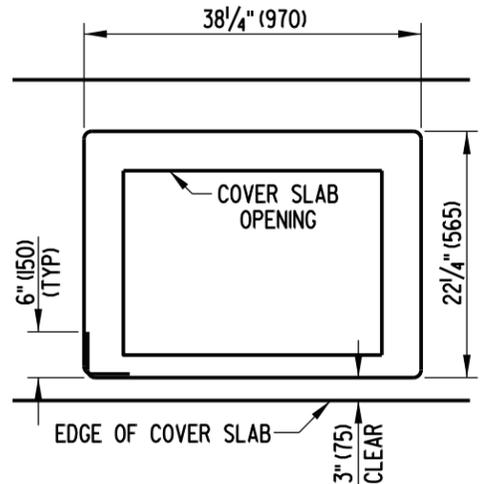
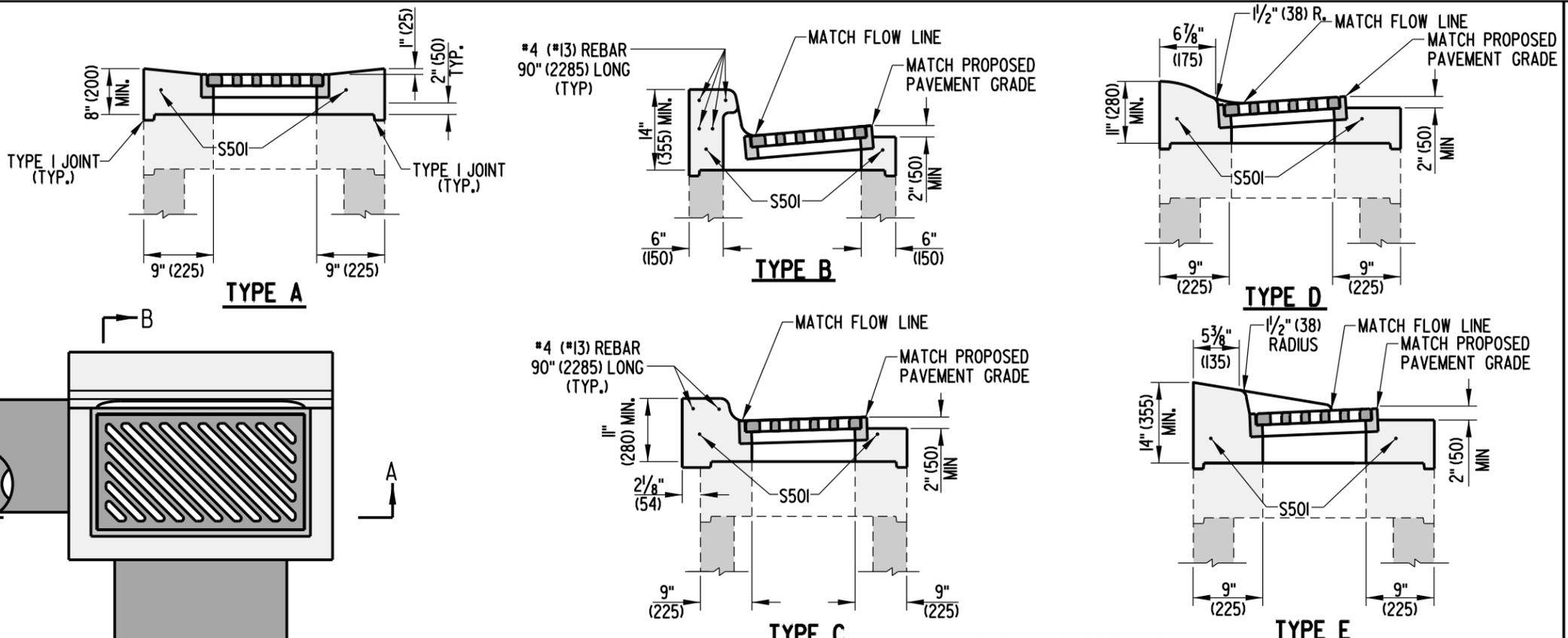


SCALE : N.T.S.

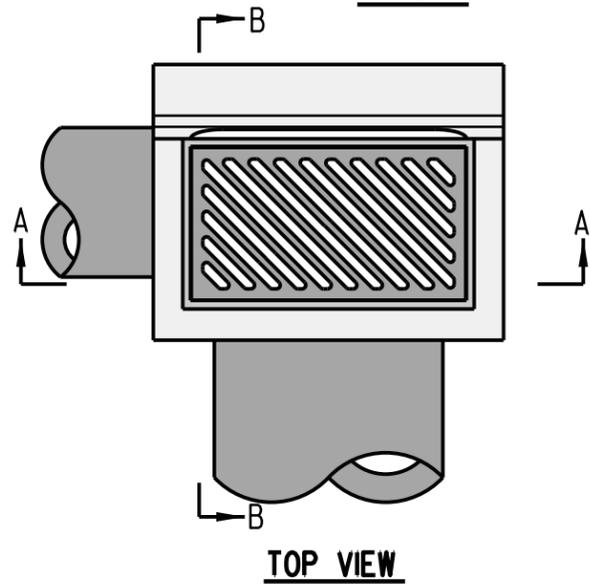


S503 BENDING DIAGRAM

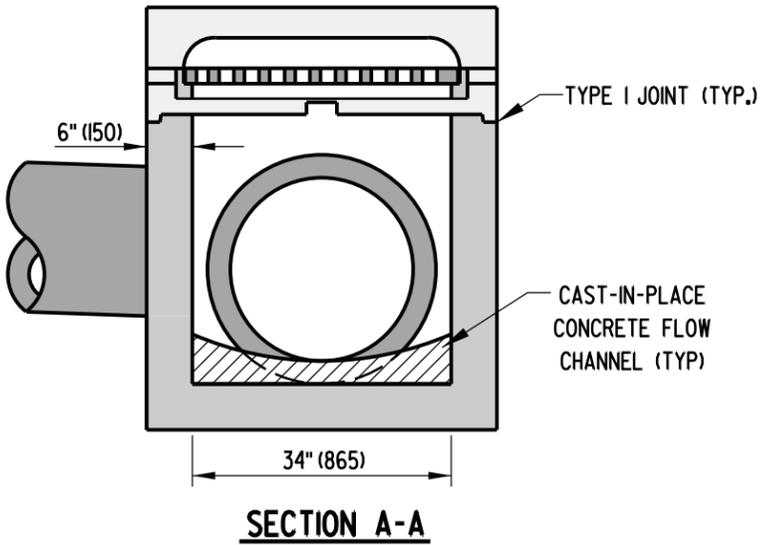
S503 IS NOT REQUIRED TO BE ONE CONTINUOUS BAR. IF MORE THAN ONE BAR IS USED, THERE MUST BE A 12" (300) OVERLAP BETWEEN BARS.

TOP UNIT DETAILS

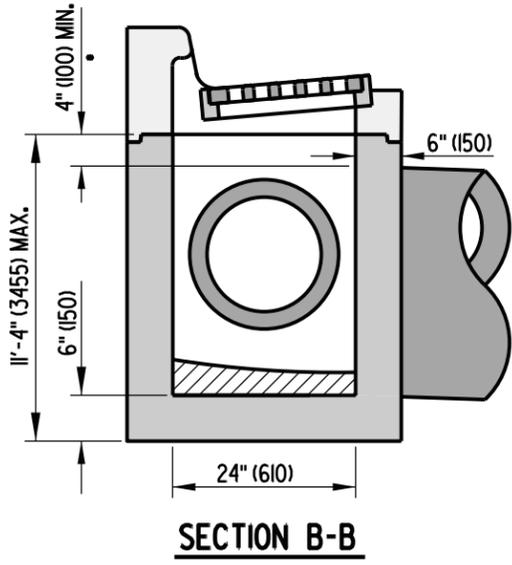
NOTE: SEE DETAIL D-5, SHEET 3 OF 8 FOR INLET TOP UNIT APPLICATIONS.



TOP VIEW



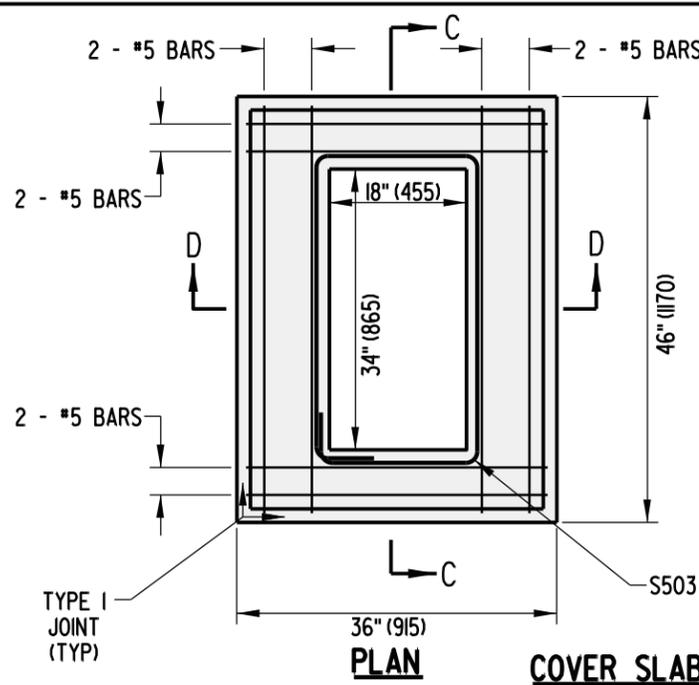
SECTION A-A



SECTION B-B

DRAINAGE INLET DETAILS

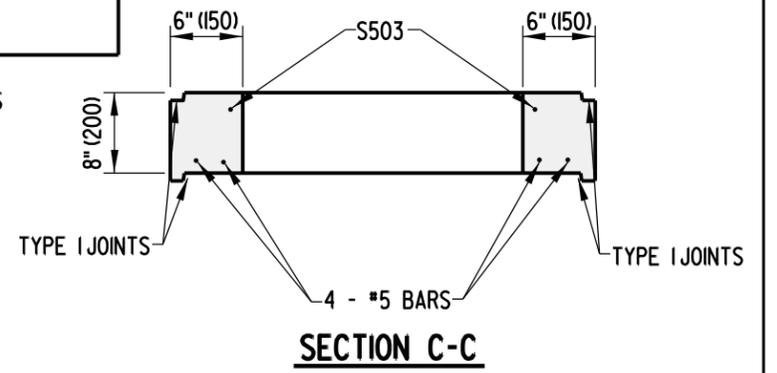
NOTE: REFER TO PREVIOUS SHEETS FOR REINFORCING REQUIREMENTS
 - - SEE OPTIONAL PIPE OPENING DETAIL ON STANDARD NO. D-4, SHEET 1 OF 1



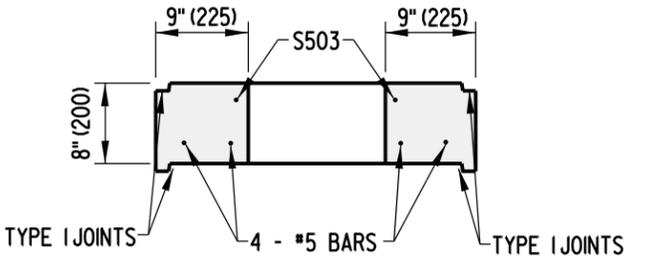
PLAN

COVER SLAB DETAILS

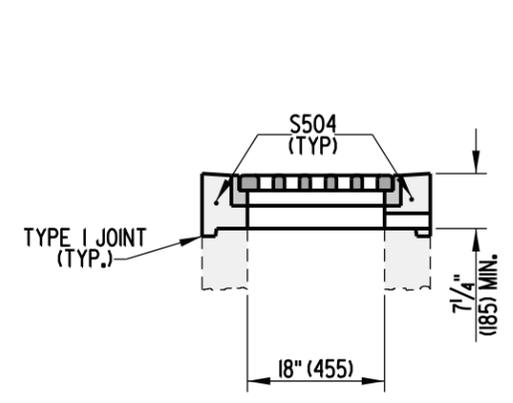
NOTE: COVER SLAB IS ONLY NEEDED FOR TYPES A, D, & E TOP UNITS FOR THE 34" (865) x 24" (610) DRAINAGE INLET.



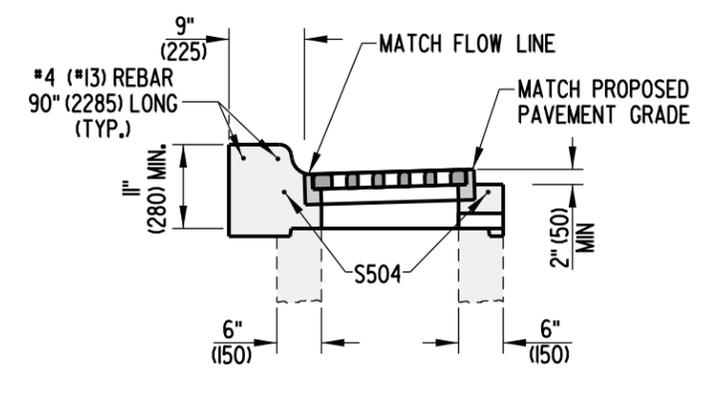
SECTION C-C



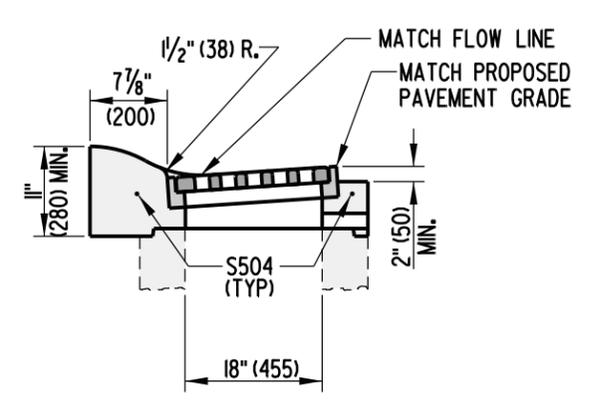
SECTION D-D



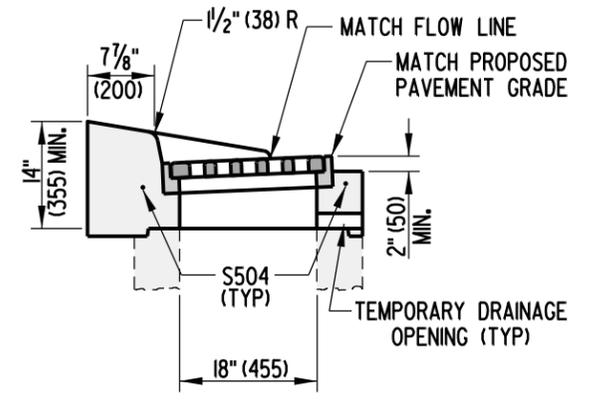
TYPE A



TYPE C

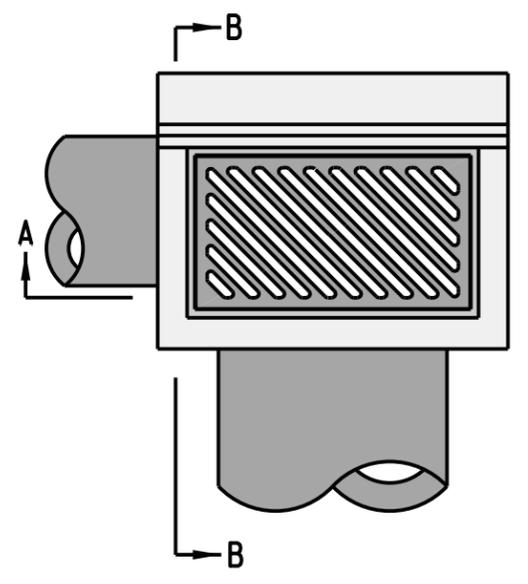


TYPE D

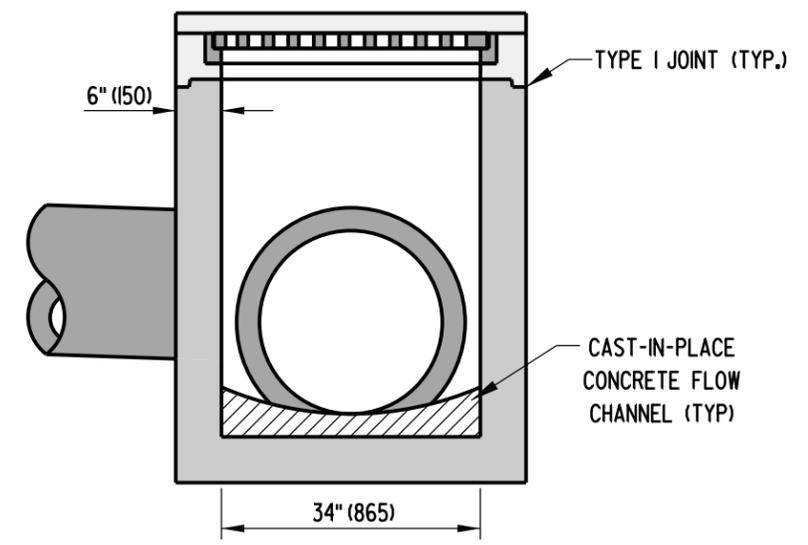


TYPE E

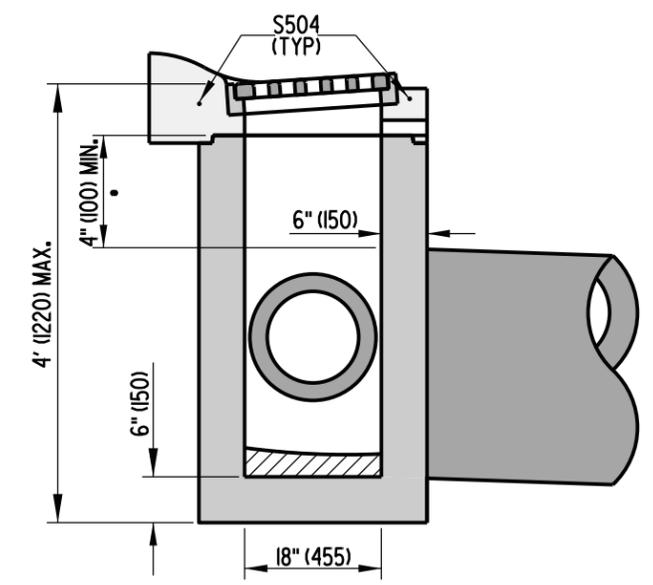
TOP UNIT DETAILS



TOP VIEW

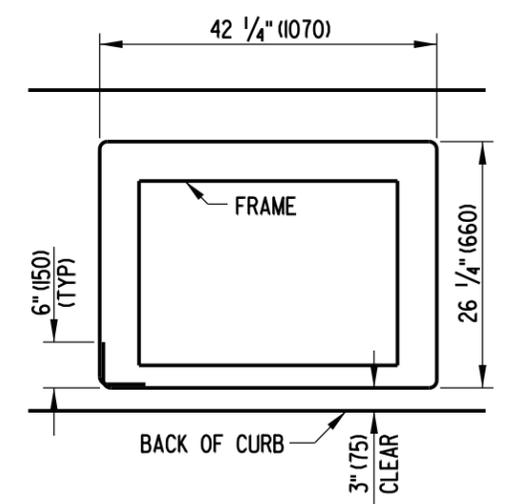


SECTION A-A



SECTION B-B

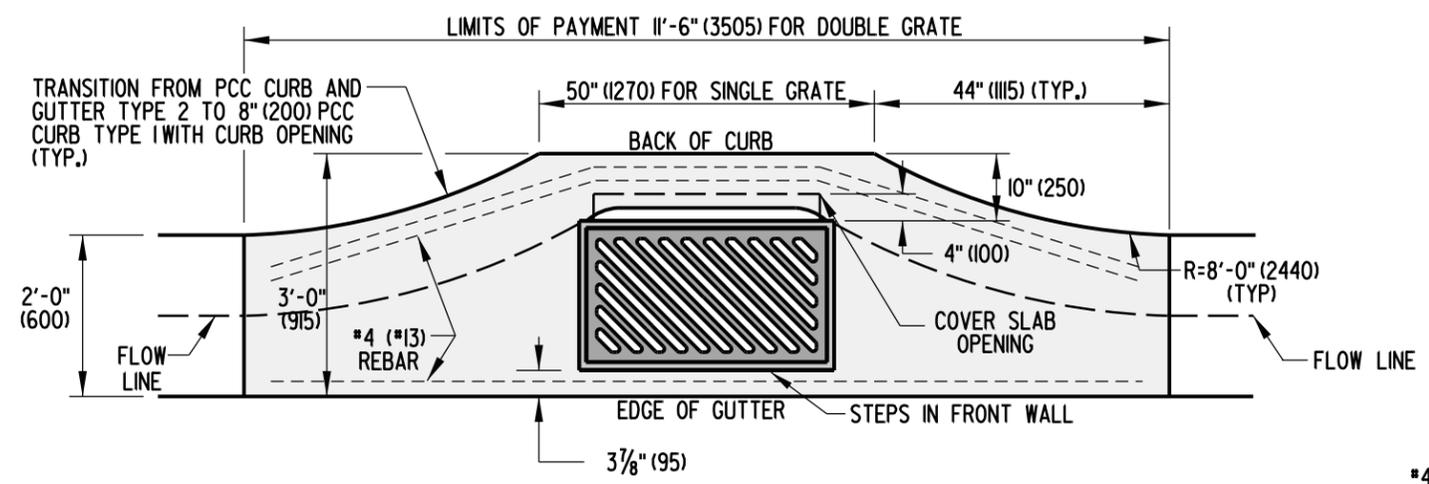
• - SEE OPTIONAL PIPE OPENING DETAIL ON STANDARD D-4, SHEET 1 OF 1.



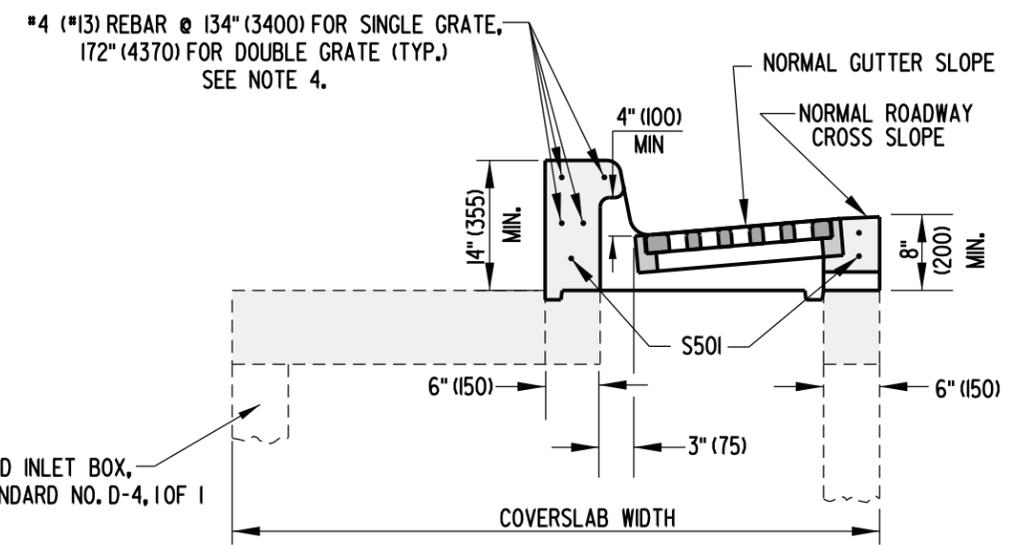
S504 BENDING DIAGRAM

S504 IS NOT REQUIRED TO BE ONE CONTINUOUS BAR. IF MORE THAN ONE BAR IS USED, THERE MUST BE A 12" (300) OVERLAP BETWEEN BARS.

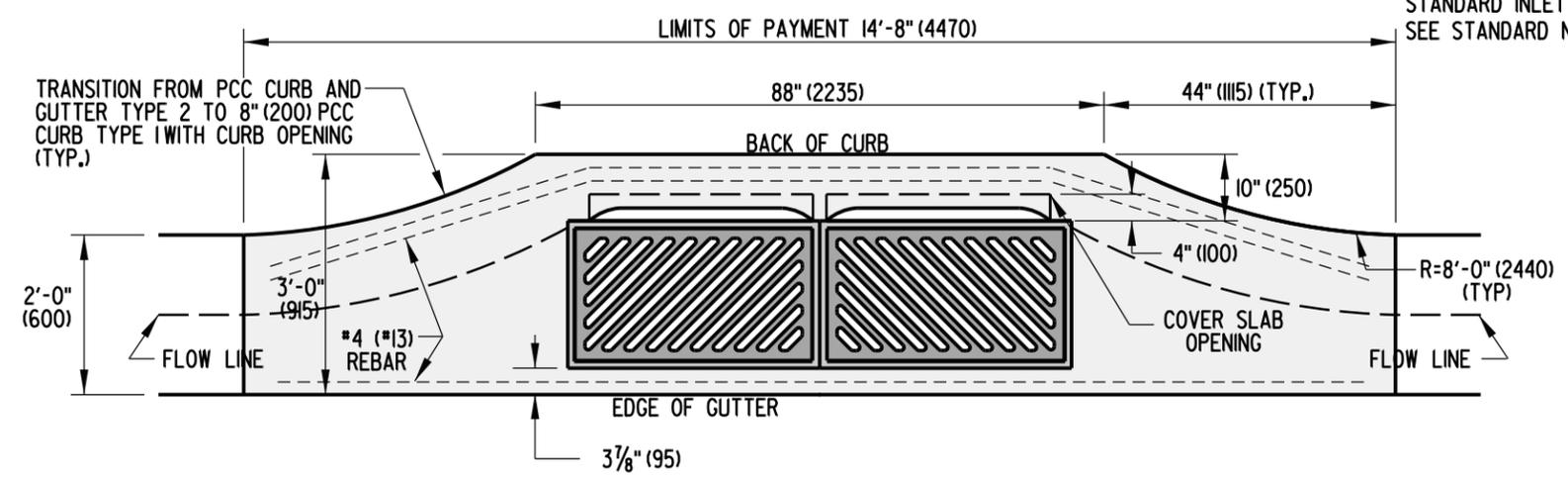
- NOTES:
- 1.) REFER TO PREVIOUS SHEETS FOR REINFORCEMENT REQUIREMENTS
 - 2.) THE HEIGHT OF THIS INLET IS LIMITED TO 4' (1220) MAXIMUM, THEREFORE STEPS WILL NOT BE REQUIRED AND SHOULD NOT BE INSTALLED ON THIS INLET.
 - 3.) REFER TO DETAIL D-5, SHEET 3 OF 8 FOR INLET TOP UNIT APPLICATION.



