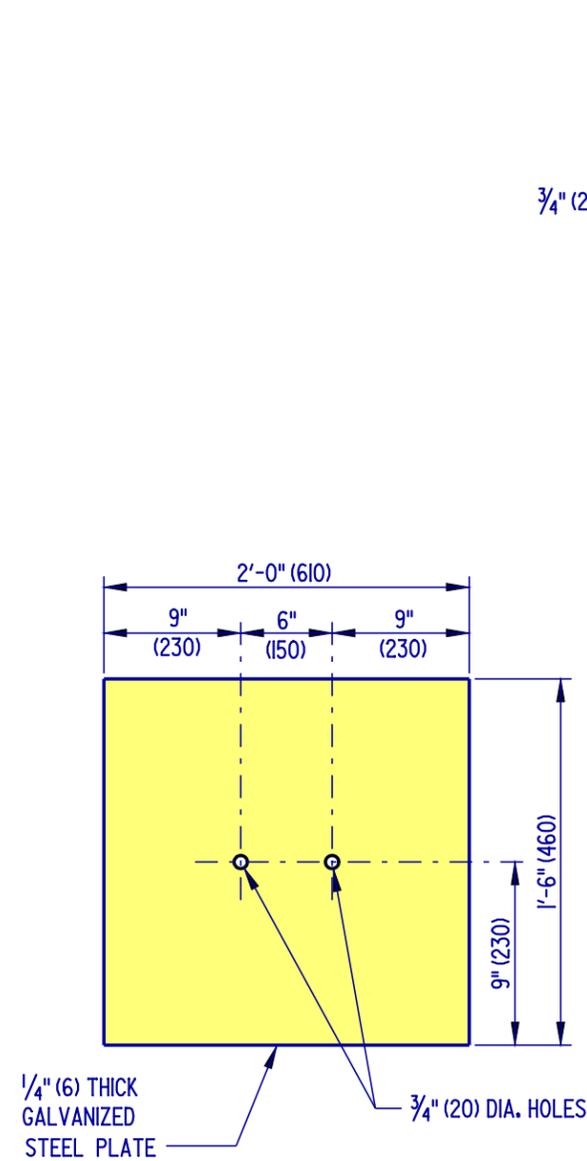
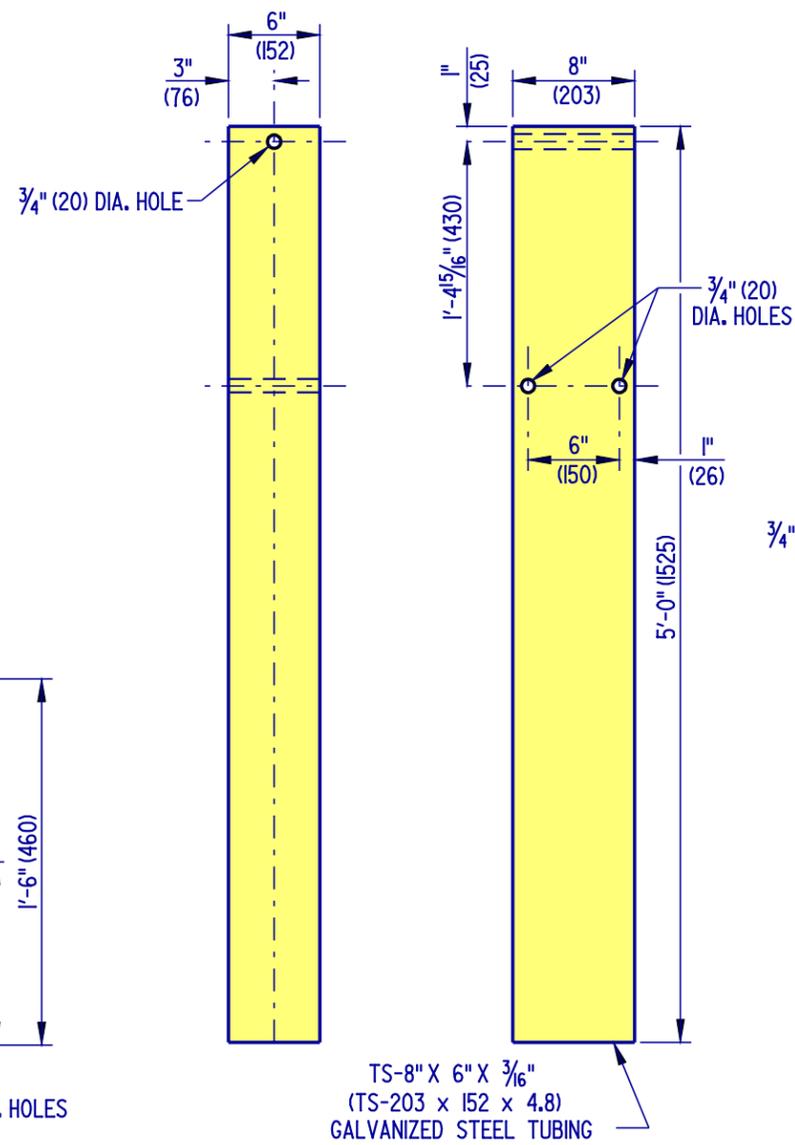


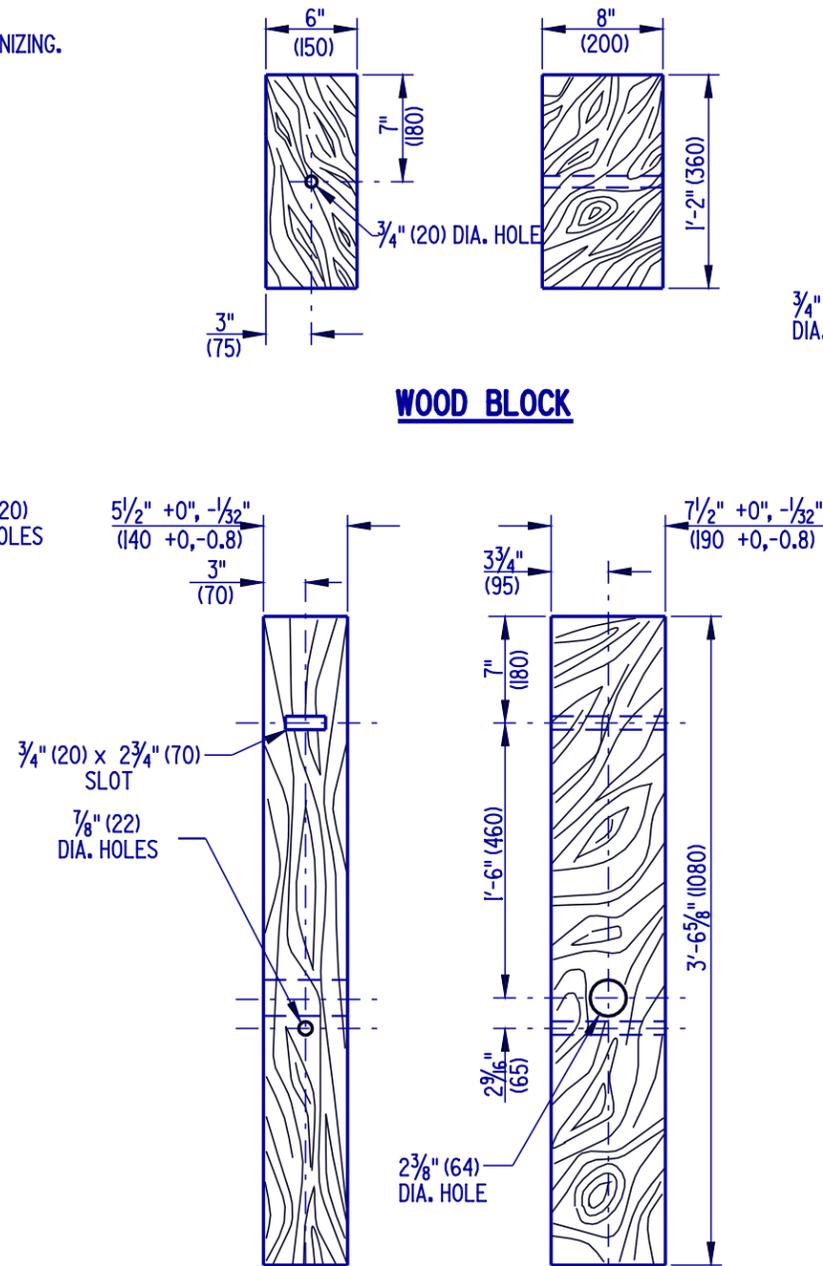
NOTES : 1). ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.
 2). ALL WOOD SIZES ARE NOMINAL DIMENSIONS.



