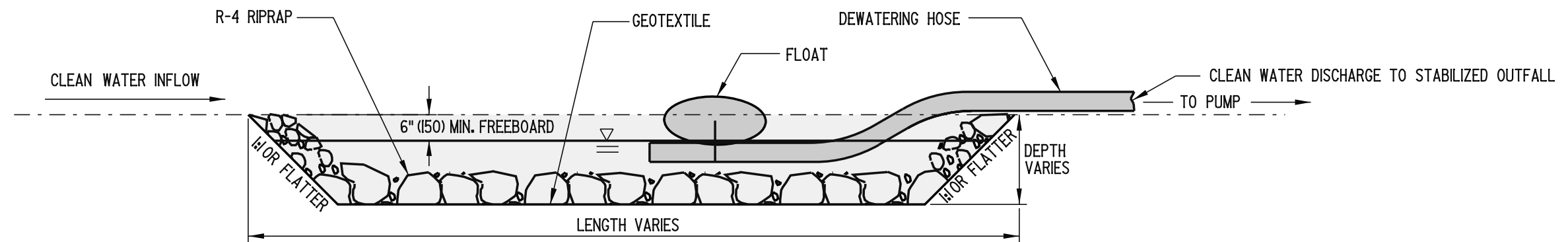
E-14 (2005)

SHT. 1

OF 1

APPROVED *Carolann Wick* 12/5/05
CHIEF ENGINEER DATE

RECOMMENDED *James M. O'Brien* 11/29/05
DESIGN ENGINEER DATE



- NOTES:**
- 1). THE WORK SHALL CONSIST OF CONSTRUCTING A STILLING WELL FOR THE PURPOSE OF PUMPING CLEAN WATER AROUND A DISTURBED CONSTRUCTION AREA TO A STABILIZED OUTFALL.
 - 2). THE DIMENSIONS OF THE STILLING WELL SHALL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.



DELAWARE
DEPARTMENT OF TRANSPORTATION

STILLING WELL

STANDARD NO.

E-15 (2005)

SHT. 1

OF 1

APPROVED

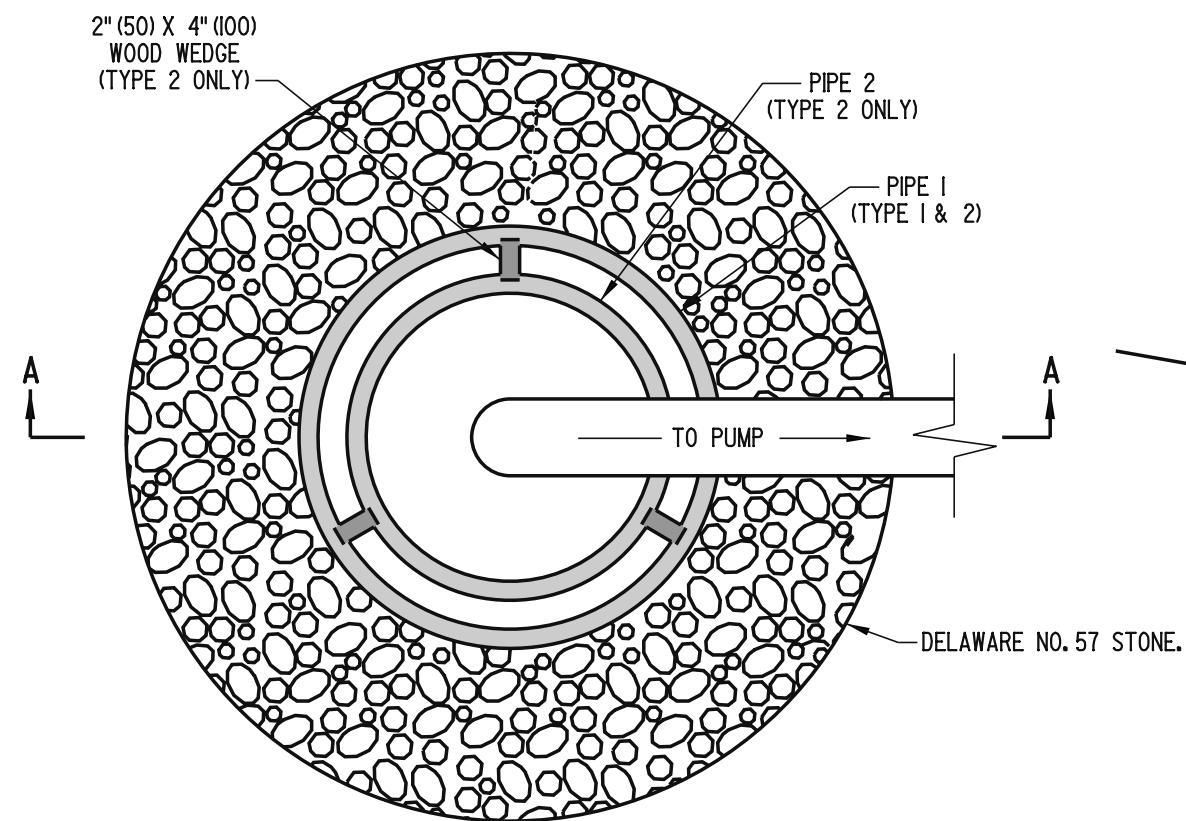
Carolann Wick
CHIEF ENGINEER

12/5/05
DATE

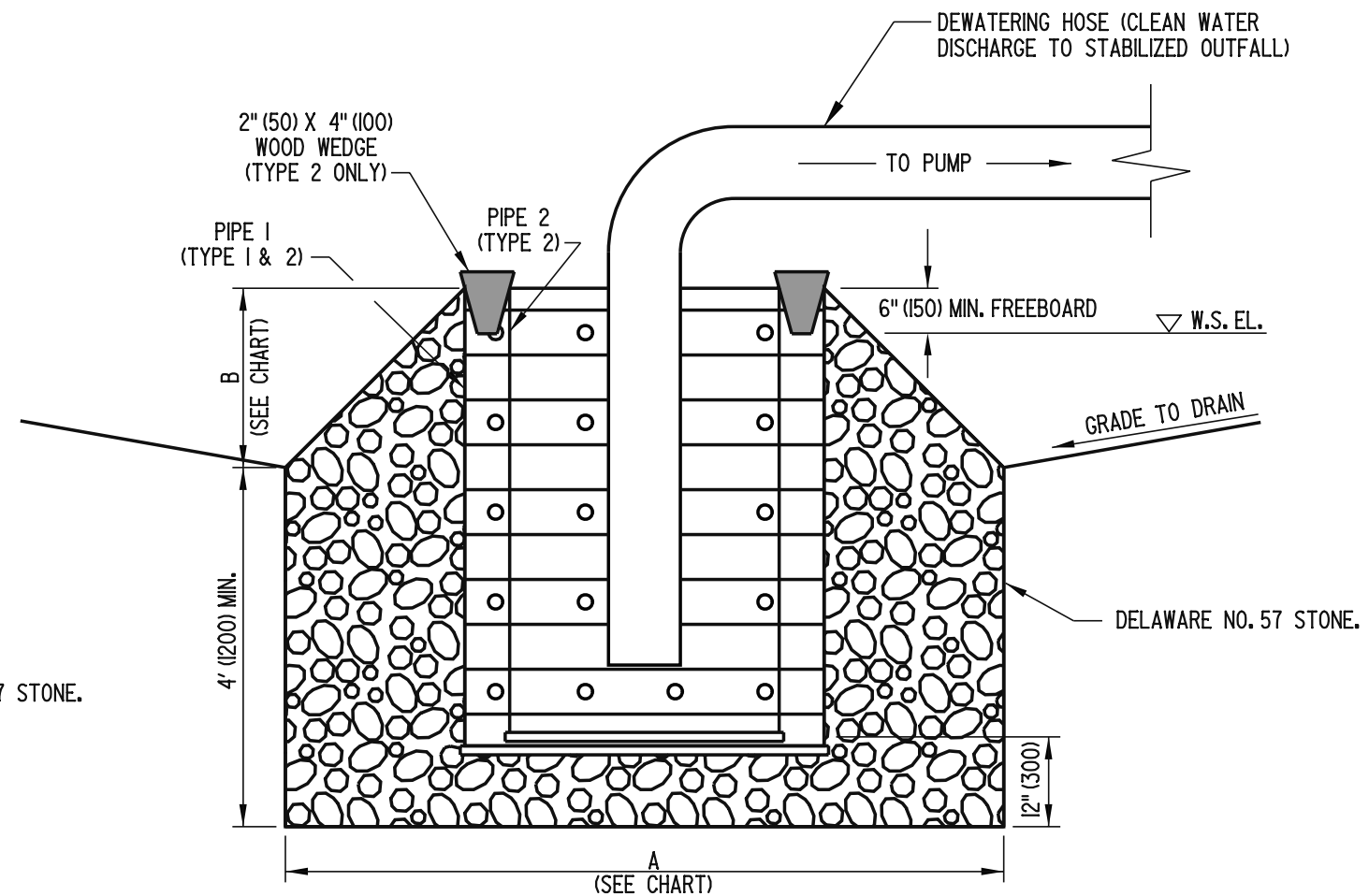
RECOMMENDED

James M. O'Brien
DESIGN ENGINEER

11/29/05
DATE



PLAN



SECTION A-A

- NOTES:**
- 1). THE WORK SHALL CONSIST OF CONSTRUCTING A SUMP PIT FOR THE PURPOSE OF FILTERING AND PUMPING WATER TO A STABILIZED OUTFALL.
 - 2). GEOTEXTILE FOR THE 36" (900) CMP SHALL BE REPLACED WHEN CLOGGED WITH SEDIMENT.
 - 3). $\frac{1}{2}$ " x $\frac{1}{2}$ " (13 x 13) 19 GAGE (I.I) WIRE MESH SHALL BE PLACED AROUND THE REMOVABLE 36" (900) CMP BEFORE ATTACHING THE GEOTEXTILE TO INCREASE FLOW THROUGH THE GEOTEXTILE.
 - 4). ALL PERFORATIONS SHALL BE 1" (25) IN DIAMETER AND 12" (300) ON CENTER IN ALL DIRECTIONS.
 - 5). TYPE I SUMP PIT SHALL BE USED ONLY WHEN PUMPING IS NEEDED FOR LESS THAN 7 DAYS.

SUMP PIT CHART				
TYPE	PIPE 1	PIPE 2	A	B
1	PERFORATED 24" (600) CMP WITH PERFORATED CAP WELDED ON BOTTOM AND COMPLETELY WRAPPED WITH GEOTEXTILE.	N/A	4' (1200) MIN.	12" (300)
2	PERFORATED 48" (1200) CMP WITH PERFORATED CAP WELDED ON BOTTOM	REMOVABLE PERFORATED 36" (900) CMP WITH PERFORATED CAP WELDED ON BOTTOM AND COMPLETELY WRAPPED WITH GEOTEXTILE.	8' (2400) MIN.	24" (600)



DELAWARE
DEPARTMENT OF TRANSPORTATION

SUMP PIT, TYPE 1 & 2

STANDARD NO.