SINGLE GRATE SETUP

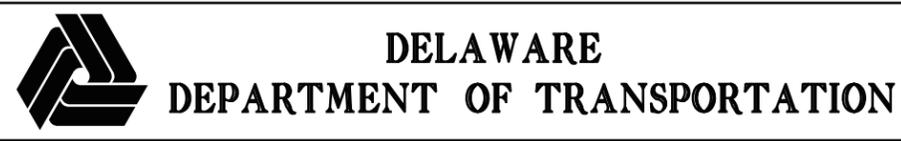


SUBDIVISION TOP & CONFIGURATION



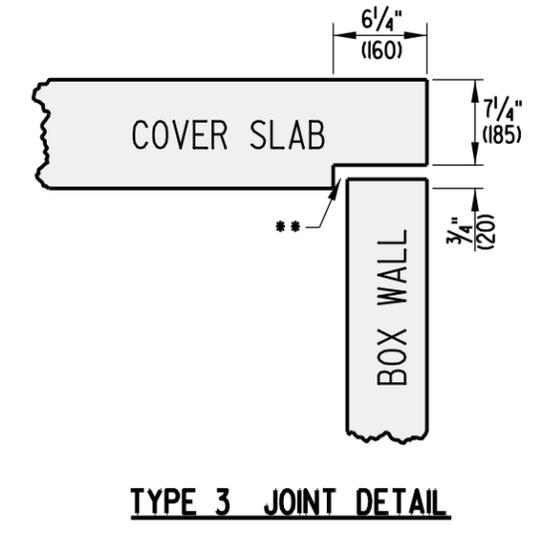
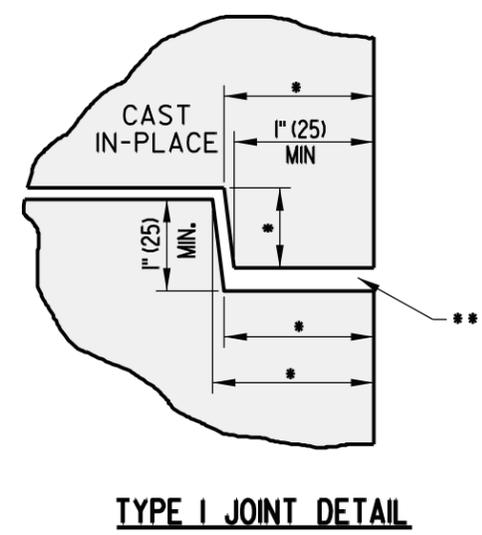
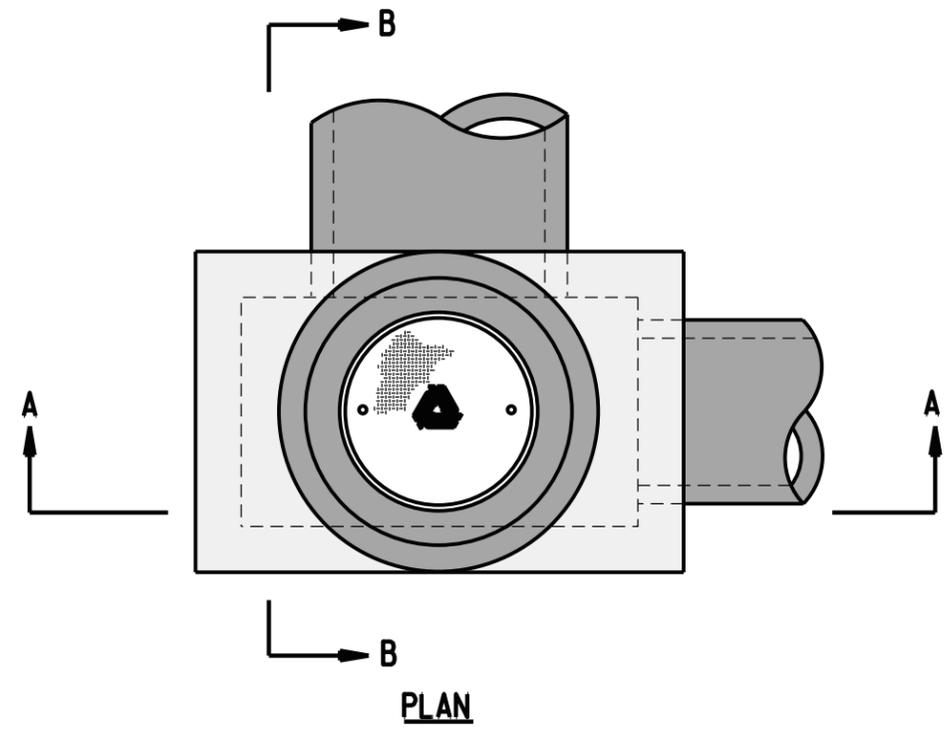
DOUBLE GRATE SETUP

- NOTES:**
- 1). MINIMUM BOX SIZE TO BE 34" (850) X 24" (600).
 - 2). PIPE OPENINGS IN THE FRONT WALL SHALL NOT INTERFERE WITH THE STEPS. THE PIPE SHALL BE SHIFTED HORIZONTALLY TO AVOID THE STEPS. IT MAY BE NECESSARY TO USE A LARGER BOX TO AVOID CONFLICT BETWEEN STEPS AND PIPE OPENING.
 - 3). SEE DETAIL D-5, SHEET 3 OF 9, FOR S501 BAR DIAGRAM.
 - 4). THE REBAR IN THE HEAD IS PREFERRED TO BE 1 CONTINUOUS PIECE, HOWEVER, IF MULTIPLE PIECES ARE TO BE USED, EACH PIECE SHALL OVERLAP BY 12" (300) MINIMUM AND THE FINAL LENGTH OF THE SPLICED REBAR SHALL BE AS NOTED ON THIS DETAIL.

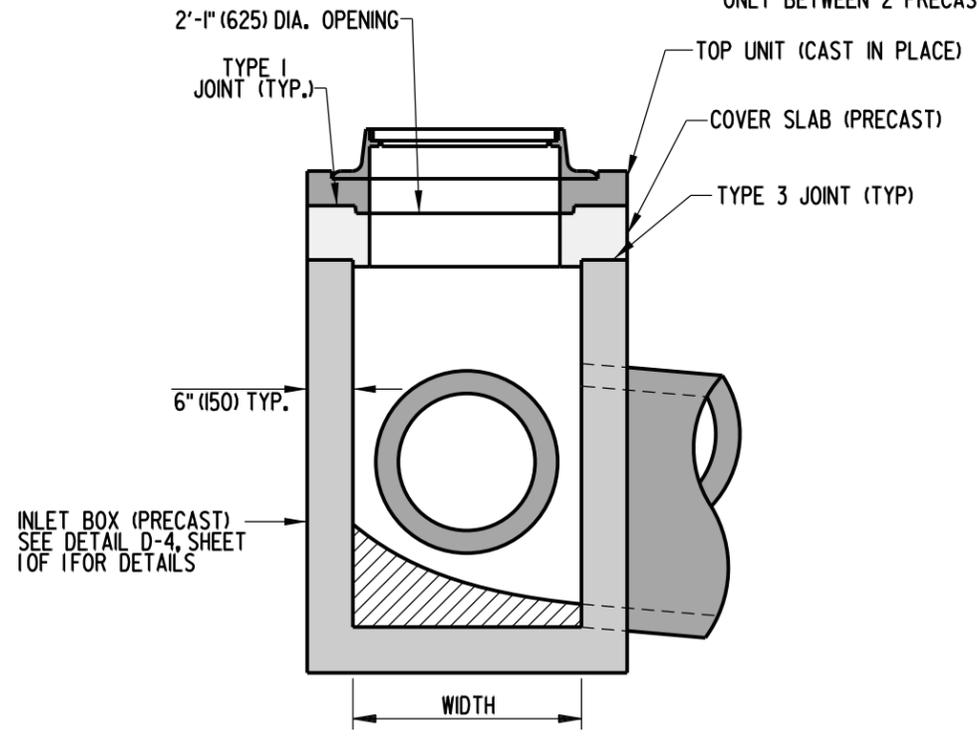
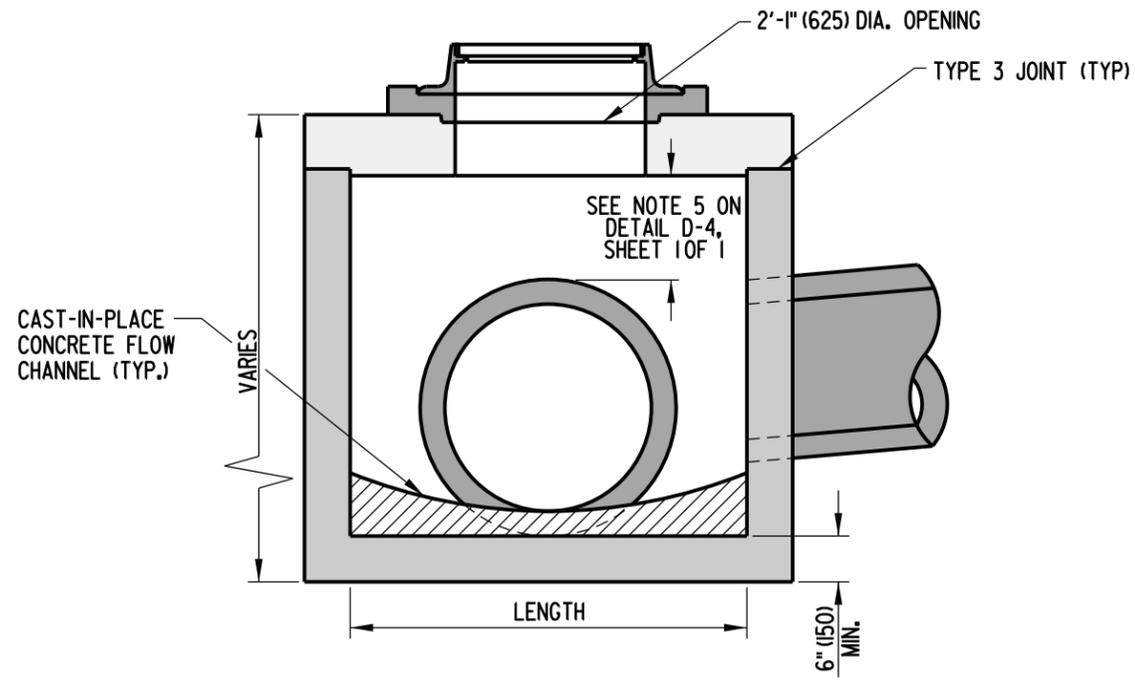


DRAINAGE INLET TOP UNIT, TYPE S			
STANDARD NO.	D-5 (2009)	SHT.	8 OF 8

APPROVED	SIGNATURE ON FILE	01/19/2010
	CHIEF ENGINEER	DATE
RECOMMENDED	SIGNATURE ON FILE	01/14/2010
	DESIGN ENGINEER	DATE



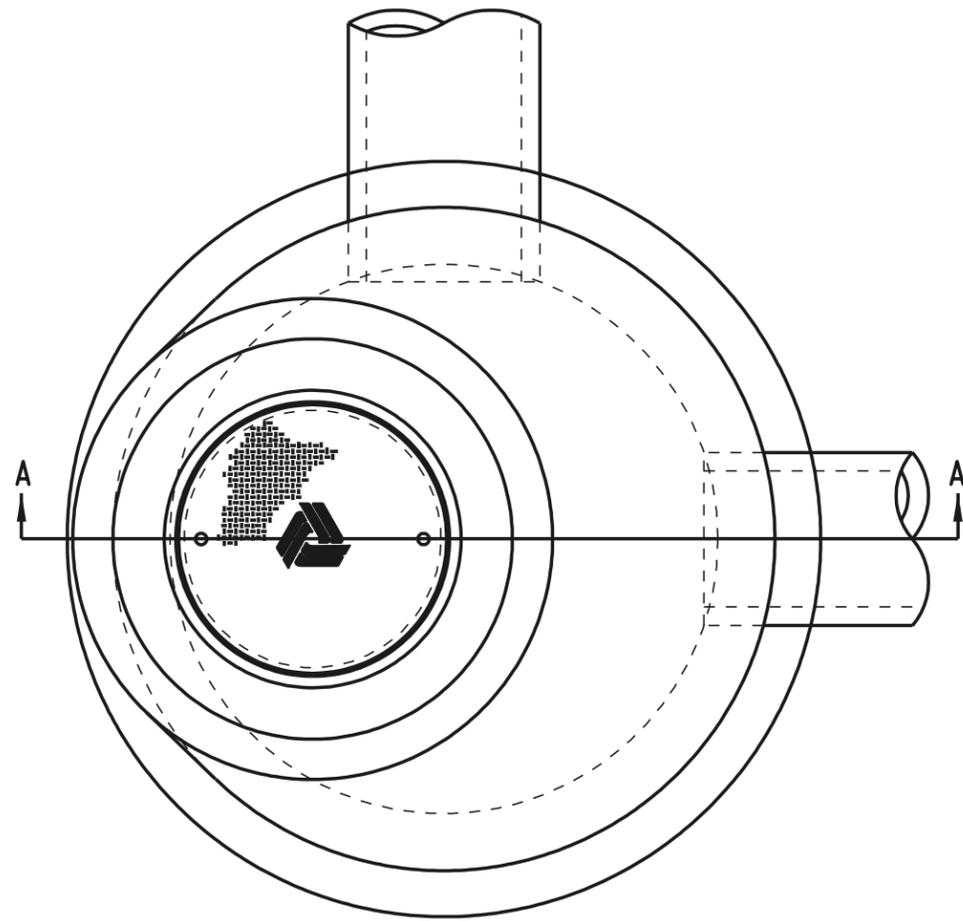
* DIMENSIONS MAY VARY
 ** JOINT SEALANT AS PER SPECIFICATIONS ONLY BETWEEN 2 PRECAST UNITS



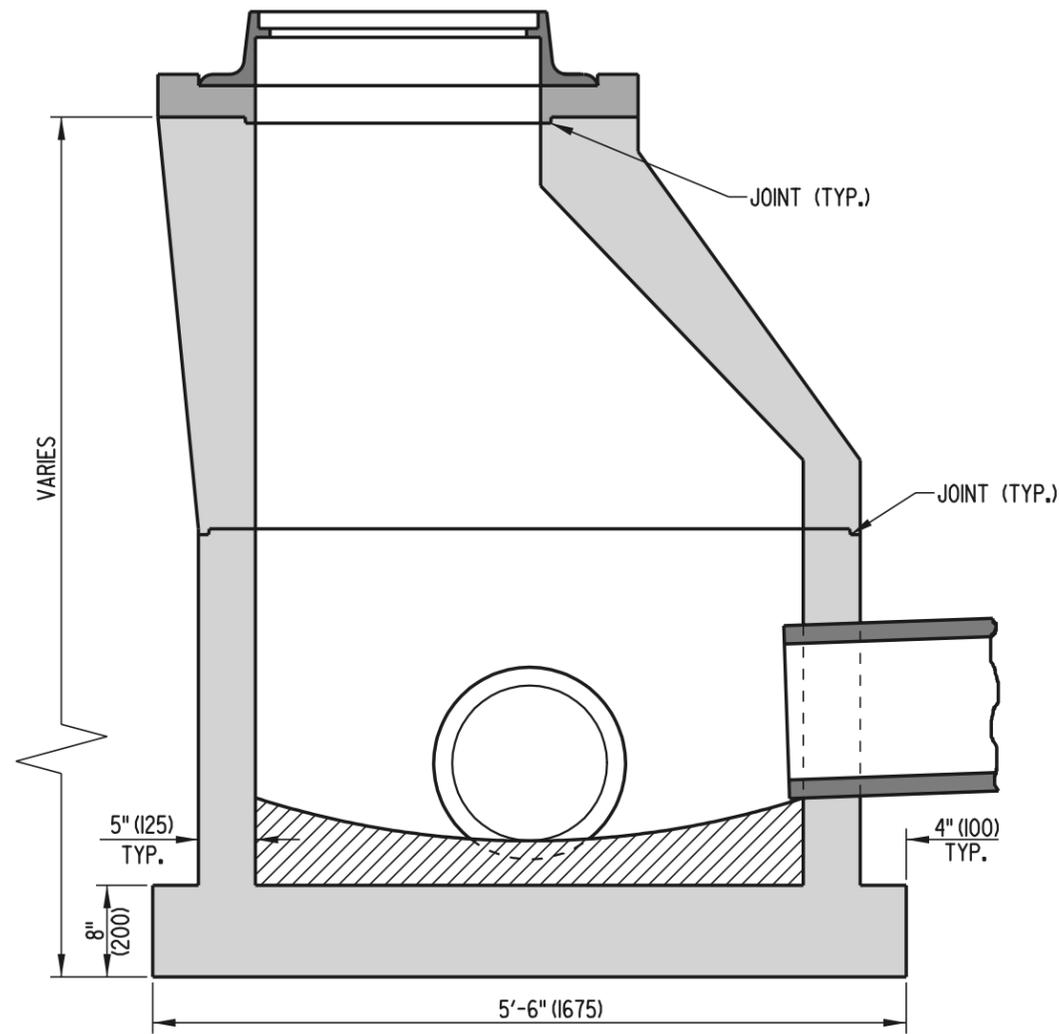
• - SEE OPTIONAL PIPE OPENING DETAIL ON STANDARD D-4, SHEET 1 OF 1.

BOX MANHOLE ASSEMBLY

<p>DELAWARE DEPARTMENT OF TRANSPORTATION</p>	MANHOLE DETAILS			<p>APPROVED _____ SIGNATURE ON FILE _____ 01/19/2010 <small>CHIEF ENGINEER DATE</small></p>
	<p>STANDARD NO. D-6 (2009)</p>	<p>SHT. 1</p>	<p>OF 4</p>	<p>RECOMMENDED _____ SIGNATURE ON FILE _____ 01/14/2010 <small>DESIGN ENGINEER DATE</small></p>



PLAN



SECTION A-A

ROUND MANHOLE ASSEMBLY

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



DELAWARE
DEPARTMENT OF TRANSPORTATION

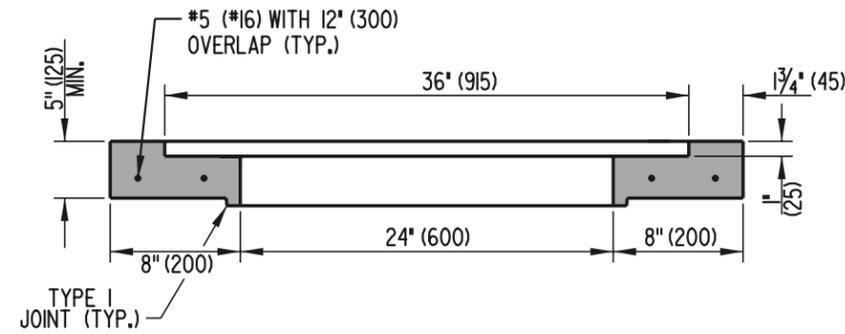
MANHOLE DETAILS

STANDARD NO. D-6 (2001) SHT. 2 OF 4

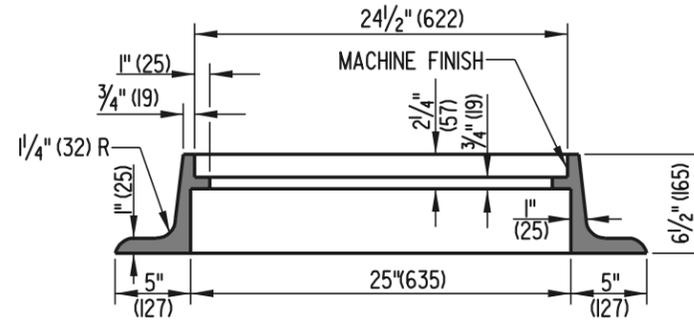
APPROVED *Ryan M. Harkness* 6/18/01
CHIEF ENGINEER DATE

RECOMMENDED *Mehal Alghob* 6/18/01
DESIGN ENGINEER DATE

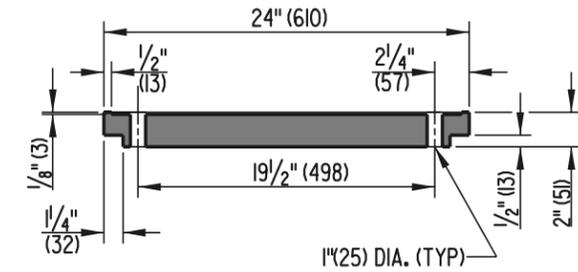
NOTE: TOP UNIT IS TO BE CAST IN PLACE TO GRADE AS SPECIFIED ON PLAN SHEETS OR AS DIRECTED BY ENGINEER.



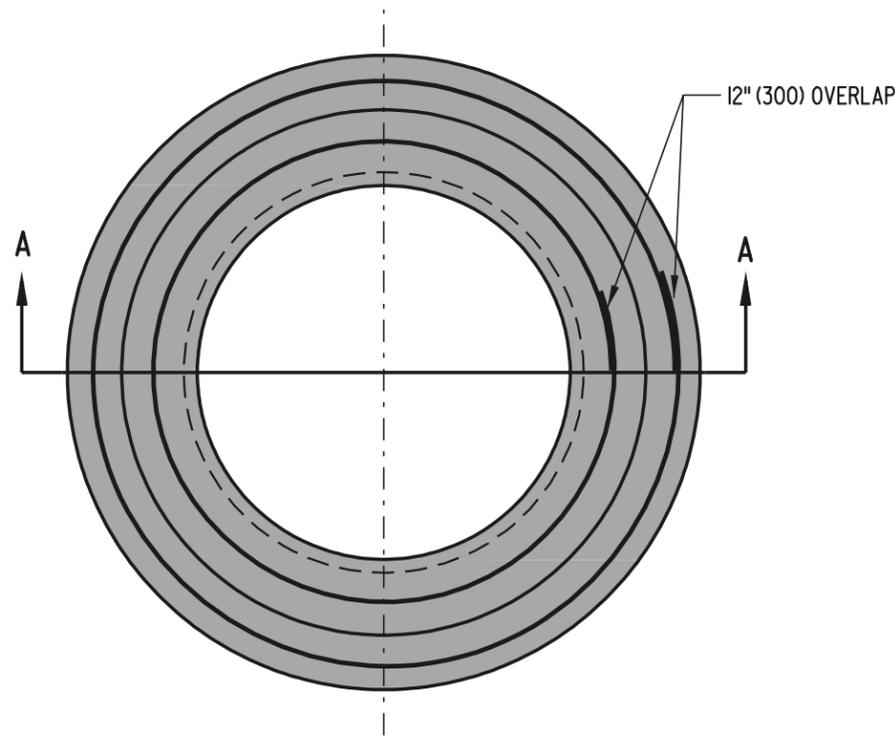
SECTION A-A



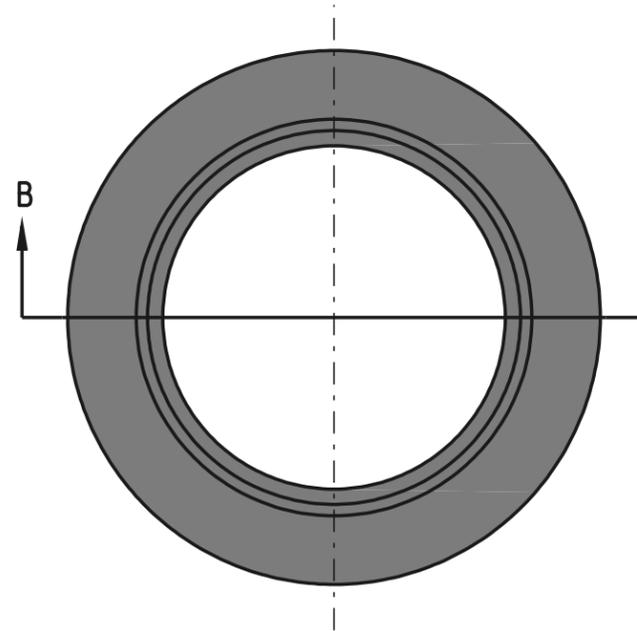
SECTION B-B



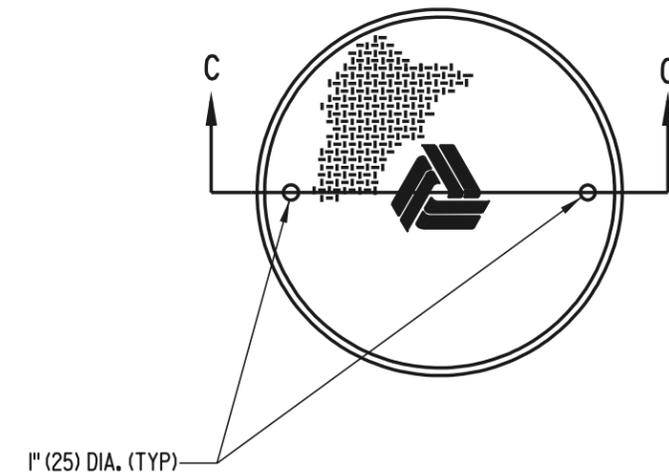
SECTION C-C



TOP UNIT



FRAME



COVER



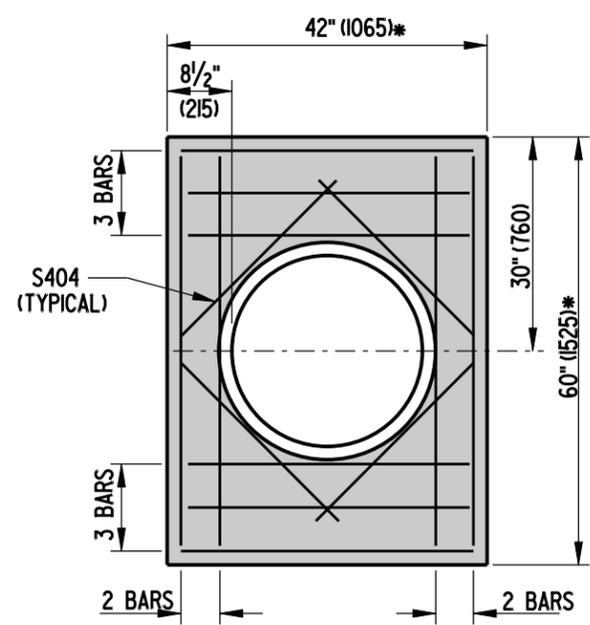
DELAWARE
DEPARTMENT OF TRANSPORTATION

MANHOLE DETAILS

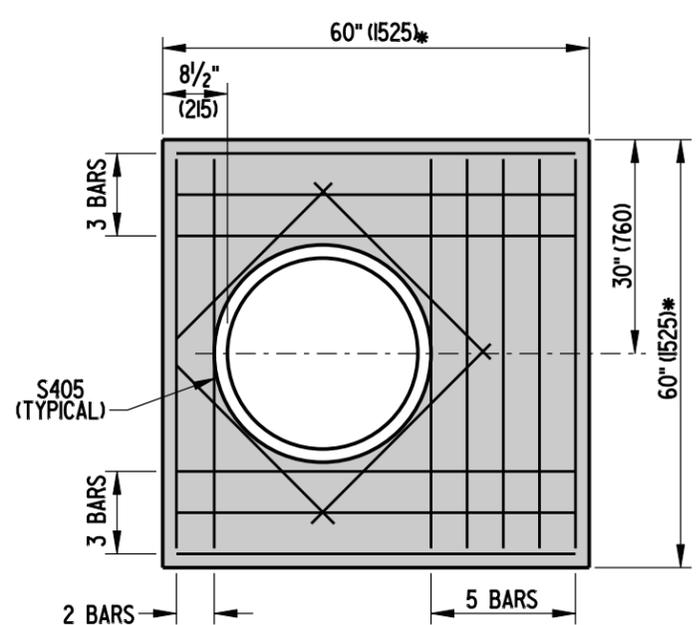
STANDARD NO. D-6 (2001) SHT. 3 OF 4

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

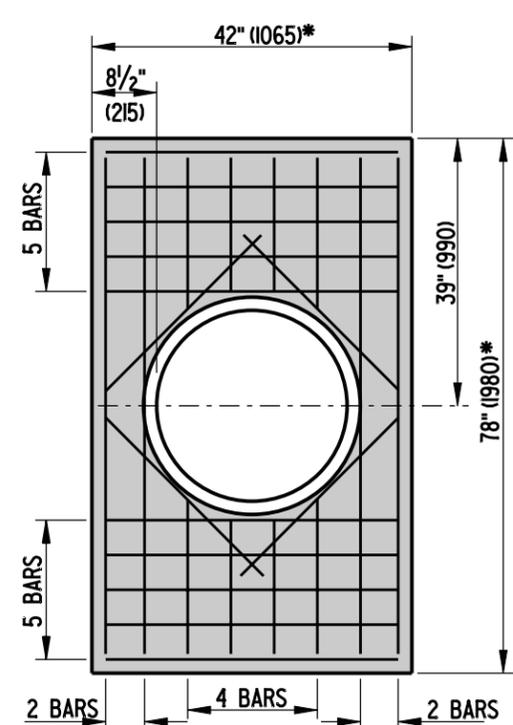
RECOMMENDED *Mehal Alghobari* 6/18/01
DESIGN ENGINEER DATE