SOIL PLATE

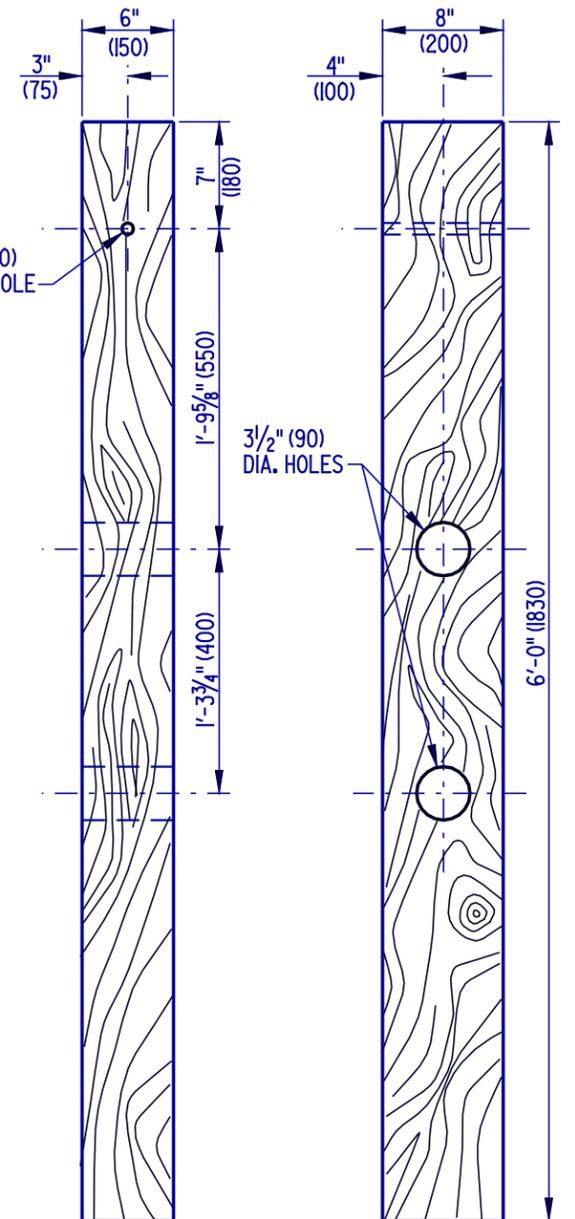


STEEL TUBE



WOOD BLOCK

SHORT WOOD BREAKAWAY POST



LONG WOOD BREAKAWAY POST

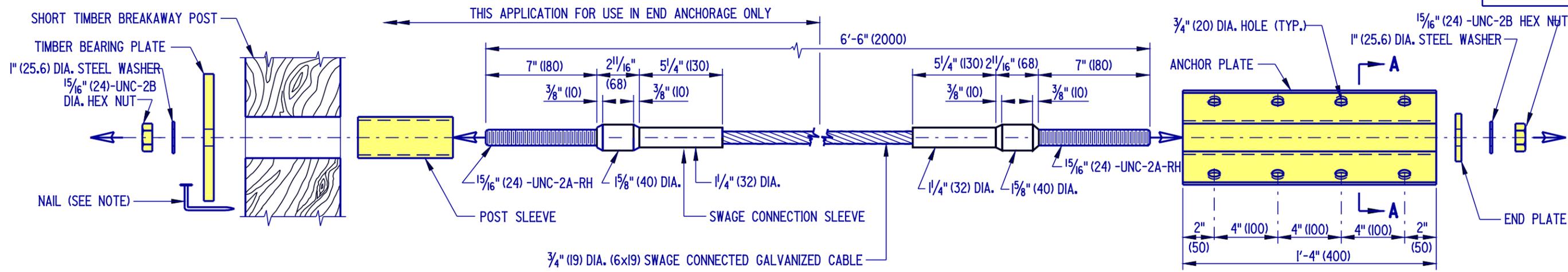


DELAWARE
 DEPARTMENT OF TRANSPORTATION

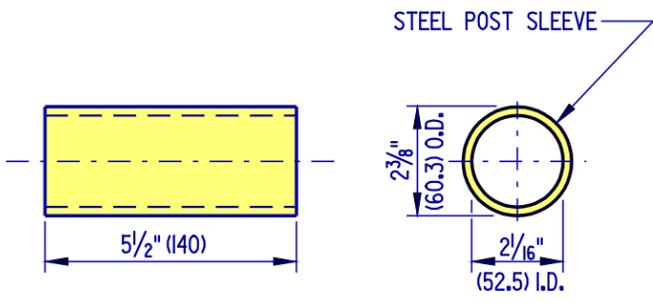
HARDWARE
 STANDARD NO. B-13 (2004) SHT. 7 OF 13

APPROVED *Carolann Wicks* 1/10/05
 CHIEF ENGINEER DATE
 RECOMMENDED *Dennis M. O'Flaherty* 1/13/05
 DESIGN ENGINEER DATE

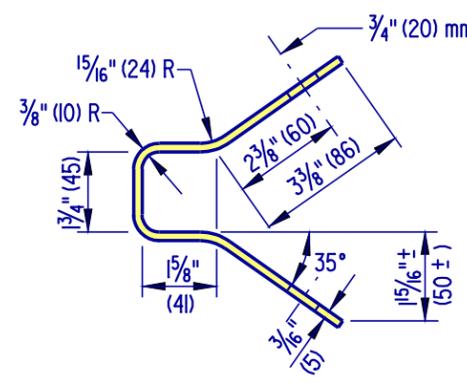
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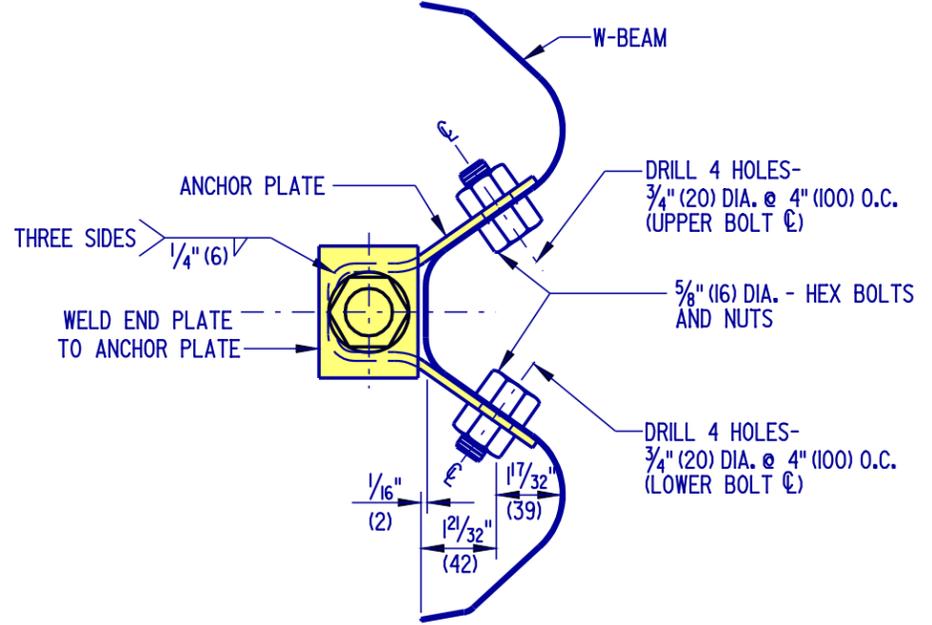
SWAGED CABLE ASSEMBLY AND RELATED HARDWARE ASSEMBLY



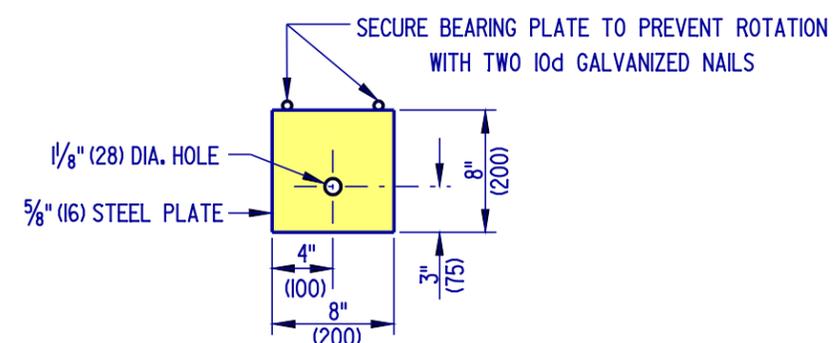
POST SLEEVE



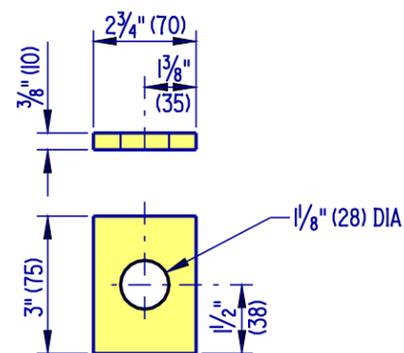
SECTION A-A



ANCHOR PLATE TO W-BEAM CONNECTION DETAIL



TIMBER BEARING PLATE



END PLATE

- NOTES:**
- 1). TO ENSURE THAT THE TIMBER BEARING PLATE REMAINS IN POSITION, 2 - 10d GALVANIZED STEEL NAILS SHALL BE DRIVEN IN THE SHORT TIMBER BREAKAWAY POST, AND BENT OVER BEARING PLATE.
 - 2). TIGHTEN ASSEMBLY UNTIL CABLE IS TAUGHT.
 - 3). ALL HOLES SHALL BE DRILLED PRIOR TO GALVANIZING.

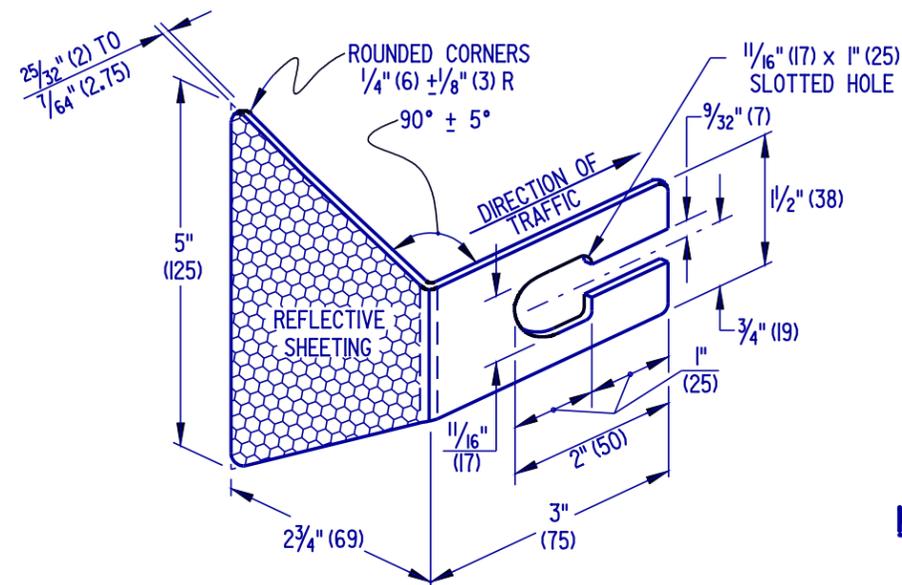


DELAWARE
DEPARTMENT OF TRANSPORTATION

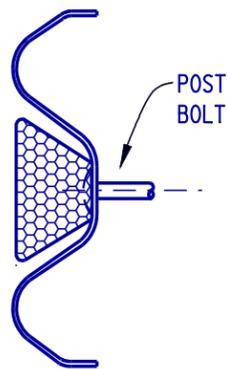
STANDARD NO. B-13 (2004)		HARDWARE		APPROVED	
SHT. 8	OF 13			1/10/05	
				RECOMMENDED	
				1/13/05	