E-16 (2005)

SHT. 1

OF 1

APPROVED

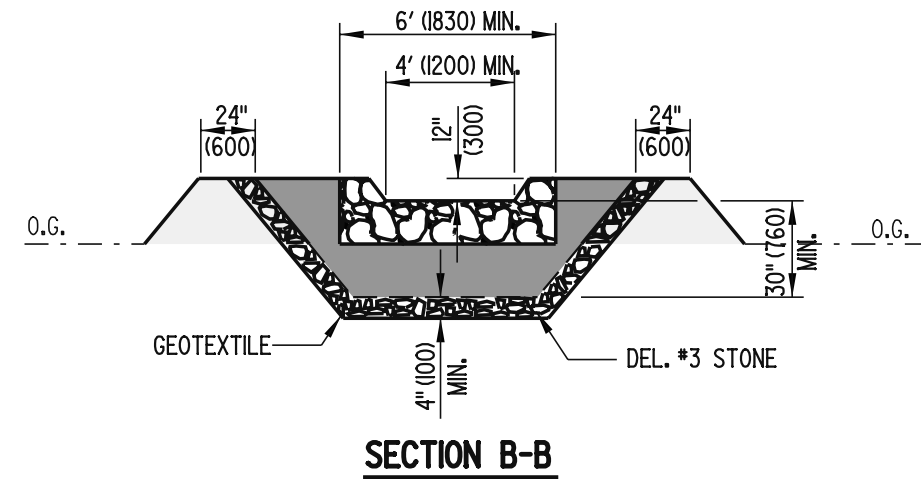
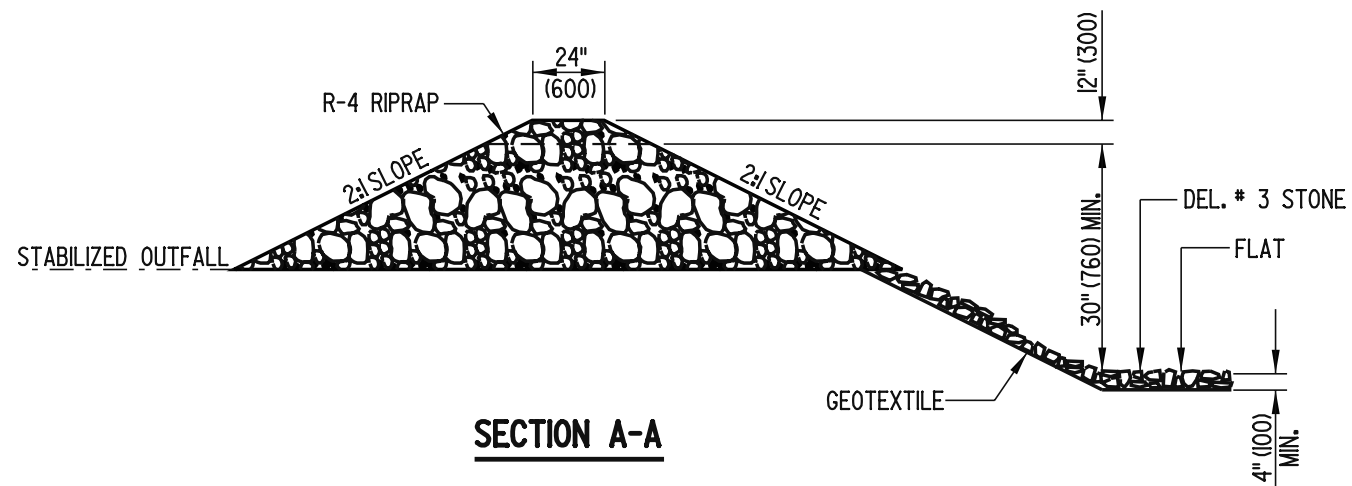
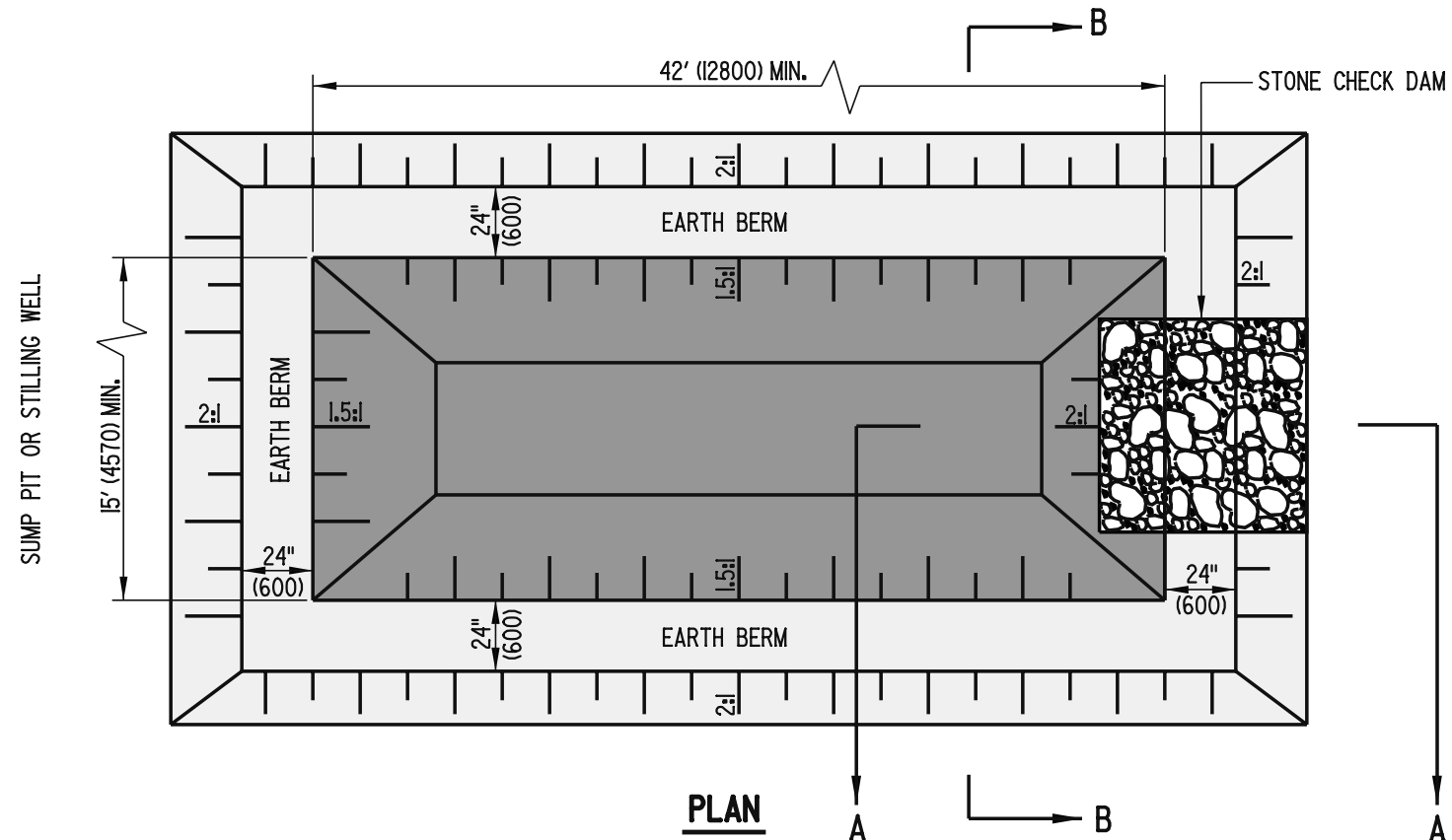
Carolann Wick
CHIEF ENGINEER

12/5/05
DATE

RECOMMENDED

James M. O'Brien
DESIGN ENGINEER

11/29/05
DATE



- NOTES:**
- 1.) A DEWATERING BASIN (DWB) IS USED TO REMOVE SEDIMENT FROM SEDIMENT-LADEN WATER PUMPED FROM A CONSTRUCTION SITE BEFORE THE WATER RE-ENTERS THE WATERWAY. THE DWB SHALL HAVE A MINIMUM TOP WIDTH OF 15' (4570) AND A MINIMUM DEPTH OF 3.5' (1065). THE MINIMUM TOP LENGTH SHOWN IN THE PLAN IS USED ONLY FOR QUANTITY CALCULATIONS BY THE ENGINEER. THE ACTUAL TOP LENGTH IN THE FIELD SHALL BE CALCULATED BY THE EQUATION:
 US CUSTOMARY : TOP LENGTH (FEET) = 26' + .01 x Y
 METRIC : TOP LENGTH (mm) = 7930 + 48300 x Y
 WHERE Y IS THE MAXIMUM CAPACITY IN GALLONS PER MINUTE (CUBIC METERS PER SECOND) OF THE DEWATERING PUMP.
 - 2.) THE OUTFALL FROM THE BASIN TO THE RECEIVING WATERS SHALL BE STABILIZED. PUMPING INTO THE DWB SHALL CEASE WHEN THE EFFLUENT FROM THE BASIN BECOMES SEDIMENT-LADEN.
 - 3.) A SUMP PIT OR STILLING WELL (SEE STANDARD SHEETS) SHALL BE USED IN CONJUNCTION WITH A DWB. THE BASIN MAY BE BYPASSED INTO THE STABILIZED OUTFALL IF THE WATER BEING PUMPED IS NON-SEDIMENT-LADEN. DIRECT DISCHARGE TO THE RECEIVING WATERS SHALL CEASE AND BE REDIRECTED TO THE DWB WHEN EFFLUENT FROM THE PUMP BECOMES SEDIMENT-LADEN.
 - 4.) MAINTENANCE MUST BE PERFORMED IN ORDER FOR THE DWB TO FUNCTION PROPERLY. ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED DISPOSAL AREA WHEN THE BASIN IS FILLED TO WITHIN 12" (300) FROM THE CREST.
 - 5.) WHEN USED IN CONJUNCTION WITH A COFFERDAM, DEWATERING SHALL BEGIN NO SOONER THAN 12 HOURS AFTER COFFERDAM INSTALLATION IN ORDER TO ALLOW SEDIMENT PRODUCED DURING INSTALLATION TO SETTLE COMPLETELY.