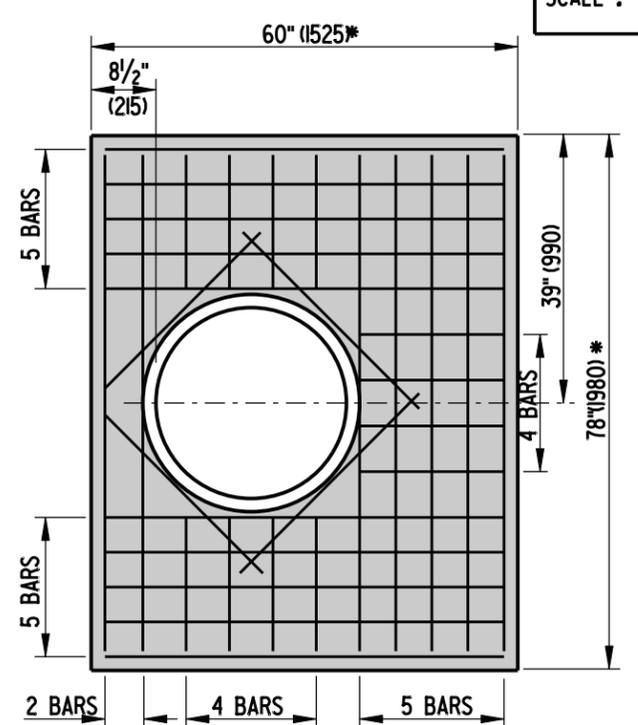
48" (1220) X 30" (760) MANHOLE



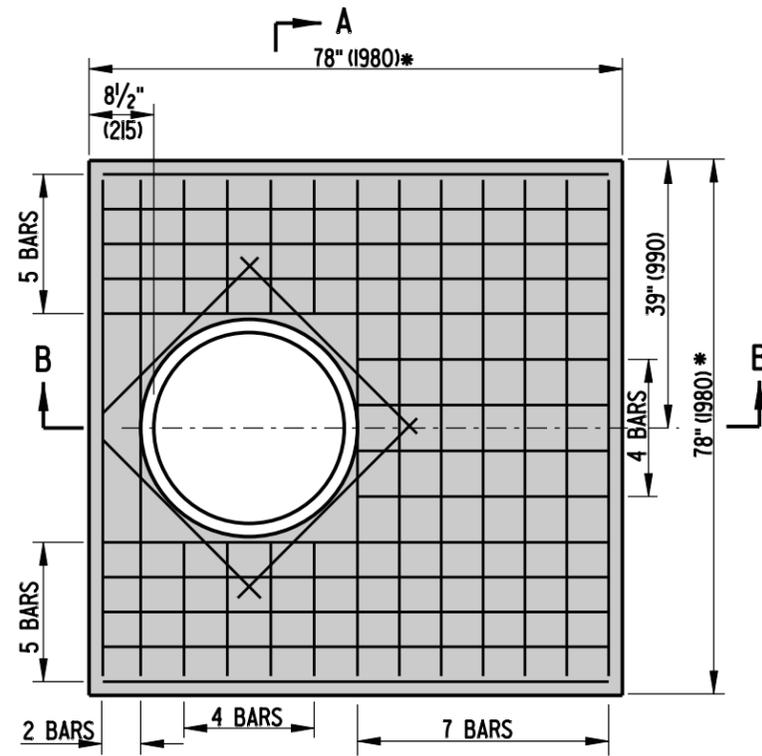
48" (1220) X 48" (1220) MANHOLE



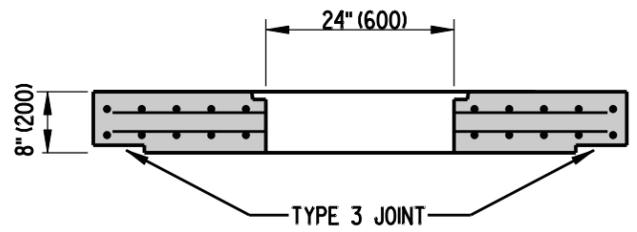
66" (1675) X 30" (760) MANHOLE



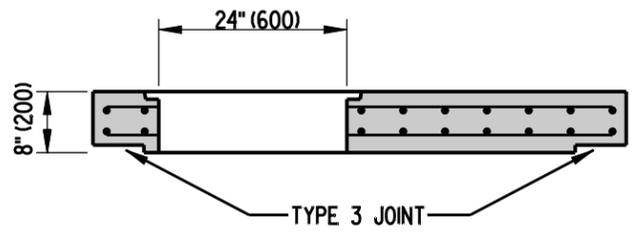
66" (1675) X 48" (1220) MANHOLE



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



SECTION A-A



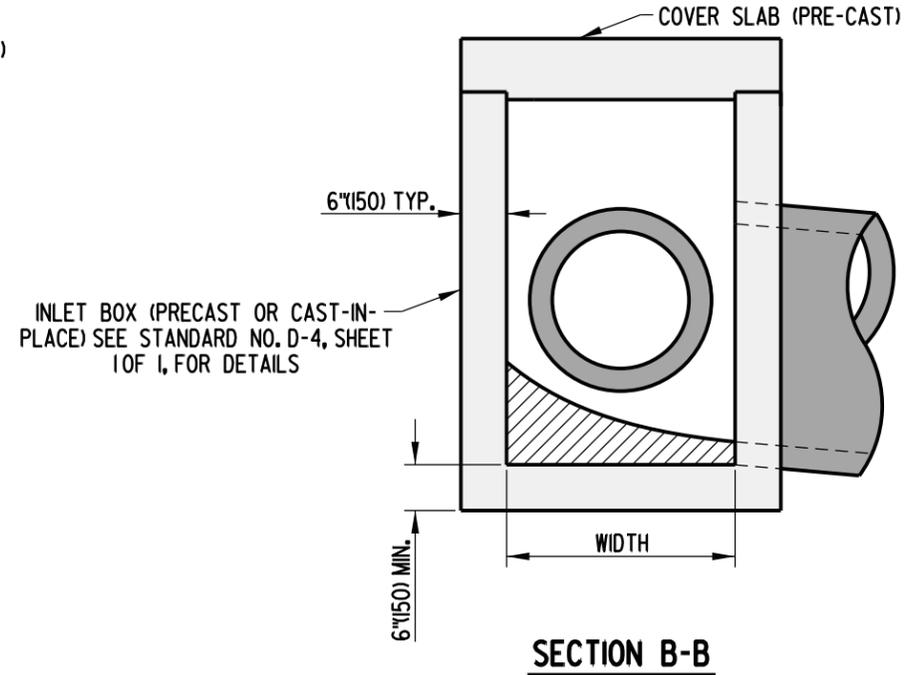
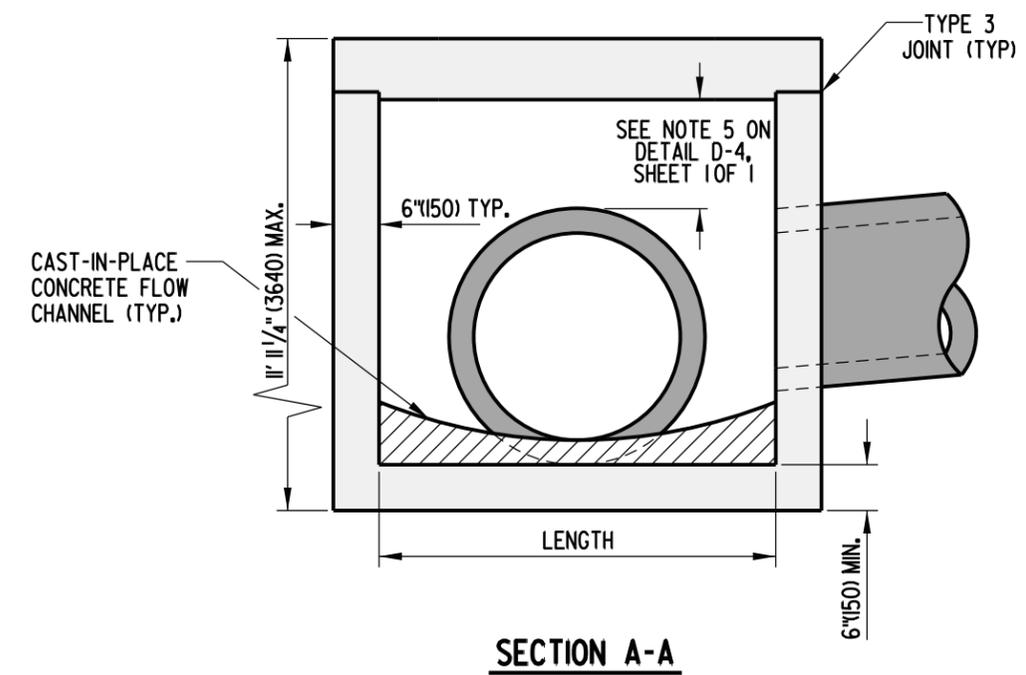
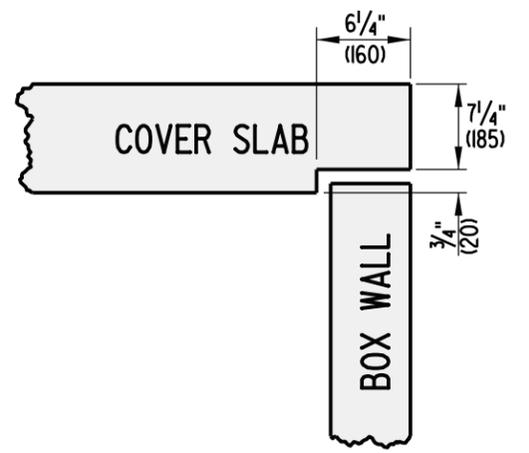
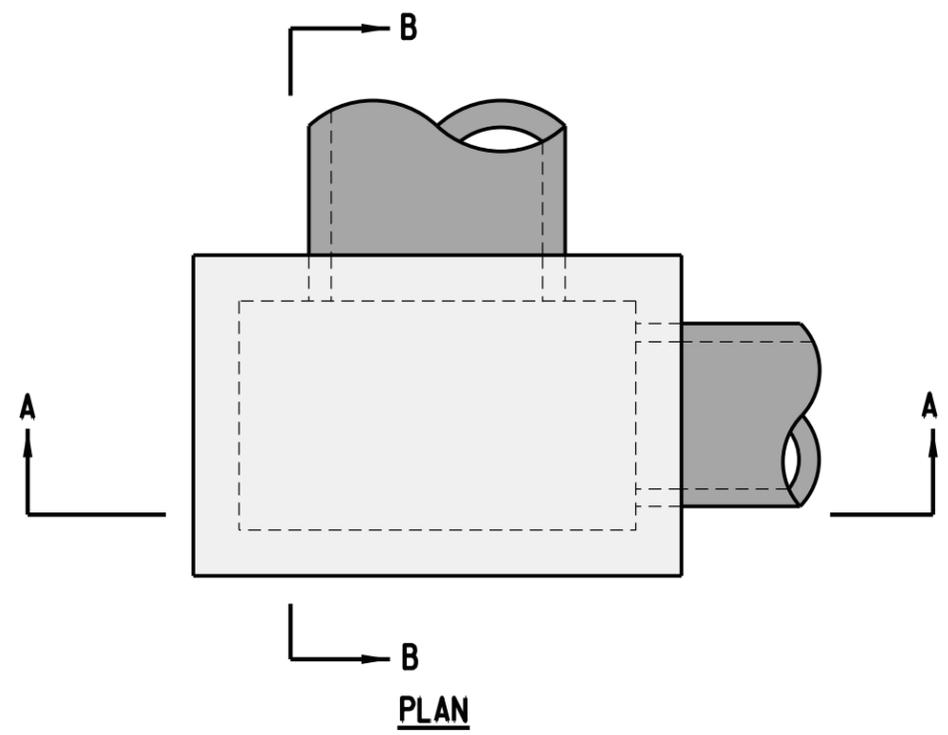
SECTION B-B

BOX MANHOLE COVER SLAB DETAILS

NOTES:

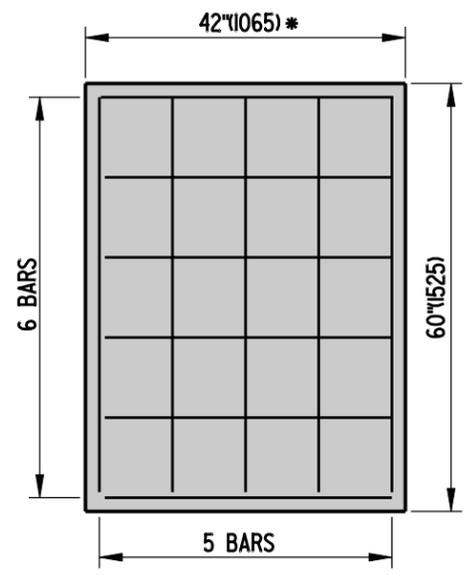
1. COVER SLABS SHALL BE PRE-CAST.
2. ALL BARS SHALL BE #5 (#16) SPACED AT 6" (150) ± UNLESS NOTED OTHERWISE.
3. MINIMUM BAR COVER = 1/2" (38).

* - DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX.

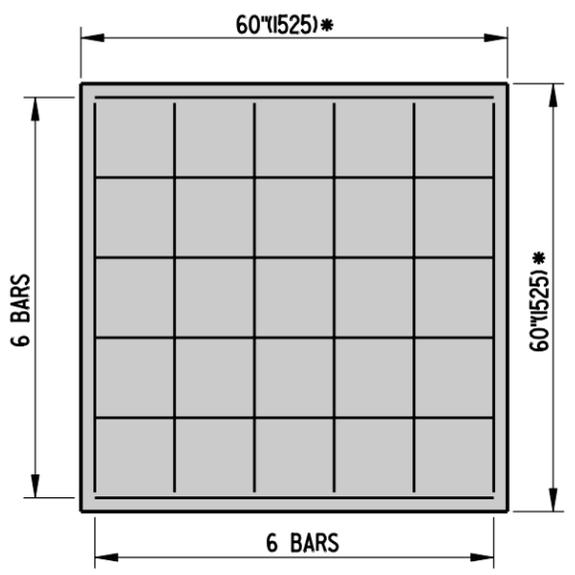


JUNCTION BOX ASSEMBLY

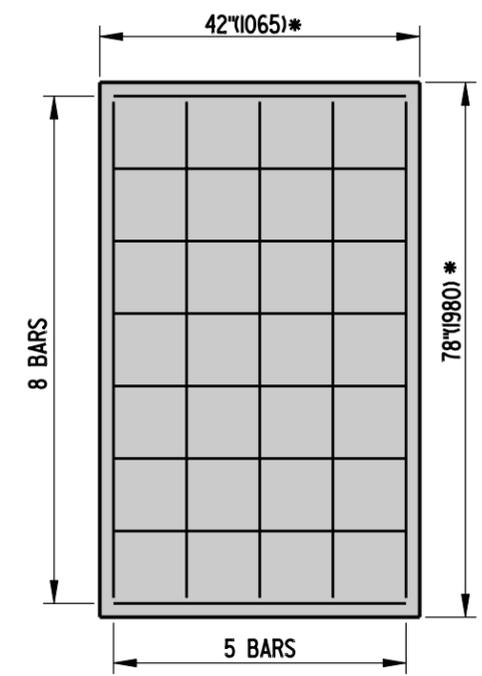
• - SEE OPTIONAL PIPE OPENING DETAIL ON STANDARD NO. D-4, SHEET 1 OF 1.



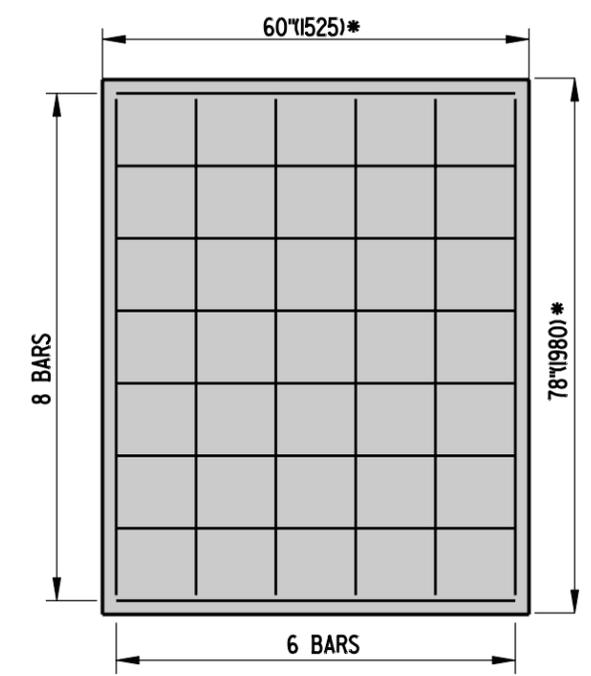
**48" (1220) x 30" (760)
JUNCTION BOX**



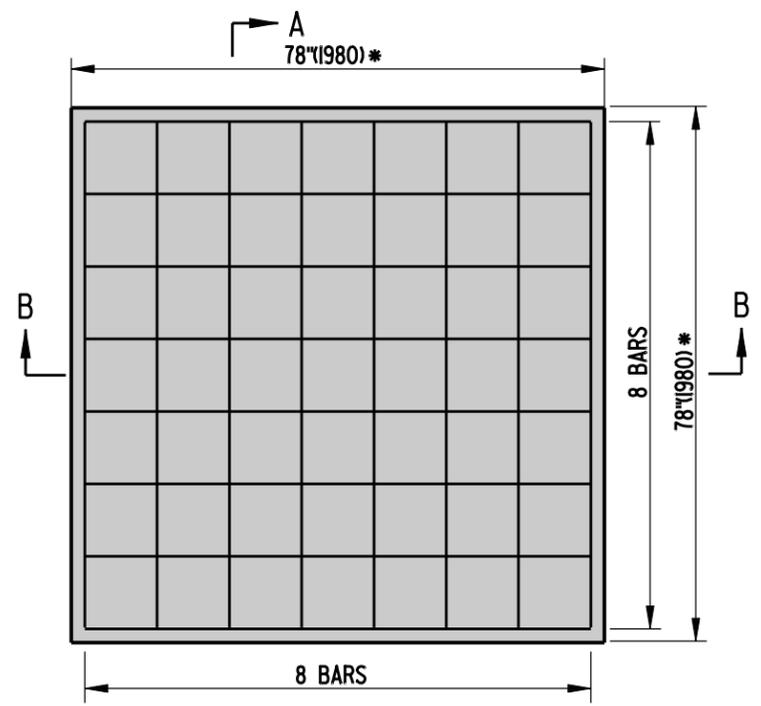
**48" (1220) x 48" (1220)
JUNCTION BOX**



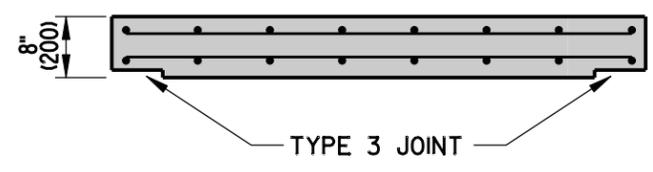
**66" (1675) x 30" (760)
JUNCTION BOX**



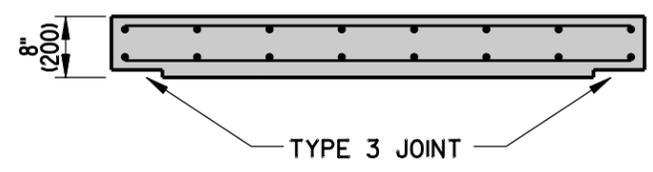
**66" (1675) x 48" (1220)
JUNCTION BOX**



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



SECTION A-A

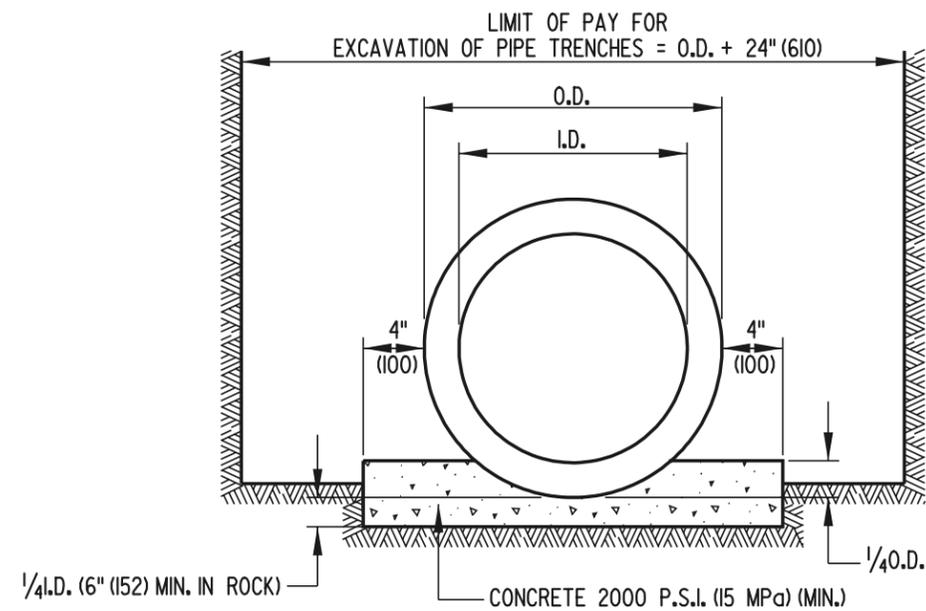


SECTION B-B

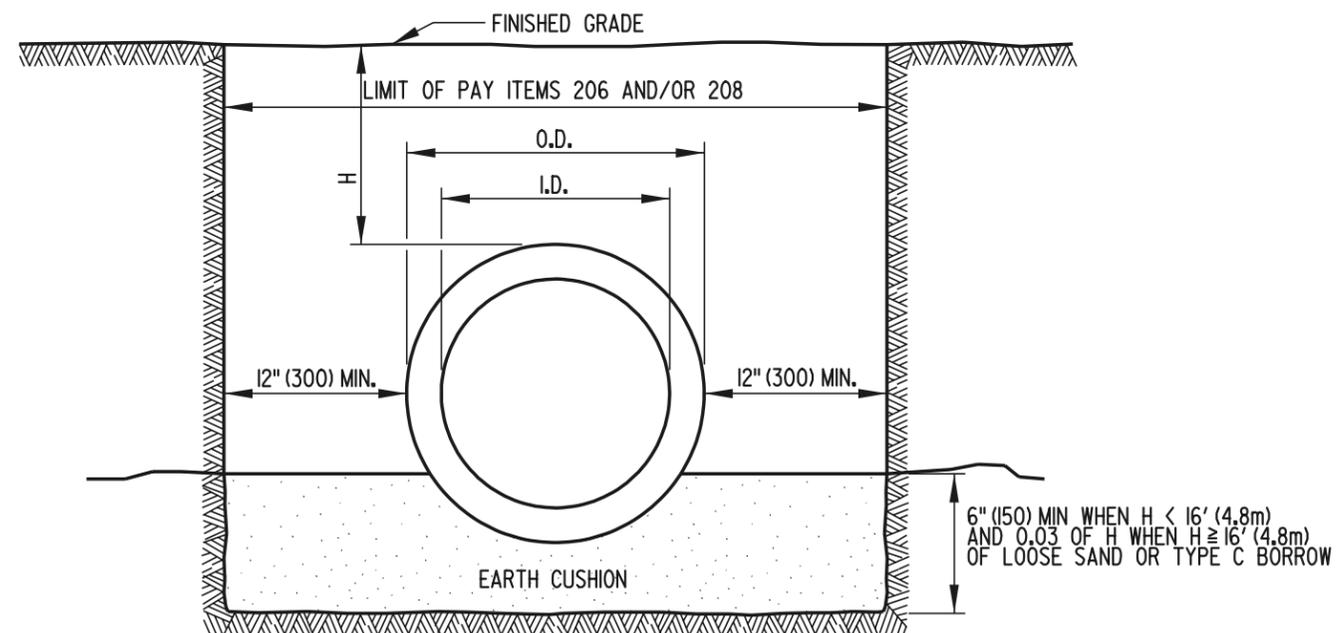
JUNCTION BOX COVER SLAB DETAILS

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.



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

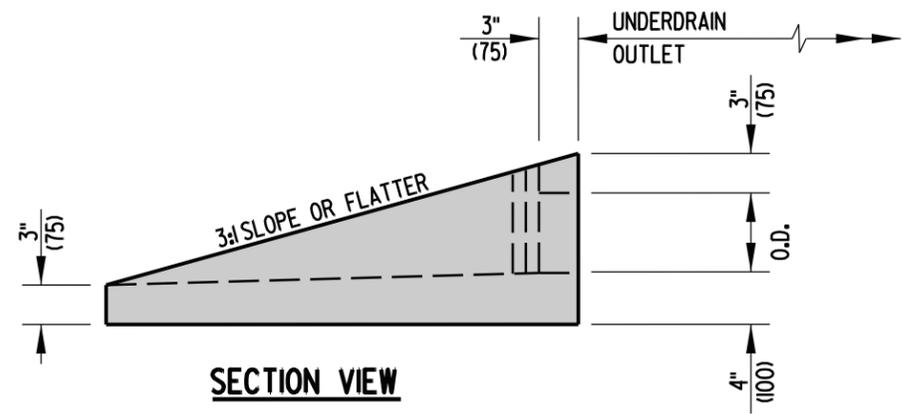
OF 1

APPROVED

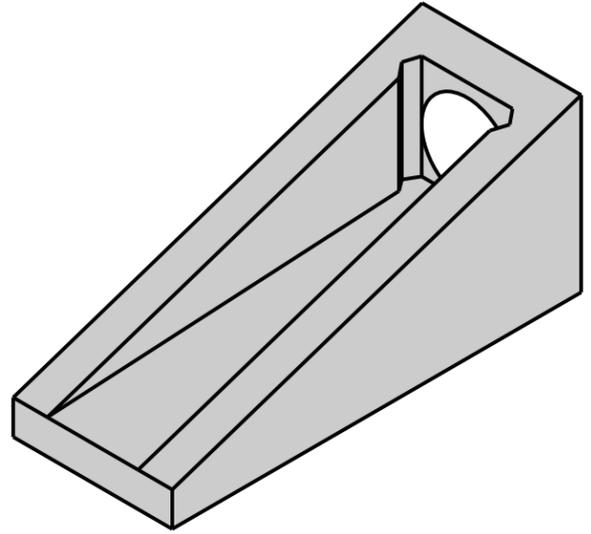
Ryan M. Harshbarger
CHIEF ENGINEER DATE 6/18/01

RECOMMENDED

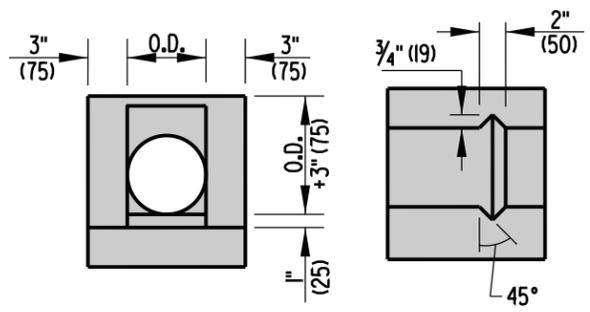
Michael R. [Signature]
DESIGN ENGINEER DATE 6/18/01



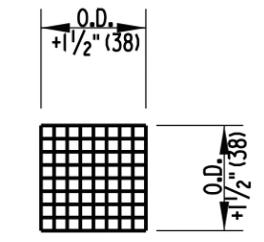
SECTION VIEW



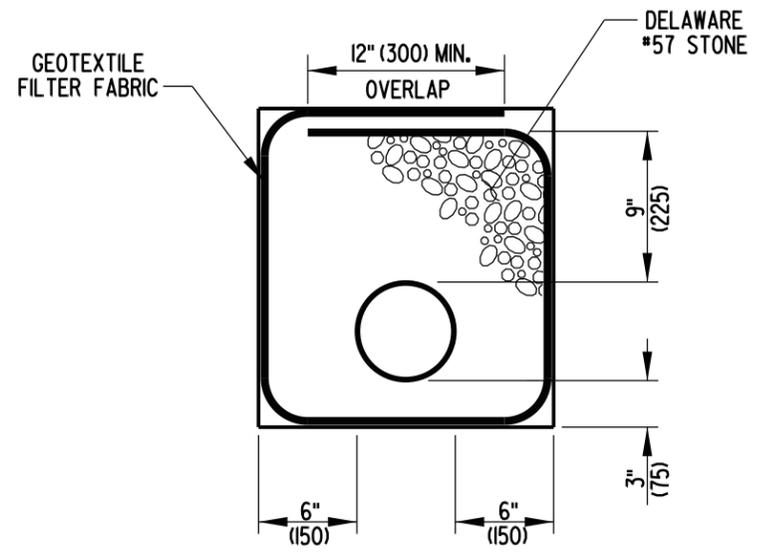
**ISOMETRIC VIEW
UNDERDRAIN OUTLET**



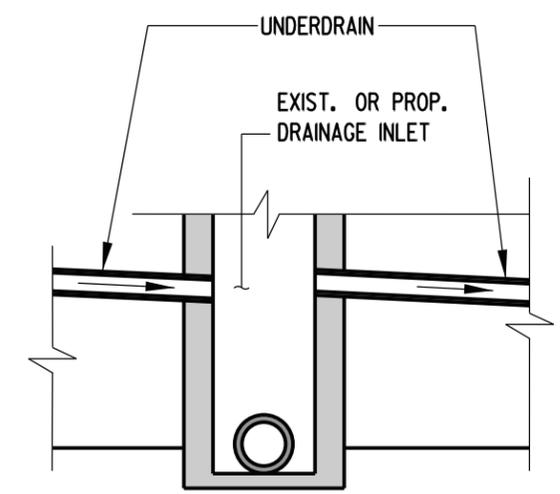
**FRONT VIEW
TOP VIEW
SLOTTED HEADWALL DETAIL**