APPROVED *Carolann Wicks* 1/10/05
CHIEF ENGINEER DATE

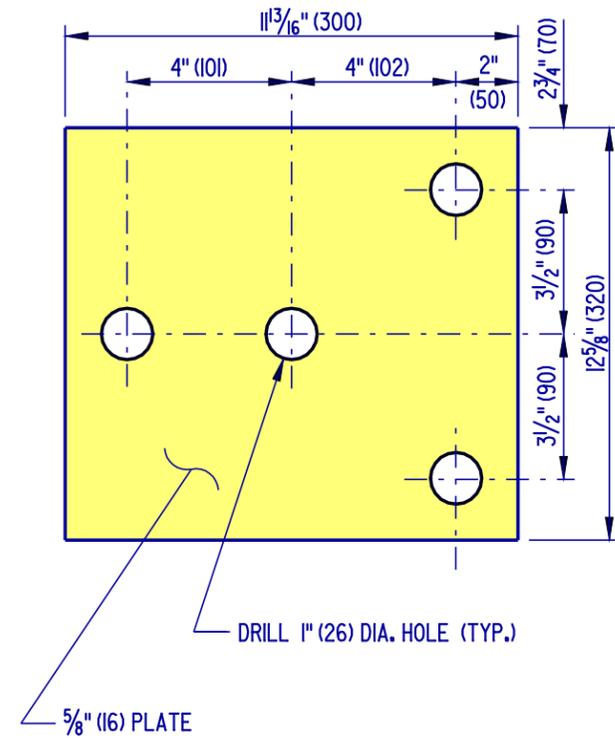
RECOMMENDED *Dennis M. O'Flaherty* 1/13/05
DESIGN ENGINEER DATE



GUARDRAIL REFLECTOR



MOUNTING POSITION



BEARING PLATE DETAIL II



DELAWARE
DEPARTMENT OF TRANSPORTATION

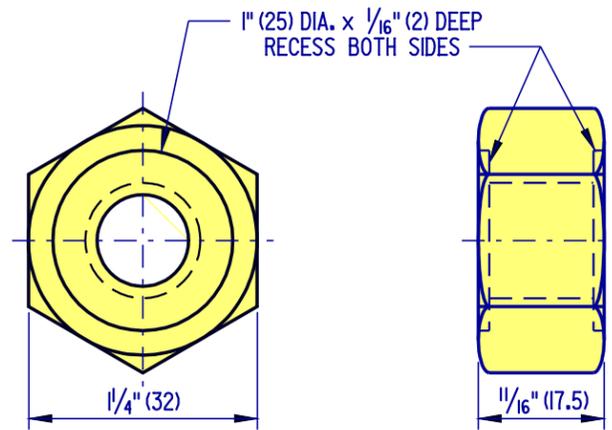
HARDWARE

STANDARD NO. B-13 (2004)

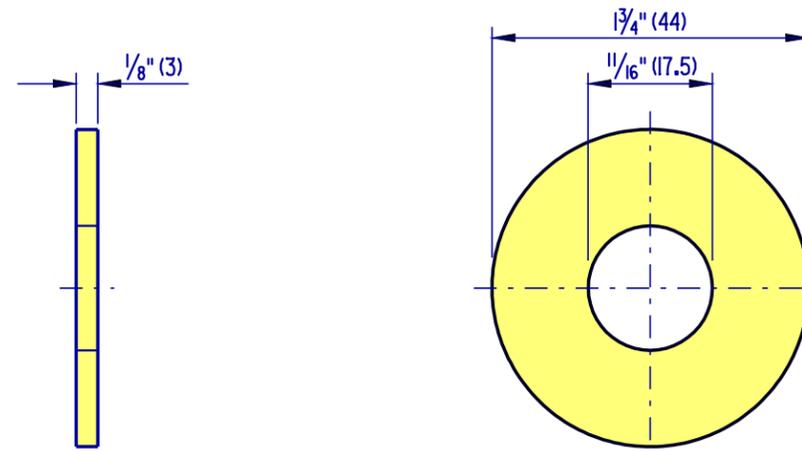
SHT. 9 OF 13

APPROVED *Carolann Wicks* 1/10/05
CHIEF ENGINEER DATE

RECOMMENDED *Dennis M. O'Flaherty* 1/13/05
DESIGN ENGINEER DATE

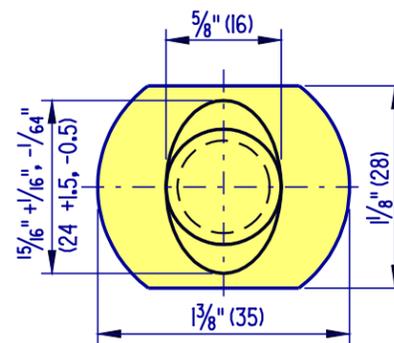
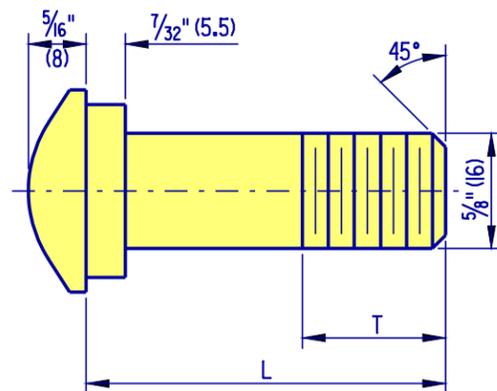


**RECESSED NUT
(FOR 5/8" (16) GUARDRAIL BOLT)**



STEEL WASHER (FOR 5/8" (16) GUARDRAIL BOLT)

NOTE: DIMENSION FOR WASHER THICKNESS IS APPROXIMATE BASED ON METAL THICKNESS.



GUARDRAIL BOLT

L	T (MIN.)
1/4" (35)	FULL THREAD LENGTH
2" (50)	FULL THREAD LENGTH
4" (100)	FULL THREAD LENGTH
10" (255)	4" (100) THREAD LENGTH
18" (460)	4" (100) THREAD LENGTH

NOTES : 1. ALL FILLETS SHALL HAVE A MINIMUM RADIUS OF 1/16" (2).
2. IF THE BOLT EXTENDS MORE THAN 1/2" (12) BEYOND THE NUT, THE BOLT SHALL BE TRIMMED BACK AS PER THE DEPARTMENT'S SPECIFICATIONS.



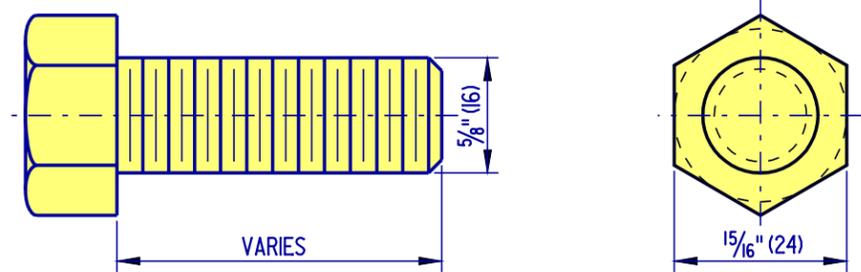
DELAWARE
DEPARTMENT OF TRANSPORTATION

HARDWARE

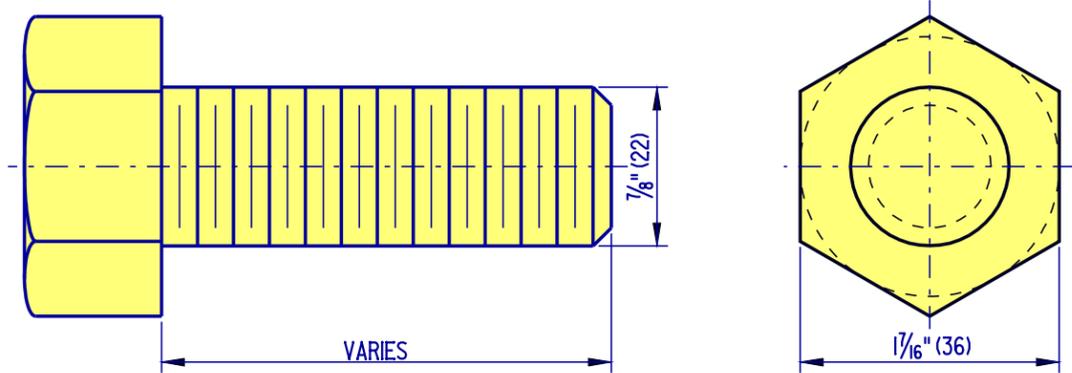
STANDARD NO. B-13 (2004) SHT. 10 OF 13

APPROVED *Carolann Wicks* 1/10/05
CHIEF ENGINEER DATE

RECOMMENDED *Dennis M. O'Flaherty* 1/13/05
DESIGN ENGINEER DATE



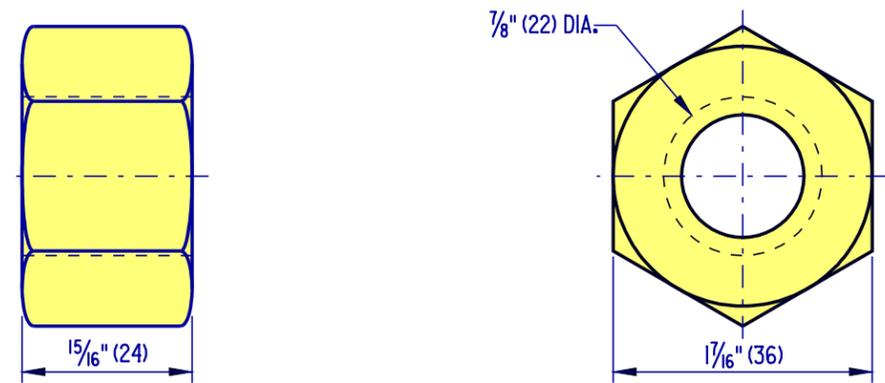
5/8" (16) HEX BOLT



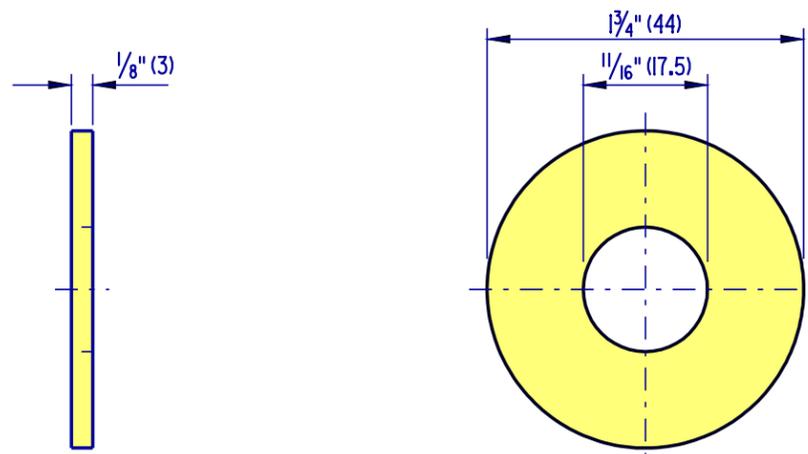
HIGH-STRENGTH STRUCTURAL HEX BOLT



5/8" (16) HEX NUT



HIGH-STRENGTH STRUCTURAL HEX NUT



5/8" (16) STEEL WASHER

NOTE : DIMENSION FOR WASHER THICKNESS IS APPROXIMATE BASE METAL THICKNESS.