DELAWARE
DEPARTMENT OF TRANSPORTATION

DEWATERING BASIN

STANDARD NO. E-17 (2005)

SHT. 1 OF 1

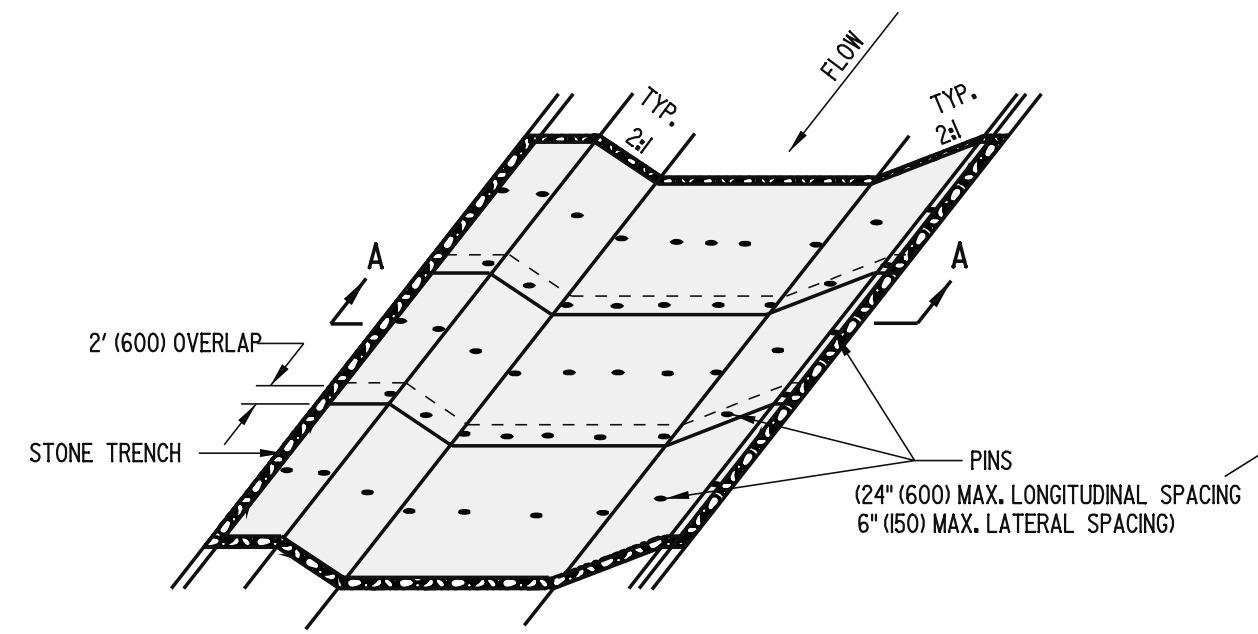
APPROVED *Carolann Wick*
CHIEF ENGINEER

12/5/05
DATE

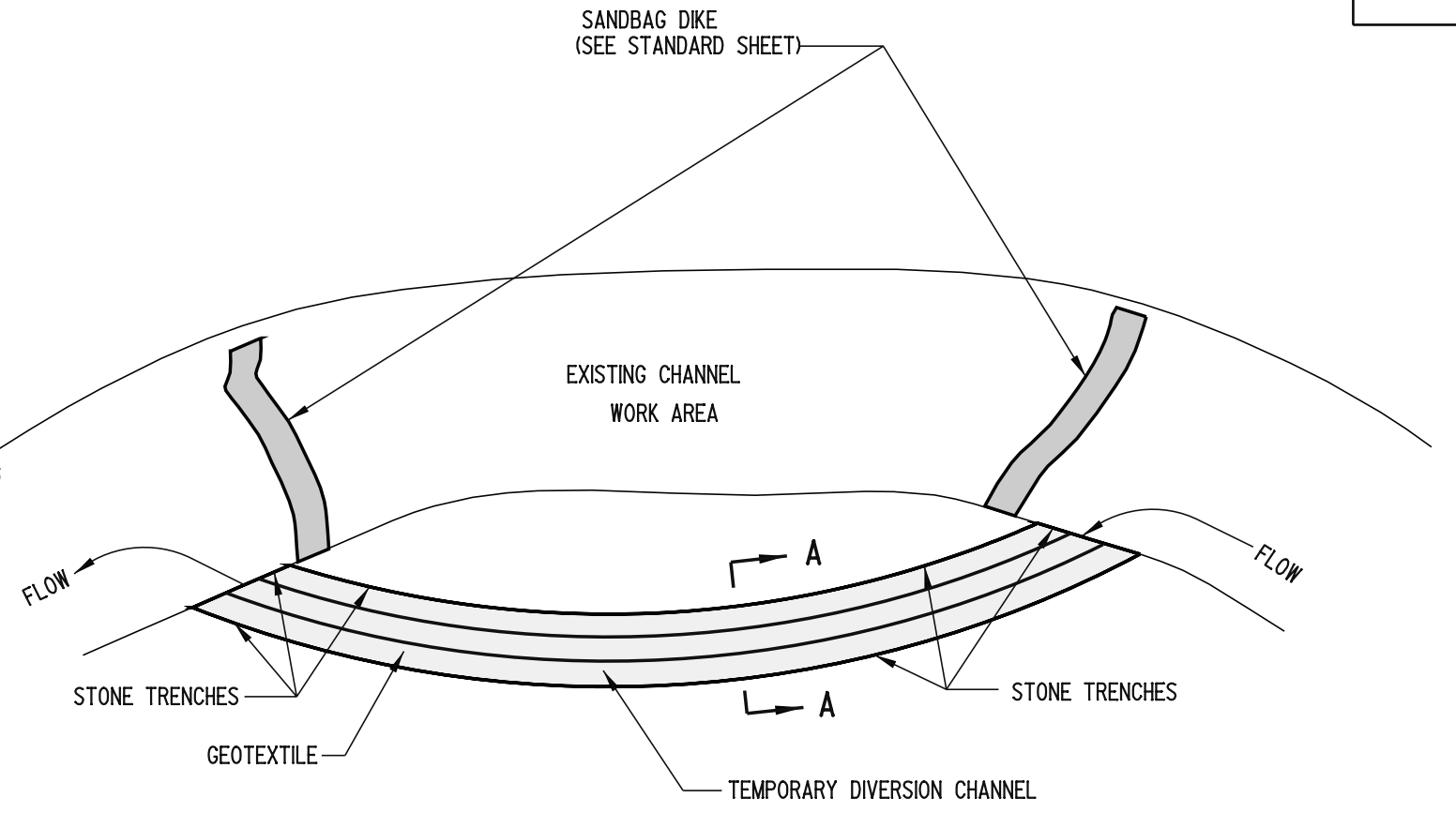
RECOMMENDED *James M. O'Brien*
DESIGN ENGINEER

11/29/05
DATE

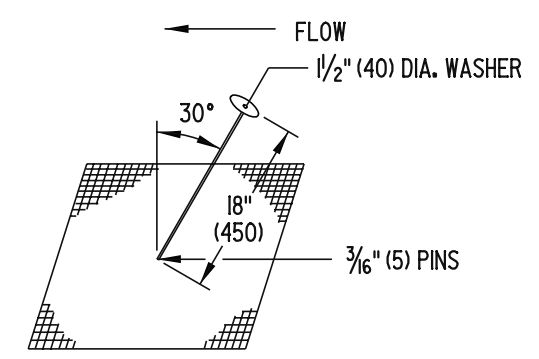
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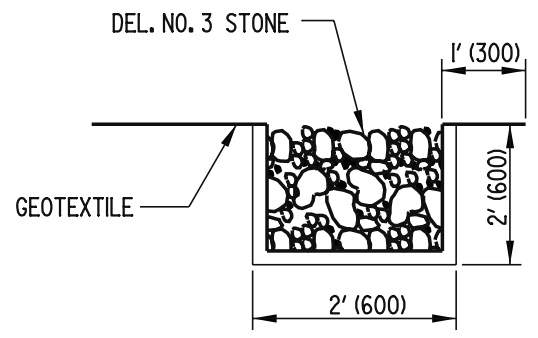
OBLIQUE VIEW



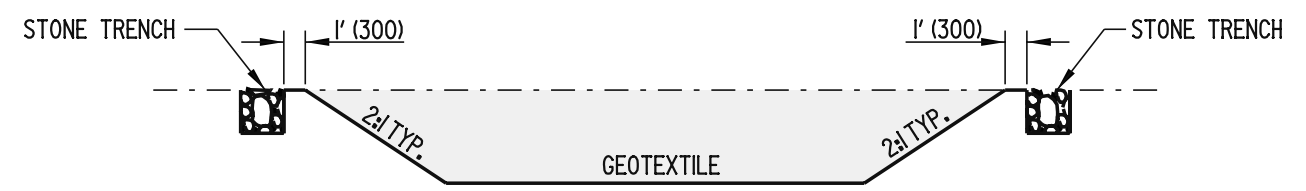
PLAN



FASTENING DETAIL



TRENCHING DETAIL



SECTION A-A

NOTE: SEE PLANS FOR LOCATION, DIMENSIONS, GRADES, ETC.

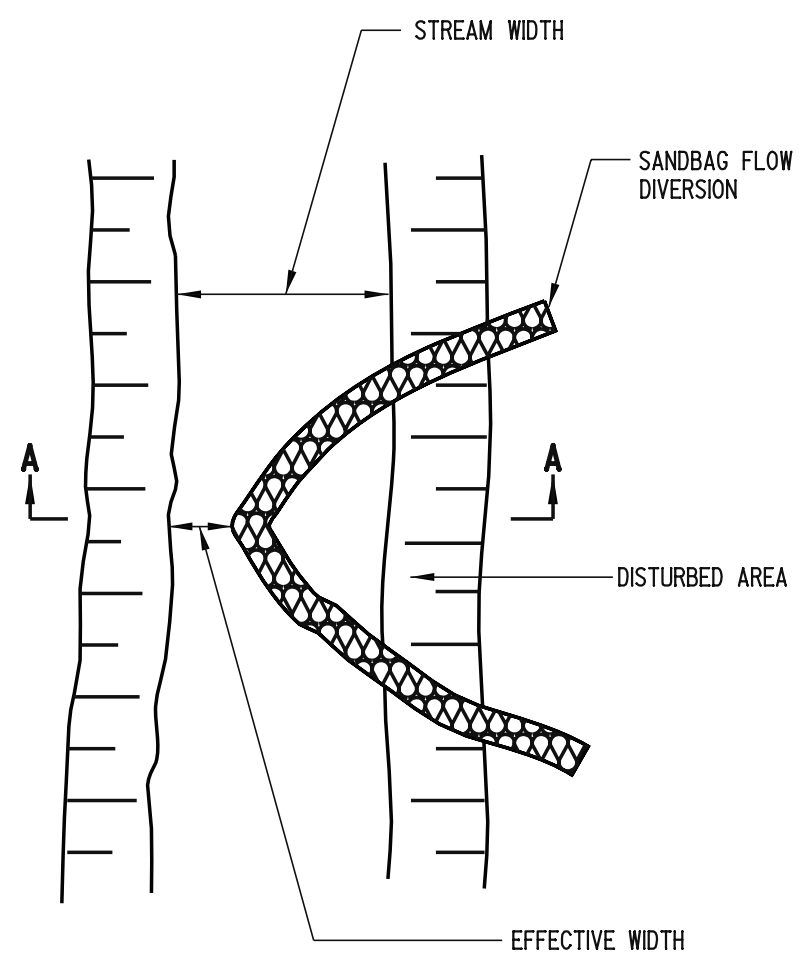


DELAWARE
DEPARTMENT OF TRANSPORTATION

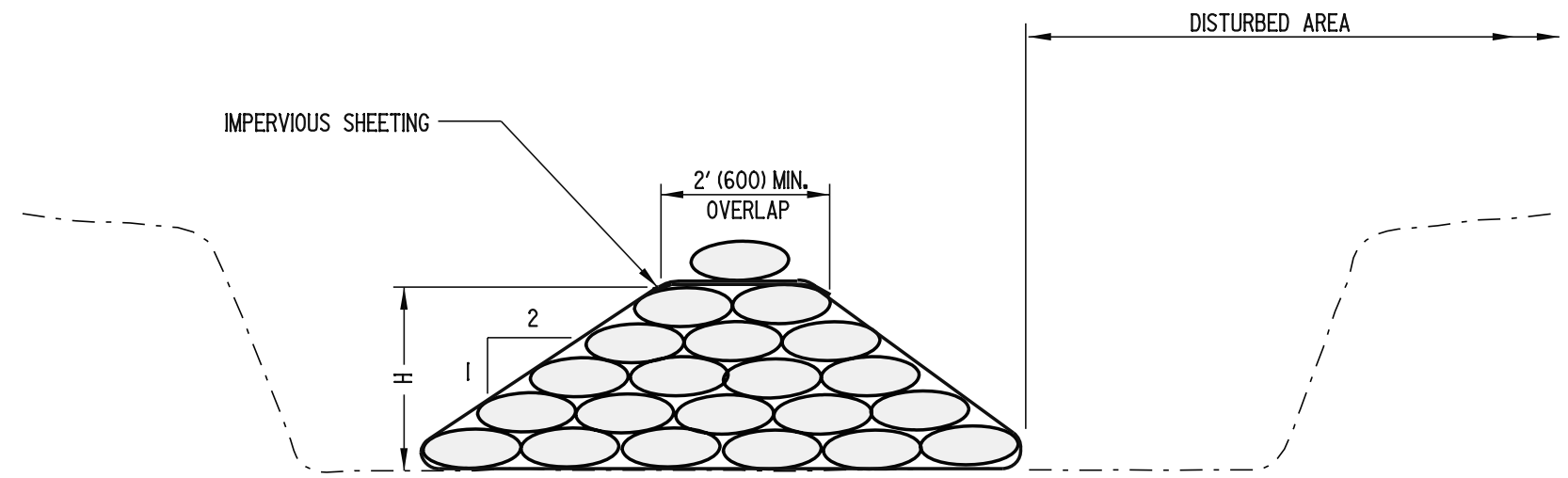
GEOTEXTILE-LINED CHANNEL DIVERSION

STANDARD NO. E-18 (2005) SHT. 1 OF 1

APPROVED *Carolann Wick* 12/5/05
CHIEF ENGINEER DATE
RECOMMENDED *James M. O'Brien* 11/29/05
DESIGN ENGINEER DATE