**FRONT VIEW
RODENT SCREEN**



SECTION

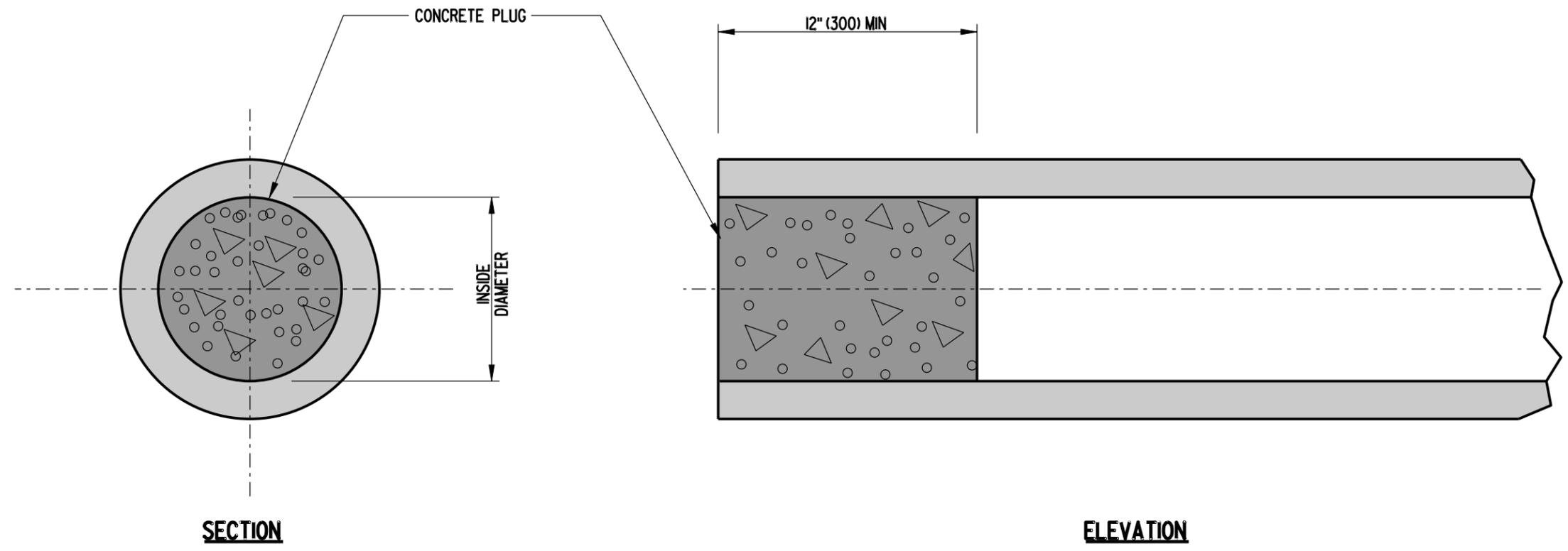


ELEVATION

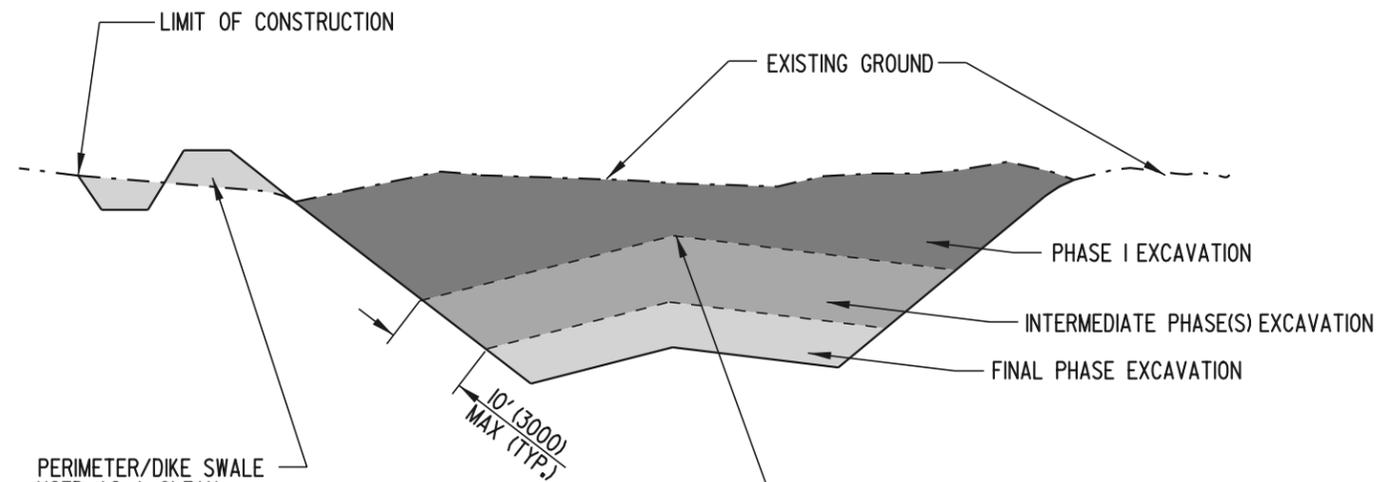
PERFORATED PIPE UNDERDRAIN

- NOTES:**
- 1). THE PERFORATED PIPE UNDERDRAIN SHALL BE LOCATED AS SHOWN ON THE TYPICAL SECTIONS OF THE CONSTRUCTION PLANS.
 - 2). GEOTEXTILE FILTER FABRIC SHALL BE PLACED ENTIRELY OVER THE TOP OF UNDERDRAIN TRENCH AND LAPPED AS SHOWN.
 - 3). SLOPE OF UNDERDRAINS SHALL MATCH ROADWAY GRADE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
 - 4). 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.
 - 5). RODENT SCREEN SHALL SNUGLY FIT THE PROVIDED SLOT WITH THE SCREEN LIP FITTING TIGHT TO THE BOTTOM FLOW LINE.
 - 6). A 4' (1200) FLEXIBLE DELINEATOR SHALL BE FURNISHED AND INSTALLED AT THE DIRECTION OF THE ENGINEER TO MARK THE LOCATION OF THE CONCRETE HEADWALL.
 - 7). WHEN TWO LINES OF PIPE UNDERDRAIN DRAIN TO A LOW POINT, EACH PIPE MUST HAVE ITS OWN OUTLET.
 - 8). PERFORATED PIPE UNDERDRAIN SHALL NOT BE PLACED UNDER GUARDRAIL IN ORDER TO AVOID PUNCTURING.

 DELAWARE DEPARTMENT OF TRANSPORTATION	PERFORATED PIPE UNDERDRAIN DETAIL		APPROVED  11/18/08 <small>CHIEF ENGINEER DATE</small>
	STANDARD NO. D-9 (2008)	SHT. 1 OF 1	RECOMMENDED  11/17/08 <small>DESIGN ENGINEER DATE</small>

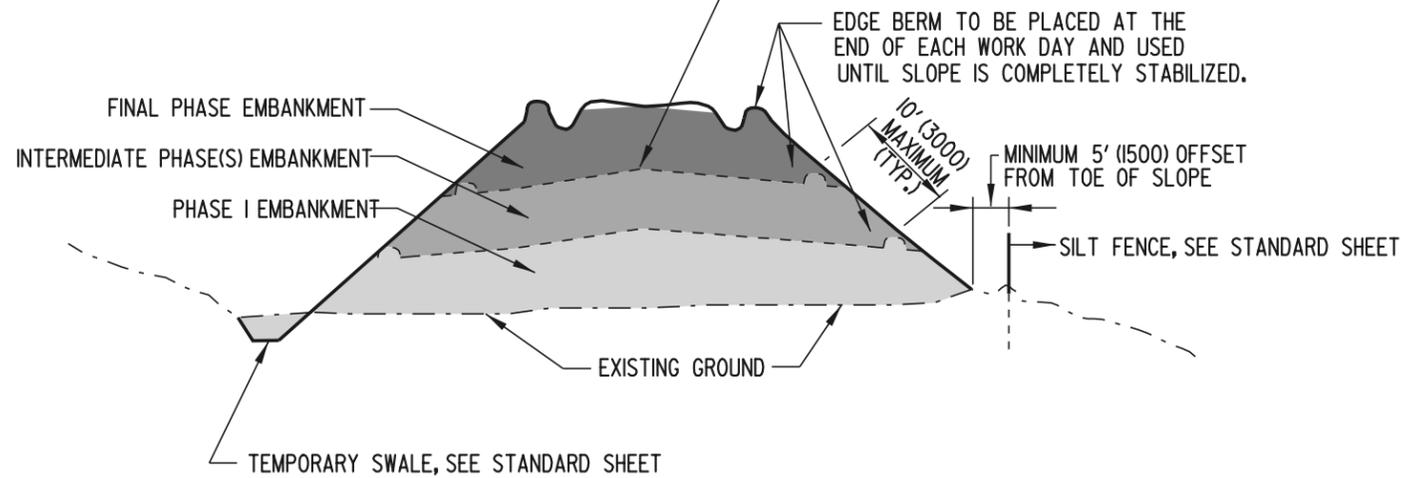


NOTE:
 THE CONTRACTOR SHALL FURNISH MATERIAL AND PLUG ABANDONED DRAINAGE PIPES WITH CONCRETE AS DIRECTED BY THE ENGINEER.



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.

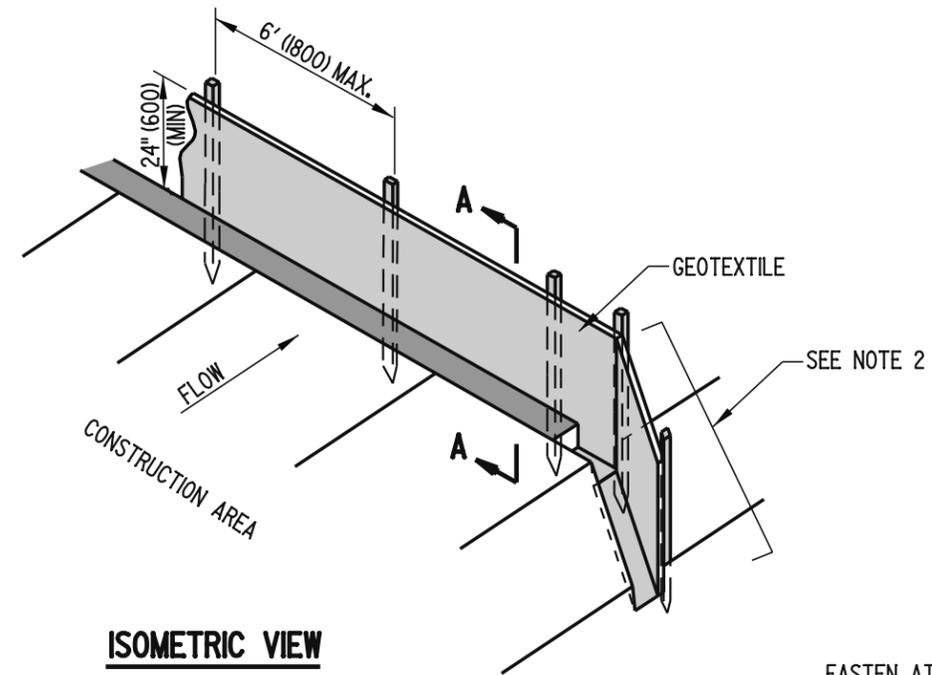


**DELAWARE
DEPARTMENT OF TRANSPORTATION**

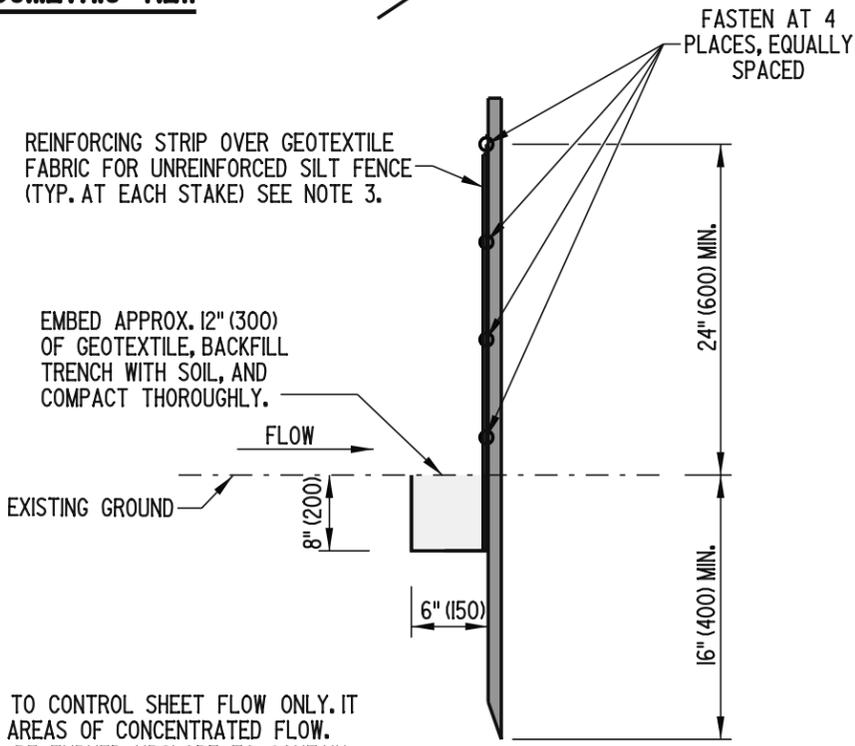
INCREMENTAL STABILIZATION

STANDARD NO. **E-1 (2001)** SHT. **1** OF **1**

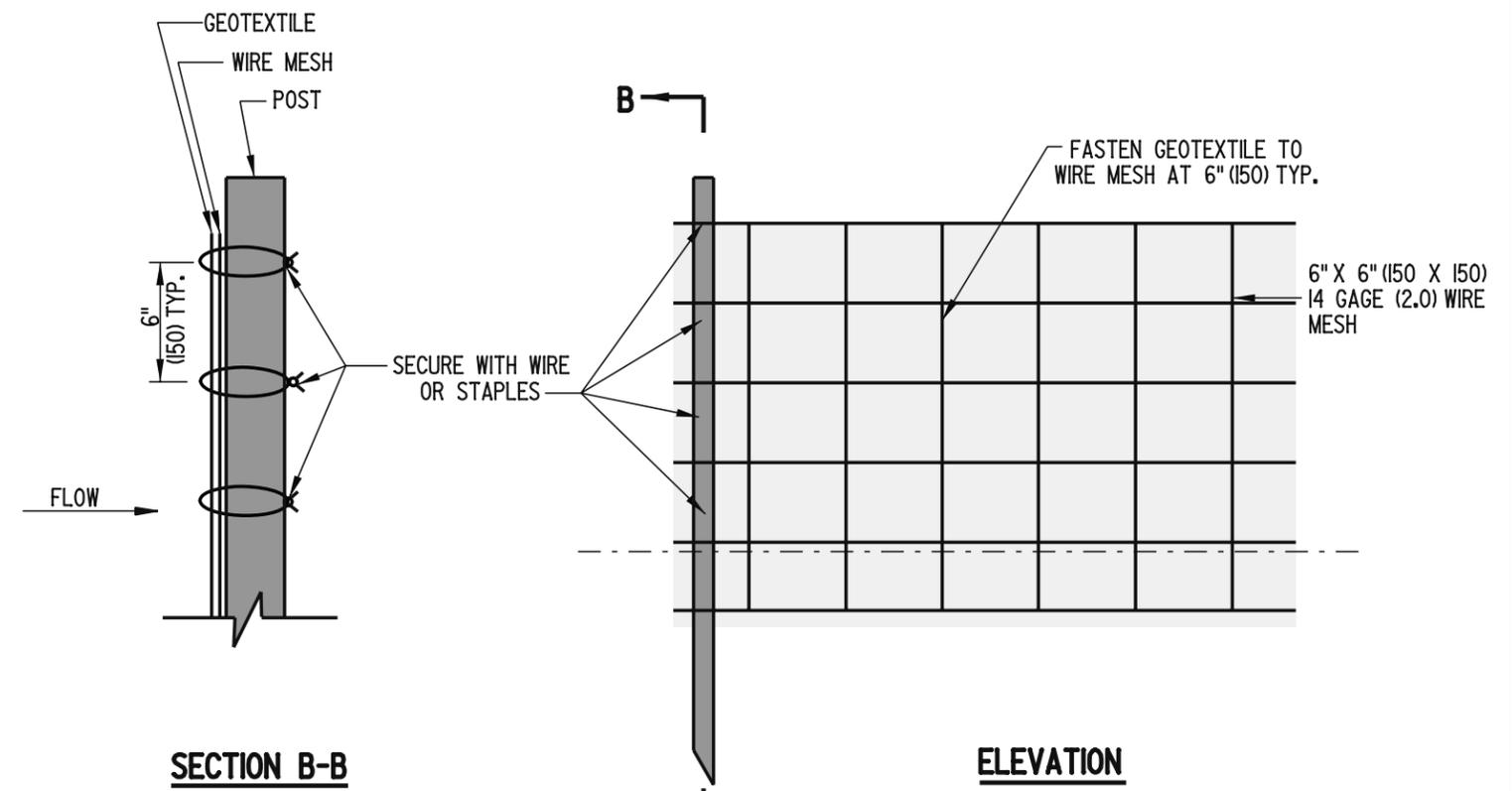
APPROVED *Ryan M. Harkins* 6/18/01
CHIEF ENGINEER DATE
 RECOMMENDED *Mehal R. Gots* 6/18/01
DESIGN ENGINEER DATE



ISOMETRIC VIEW



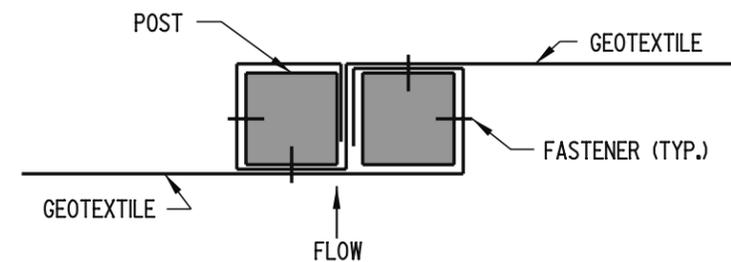
SECTION A-A



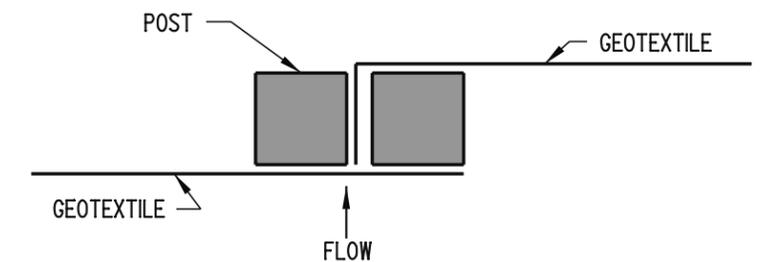
SECTION B-B

ELEVATION

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

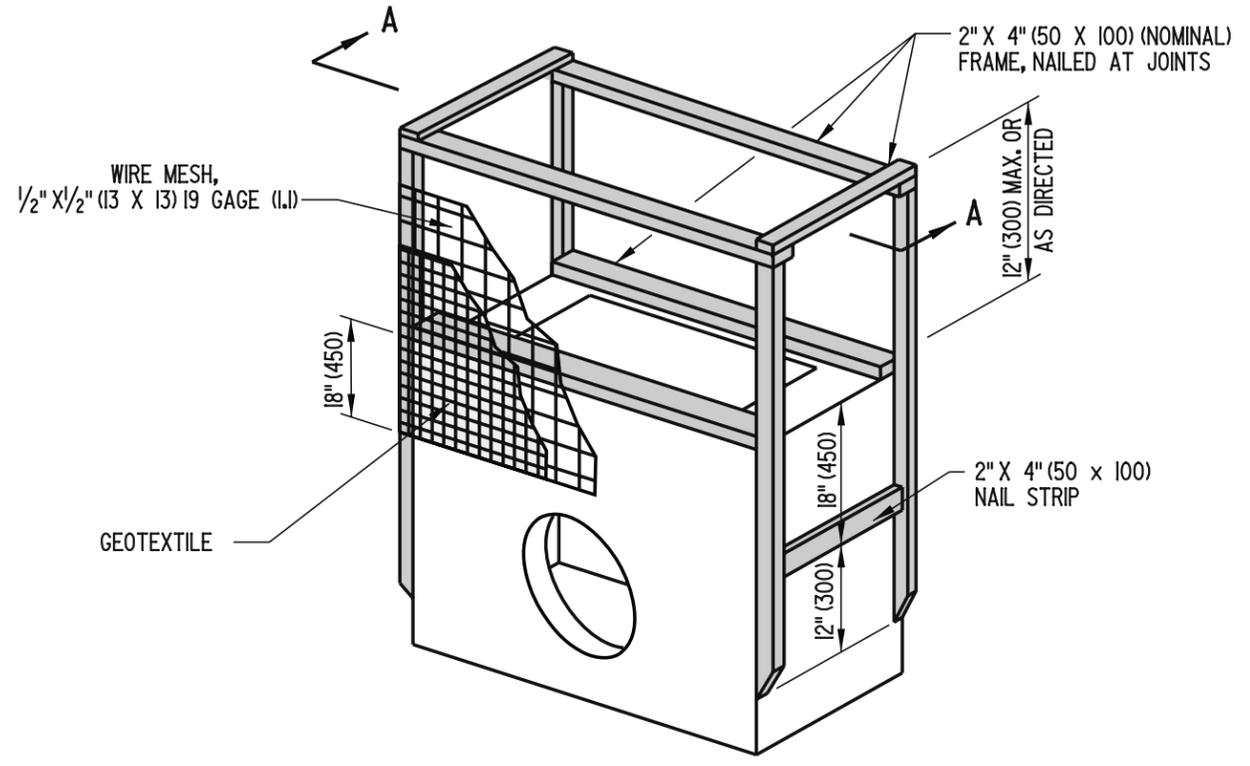


**UNREINFORCED SILT FENCE
CONNECTON DETAIL**

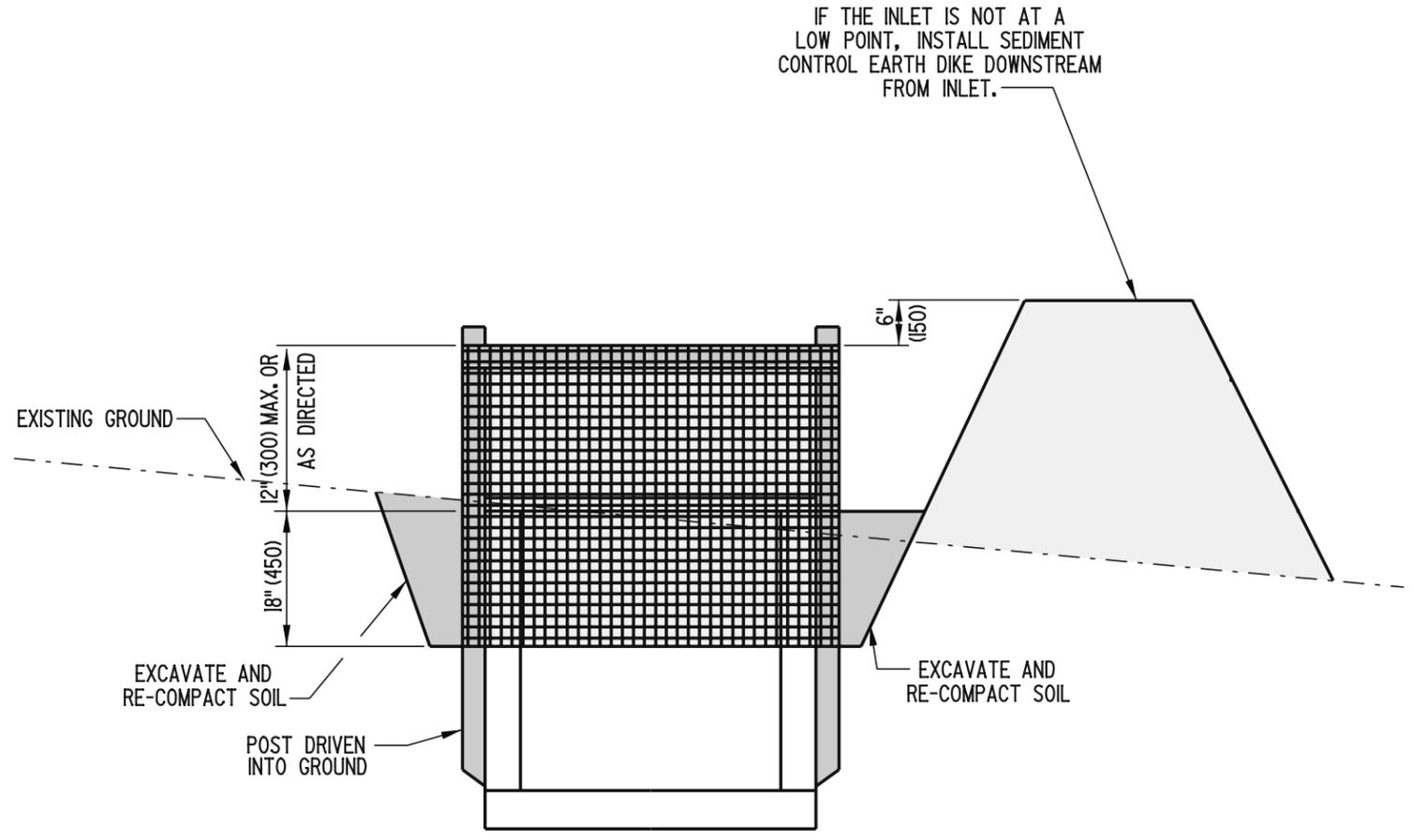


**REINFORCED SILT FENCE
CONNECTON DETAIL**

- NOTES:**
- 1). THIS DEVICE IS INTENDED TO CONTROL SHEET FLOW ONLY. IT SHALL NOT BE USED IN AREAS OF CONCENTRATED FLOW.
 - 2). SILT FENCE ENDS SHALL BE TURNED UPSLOPE TO CONTAIN RUNOFF.
 - 3). REINFORCING STRIP IS TO BE ONE COMPLETE STRIP COVERING ALL GEOTEXTILE FABRIC AT POST.