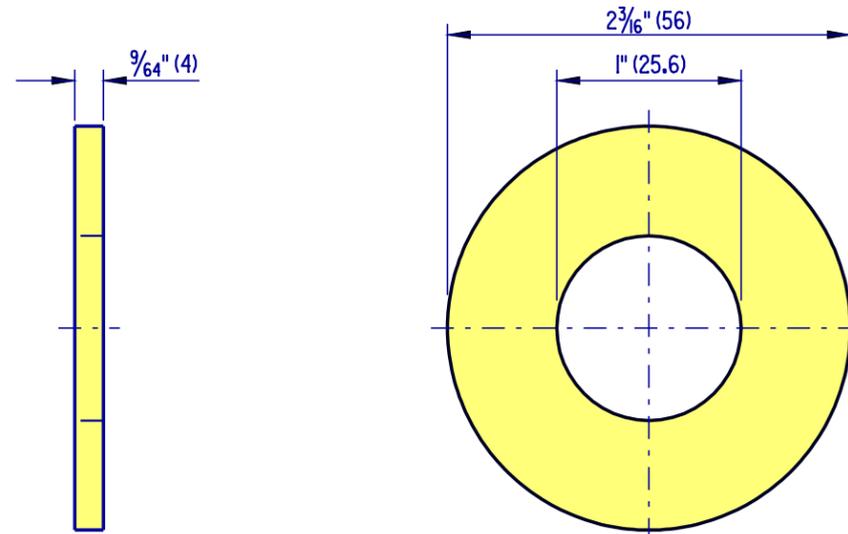


**DELAWARE
DEPARTMENT OF TRANSPORTATION**

HARDWARE					
STANDARD NO.	B-13 (2004)	SHT.	11	OF	13

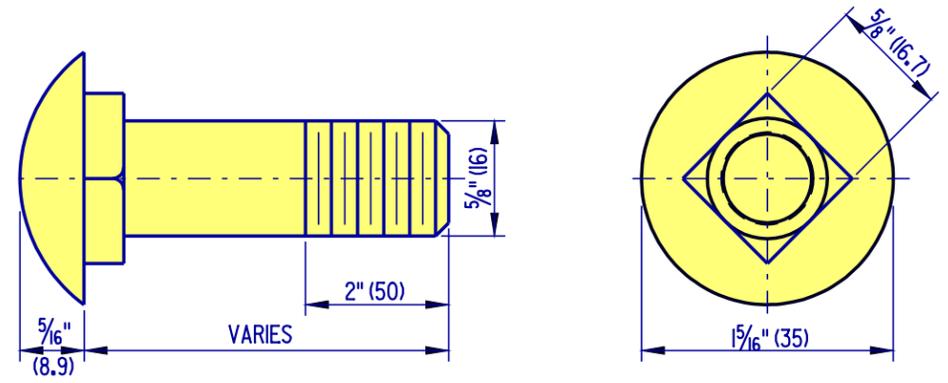
APPROVED *Carolann Wicks* 1/10/05
CHIEF ENGINEER DATE

RECOMMENDED *Dennis M. O'Flaherty* 1/13/05
DESIGN ENGINEER DATE

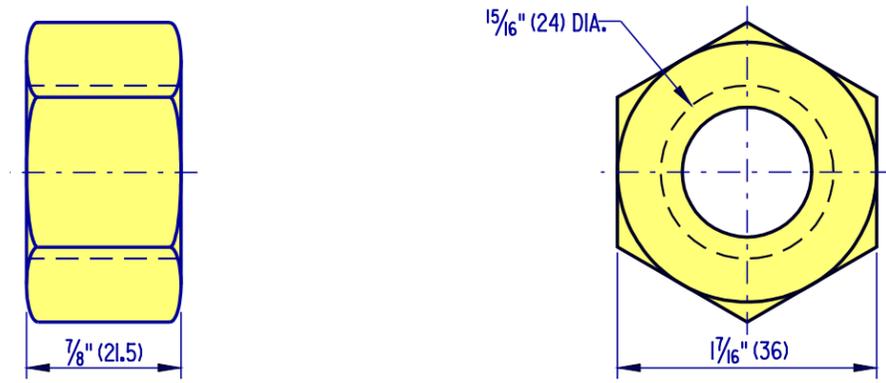


STEEL WASHER

NOTES : 1. FOR USE WITH SWAGED CABLE ASSEMBLAGE.
2. DIMENSION FOR WASHER THICKNESS IS APPROXIMATE BASE METAL THICKNESS.



5/8" (16) CARRIAGE BOLT



1 5/16" (24) HEX NUT

NOTE : FOR USE WITH SWAGED CABLE ASSEMBLAGE.

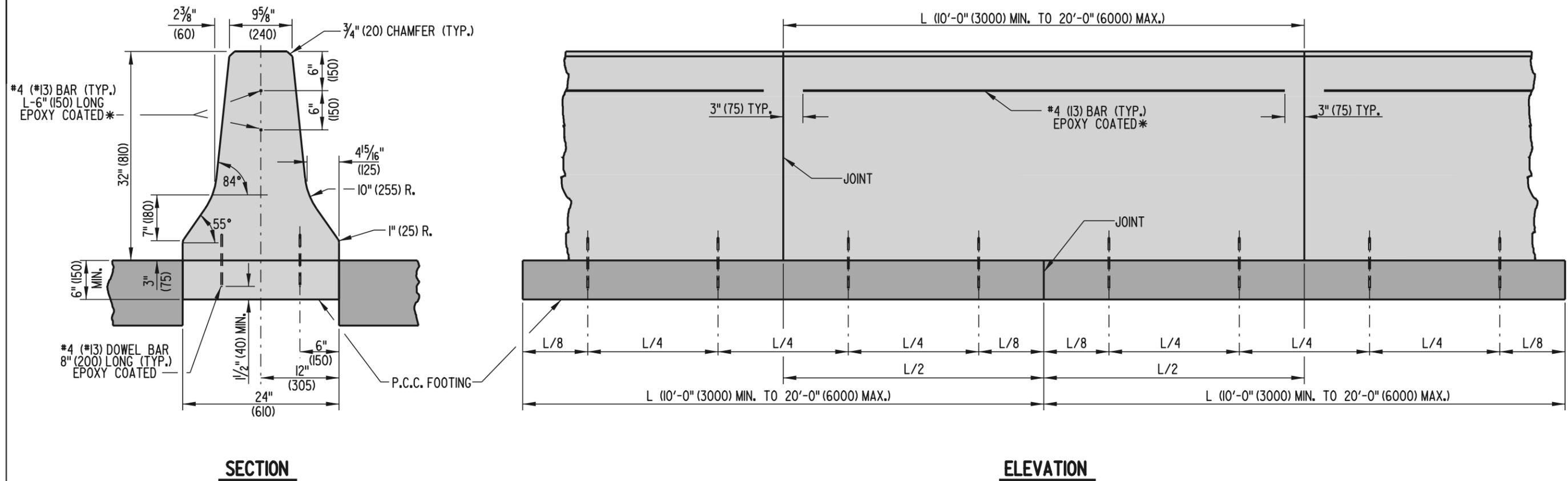


DELAWARE
DEPARTMENT OF TRANSPORTATION

HARDWARE

STANDARD NO. B-13 (2004) SHT. 12 OF 13

APPROVED *Carolann Wicks* 1/10/05
CHIEF ENGINEER DATE
RECOMMENDED *Dennis M. O'Flaherty* 1/13/05
DESIGN ENGINEER DATE



TYPICAL CAST-IN-PLACE OR SLIP-FORM CONSTRUCTION

* BAR SHALL BE CUT AT EVERY JOINT IF MADE CONTINUOUS FOR SLIP-FORM CONSTRUCTION



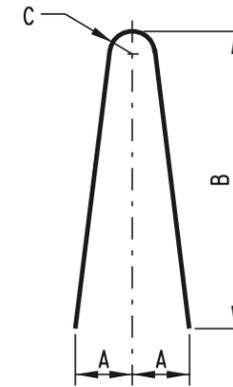
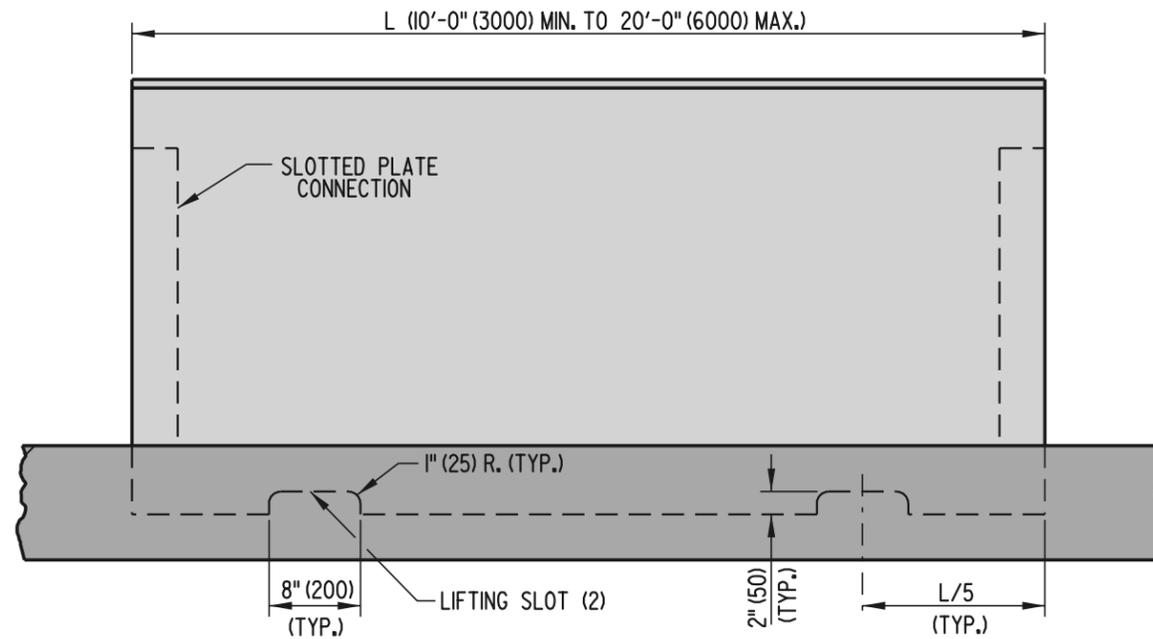
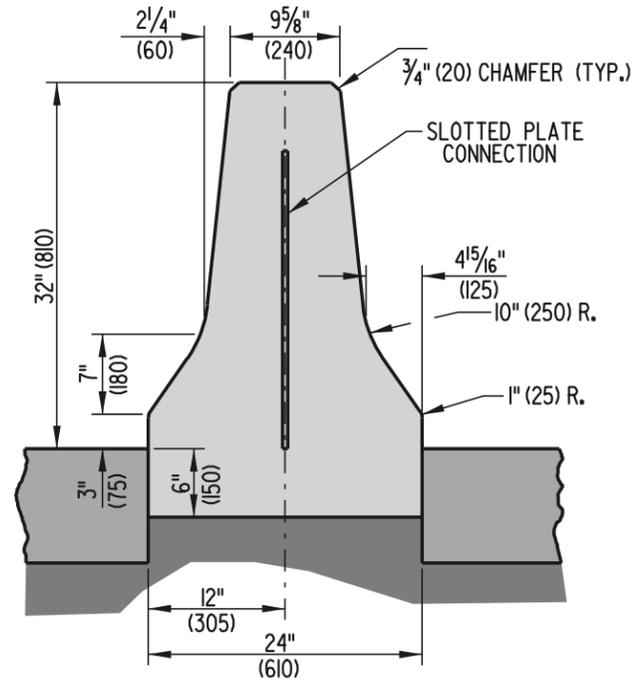
**DELAWARE
DEPARTMENT OF TRANSPORTATION**