PLAN



SECTION A-A

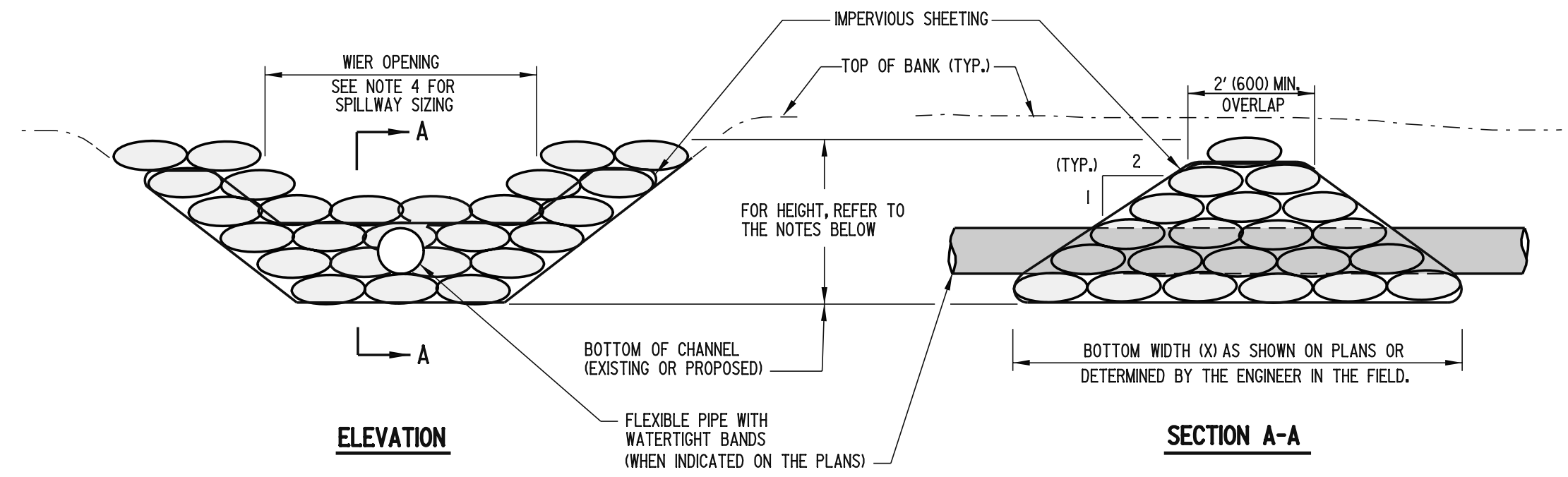
- NOTES:**
- 1). THE WORK SHALL CONSIST OF INSTALLING FLOW DIVERSIONS FOR THE PURPOSE OF EROSION CONTROL WHEN CONSTRUCTION ACTIVITIES TAKE PLACE WITHIN THE STREAM CHANNEL SUCH AS BANK STABILIZATION OR BRIDGE ABUTMENT CONSTRUCTION.
 - 2). THE DIVERSION STRUCTURE SHALL BE INSTALLED FROM UPSTREAM TO DOWNSTREAM.
 - 3). THE EFFECTIVE CHANNEL WIDTH SHALL BE SIZED TO PASS A ONE YEAR STORM EVENT PEAK FLOW, OR 1/3 OF STREAM WIDTH, WHICHEVER IS GREATER.
 - 4). THE SANDBAG DIVERSION HEIGHT (H) SHALL BE 1' (300) ABOVE THE PEAK ELEVATION OF THE ONE YEAR STORM.



DELAWARE
DEPARTMENT OF TRANSPORTATION

SANDBAG DIVERSION			
STANDARD NO.	E-19 (2005)	SHT.	1 OF 1

APPROVED	<i>Carolann Wick</i>	12/5/05
	CHIEF ENGINEER	DATE
RECOMMENDED	<i>James M. O'Brien</i>	11/29/05
	DESIGN ENGINEER	DATE



- NOTES:**
- 1). THE WORK SHALL CONSIST OF INSTALLING A SANDBAG DIKE FOR THE PURPOSE OF EROSION CONTROL WHEN CONSTRUCTION ACTIVITIES TAKE PLACE WITHIN THE STREAM CHANNEL SUCH AS BANK STABILIZATION OR BRIDGE ABUTMENT CONSTRUCTION.
 - 2). THE SANDBAG DIKE SHALL BE INSTALLED AT THE UPSTREAM LOCATION FIRST.
 - 3). THE HEIGHT OF THE SANDBAG DIKE SHALL BE 1' (300) ABOVE THE PEAK ELEVATION OF THE ONE YEAR STORM, OR EQUAL WITH THE TOP OF BANK, WHICHEVER IS LESS. SEE PLANS FOR INFORMATION.
 - 4). THE SPILLWAY SHALL BE SIZED TO PASS A (1) ONE YEAR STORM EVENT PEAK FLOW, SEE PLANS.
 - 5). THE PIPE, WHEN UTILIZED, SHALL BE SIZED TO PASS THE STREAM BASE FLOW.

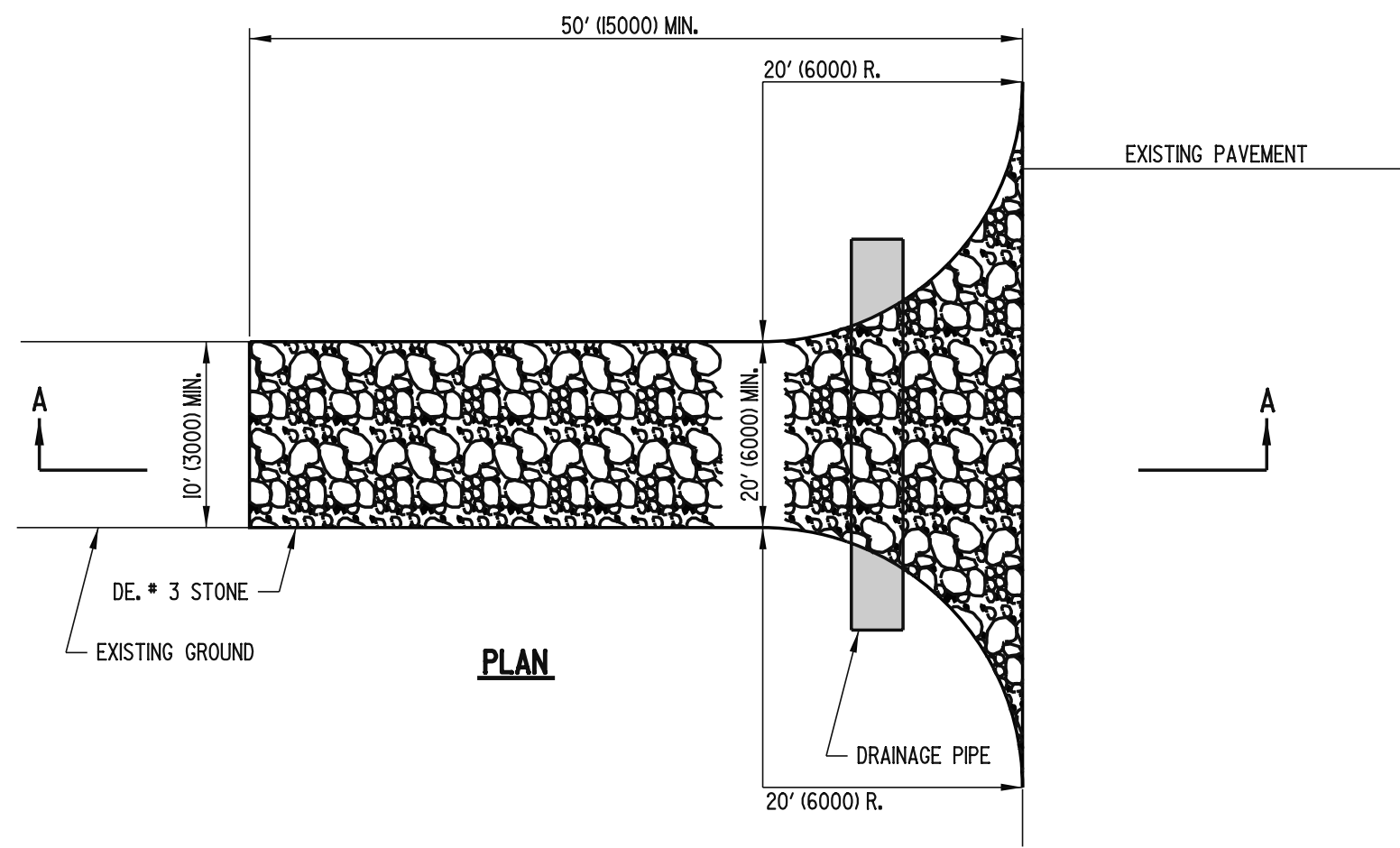


DELAWARE
DEPARTMENT OF TRANSPORTATION

SANDBAG DIKE			
STANDARD NO.	E-20 (2005)	SHT.	1 OF 1

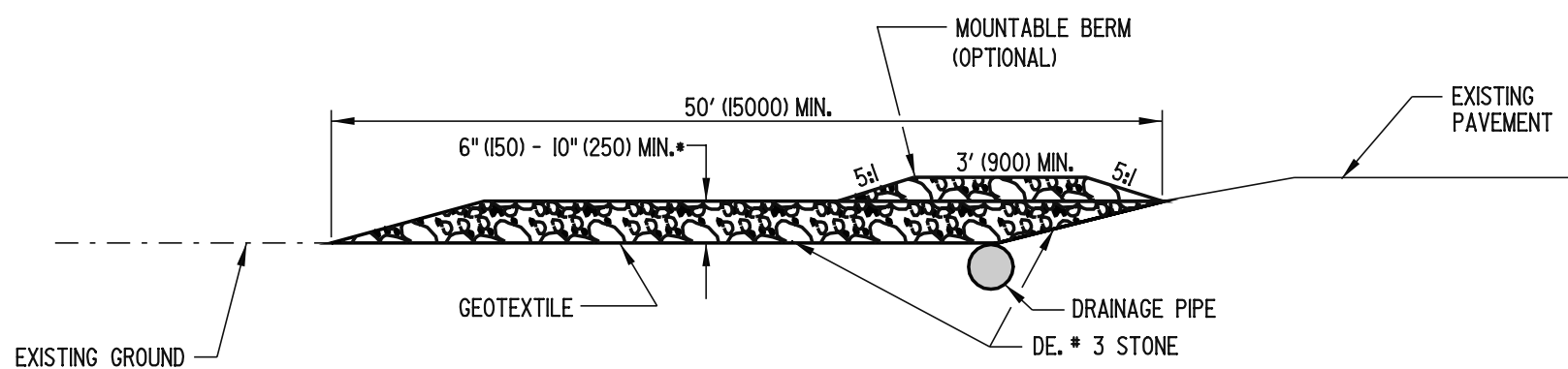
APPROVED *Carolann Wick* 12/5/05
CHIEF ENGINEER DATE