ISOMETRIC VIEW



SECTION A-A



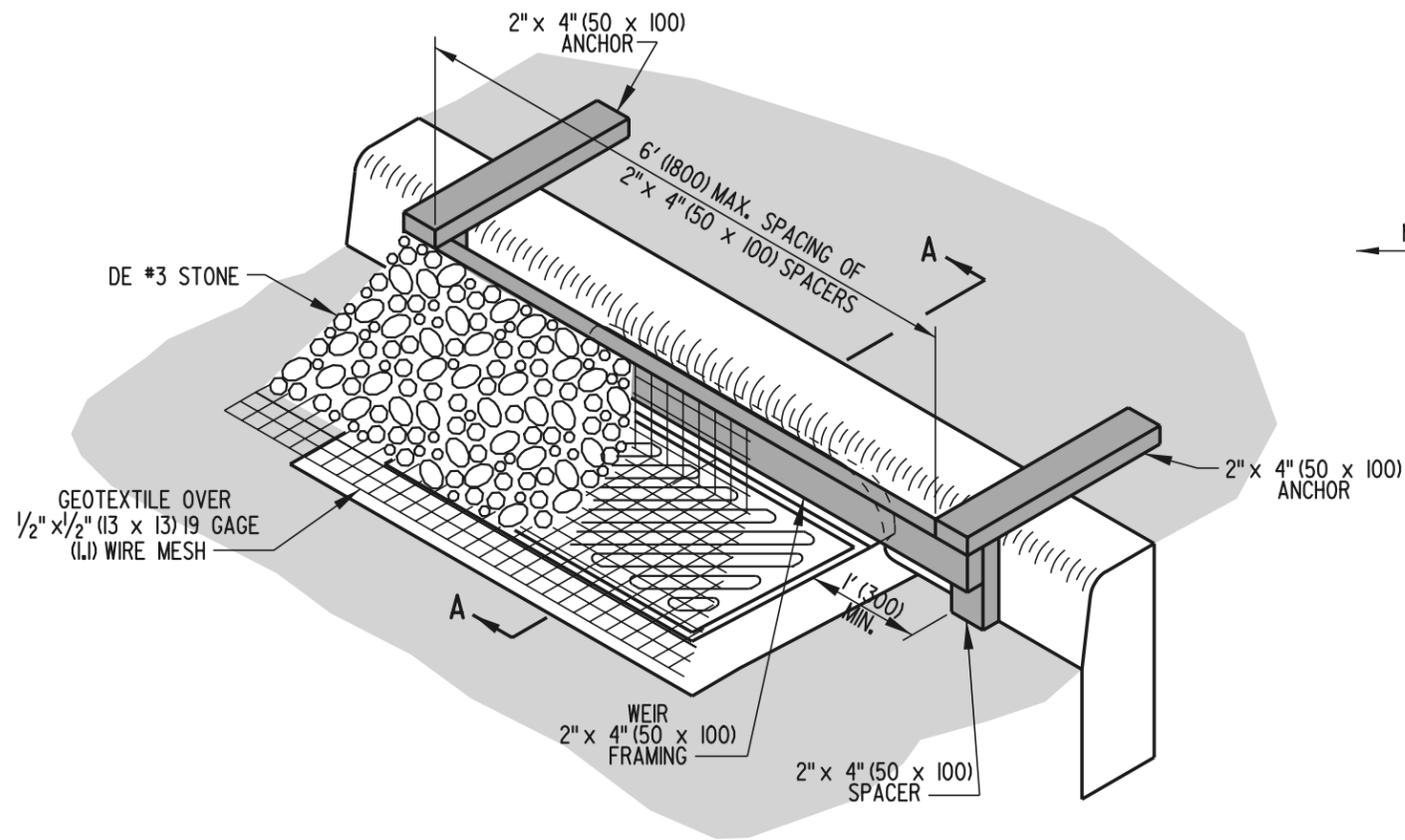
DELAWARE
DEPARTMENT OF TRANSPORTATION

DRAINAGE INLET SEDIMENT CONTROL

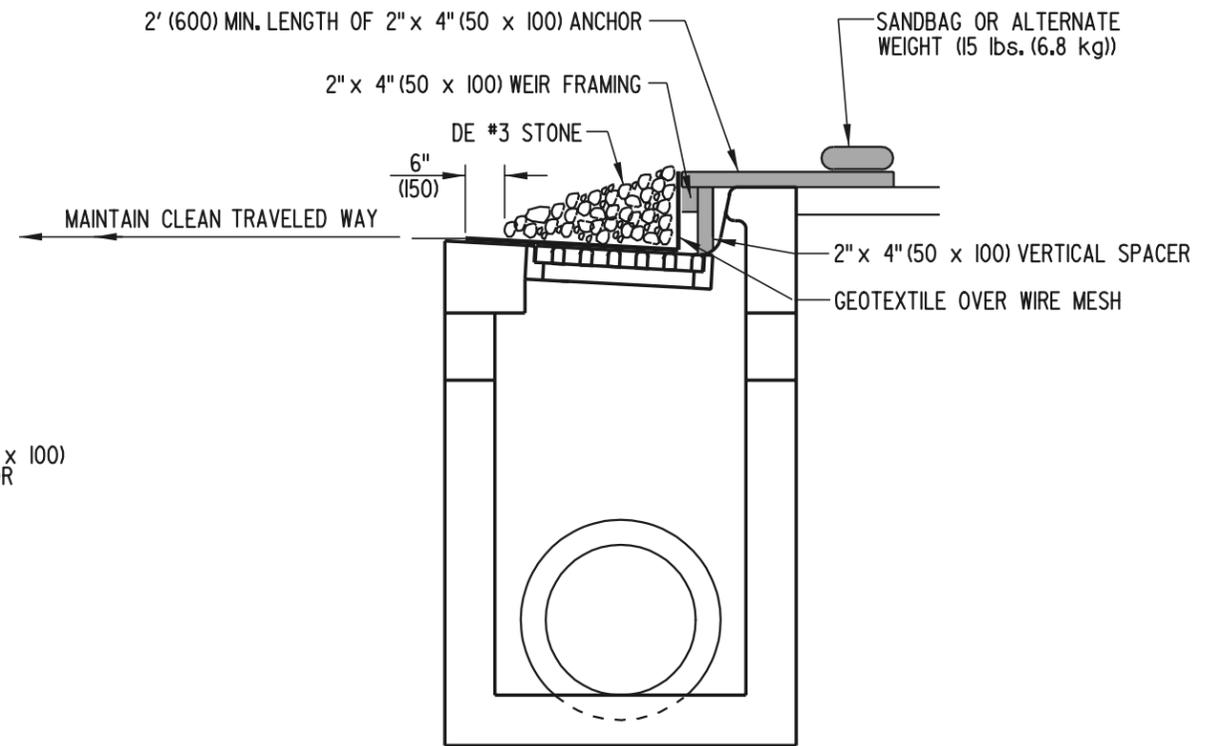
STANDARD NO. **E-3 (2005)** SHT. **1** OF **1**

APPROVED *Candace 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

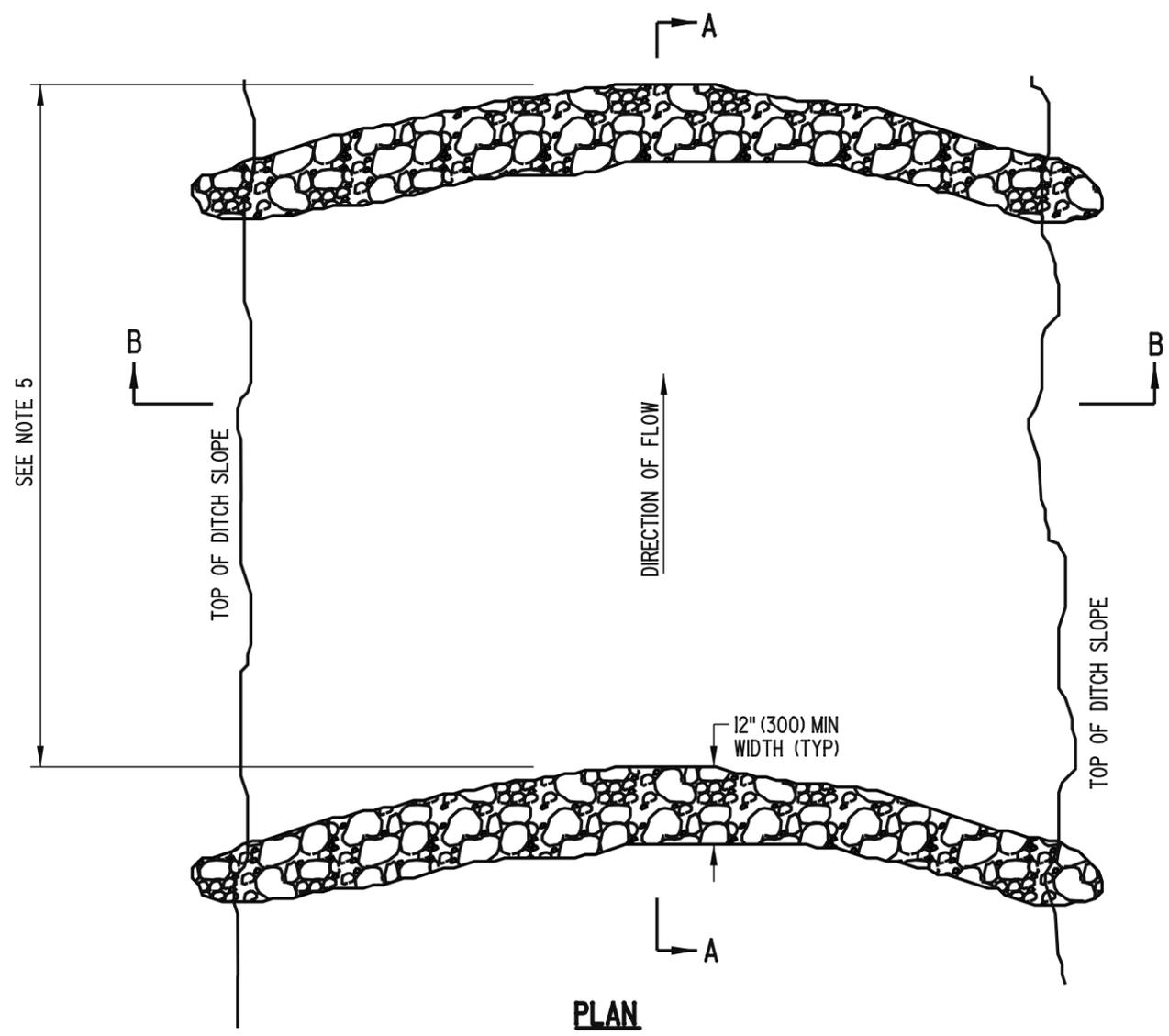
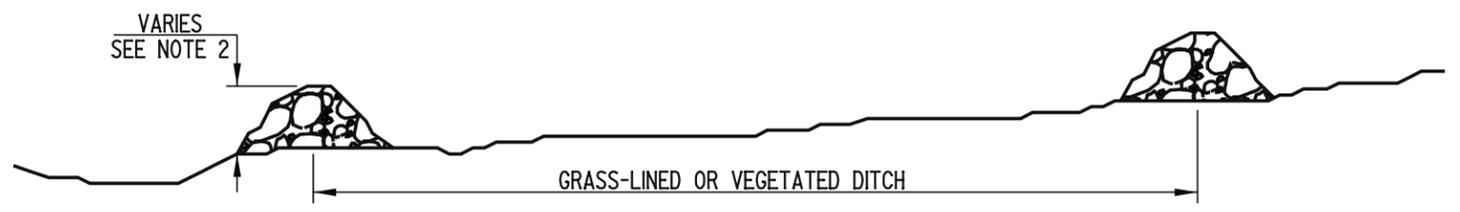
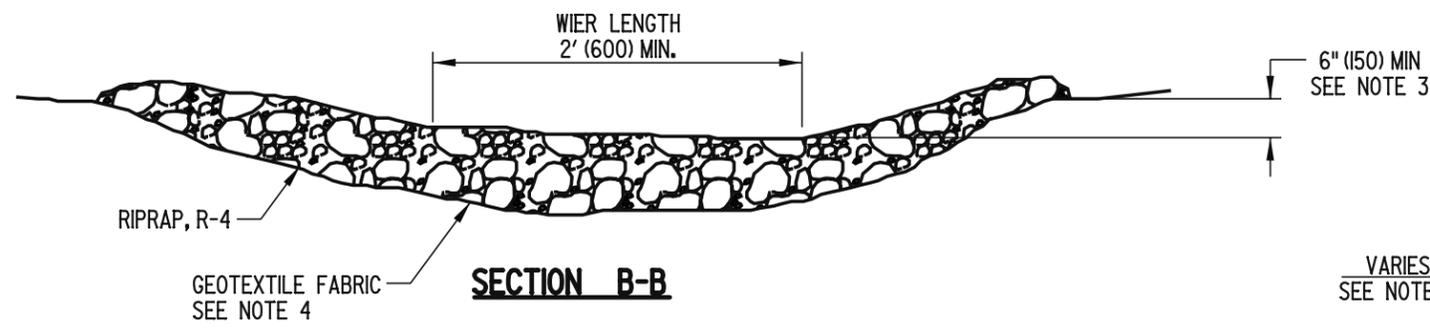


**DELAWARE
DEPARTMENT OF TRANSPORTATION**

CURB INLET SEDIMENT CONTROL

STANDARD NO. **E-4 (2001)** SHT. **1** OF **1**

APPROVED *Ryan M. Harshbarger* **6/18/01**
CHIEF ENGINEER DATE
 RECOMMENDED *Mehal Akhavan* **6/18/01**
DESIGN ENGINEER DATE

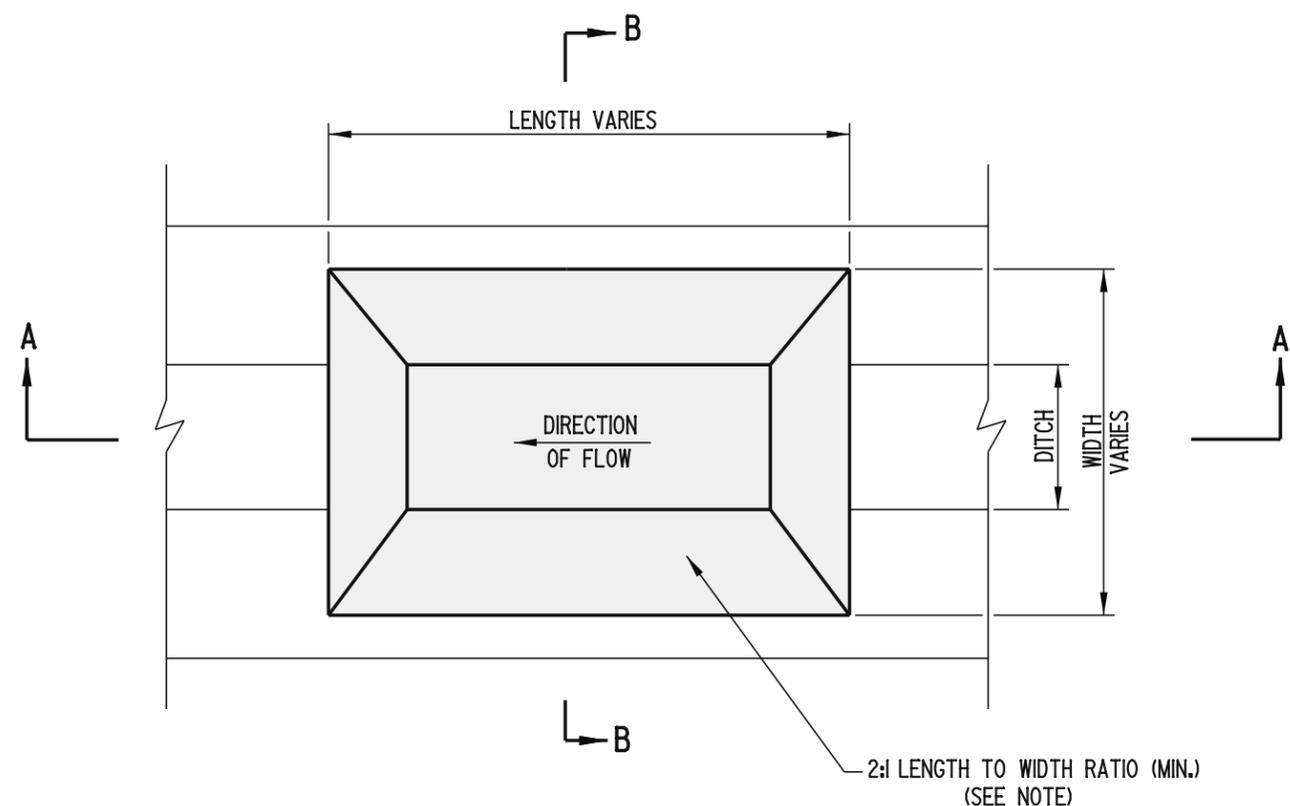


SECTION A-A

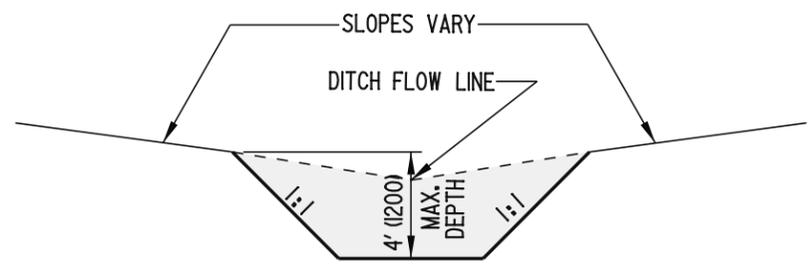
PLAN

NOTES:

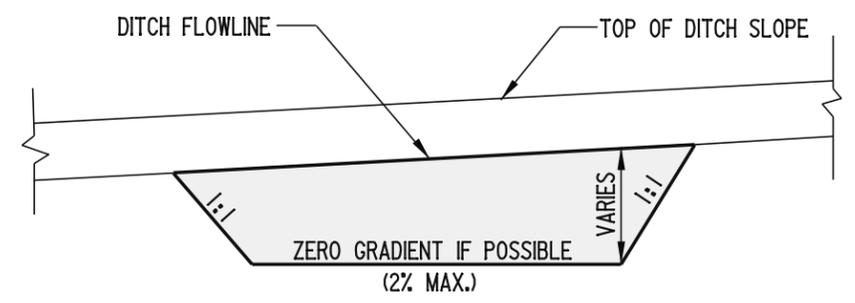
- 1). FOR DITCHES LESS THAN 30" (750) IN DEPTH, PLACE DAM AS DIRECTED BY THE ENGINEER.
- 2). THE CHECK DAM HEIGHT MUST NOT EXCEED 2' (600) AT THE CENTER OF THE WEIR.
- 3). THE CHECK DAM IS TO BE CONSTRUCTED SO THAT THE CENTER IS 6" (150) MIN. LOWER THAN THE OUTER EDGES, FORMING A WEIR THAT WATER CAN FLOW ACROSS.
- 4). GEOTEXTILE FABRIC IS TO BE INSTALLED UNDERNEATH RIPRAP ON PERMANENT CHECK DAMS ONLY.
- 5). THE MAXIMUM SPACING BETWEEN DAMS SHALL BE THE DISTANCE IN THE DITCH WHERE THE TOE OF THE UPSTREAM DAM IS AT THE SAME ELEVATION AS THE TOP OF THE DOWNSTREAM DAM AT THE CENTER OF THE WEIR.



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.

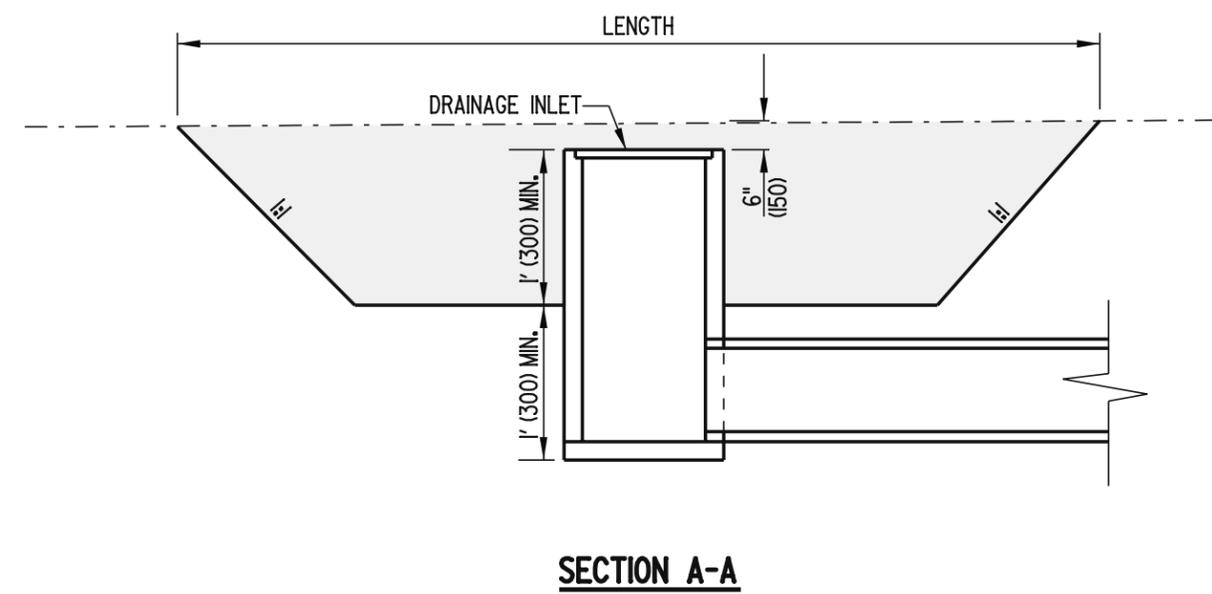
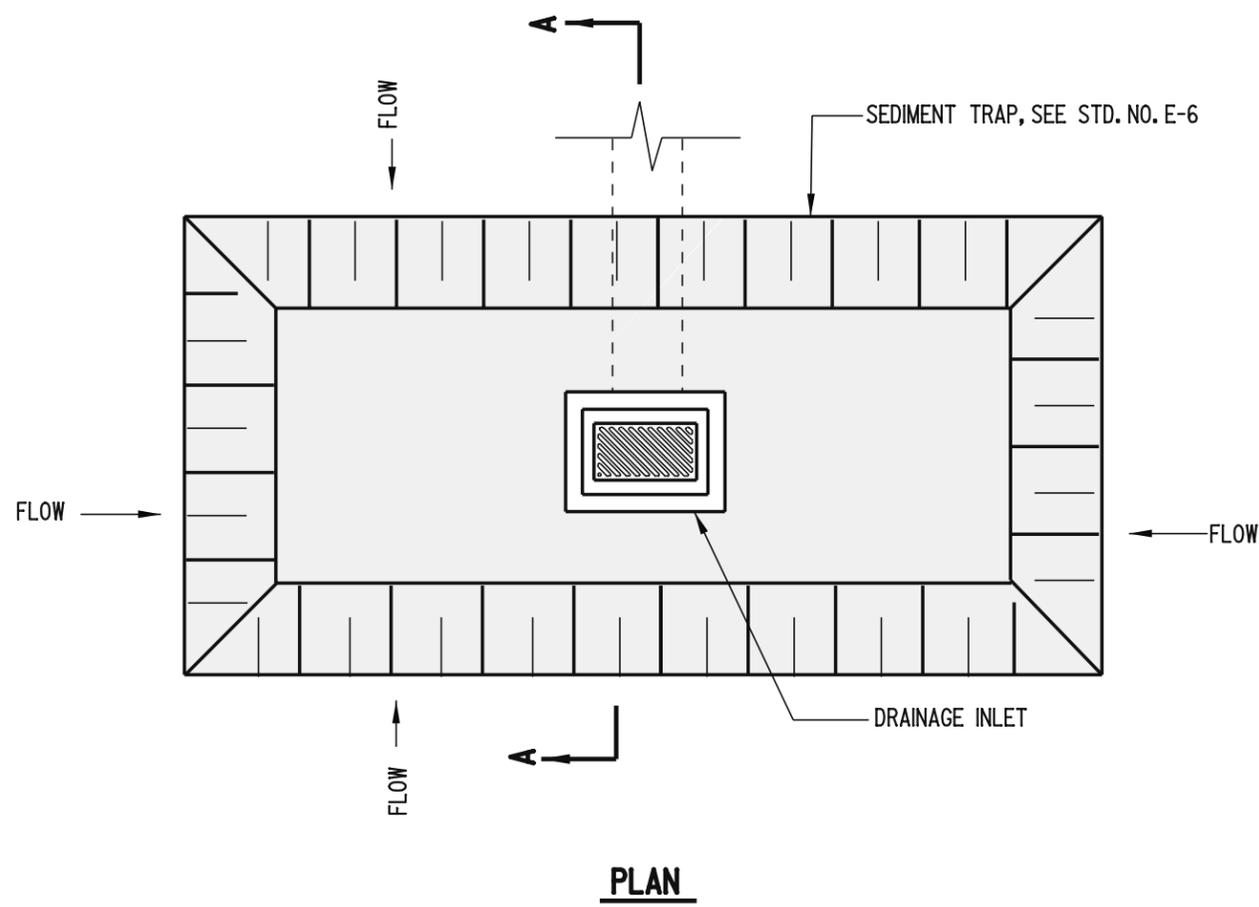


**DELAWARE
DEPARTMENT OF TRANSPORTATION**

SEDIMENT TRAP			
STANDARD NO.	E-6 (2005)	SHT.	1 OF 1

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

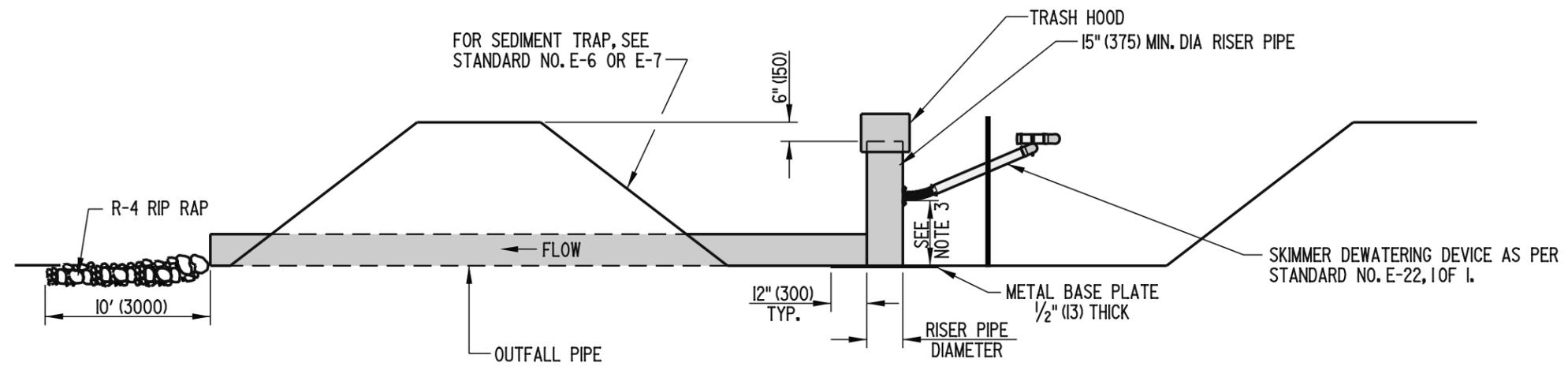
RECOMMENDED *James M. O'Brien* 11/29/05
DESIGN ENGINEER DATE



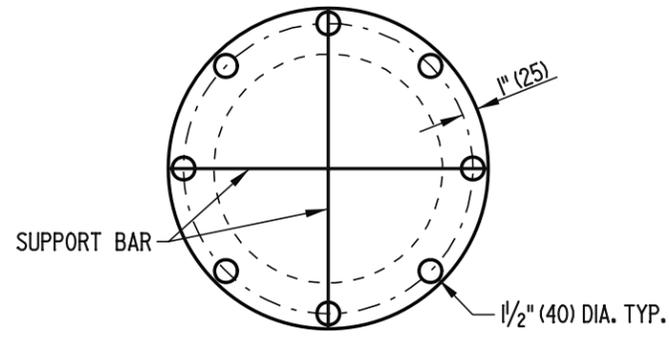
- NOTES:**
- 1). THE WORK SHALL CONSIST OF THE CONSTRUCTION OF A SEDIMENT TRAP AROUND A DRAINAGE INLET TO ALLOW SEDIMENTATION TO OCCUR BEFORE RUNOFF ENTERS THE DRAINAGE INLET.
 - 2). DRAINAGE INLET SEDIMENT TRAPS SHALL BE LIMITED TO A THREE (3) ACRE (1.2 HECTARE) MAXIMUM DRAINAGE AREA.
 - 3). THE DIMENSIONS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

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)

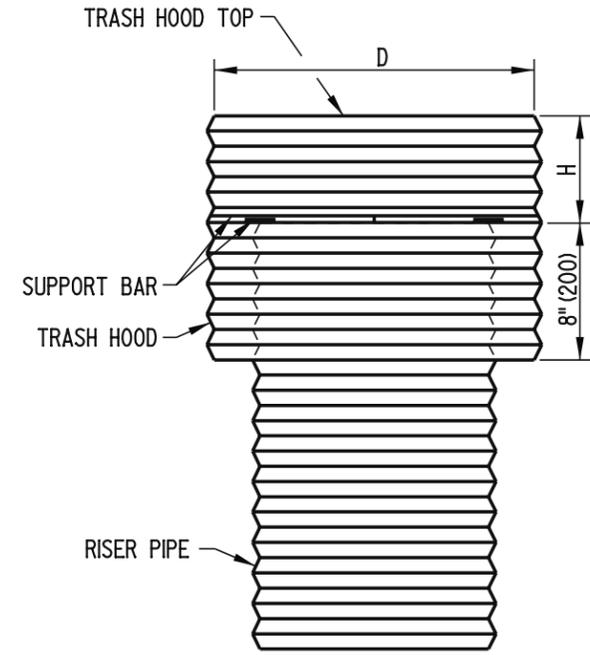
* OUTFALL PIPE DIAMETER MAY BE SAME SIZE AS RISER DIAMETER.



- NOTES:**
- 1). THIS DEVICE IS INTENDED TO BE USED AS AN OUTLET FOR SEDIMENT TRAPS.
 - 2). 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 REQUIRE AN ENGINEERED DESIGN.
 - 3). THE HEIGHT OF THE SKIMMER DEWATERING DEVICE SHALL BE SPECIFIED BY THE ENGINEER IN THE FIELD.