CONCRETE SAFETY BARRIER (F SHAPE)

STANDARD NO. **B-14 (2001)**

SHT. **1** OF **3**

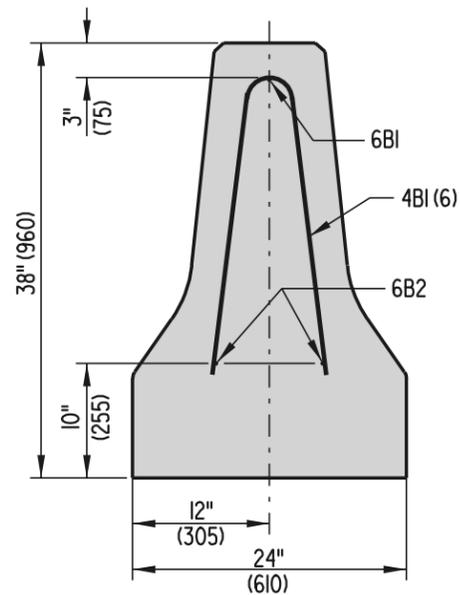
APPROVED *Ryan M. Harkness* 6/18/01
CHIEF ENGINEER DATE
 RECOMMENDED *Mehal Akhavan* 6/18/01
DESIGN ENGINEER DATE



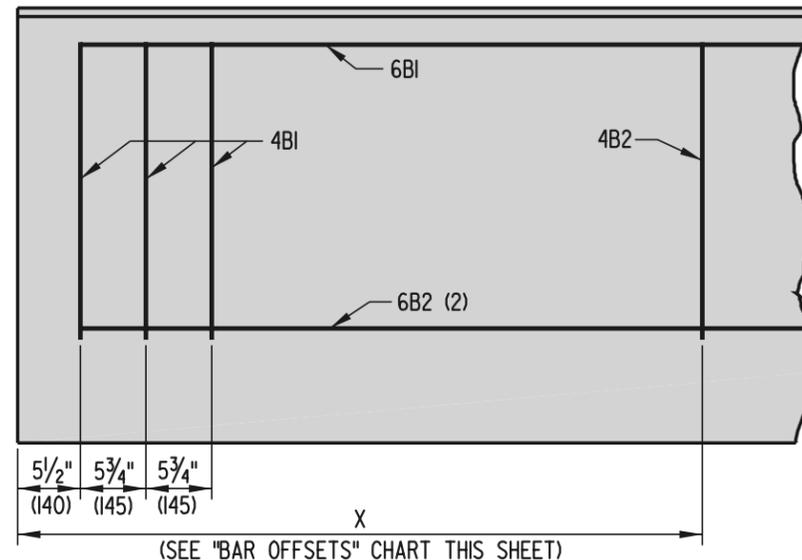
TYPE 'I' BAR

TYPICAL PRE-CAST CONSTRUCTION

BAR OFFSETS		
NOMINAL LENGTH OF BARRIER UNIT	"X"	NO. REQ'D FOR EACH BARRIER UNIT
20' (6000)	6' - 11" (2100)	2
18' (5500)	6' - 5" (1950)	2
16' (5000)	5' - 11" (1800)	2
14' (4500)	7' - 0" (2250)	1
12' (4000)	6' - 0" (2000)	1
10' (3000)	5' - 0" (1500)	1



'F' SHAPE BARRIER SECTION



ELEVATION

BAR LIST							
MARK	SIZE	NUMBER IN EACH SECTION	LENGTH	TYPE	A	B	C
4B1	4 (I3)	6	4'-7" (1400)	I	5" (125)	26" (660)	2" (50)
4B2	4 (I3)	**	4'-7" (1400)	I	5" (125)	26" (660)	2" (50)
6B1	6 (I9)	1	*	STR.			
6B2	6 (I9)	2	*	STR.			

* THE LENGTH OF BARS 6B1 AND 6B2 SHALL BE 1" (280) SHORTER IN LENGTH THAN THE NOMINAL SIZE OF THE BARRIER IN WHICH IT IS USED.
 ** SEE "BAR OFFSETS" CHART ON THIS SHEET FOR MORE INFORMATION.

TYPICAL PRE-CAST REINFORCEMENT DETAILS

NOTES: 1). CONCRETE CLEAR COVER FOR REINFORCING BARS SHALL BE 1/2" (40) MIN..

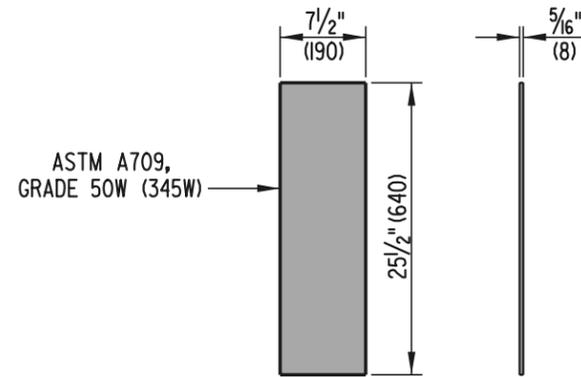


DELAWARE
DEPARTMENT OF TRANSPORTATION

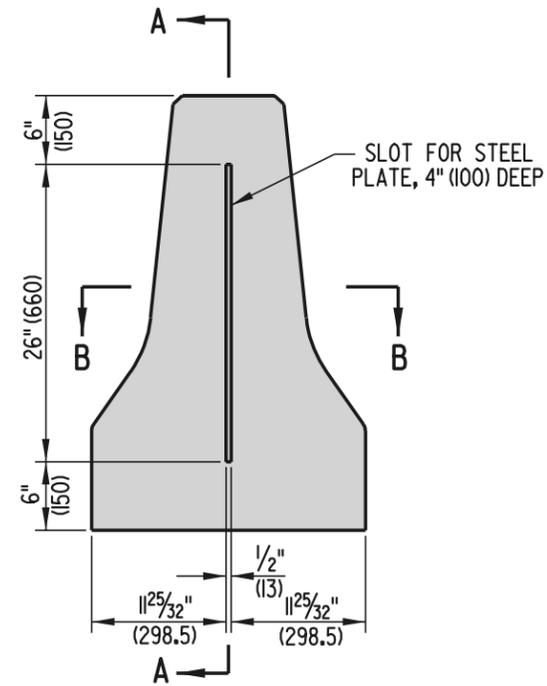
CONCRETE SAFETY BARRIER (F SHAPE)

STANDARD NO. B-14 (2001) SHT. 2 OF 3

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

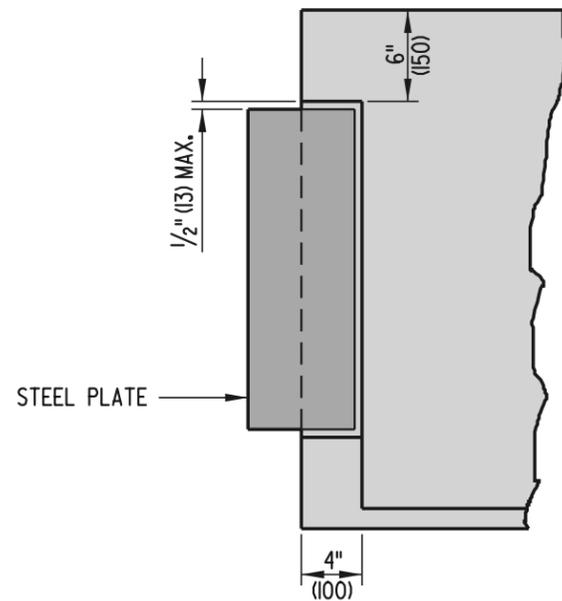


STEEL CONNECTOR PLATE

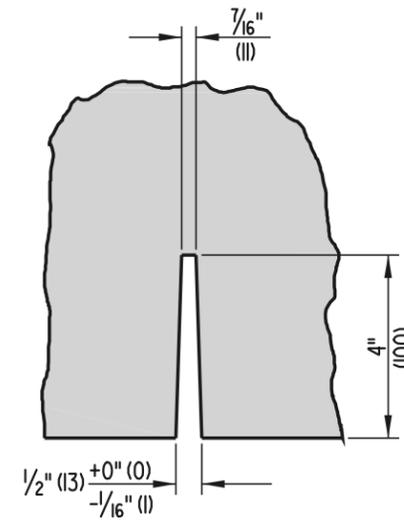


SLOT DIMENSIONS

CONCRETE SAFETY BARRIER, PRECAST CONSTRUCTION
'F' SHAPE BARRIER SECTION



SECTION A-A



SECTION B-B



DELAWARE
DEPARTMENT OF TRANSPORTATION

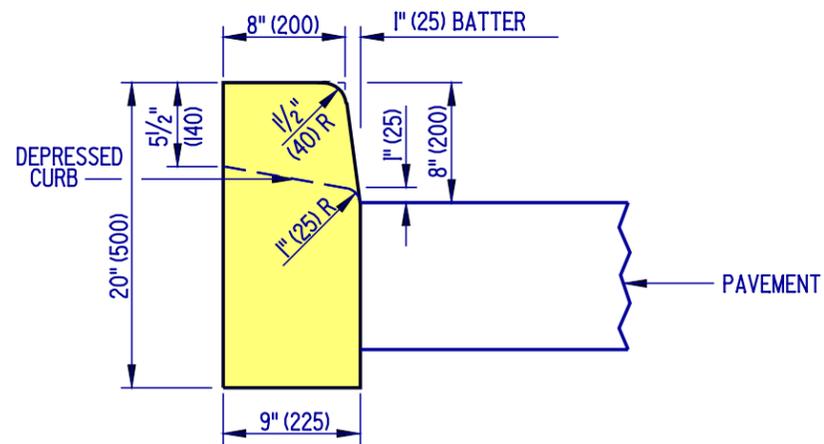
SLOTTED PLATE CONNECTION DETAILS

STANDARD NO. B-14 (2001)