RECOMMENDED *James M. O'Brien* 11/29/05
DESIGN ENGINEER DATE



PLAN

- NOTES:**
- 1). ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED UNDER THE ENTRANCE. IF NECESSARY, A MOUNTABLE BERM WITH 5:1 SLOPES SHALL BE ALLOWED TO FACILITATE PLACEMENT OF PIPES IN SHALLOW CONDITIONS.
 - 2). THE LOCATION AND NUMBER OF STABILIZED CONSTRUCTION ENTRANCES SHALL BE AS INDICATED ON THE PLANS. ANY CHANGE IN LOCATION, ADDITION, OR DELETION OF AN ENTRANCE SHALL BE APPROVED IN ADVANCE BY THE ENGINEER.
 - 3). DRAINAGE PIPE, IF UTILIZED, SHALL BE PAID FOR SEPARATELY UNDER THE APPROPRIATE BID ITEM.
 - 4). THE TOP 2" (50) OF STONE SHALL BE REMOVED AND REPLACED WITH 2" (50) OF CLEAN STONE WHEN VOIDS ARE FILLED OR AS DIRECTED BY THE ENGINEER.



SECTION A-A

* 6" (150) MIN. (< 3 AXLE)
10" (250) MIN. (> 3 AXLE)



DELAWARE
DEPARTMENT OF TRANSPORTATION

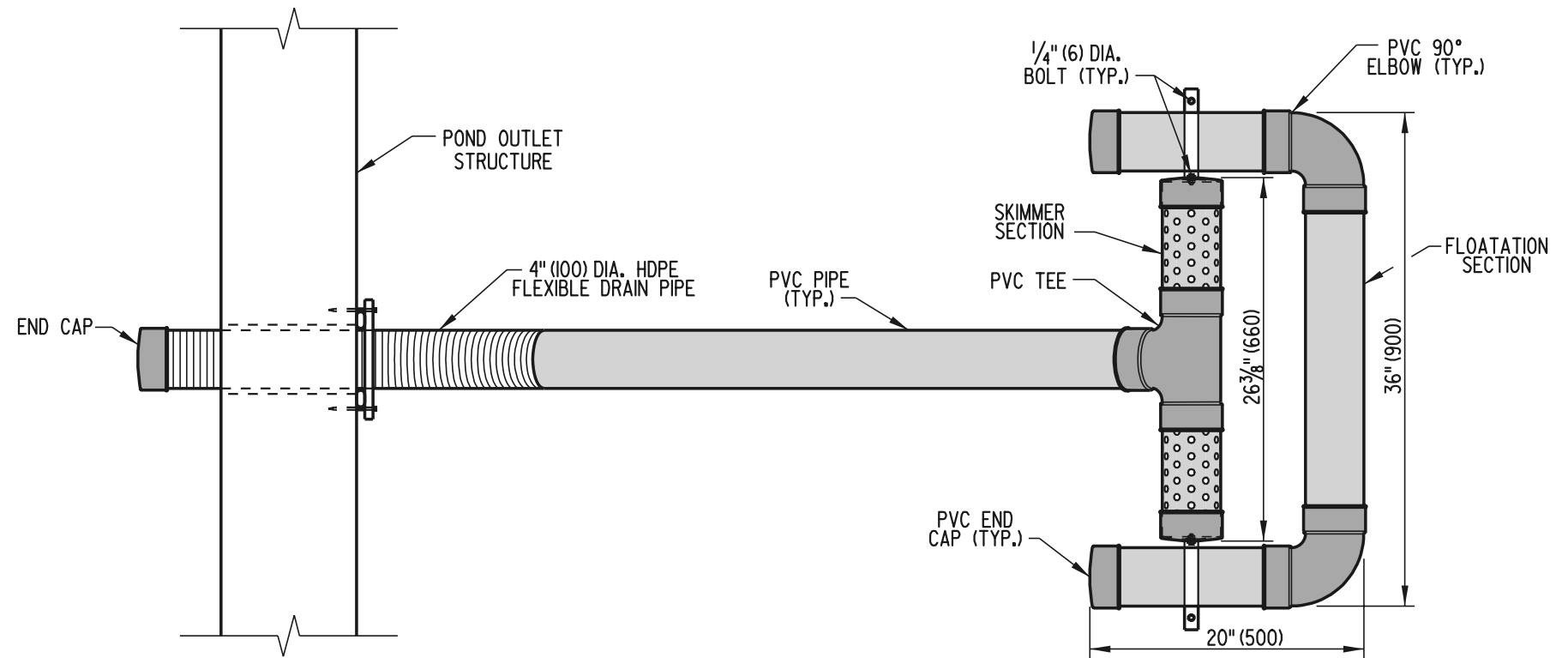
STABILIZED CONSTRUCTION ENTRANCE

STANDARD NO. E-21 (2005)

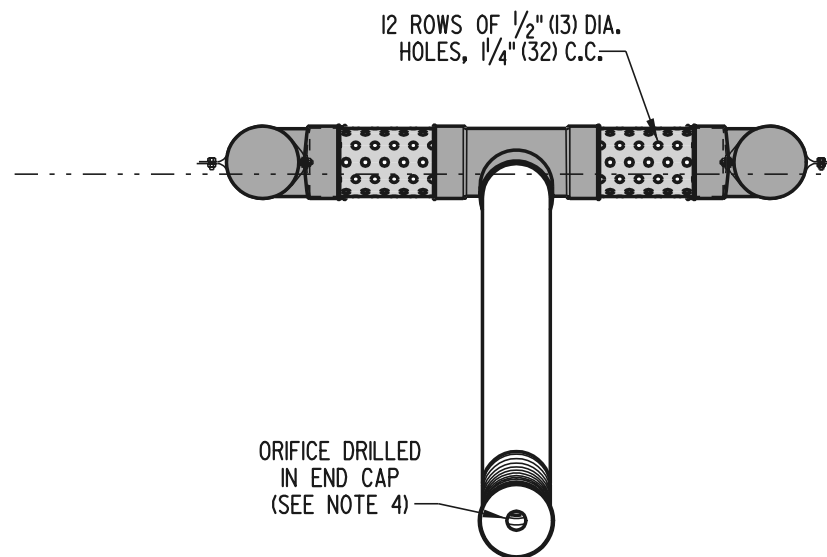
SHT. 1 OF 1

APPROVED *Carolann Wick* 12/5/05
CHIEF ENGINEER DATE
RECOMMENDED *James M. O'Brien* 11/29/05
DESIGN ENGINEER DATE

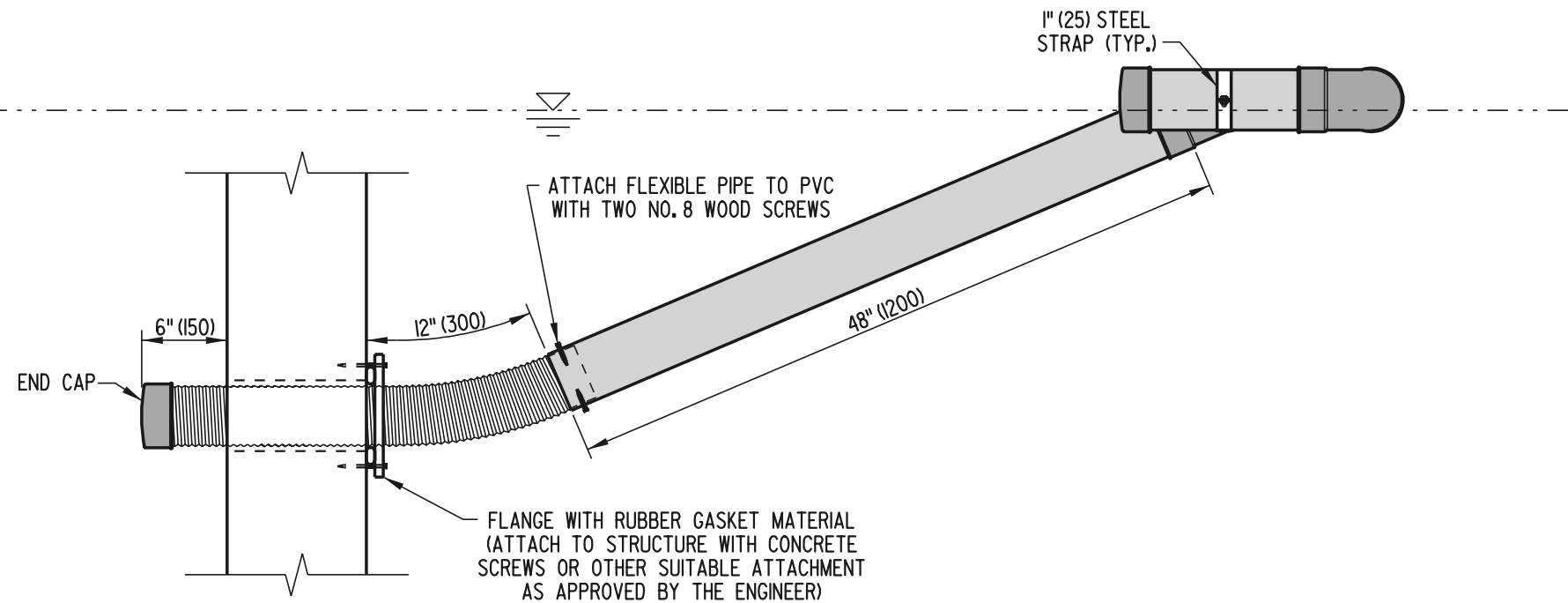
- NOTES:** 1). ALL P.V.C. PIPES ARE TO BE 4" (100) I.D., SCHEDULE 40
- 2). ALL JOINTS OF THE FLOATATION SECTION SHALL BE SOLVENT WELDED. JOINTS OF SKIMMER SECTION NEED NOT BE WATER-TIGHT.
- 3). 4" (100) HDPE FLEXIBLE DRAIN PIPE IS TO BE ATTACHED TO THE POND OUTLET STRUCTURE WITH WATER-TIGHT CONNECTIONS.
- 4). ORIFICE IS TO BE SIZED ACCORDING TO STORAGE VOLUME AND TO SLOWLY RELEASE 1" (25) RUNOFF FOR AT LEAST 24-HOURS.



PLAN VIEW



FRONT VIEW



SIDE VIEW



DELAWARE
DEPARTMENT OF TRANSPORTATION

SKIMMER DEWATERING DEVICE

STANDARD NO.

E-22 (2001)

SHT.