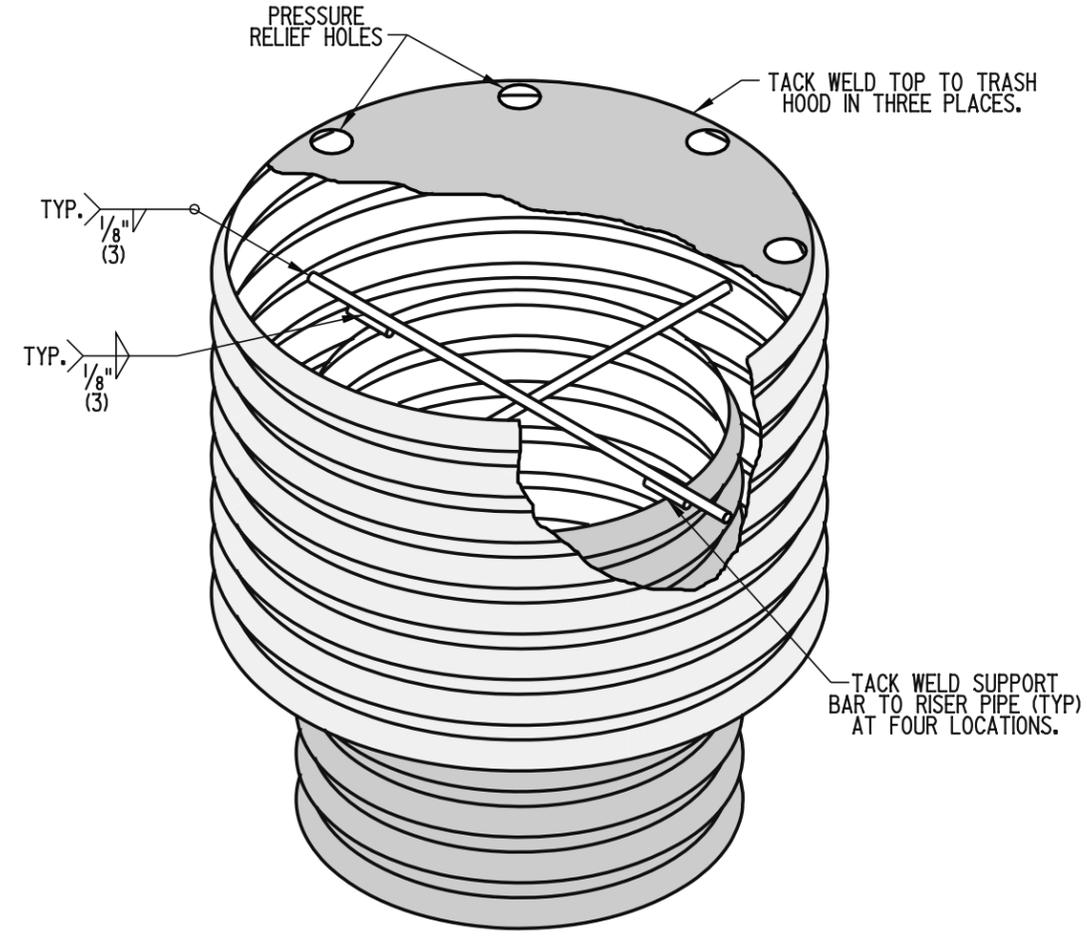


PLAN



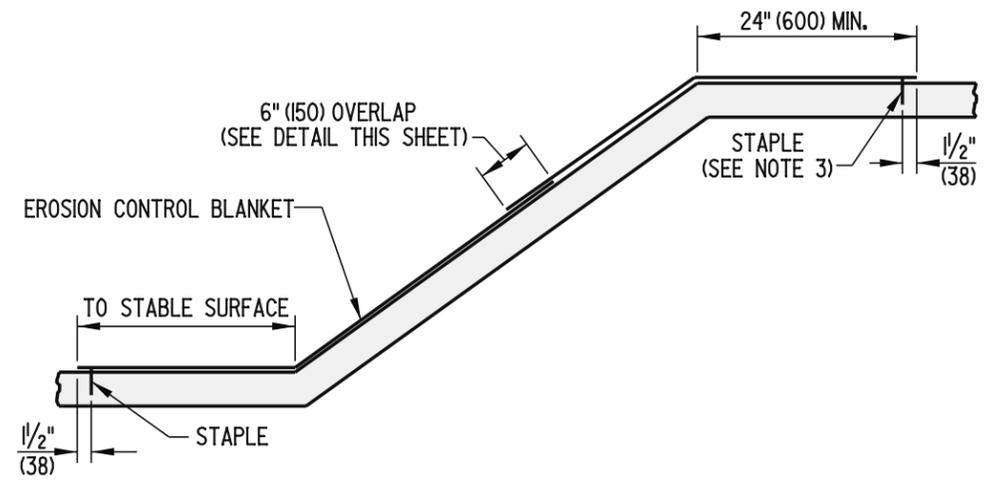
FRONT

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)



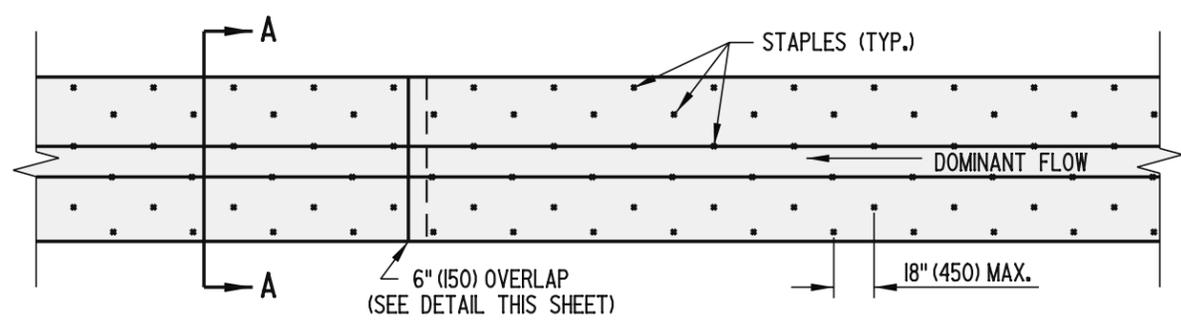
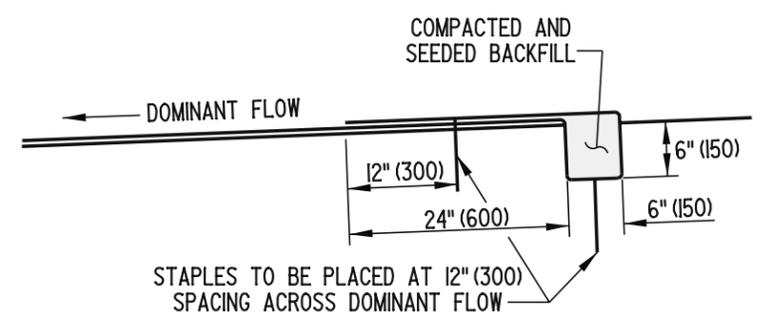
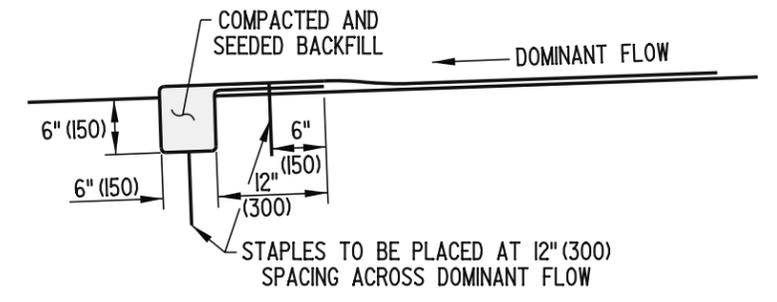
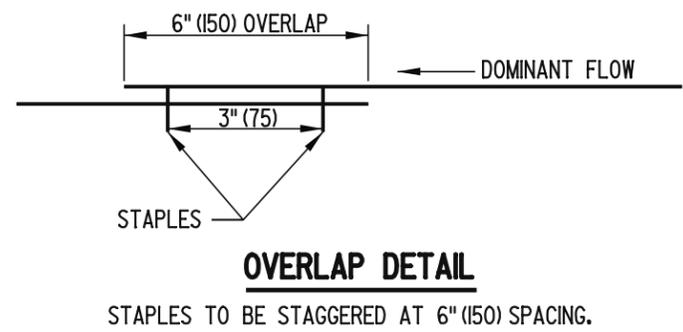
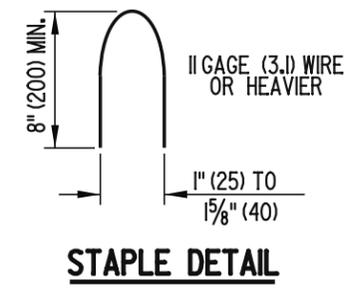
ISOMETRIC VIEW

TRASH HOOD DETAILS

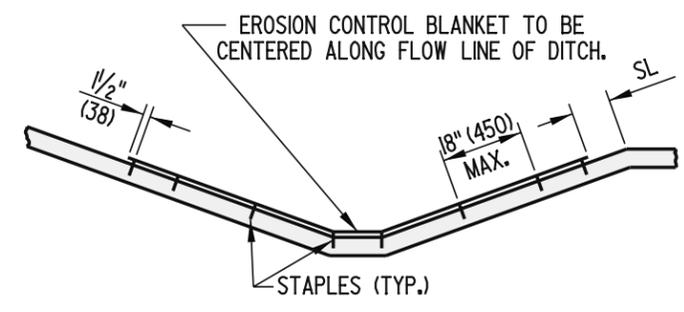


STABILIZATION OF EMBANKMENTS

- 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.



- 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.



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

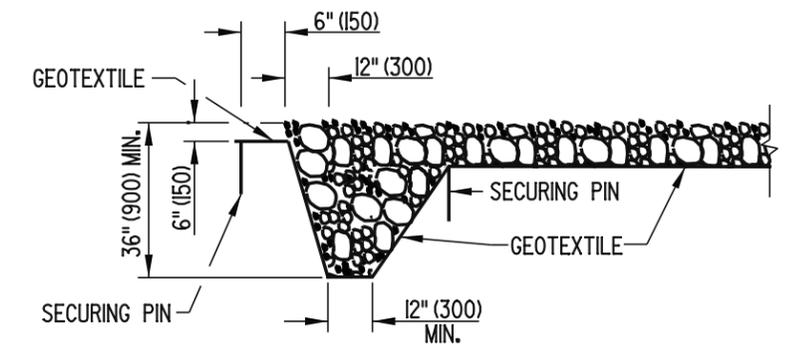
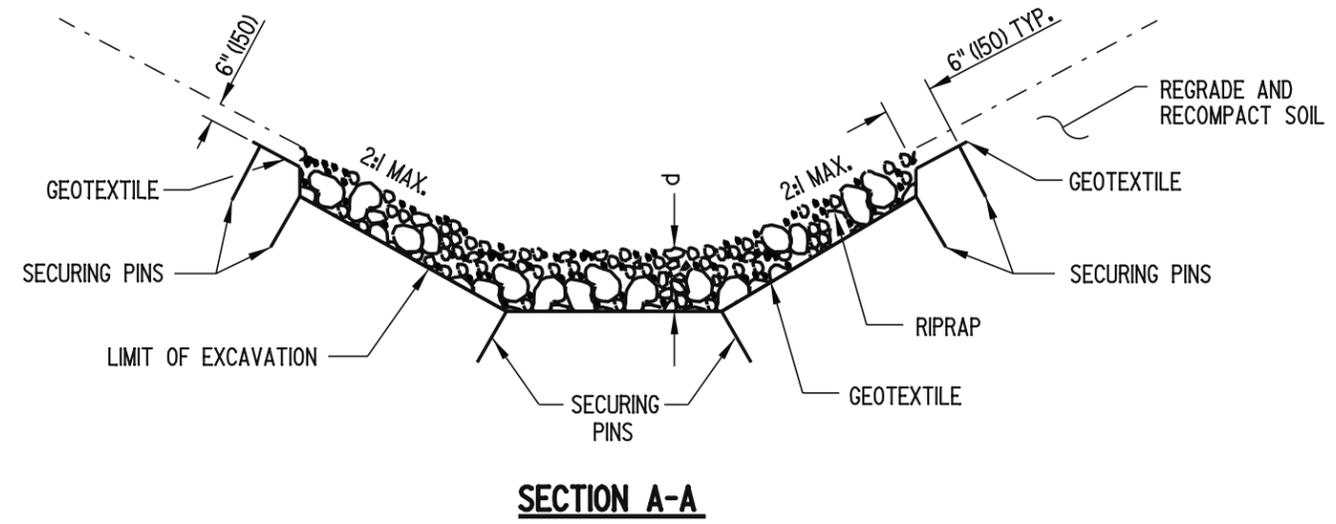


DELAWARE DEPARTMENT OF TRANSPORTATION

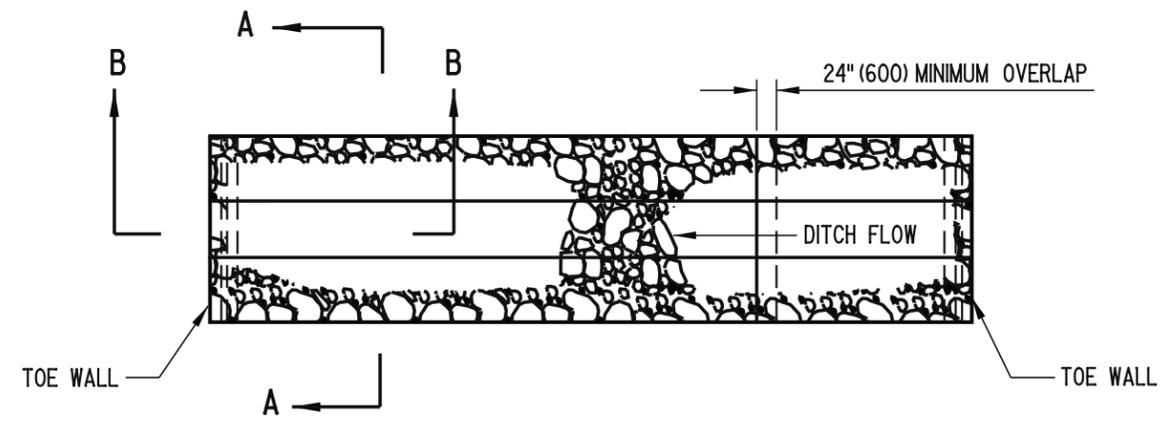
EROSION CONTROL BLANKET APPLICATIONS			
STANDARD NO.	E-9 (2005)	SHT.	1 OF 1

APPROVED *Candace Wick* 12/15/05
CHIEF ENGINEER DATE

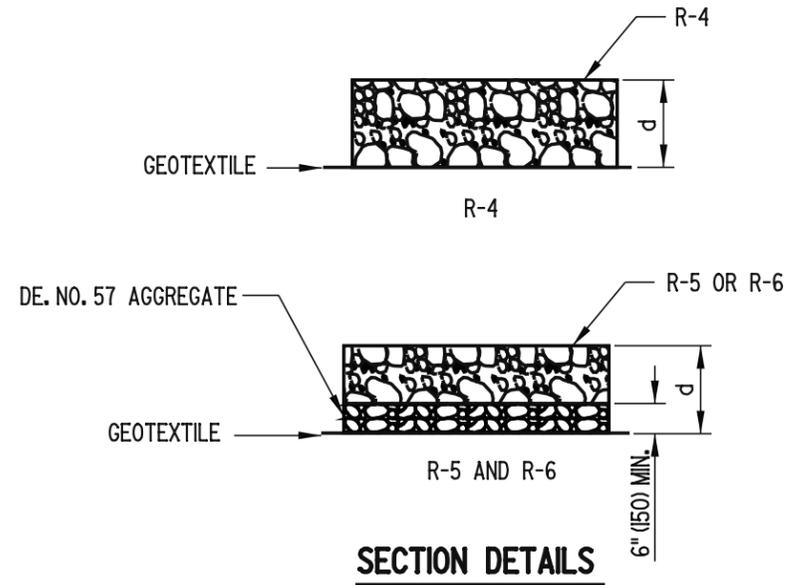
RECOMMENDED *James M. O'Brien* 11/29/05
DESIGN ENGINEER DATE



SECTION B-B



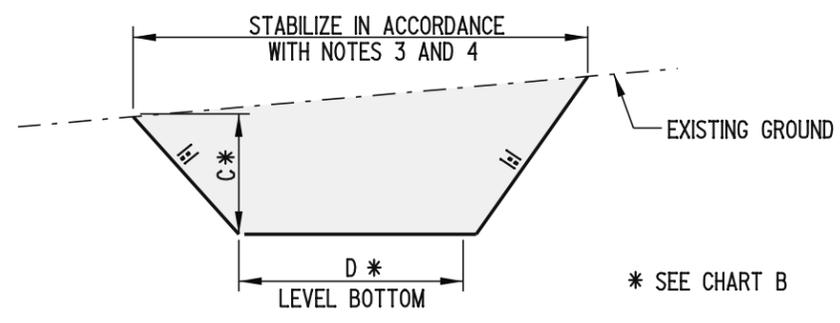
PLAN



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

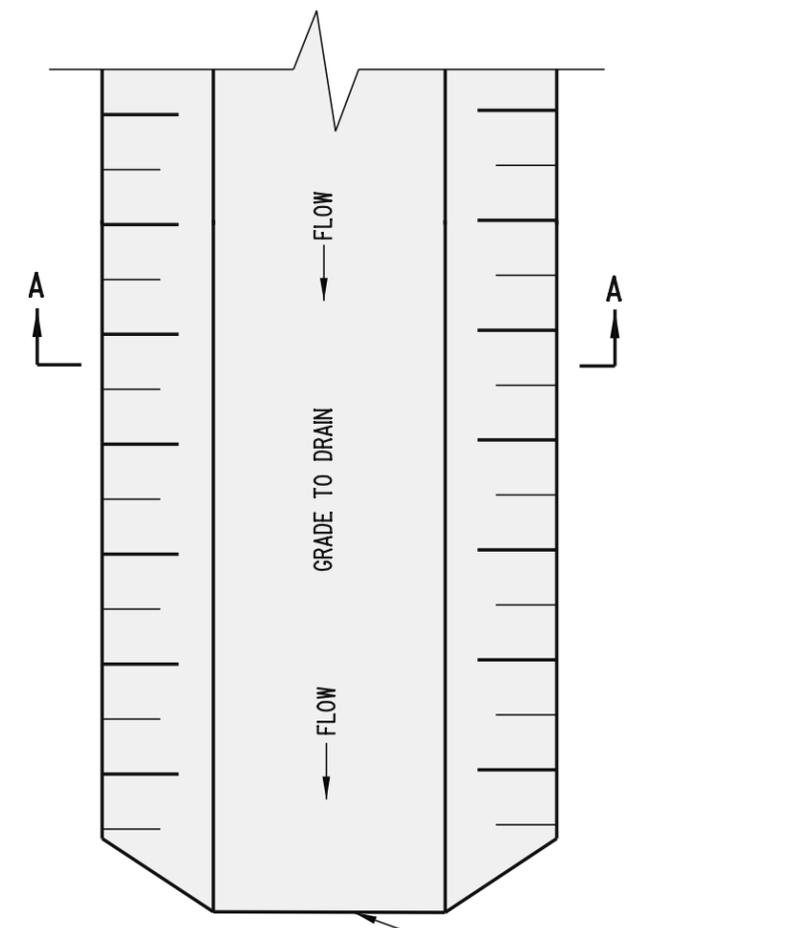
SECTION DETAILS

- 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.



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

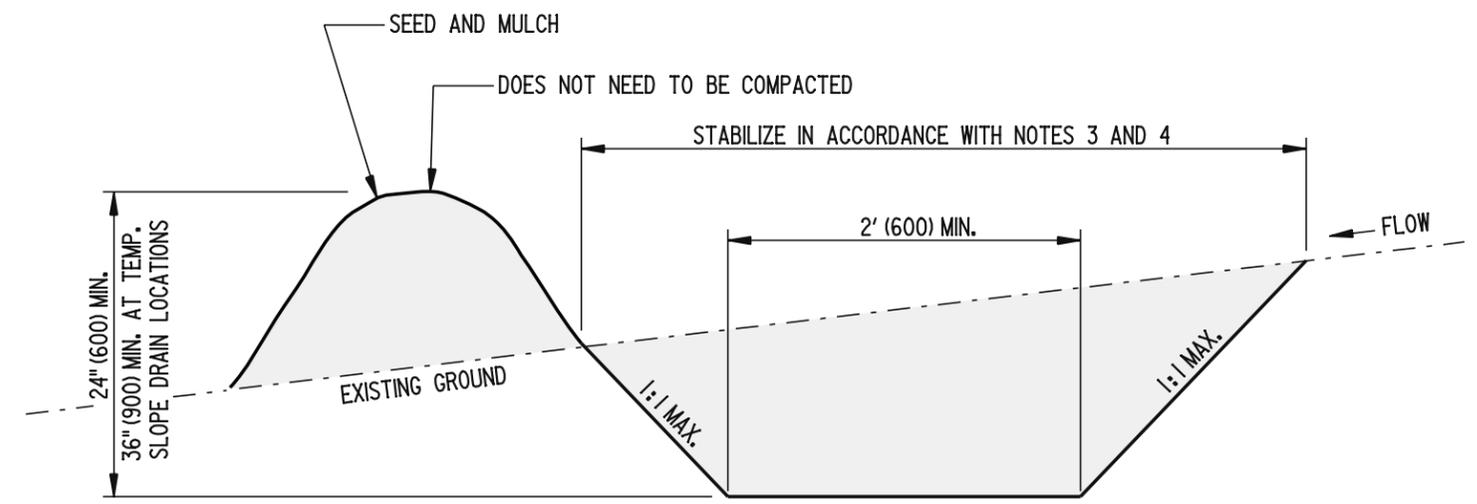


PLAN

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

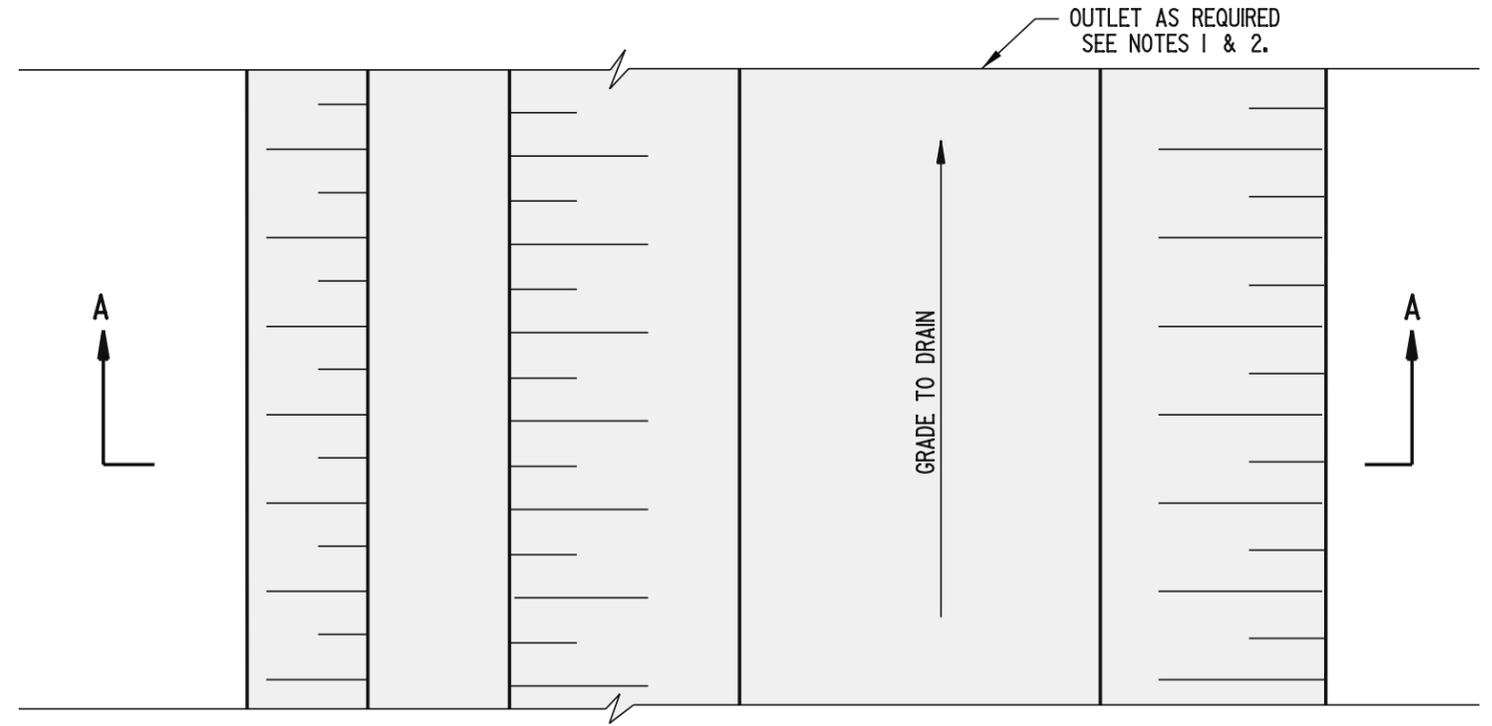
- NOTES:**
- DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
 - DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET DIRECTLY INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
 - IF TEMPORARY SWALES OR CLEAN WATER DIVERSIONS ARE TO BE OPERATIONAL FOR MORE THAN 14 DAYS, THEY SHALL BE STABILIZED IN ACCORDANCE WITH CHART A PRIOR TO BECOMING OPERATIONAL.
 - 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".



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

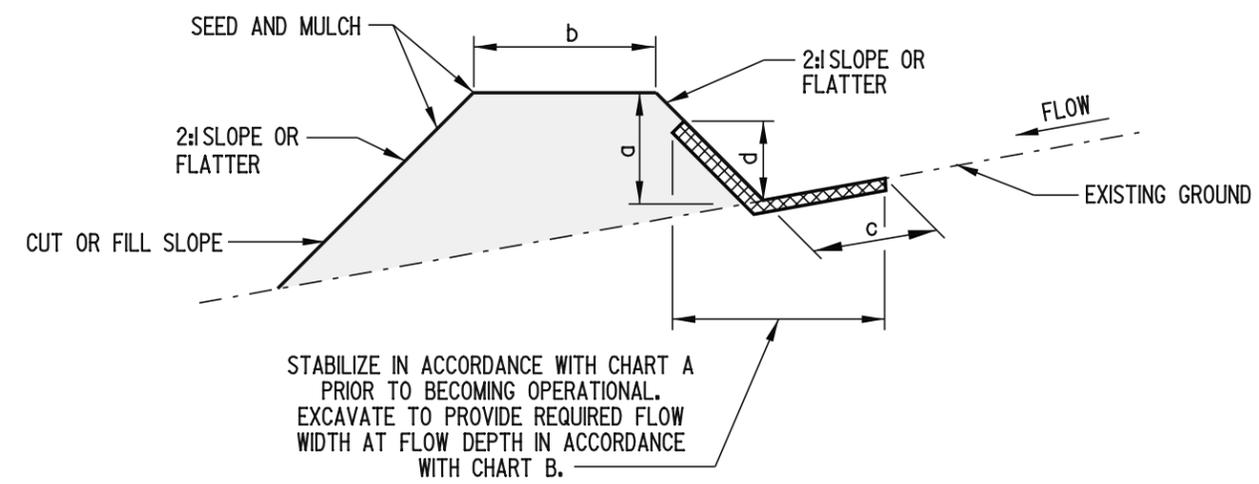
MAXIMUM DRAINAGE AREA: 2 ACRES (0.8 ha)



PLAN

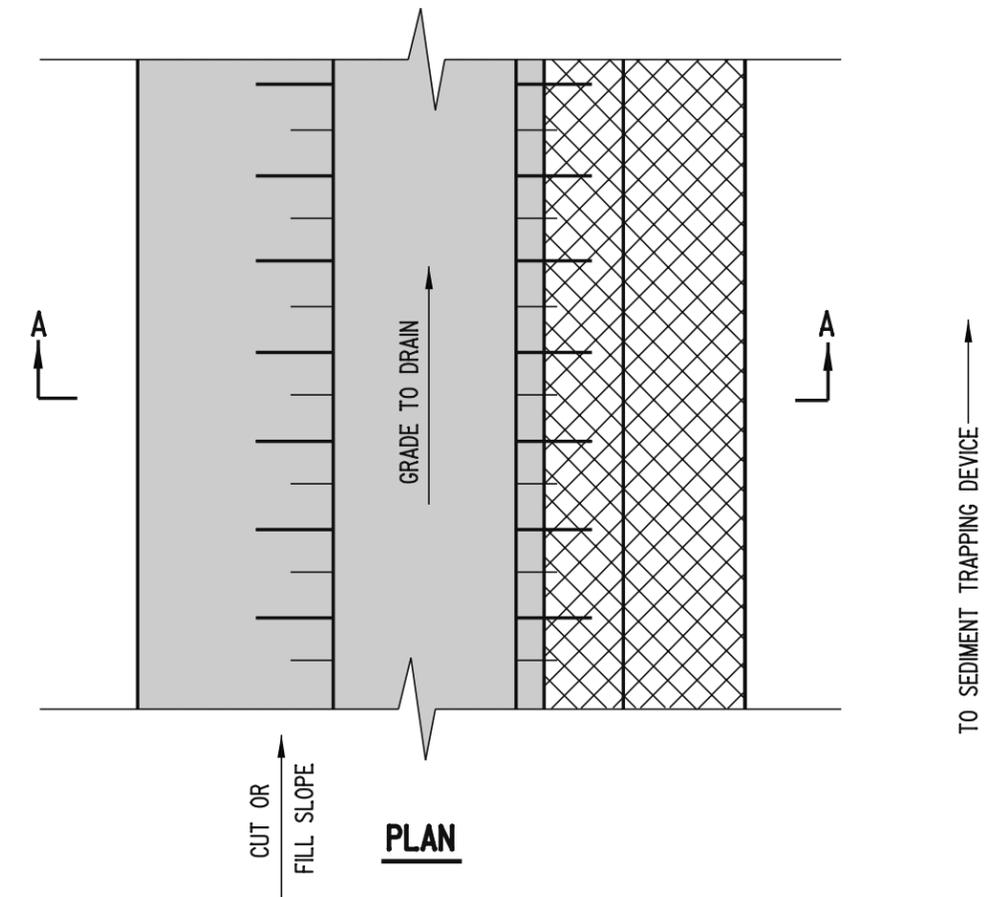
- NOTES:**
- 1). DIVERTED RUNOFF FROM A DISTURBED AREA SHALL BE CONVEYED TO A SEDIMENT TRAPPING DEVICE.
 - 2). DIVERTED RUNOFF FROM AN UNDISTURBED AREA SHALL OUTLET INTO AN UNDISTURBED STABILIZED AREA AT NON-EROSIVE VELOCITY.
 - 3). IF PERIMETER DIKE SWALES ARE TO BE OPERATIONAL FOR MORE THAN 14 DAYS, 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".