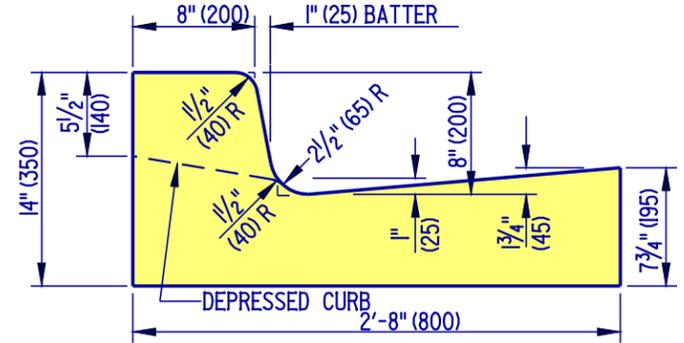
SHT. 3 OF 3

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

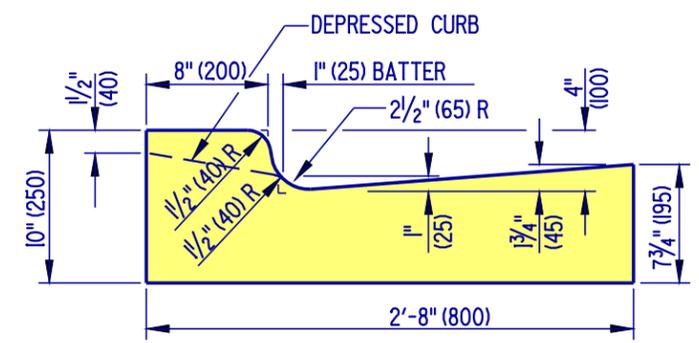
RECOMMENDED *Mehal Alghob* 6/18/01
DESIGN ENGINEER DATE



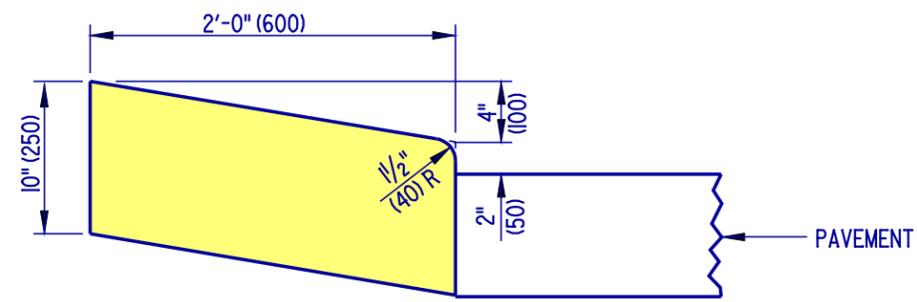
P.C.C. CURB
TYPE 1



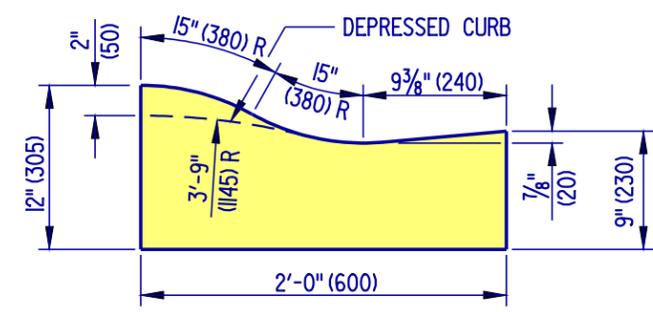
INTEGRAL P.C.C. CURB AND GUTTER
TYPE 1



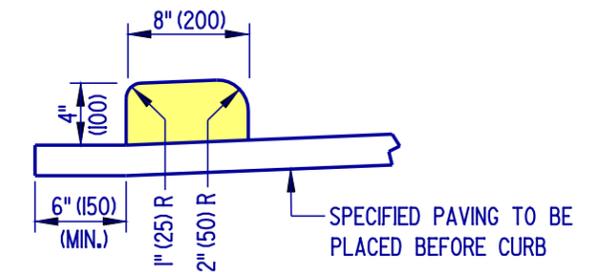
INTEGRAL P.C.C. CURB AND GUTTER
TYPE 4



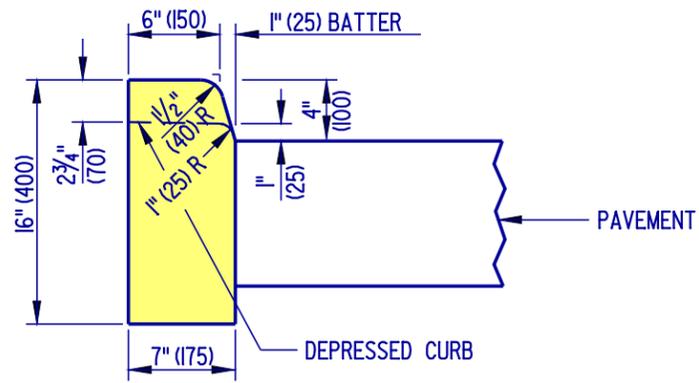
P.C.C. CURB
TYPE 2



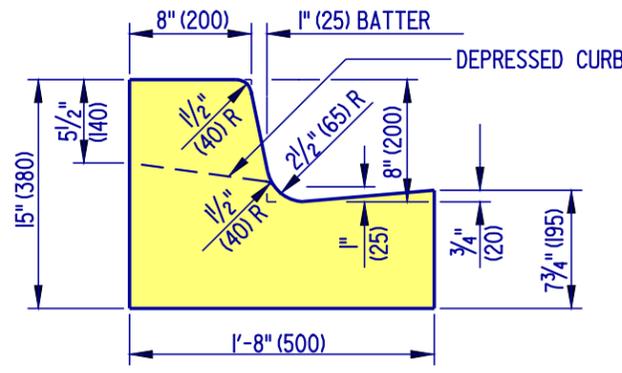
INTEGRAL P.C.C. CURB AND GUTTER
TYPE 2



HOT-MIX, HOT LAID BITUMINOUS CONCRETE CURB



P.C.C. CURB
TYPE 3



INTEGRAL P.C.C. CURB AND GUTTER
TYPE 3

- NOTES:
1. WHEN INTEGRAL P.C.C. CURB AND GUTTER IS PLACED ADJACENT TO PORTLAND CEMENT CONCRETE PAVEMENT, CONSTRUCT THE JOINT AS PER THE LONGITUDINAL JOINT SEALANT DETAIL ON STANDARD P-2, SHEET 3 OF 5. USE APPROVED JOINT FILLER TO SEAL. WORK TO BE PAID UNDER RESPECTIVE CURB AND GUTTER ITEM.
 2. DEPRESS CURB AT DRIVEWAYS AS DETAILED.
 3. DEPRESS CURB FLUSH WITH PAVEMENT AT CURB RAMPS. MAXIMUM SLOPE OF DEPRESSED CURB IS 1:2.



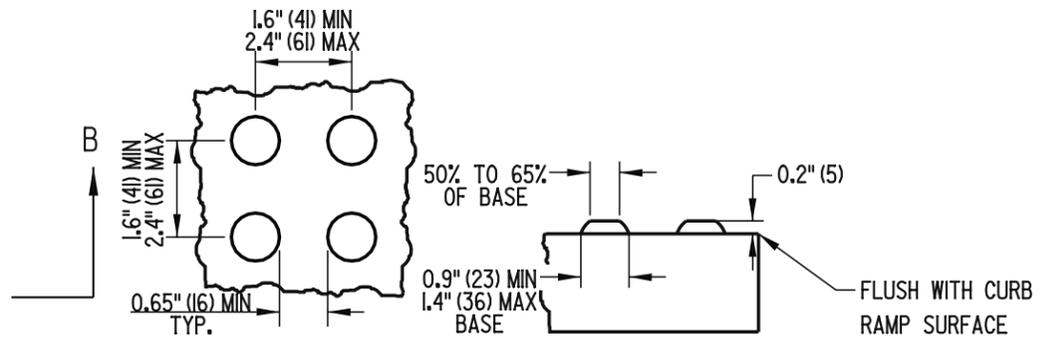
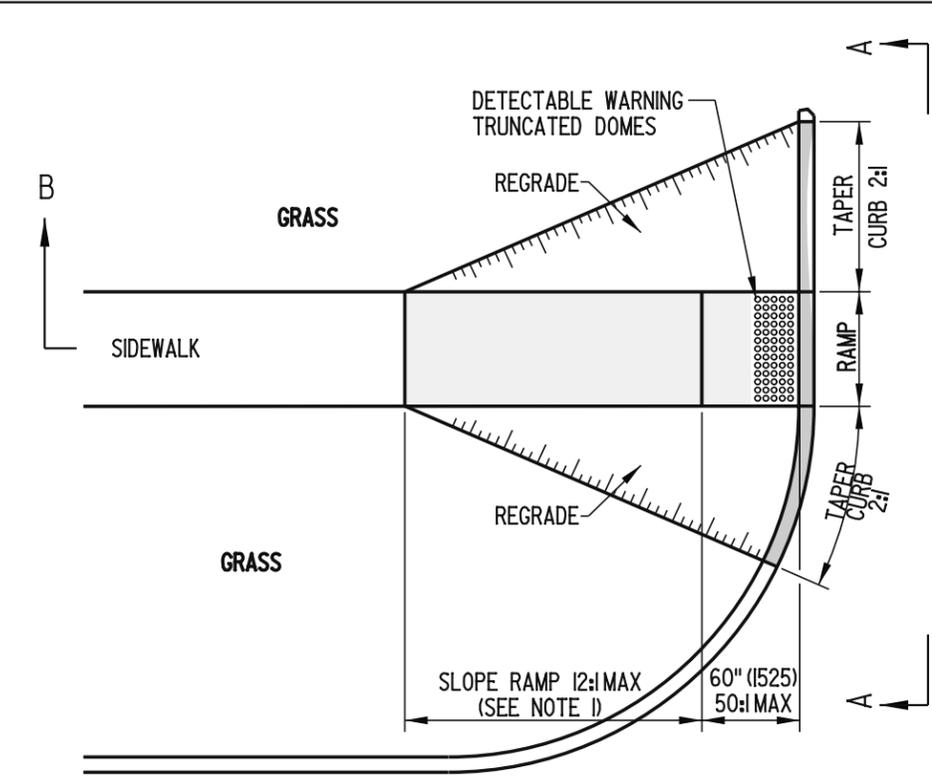
DELAWARE
DEPARTMENT OF TRANSPORTATION