1

OF

1

APPROVED

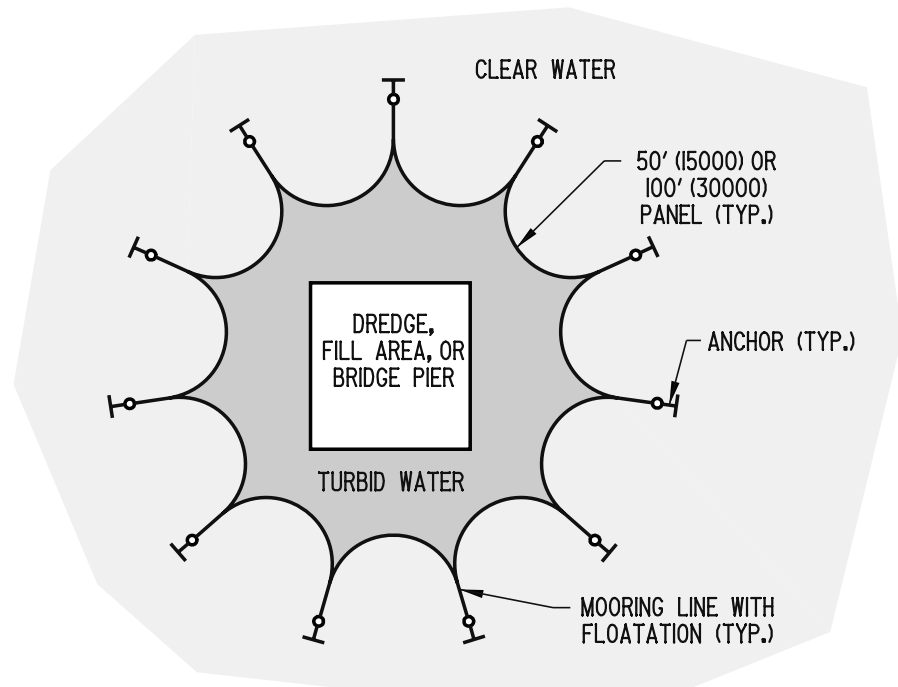
Ryan M. Harkness
CHIEF ENGINEER

6/18/01
DATE

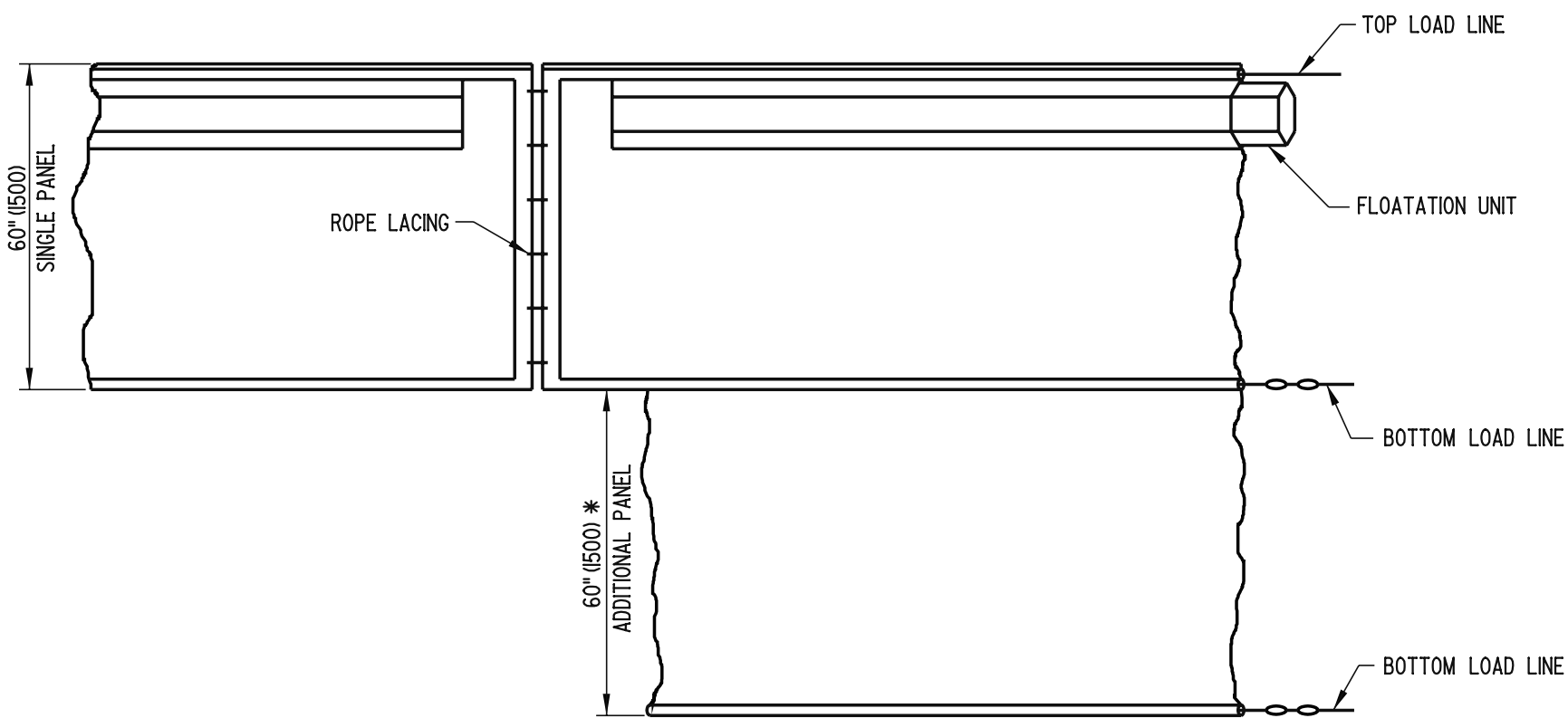
RECOMMENDED

Michael R. Galt
DESIGN ENGINEER

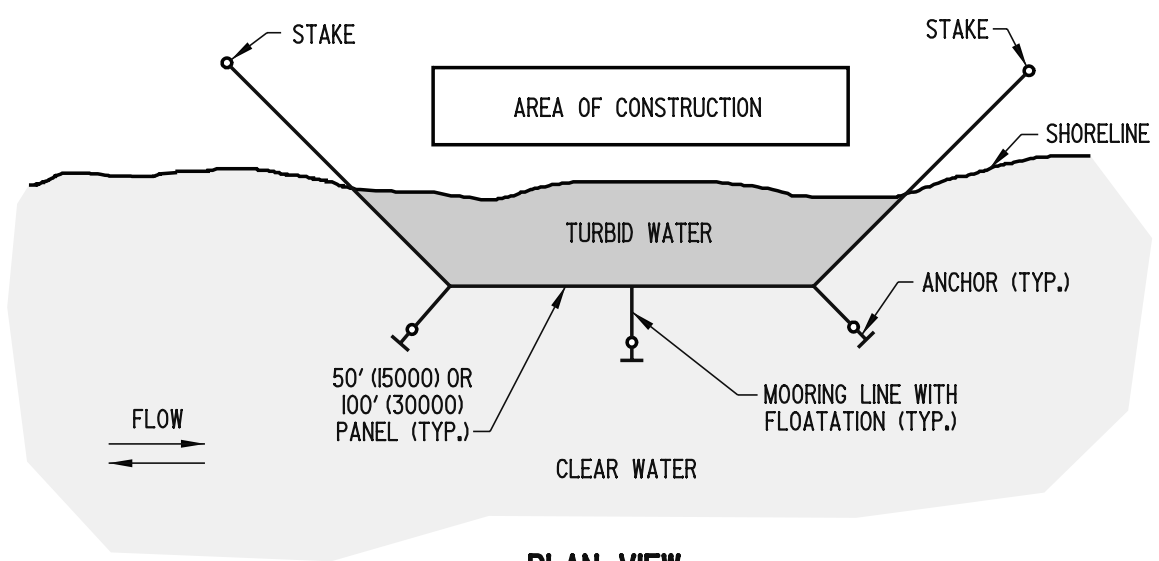
6/18/01
DATE



PLAN VIEW
OPEN WATER APPLICATION




ELEVATION

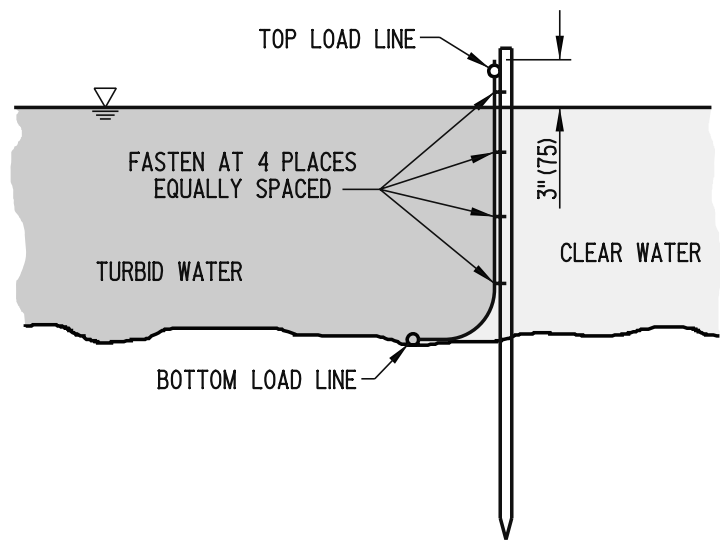


PLAN VIEW
SHORELINE APPLICATION

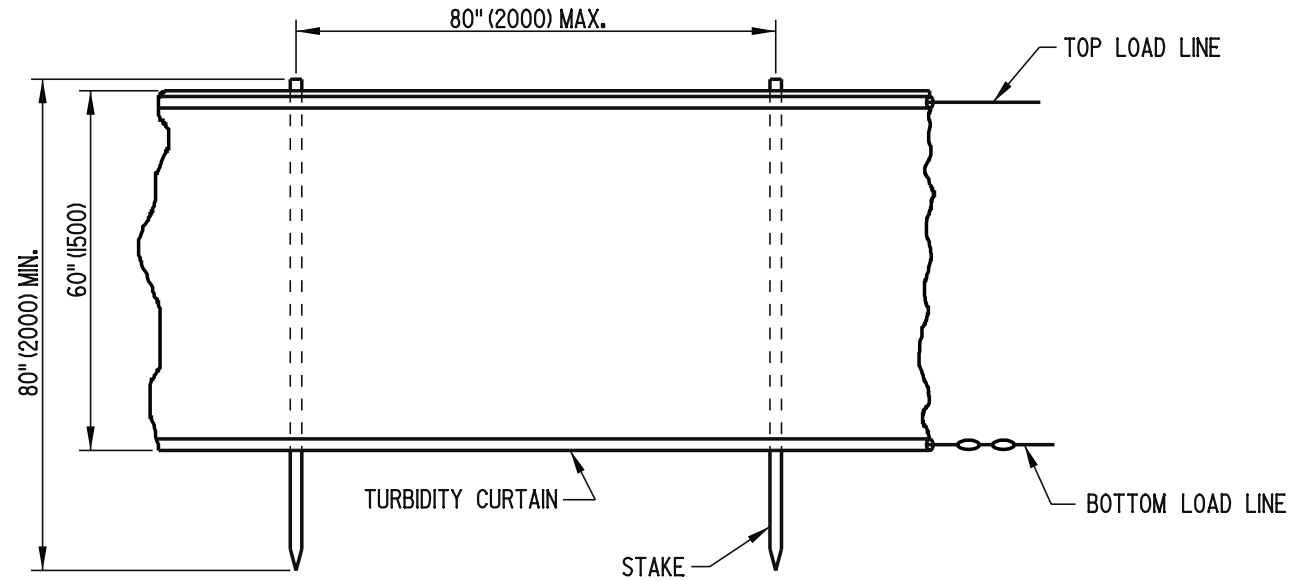
FLOATING TURBIDITY CURTAIN

- NOTE:** 1.) ADDITIONAL PANEL REQUIRED FOR DEPTHS GREATER THAN 5' (1500).
2.) FLOATING TURBIDITY CURTAIN SHALL REACH BOTTOM UP TO DEPTHS OF 10' (3000) BY USING TWO PANELS. DEPTHS GREATER THAN 10' (3000) SHALL REQUIRE SPECIAL DEPTH CURTAINS SPECIFICALLY CALLED FOR IN THE PLANS OR AS DIRECTED BY THE ENGINEER.