 DELAWARE DEPARTMENT OF TRANSPORTATION	PERIMETER DIKE / SWALE		APPROVED <i>Candace Wick</i> 12/15/05 <small>CHIEF ENGINEER DATE</small>
	STANDARD NO. E-12 (2005)	SHT. 1 OF 1	RECOMMENDED <i>James M. O'Brien</i> 11/29/05 <small>DESIGN ENGINEER DATE</small>



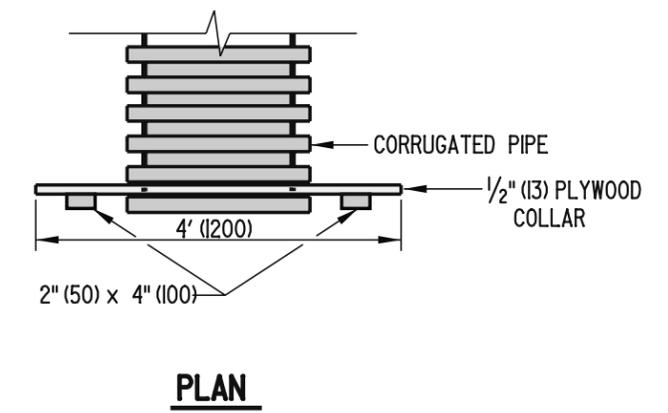
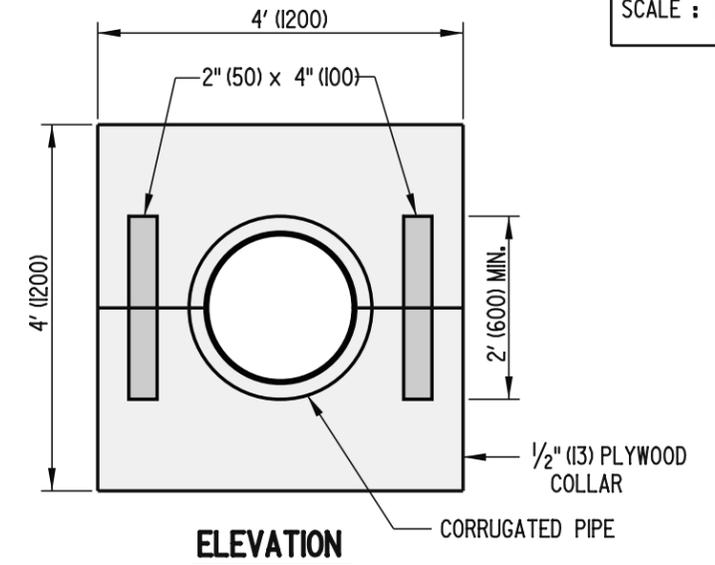
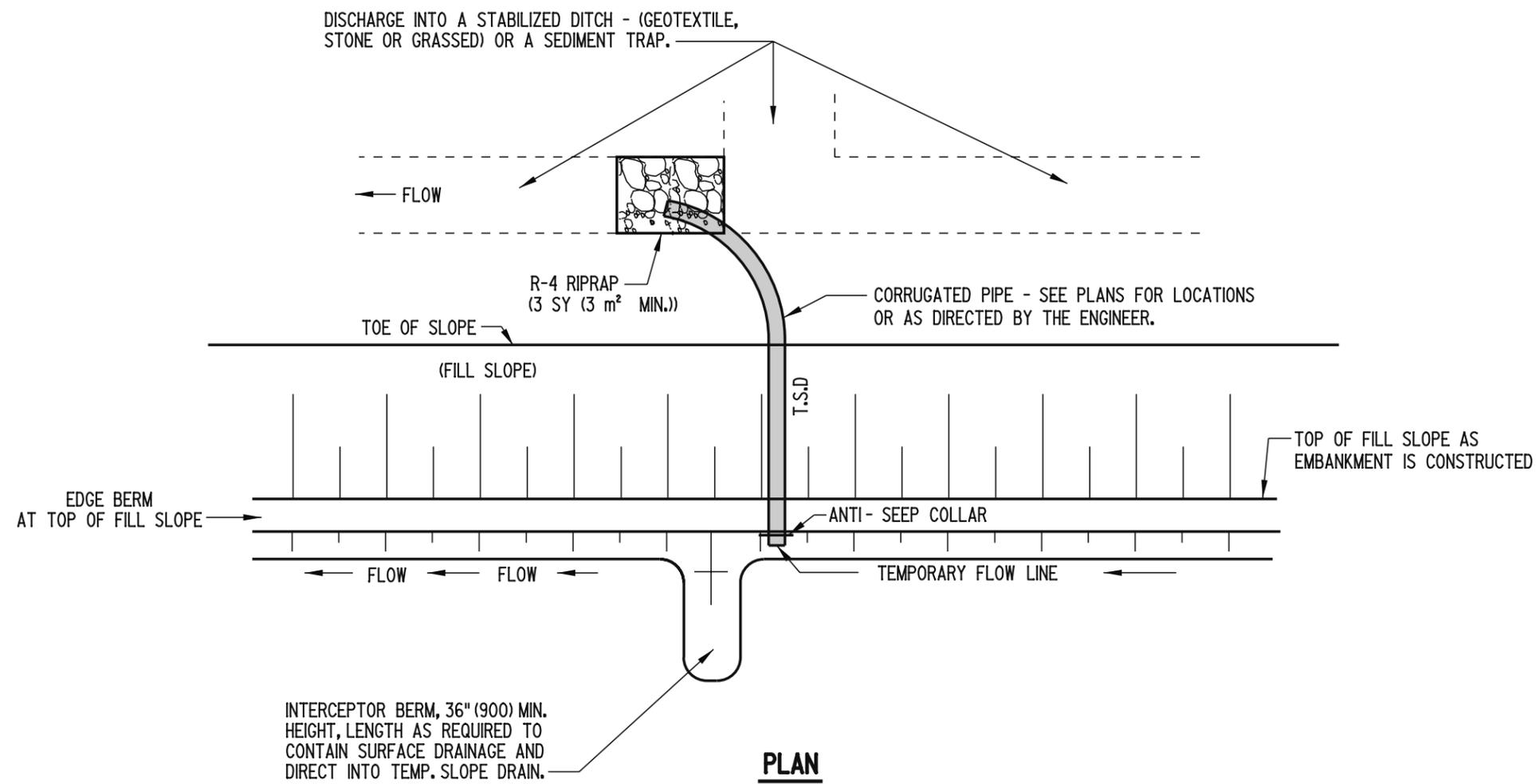
TYPE	CHANNEL GRADE	TYPE OF TREATMENT
1	0.5-2.0%	SEED AND EROSION CONTROL BLANKET
2	2.1-8.0%	R-4 RIPRAP
3	8.1-20%	ENGINEERED DESIGN

SECTION A-A

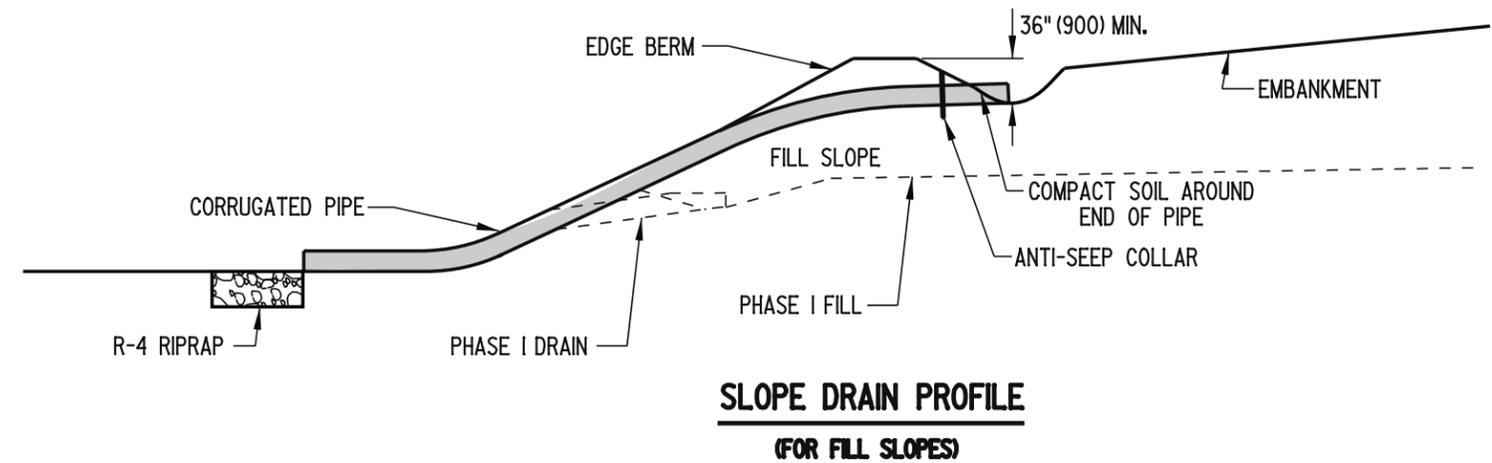


SYMBOL	DIKE A (5 ac (2 ha) or less)	DIKE B (5-10ac(2-4 ha))
a-DIKE HEIGHT	12" (300)	18" (450)
b-DIKE WIDTH	12" (300)	24" (600)
c-FLOW WIDTH	48" (1200)	72" (1800)
d-FLOW DEPTH	14" (350)	27" (680)

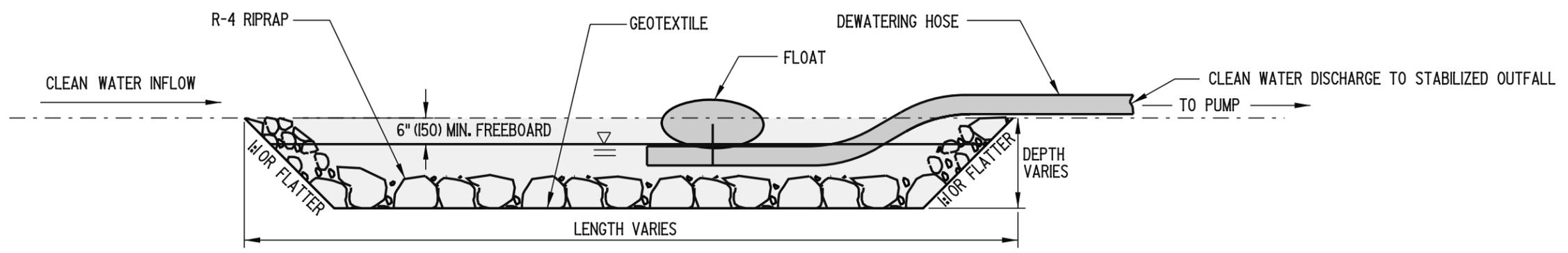
- NOTES:**
- 1). IF DESIRED, TOP WIDTH MAY BE WIDER AND SIDE SLOPES MAY BE FLATTER TO FACILITATE CROSSING BY CONSTRUCTION TRAFFIC.
 - 2). FIELD LOCATION SHOULD BE ADJUSTED AS NEEDED TO INSURE A STABILIZED OUTFALL.



ANTI-SEEP COLLAR

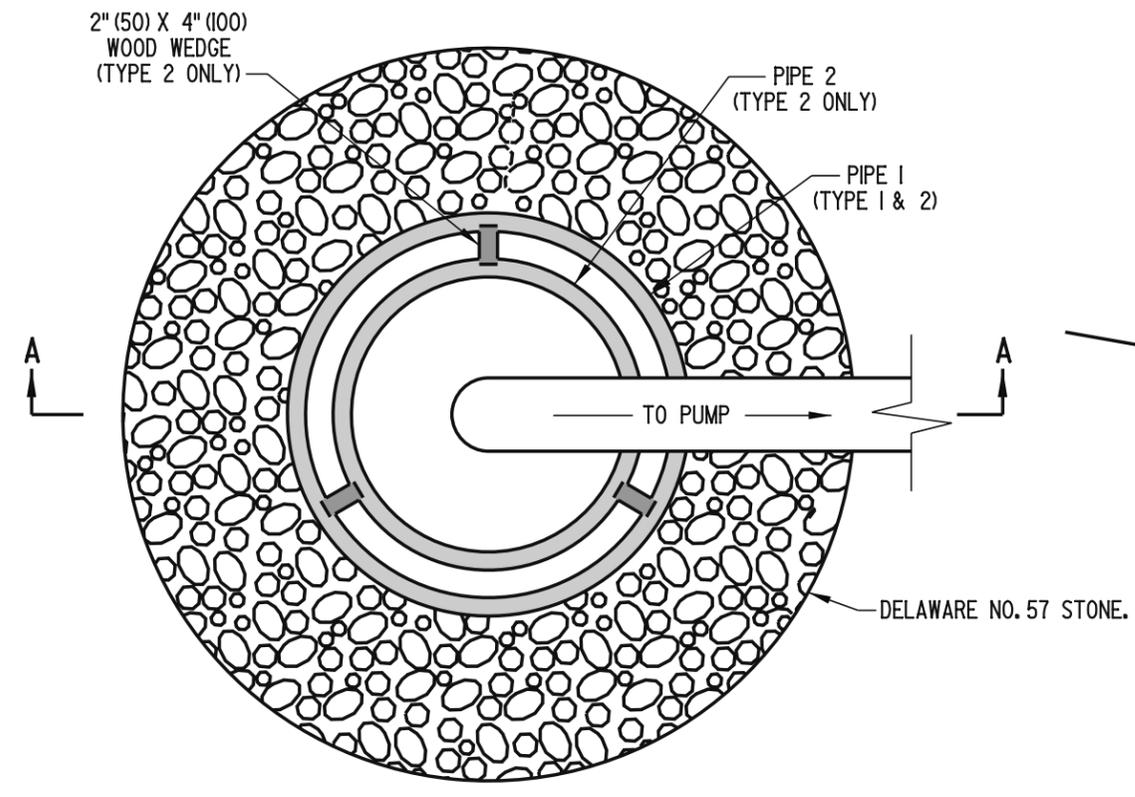


- NOTES:**
- 1). ALL TEMPORARY SLOPE DRAINS SHALL DISCHARGE INTO THE BACK OF SEDIMENT TRAPS, INTO SEDIMENT BASINS OR DITCHES DISCHARGING INTO TRAPS OR BASINS.
 - 2). TEMPORARY SLOPE DRAINS SHALL BE USED AT THE TOP OF FILL SLOPES AS EMBANKMENT IS CONSTRUCTED, TO PREVENT EXCESSIVE EROSION UNTIL SHOULDERS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

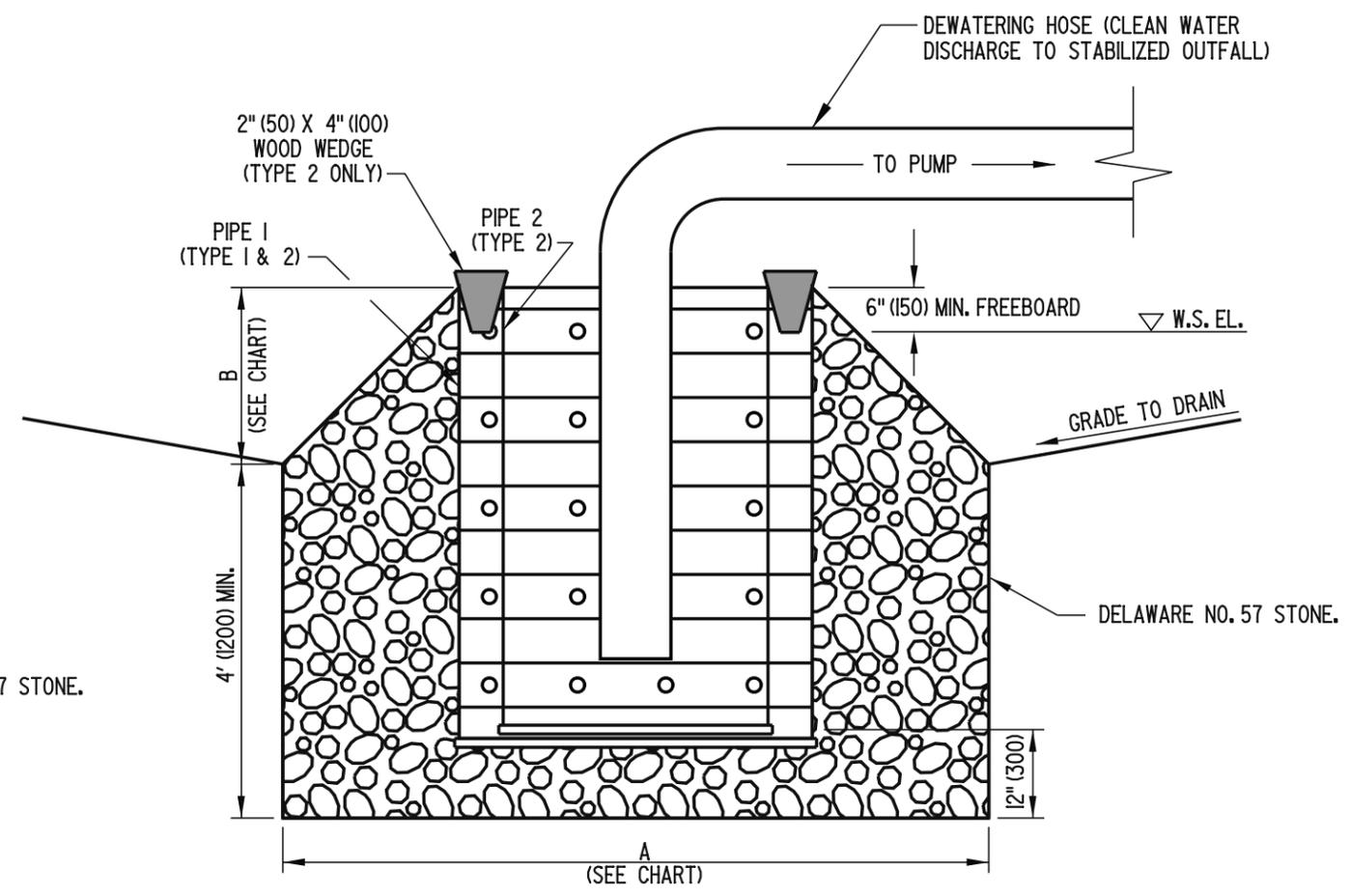


- NOTES:**
- 1). THE WORK SHALL CONSIST OF CONSTRUCTING A STILLING WELL FOR THE PURPOSE OF PUMPING CLEAN WATER AROUND A DISTURBED CONSTRUCTION AREA TO A STABILIZED OUTFALL.
 - 2). THE DIMENSIONS OF THE STILLING WELL SHALL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

 DELAWARE DEPARTMENT OF TRANSPORTATION	STILLING WELL			APPROVED <i>Carolann Wick</i> 12/5/05 <small>CHIEF ENGINEER</small> <small>DATE</small>
	STANDARD NO. E-15 (2005)	SHT. 1	OF 1	RECOMMENDED <i>James M. O'Brien</i> 11/29/05 <small>DESIGN ENGINEER</small> <small>DATE</small>



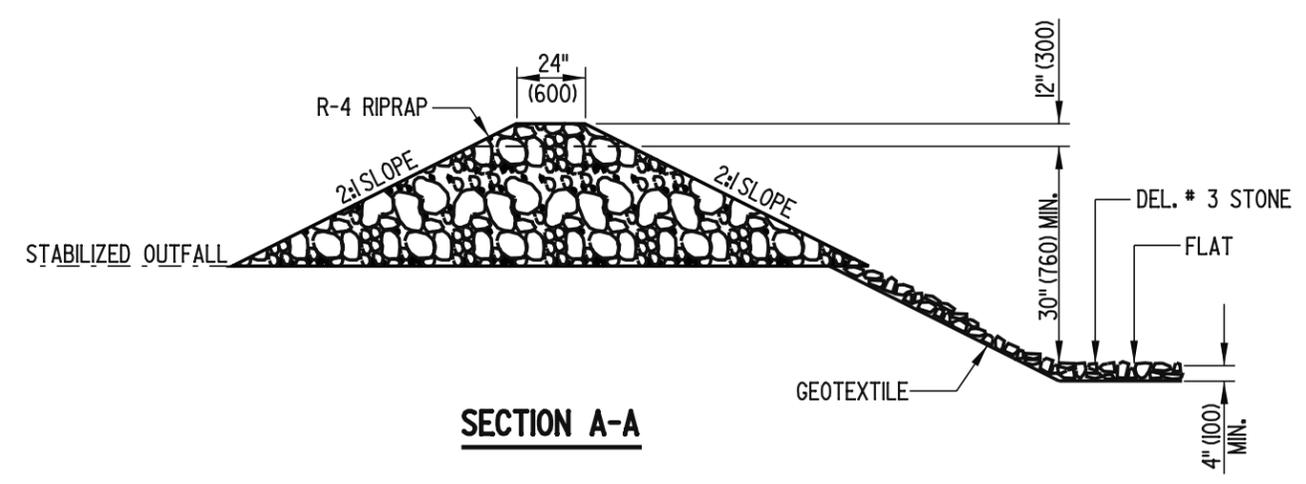
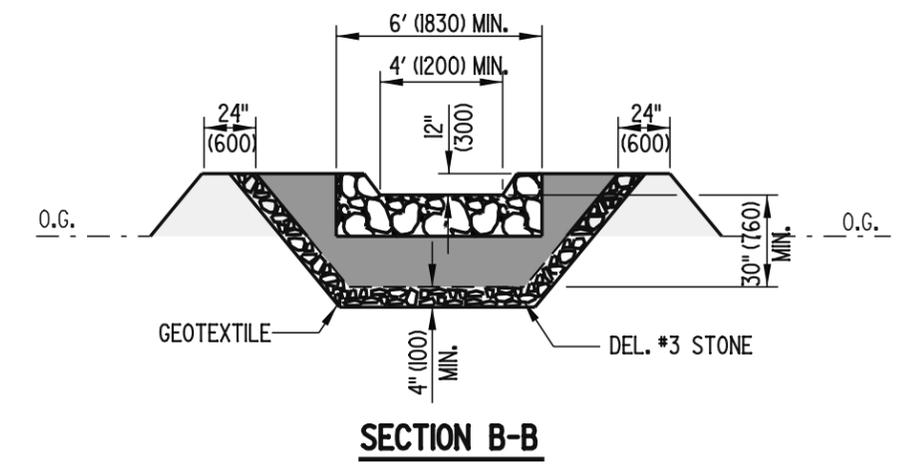
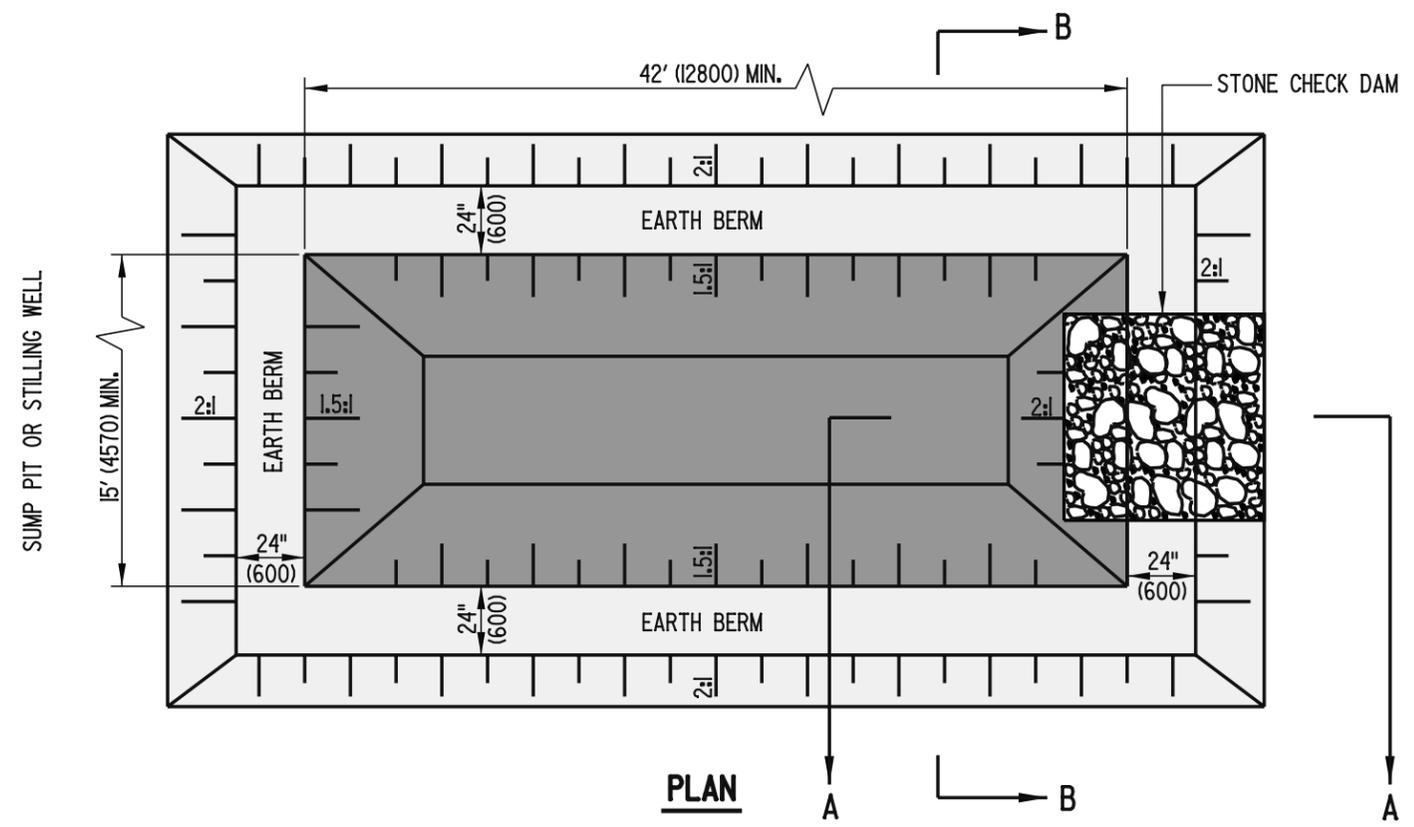
PLAN



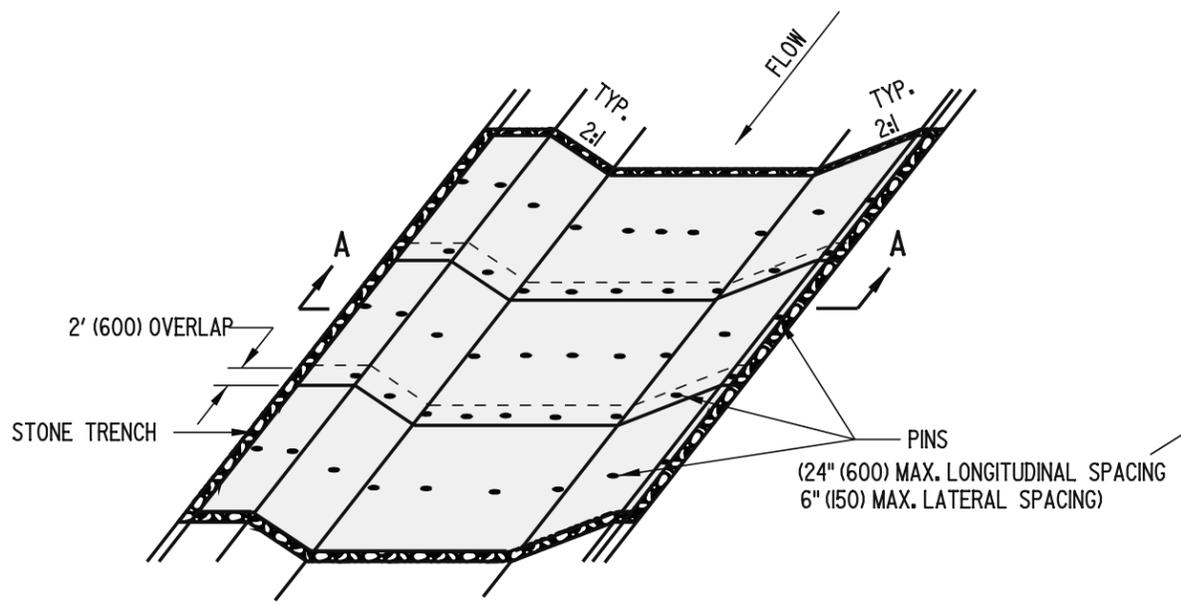
SECTION A-A

- 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). 1/2" x 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.