P.C.C. CURB, P.C.C. CURB & GUTTER, AND HOT-MIX CURB			
STANDARD NO.	C-1 (2004)	SHT.	1 OF 1

APPROVED *Carolann Wicks* 1/10/05
CHIEF ENGINEER DATE

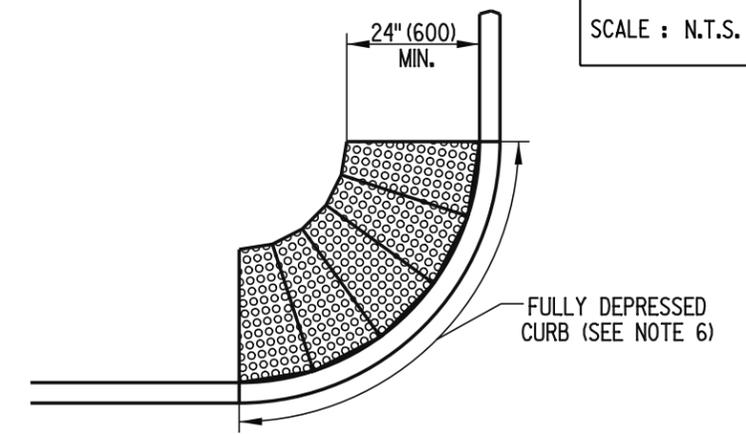
RECOMMENDED *Dennis M. O'Flaherty* 1/13/05
DESIGN ENGINEER DATE

SCALE : N.T.S.

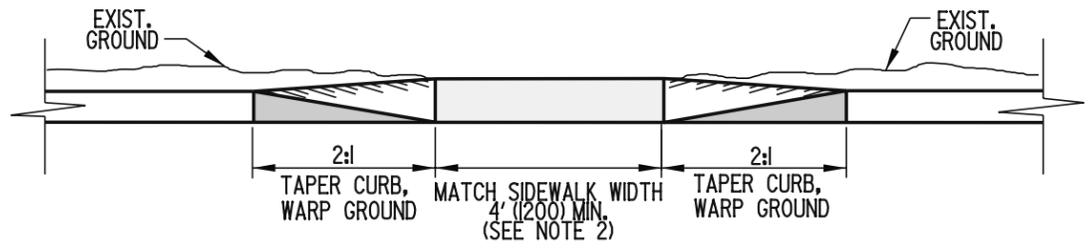


DETECTABLE WARNING TRUNCATED DOME DETAILS

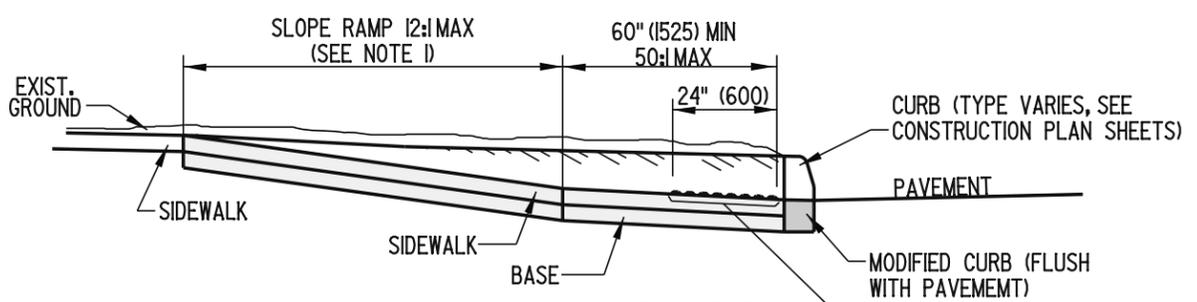
- NOTES:**
- A). THE AREA OF DETECTABLE WARNING TRUNCATED DOMES SHALL BE 24" (600) LONG AND THE FULL WIDTH OF THE RAMP OR DEPRESSED CURB.
 - B). SEE SPECIFICATION FOR ADDITIONAL INFORMATION.



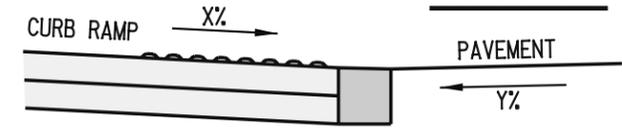
SAMPLE LAYOUT OF DETECTABLE WARNING TRUNCATED DOMES ALONG A CURB RADIUS



ELEVATION A-A



SECTION B-B

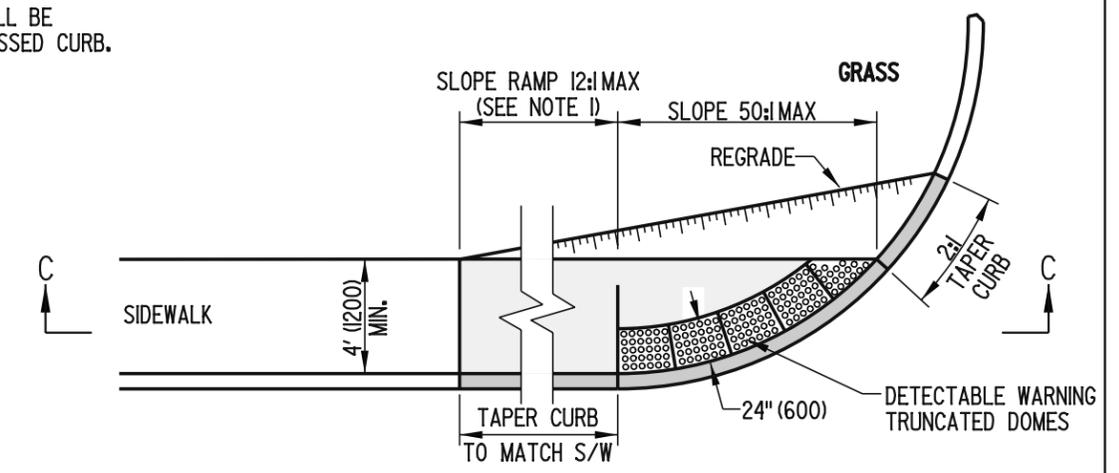


MAXIMUM DIFFERENCE IN GRADE

FOR EXAMPLE, IF THE CURB RAMP AND DEPRESSED CURB SLOPE (X) IS 8.1% AND THE PAVEMENT SLOPE (Y) IS 4.0%, THEN TO DETERMINE THE DIFFERENCE IN GRADE, ADD X + Y TO GET 12.1%. WHICH IS GREATER THAN THE 14% PREFERRED BUT LESS THAN THE 13% MAXIMUM.