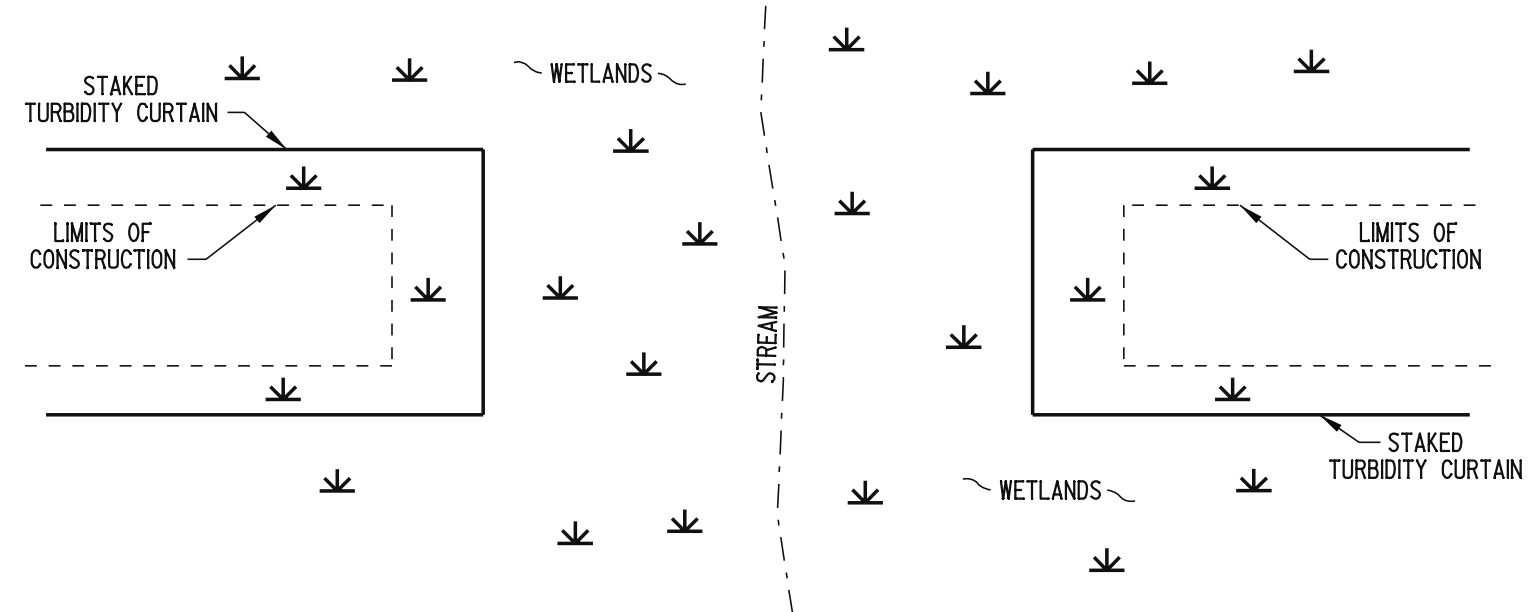
 DELAWARE DEPARTMENT OF TRANSPORTATION	TURBIDITY CURTAIN			APPROVED <i>Carolann Wick</i> 12/5/05 <small>CHIEF ENGINEER DATE</small>
	STANDARD NO. E-23 (2005)	SHT. 1	OF 2	RECOMMENDED <i>James M. O'Brien</i> 11/29/05 <small>DESIGN ENGINEER DATE</small>



SECTION




ELEVATION

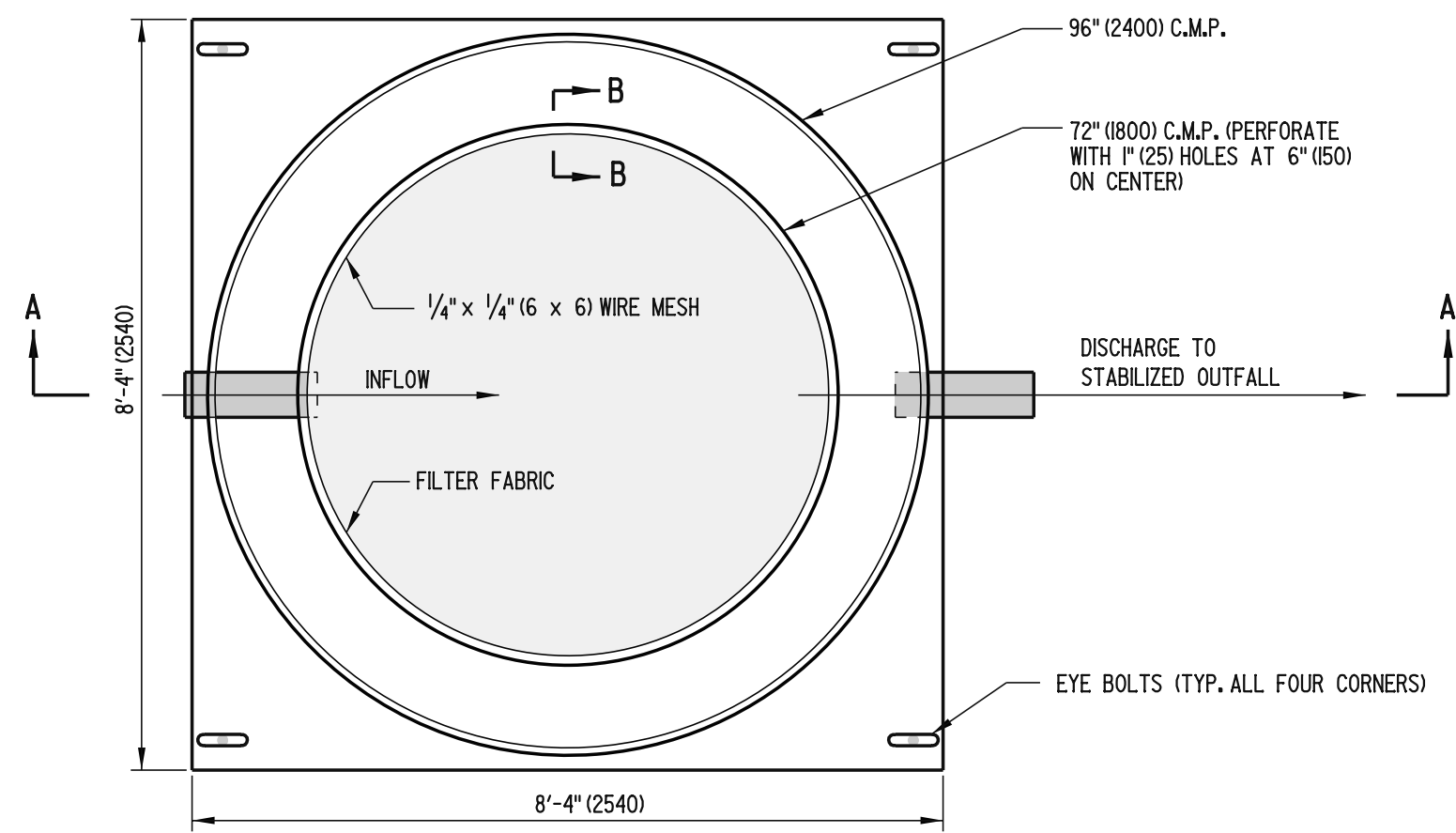


PLAN VIEW
SHALLOW WATER/MARSH APPLICATION

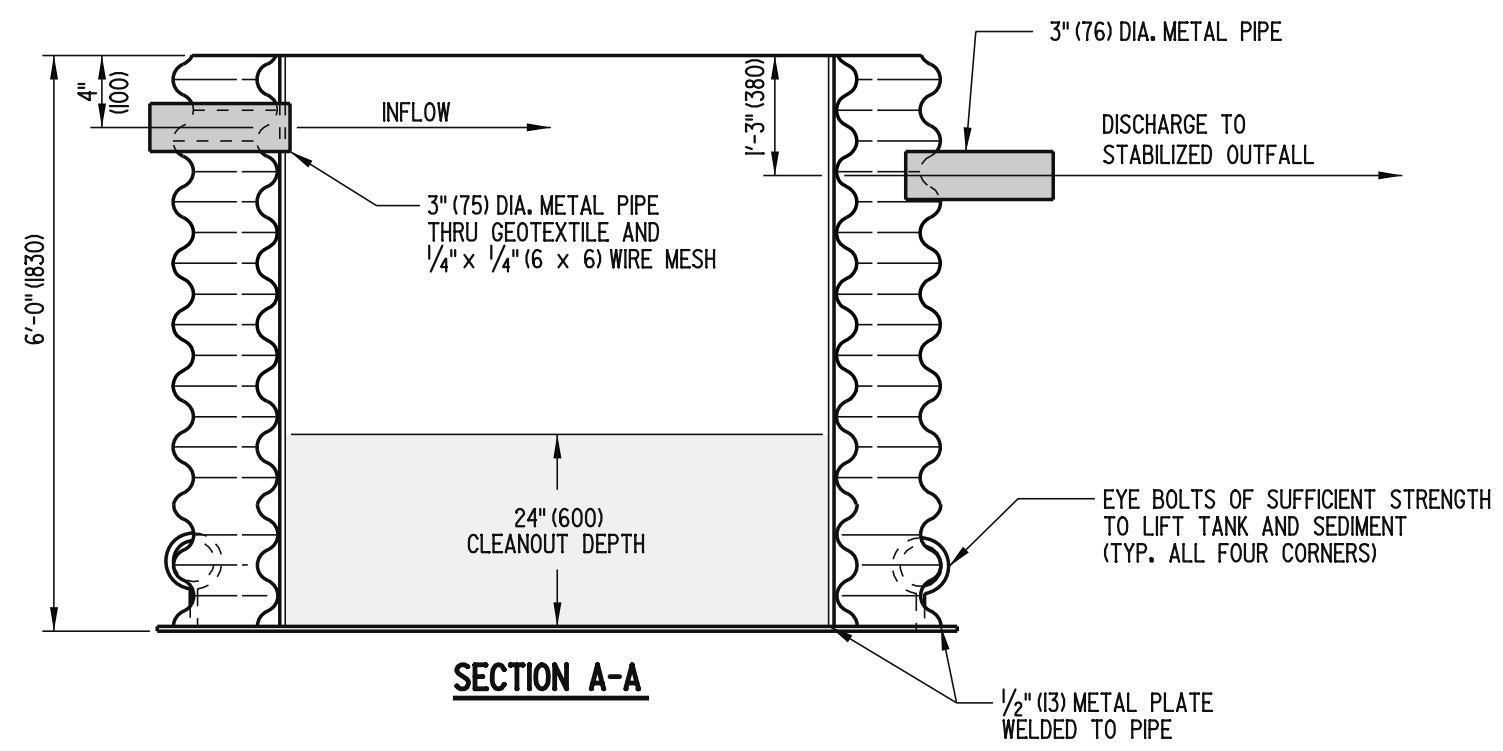
STAKED TURBIDITY CURTAIN

 DELAWARE DEPARTMENT OF TRANSPORTATION	TURBIDITY CURTAIN			APPROVED <i>Carolann Wick</i> 12/5/05 CHIEF ENGINEER DATE
	STANDARD NO. E-23 (2005)	SHT. 2	OF 2	RECOMMENDED <i>James M. O'Brien</i> 11/29/05 DESIGN ENGINEER DATE

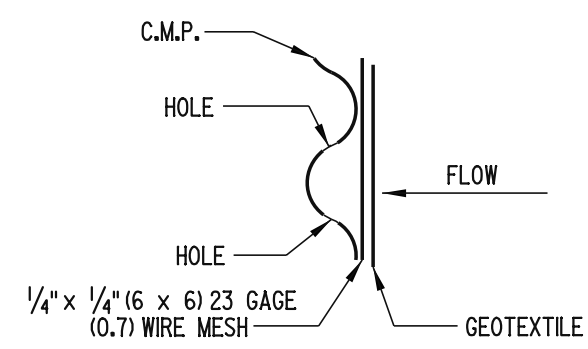
SCALE : N.T.S.