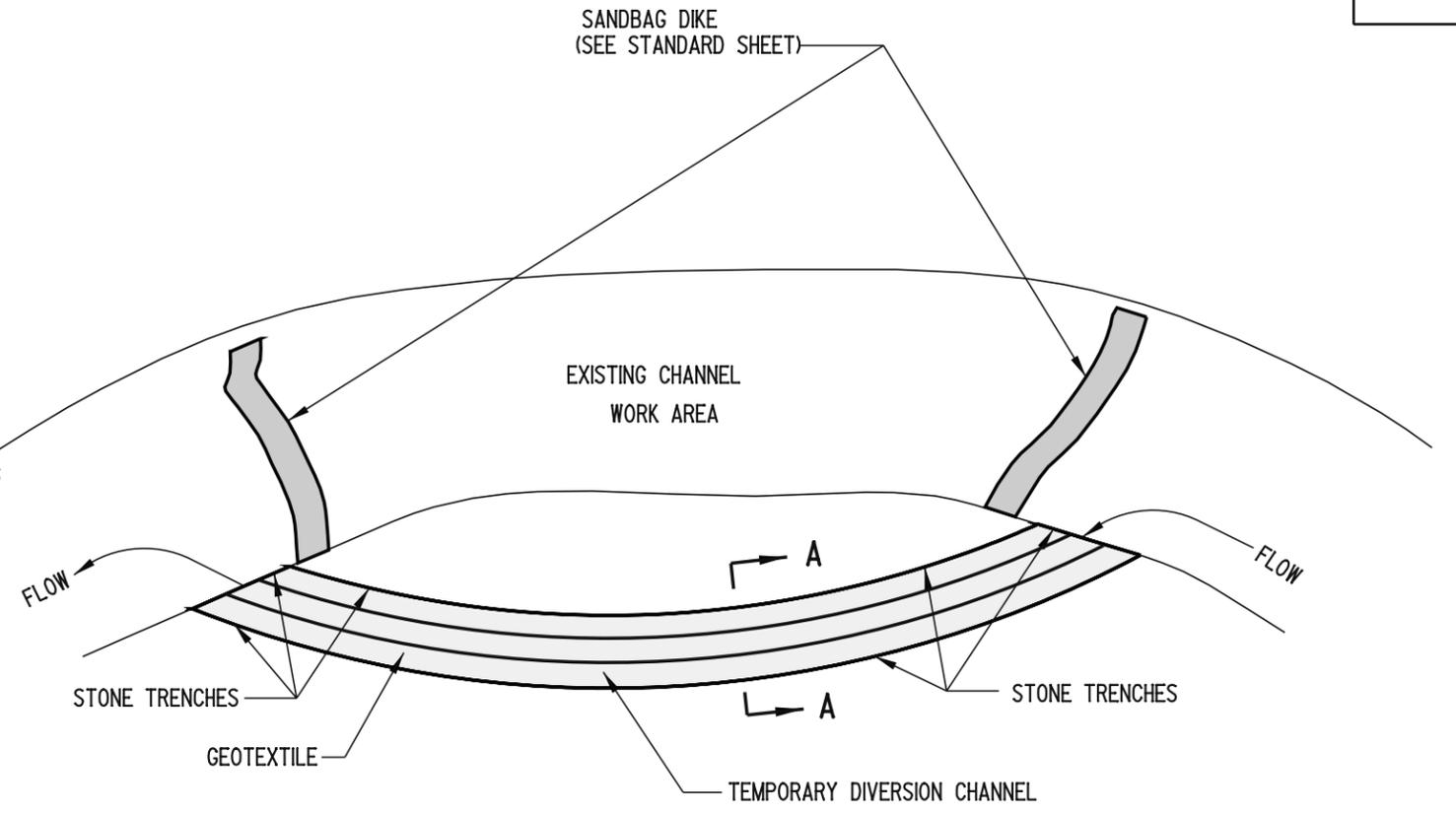
SUMP PIT CHART				
TYPE	PIPE 1	PIPE 2	A	B
1	PERFORATED 24" (600) CMP WITH PERFORATED CAP WELDED ON BOTTOM AND COMPLETELY WRAPPED WITH GEOTEXTILE.	N/A	4' (1200) MIN.	12" (300)
2	PERFORATED 48" (1200) CMP WITH PERFORATED CAP WELDED ON BOTTOM	REMOVABLE PERFORATED 36" (900) CMP WITH PERFORATED CAP WELDED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



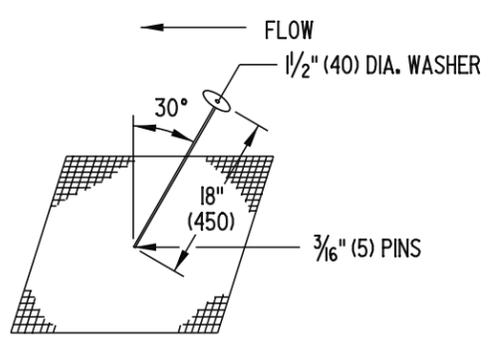
- NOTES:**
- 1.) A DEWATERING BASIN (DWB) IS USED TO REMOVE SEDIMENT FROM SEDIMENT-LADEN WATER PUMPED FROM A CONSTRUCTION SITE BEFORE THE WATER RE-ENTERS THE WATERWAY. THE DWB SHALL HAVE A MINIMUM TOP WIDTH OF 15' (4570) AND A MINIMUM DEPTH OF 3.5' (1065). THE MINIMUM TOP LENGTH SHOWN IN THE PLAN IS 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.



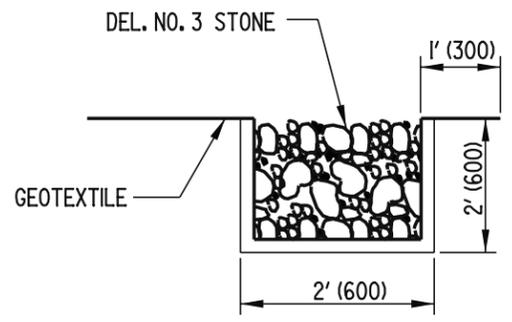
OBLIQUE VIEW



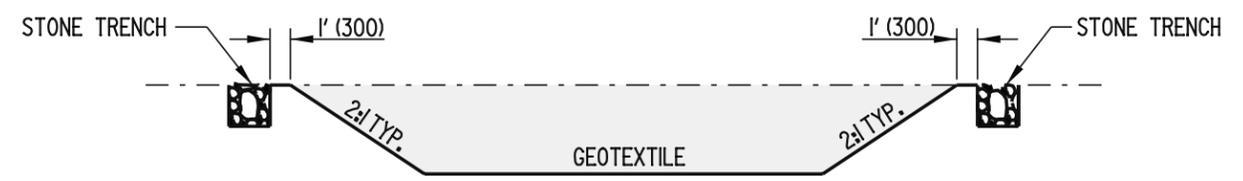
PLAN



FASTENING DETAIL



TRENCHING DETAIL



SECTION A-A

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

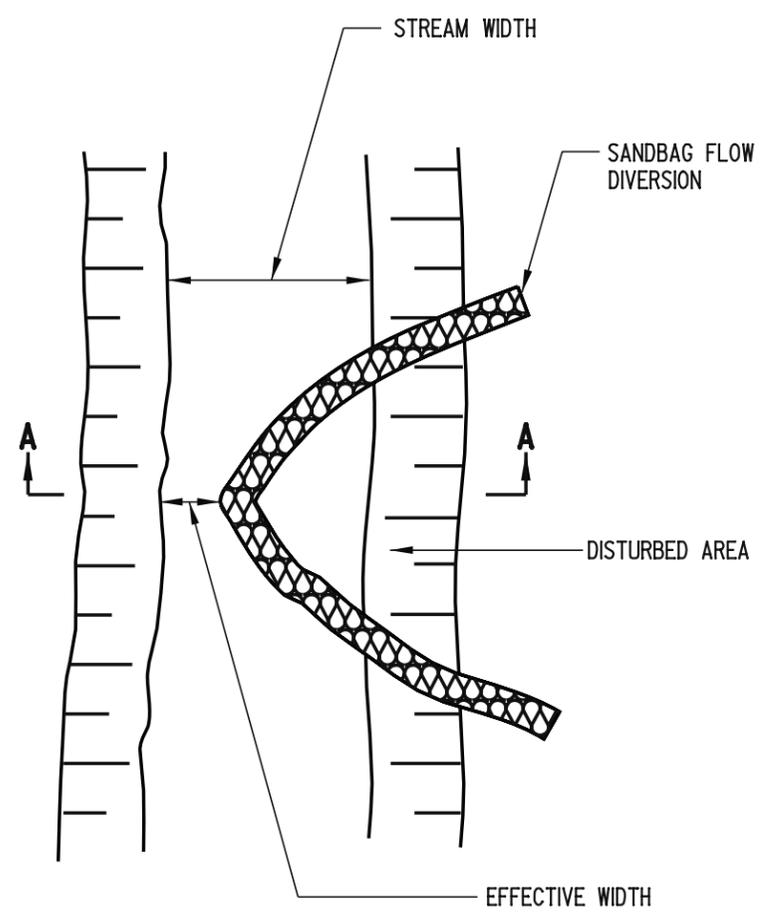


DELAWARE
DEPARTMENT OF TRANSPORTATION

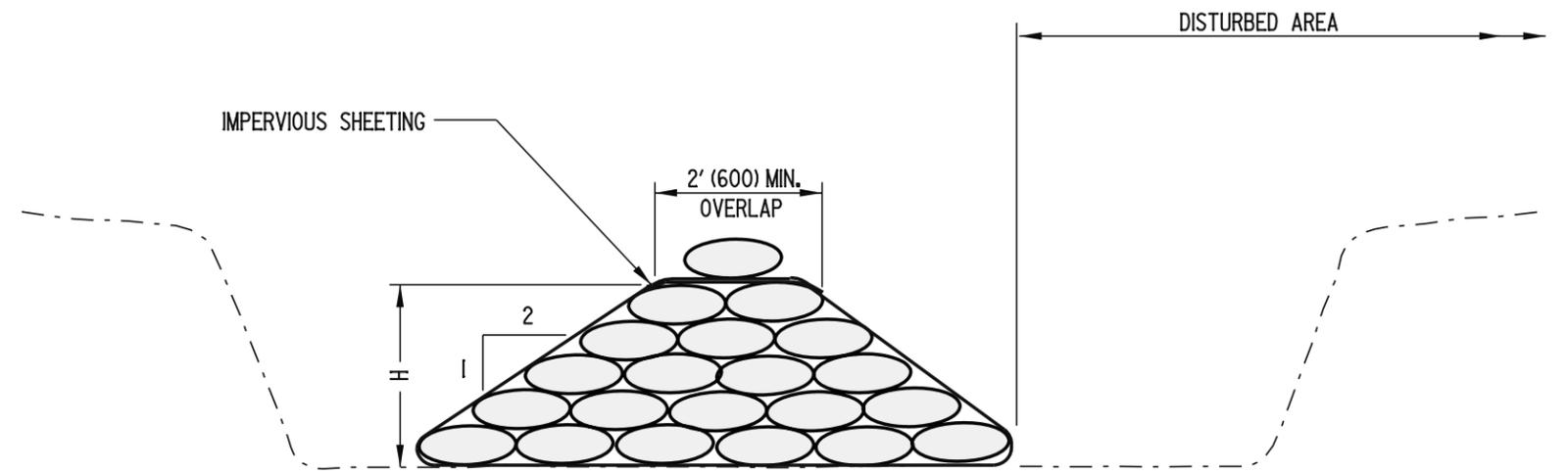
GEOTEXTILE-LINED CHANNEL DIVERSION			
STANDARD NO.	E-18 (2005)	SHT.	1 OF 1

APPROVED *Carolann Wick* 12/15/05
CHIEF ENGINEER DATE

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

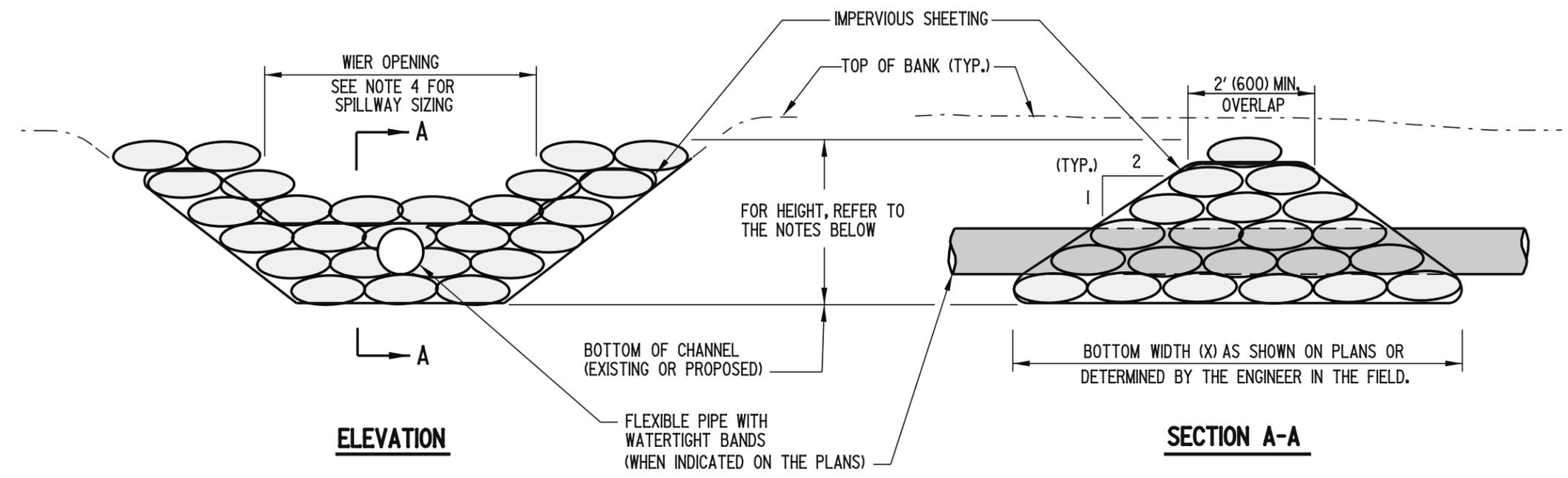


PLAN

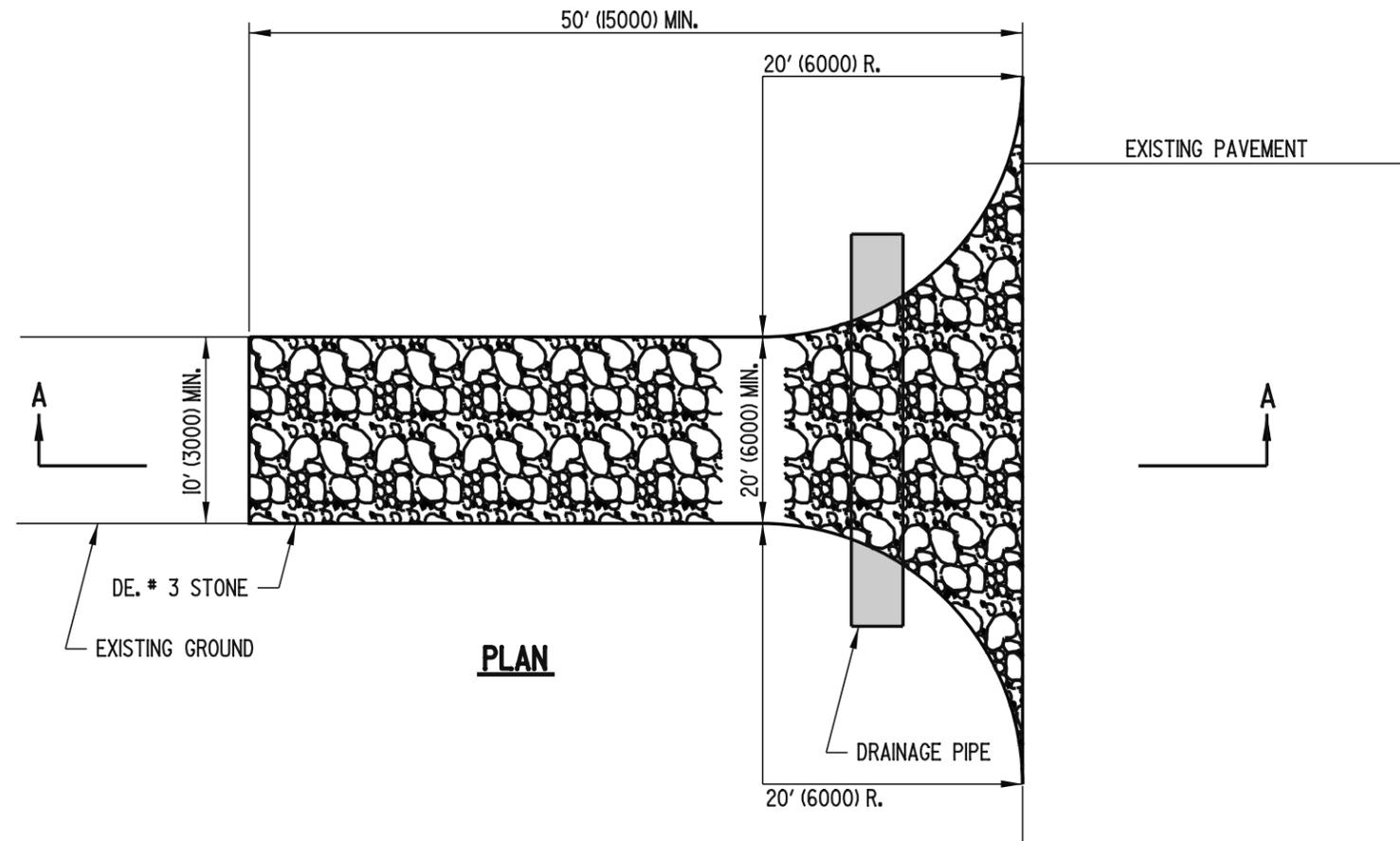


SECTION A-A

- 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.

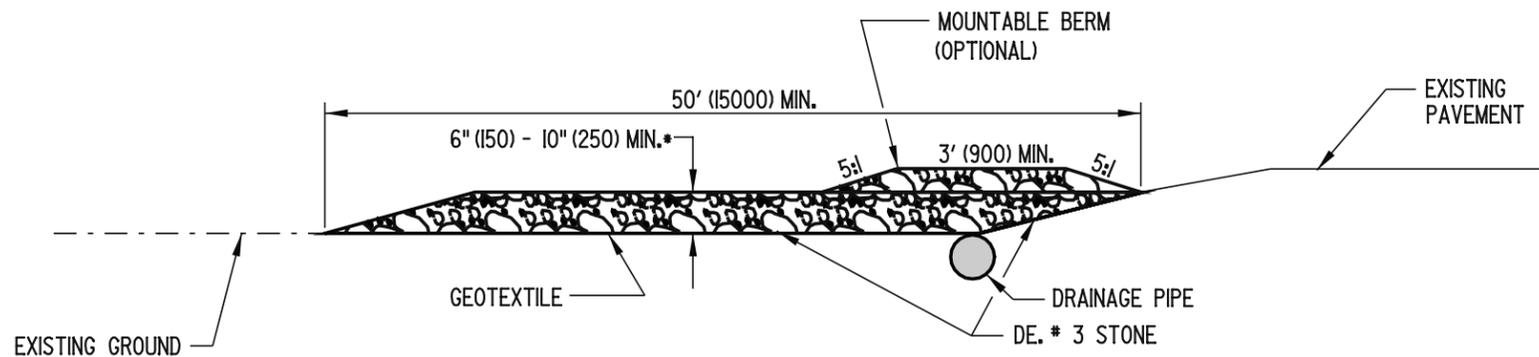


- NOTES:**
- 1). THE WORK SHALL CONSIST OF INSTALLING A SANDBAG DIKE FOR THE PURPOSE OF EROSION CONTROL WHEN CONSTRUCTION ACTIVITIES TAKE PLACE WITHIN THE STREAM CHANNEL SUCH AS BANK STABILIZATION OR BRIDGE ABUTMENT CONSTRUCTION.
 - 2). THE SANDBAG DIKE SHALL BE INSTALLED AT THE UPSTREAM LOCATION FIRST.
 - 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.



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)

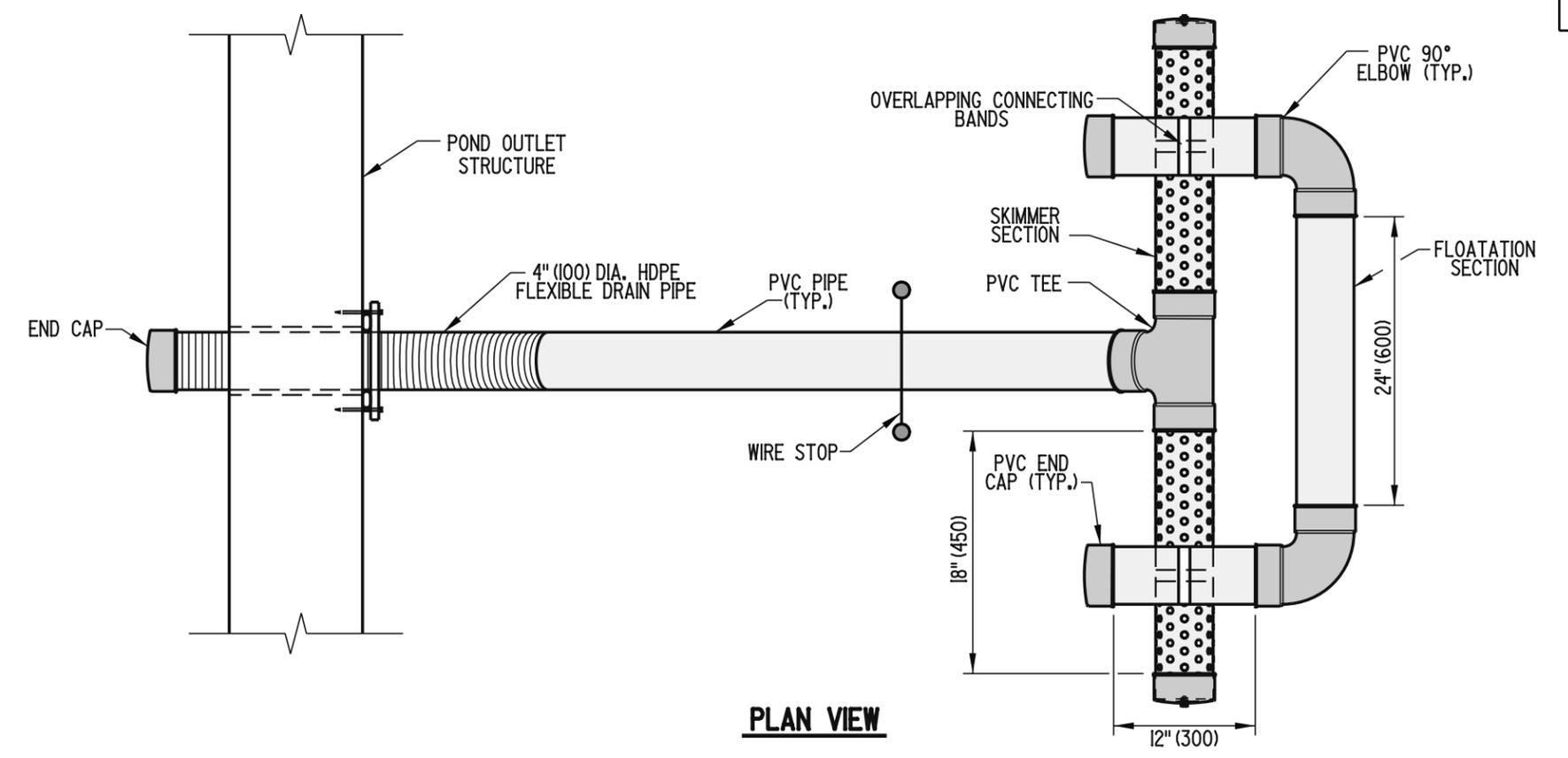


STABILIZED CONSTRUCTION ENTRANCE			
STANDARD NO.	E-21 (2005)	SHT.	1 OF 1

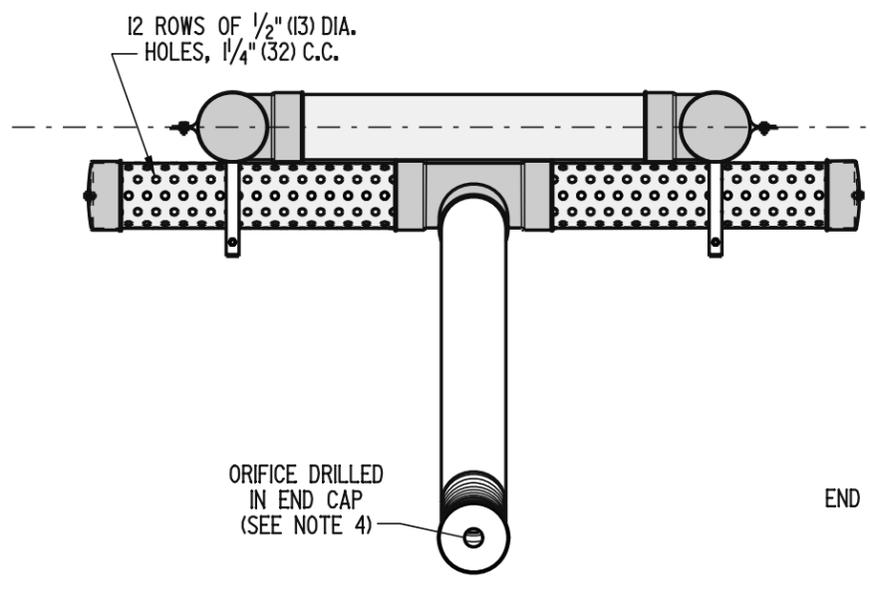
APPROVED *Carolann Wick* 12/15/05
CHIEF ENGINEER DATE

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

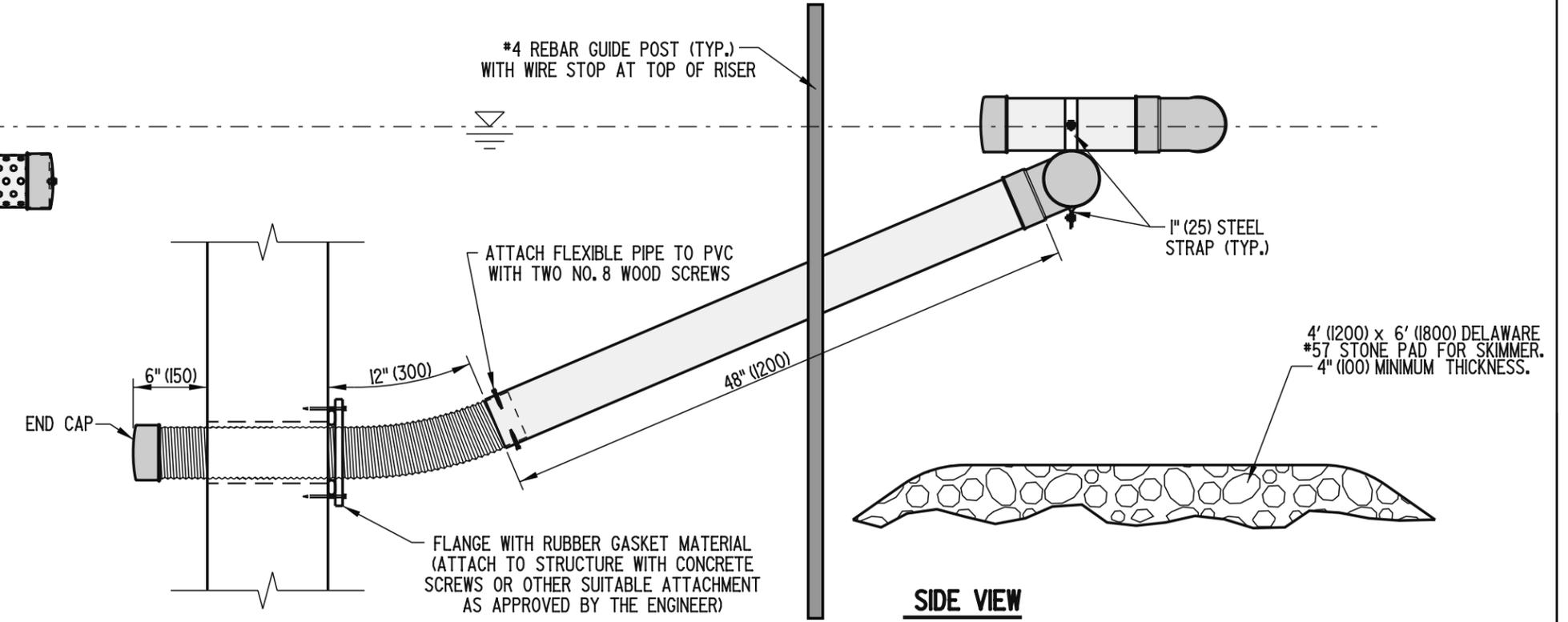
- NOTES:**
- 1). ALL P.V.C. PIPES ARE TO BE 4" (100) I.D., SCHEDULE 40
 - 2). ALL JOINTS OF THE FLOATATION SECTION SHALL BE SOLVENT WELDED. JOINTS OF SKIMMER SECTION NEED NOT BE WATER-TIGHT.
 - 3). 4" (100) HDPE FLEXIBLE DRAIN PIPE IS TO BE ATTACHED TO THE POND OUTLET STRUCTURE WITH WATER-TIGHT CONNECTIONS.
 - 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