PLAN




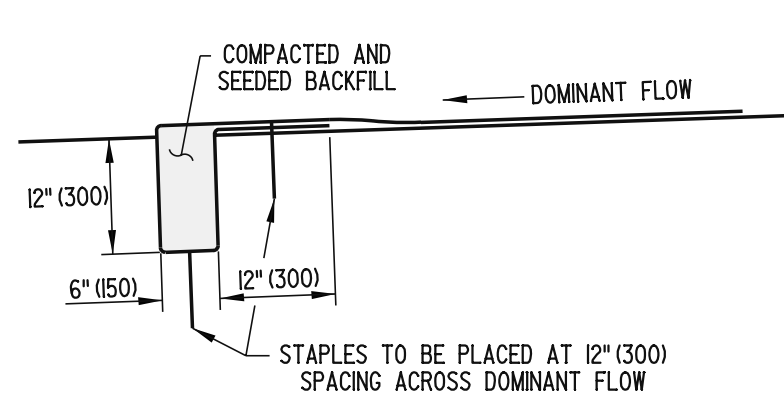
SECTION A-A



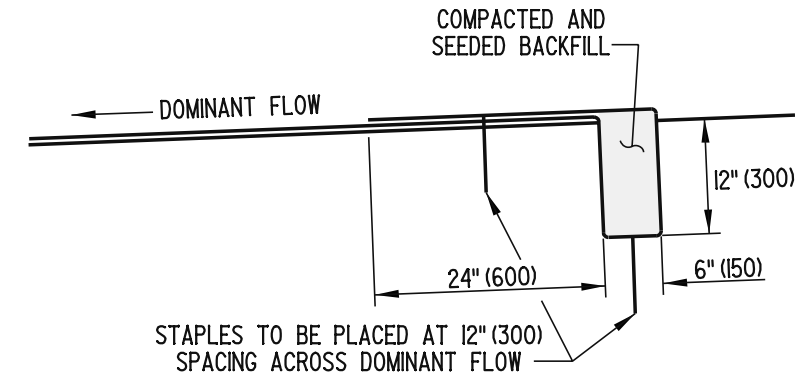
SECTION B-B

- NOTES:**
- 1). THE PORTABLE SEDIMENT TANK SHOWN MAY BE USED IN SITES WHERE SPACE IS LIMITED TO CONSTRUCT A DEWATERING BASIN.
 - 2). THE MAXIMUM PUMP DISCHARGE INTO THIS TYPICAL PORTABLE SEDIMENT TANK SHALL BE 425 GALLONS PER MINUTE (26 LITERS PER SECOND). THE FILTER FABRIC SHALL BE REPLACED WHEN THE PORTABLE SEDIMENT TANK CAN NO LONGER ALLOW THIS FLOW RATE, WHEN THERE IS A TEAR, OR WHEN DIRECTED BY THE ENGINEER.
 - 3). SEVERAL UN-CONNECTED OR CONNECTED IN PARALLEL PORTABLE SEDIMENT TANKS MAY BE USED WHEN A HIGHER FLOW RATE IS NEEDED TO DE-WATER THE JOB.
 - 4). OTHER DESIGNS MAY BE USED PROVIDED THE HYDRAULIC DESIGN IS SUBMITTED TO AND APPROVED BY THE STORMWATER ENGINEER.

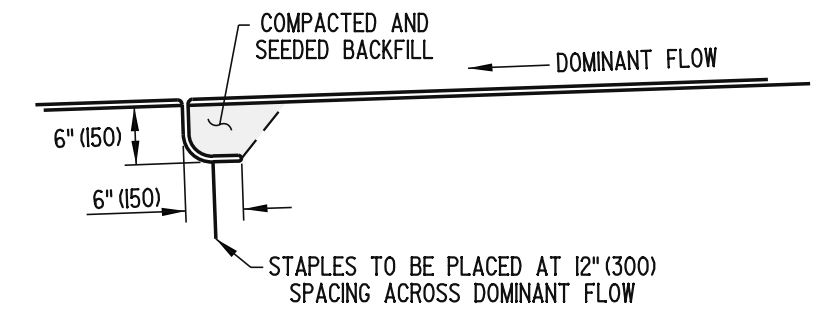
 DELAWARE DEPARTMENT OF TRANSPORTATION	PORTABLE SEDIMENT TANK			APPROVED <i>Carolann Wick</i> 12/5/05 CHIEF ENGINEER DATE
	STANDARD NO. E-24 (2005)	SHT. 1	OF 1	RECOMMENDED <i>James M. O'Brien</i> 11/29/05 DESIGN ENGINEER DATE



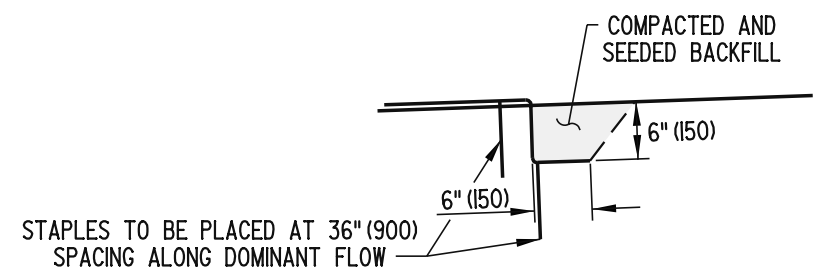
INITIAL TRENCH ANCHOR DETAIL
APPLIED AT THE DOWNSTREAM END OF DITCH



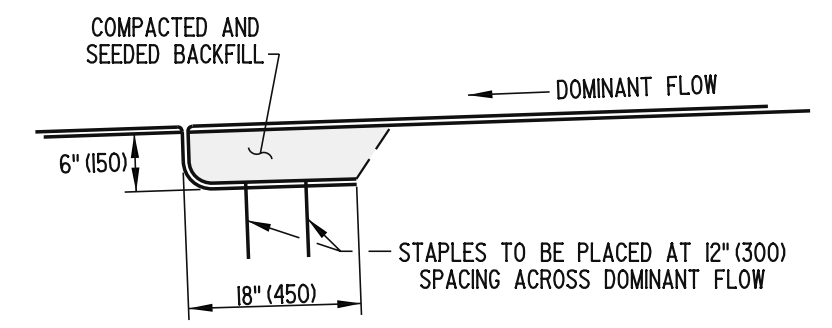
TERMINAL TRENCH ANCHOR DETAIL
APPLIED AT THE UPSTREAM END OF DITCH



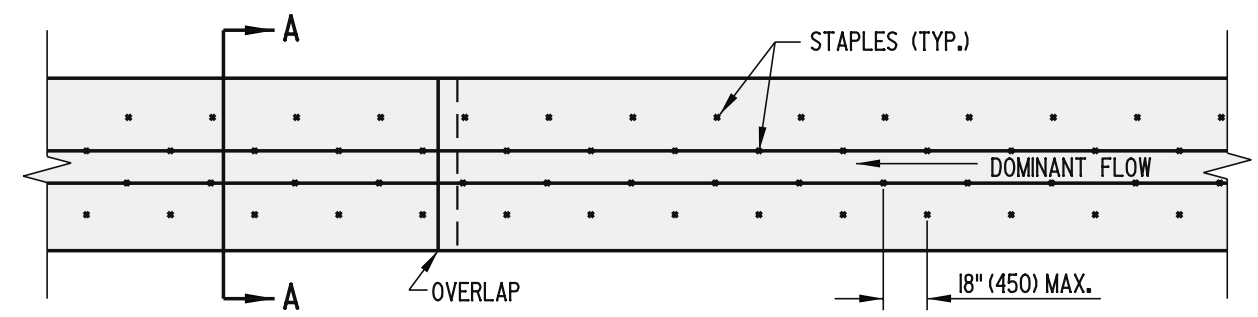
CHECK SLOT DETAIL
(AS NEEDED PER PLANS)



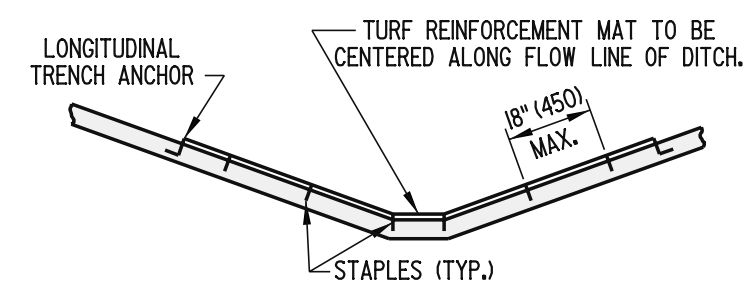
LONGITUDINAL TRENCH ANCHOR DETAIL



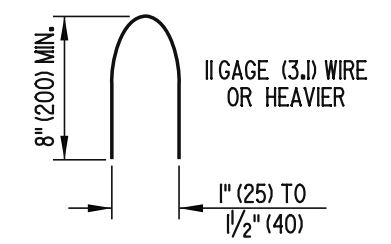
OVERLAP DETAIL



**STABILIZATION OF DITCHES
PLAN**




**STABILIZATION OF DITCHES
SECTION A-A**



STAPLE DETAIL

- NOTES: 1. ADDITIONAL STAPLES NOT SHOWN ARE REQUIRED AT OVERLAPS, ENDS, CHECK SLOTS AND EDGES. SEE APPROPRIATE DETAILS FOR STAPLE PLACEMENT.
2. STAPLES ARE TO BE STAGGERED.
3. TOPSOIL UNDER TURF REINFORCEMENT MAT IS TO BE TRACKED AND SEEDED.



 DELAWARE DEPARTMENT OF TRANSPORTATION	TURF REINFORCEMENT MAT APPLICATIONS			APPROVED <i>Carolann Wick</i> 12/15/05 CHIEF ENGINEER DATE	
	STANDARD NO. E-25 (2005)	SHT. 1	OF 1	RECOMMENDED <i>James M. O'Brien</i> 11/29/05 DESIGN ENGINEER DATE	



STANDARD NO.

SHT. 1

OF 1


 CHIEF ENGINEER

 DESIGN ENGINEER

RECOMMENDED

DESIGN ENGINEER

DATE 6/18/01

DATE 6/15/01