CURB RAMP, TYPE 1

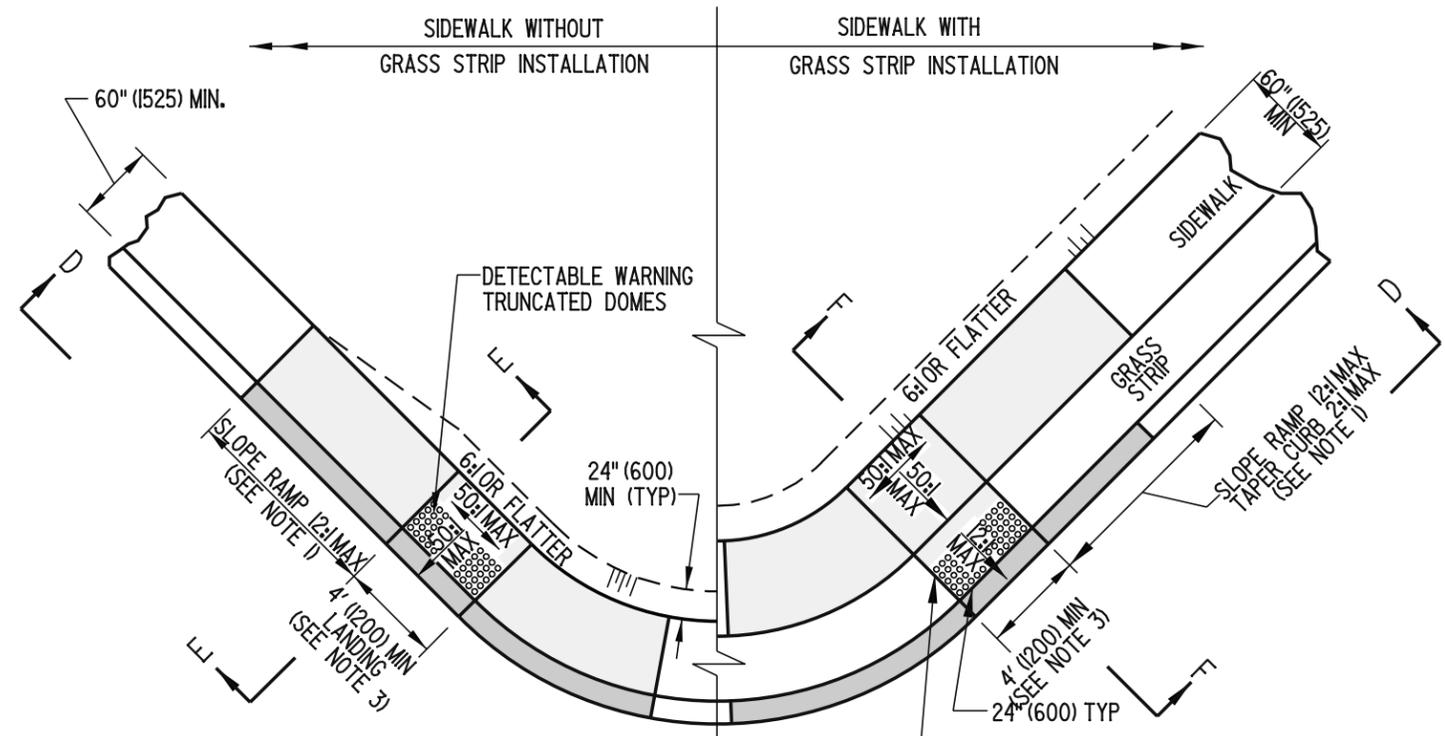
PERPENDICULAR CURB RAMP



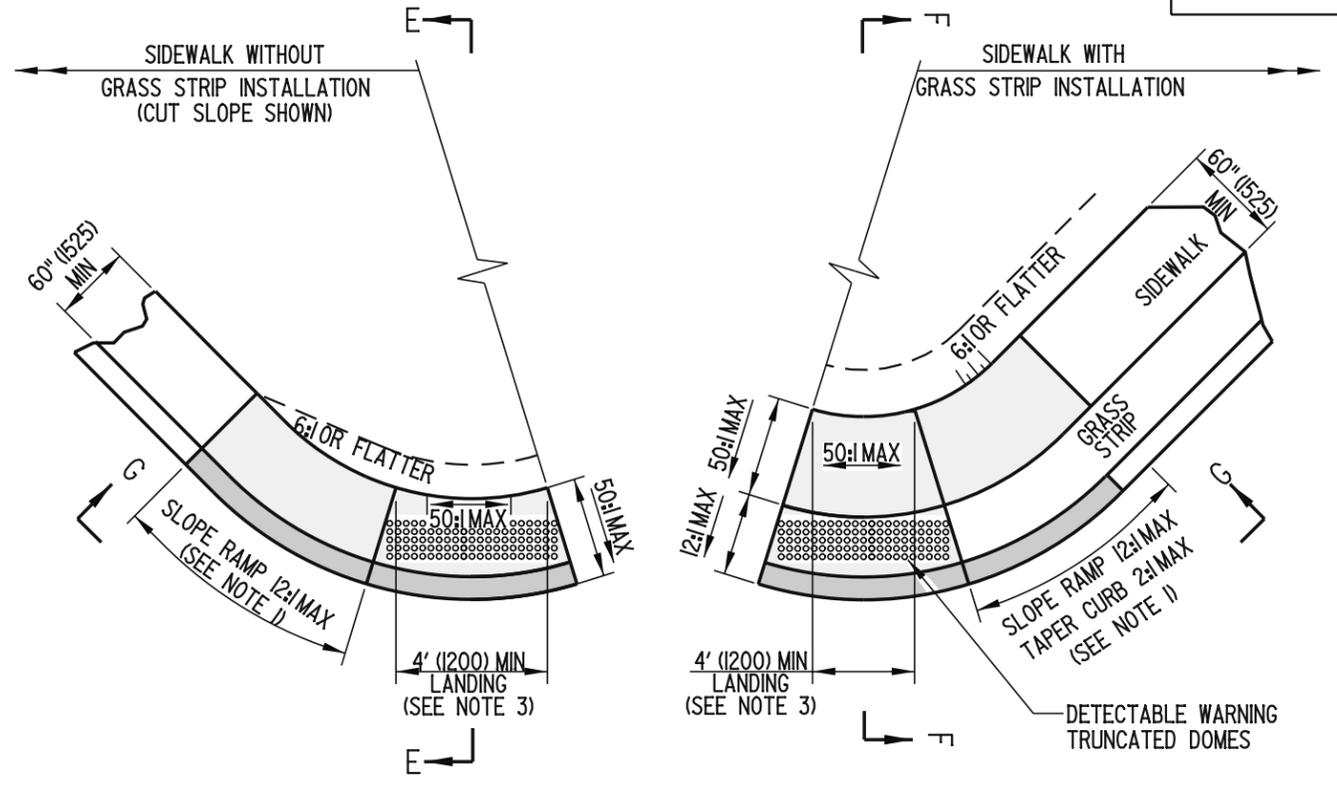
SECTION C-C

NOTES:

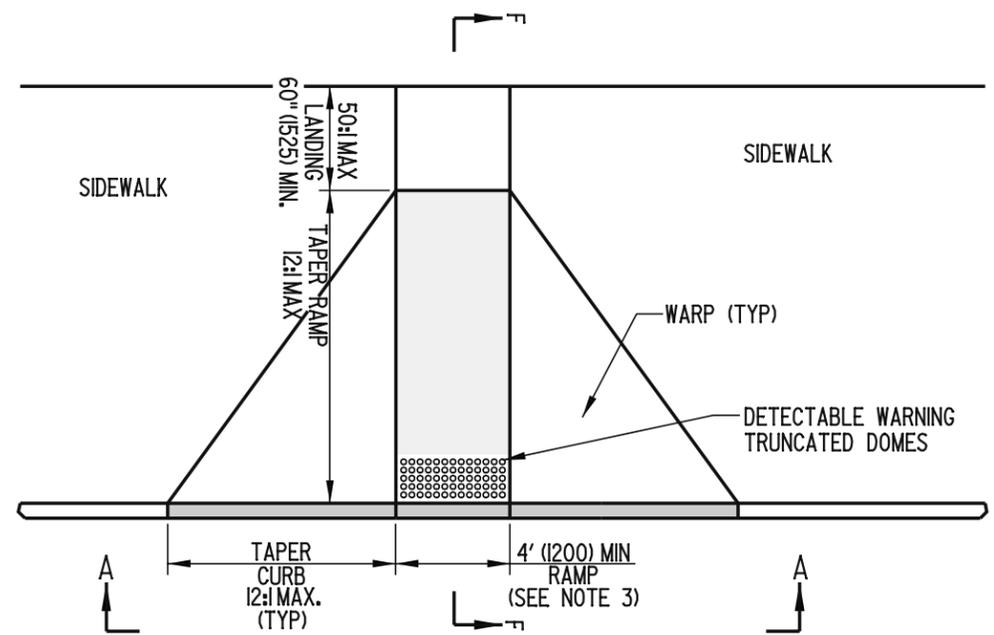
- 1). WHERE A 12:1 MAXIMUM SLOPE RAMP WILL NOT MEET THE SIDEWALK GRADE WITHIN A LENGTH OF 15' (4570) DUE TO STEEP ADJACENT ROADWAY, THE RAMP LENGTH MAY BE LIMITED TO 15' (4570), AND ALLOWED TO EXCEED 12:1.
- 2). RAMP WIDTH SHALL BE 4' (1200) MINIMUM, HOWEVER, 5' (1525) IS PREFERRED.
- 3). RAMP AND SIDEWALK CROSS SLOPE SHALL BE 50:1 (2%) MAXIMUM.
- 4). IF GRADING WILL BE STEEPER THAN 6:1, THEN A TYPE I CURB OR RETAINING WALL SHOULD BE USED TO ELIMINATE THE NEED FOR THE STEEP SLOPE.
- 5). THE MAXIMUM DIFFERENCE IN GRADE BETWEEN THE CURB RAMP OR MODIFIED CURB AND THE PAVEMENT SHALL BE 13%, HOWEVER 11% IS PREFERRED.
- 6). IF THE WIDTH OF THE FULLY DEPRESSED CURB AT THE STREET IS 5' (1525) OR LESS, THEN A RECTANGULAR PIECE OF DETECTABLE WARNING TRUNCATED DOMES MAY BE USED.



CURB RAMP, TYPE 2



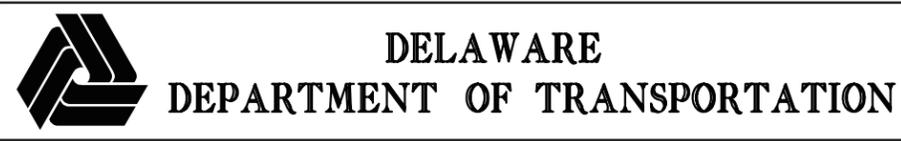
CURB RAMP, TYPE 3
DIAGONAL CURB RAMP



CURB RAMP, TYPE 4
PERPENDICULAR CURB RAMP

NOTES:

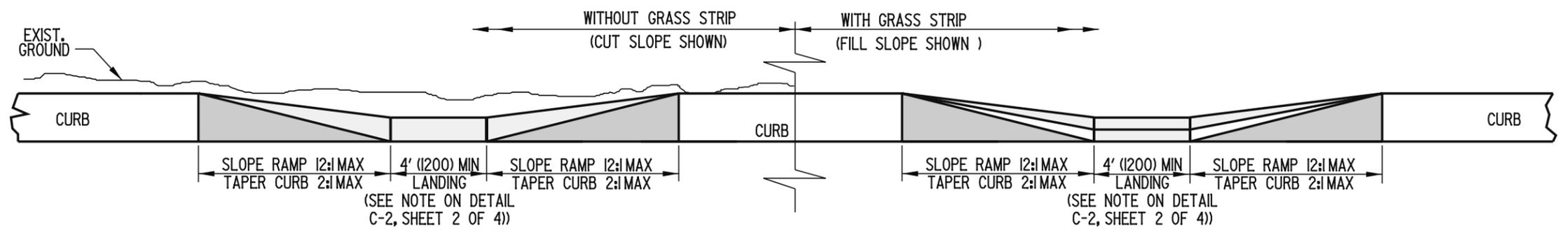
- 1). WHERE A 12:1 MAXIMUM SLOPE RAMP WILL NOT MEET THE SIDEWALK GRADE WITHIN A LENGTH OF 15' (4570) DUE TO STEEP ADJACENT ROADWAY, THE RAMP LENGTH MAY BE LIMITED TO 15' (4570), AND THE RAMP SLOPE ALLOWED TO EXCEED 12:1.
- 2). TRANSITION TO EXISTING SIDEWALK WIDTH OVER THE LENGTH OF THE RAMP.
- 3). RAMP OR LANDING WIDTH SHALL BE 4' (1200) MINIMUM, HOWEVER, 5' (1525) IS PREFERRED.
- 4). RAMP AND SIDEWALK CROSS SLOPE SHALL BE 50:1 (2%) MAXIMUM.
- 5). IF GRADING WILL BE STEEPER THAN 6:1 ADJACENT TO THE CURB RAMP OR SIDEWALK, THEN A TYPE 1 CURB OR RETAINING WALL SHOULD BE USED TO ELIMINATE THE NEED FOR THE STEEP SLOPE.
- 6). FOR THE CURB RAMP, TYPE 3, IF THE WIDTH OF THE FULLY DEPRESSED CURB AT THE STREET IS MORE THAN 5' (1525), THE DETECTABLE WARNING TRUNCATED DOMES SHALL FOLLOW THE RADIUS OF THE CURB CONTINUOUSLY WITHOUT GAPS FOR THE ENTIRE LENGTH OF DEPRESSED CURB. SEE STANDARD NO. C-2, SHEET 1 OF 4.
- 7). THE MAXIMUM DIFFERENCE IN GRADE BETWEEN THE SIDEWALK OR CURB AND THE PAVEMENT SHALL BE 13:1, HOWEVER 11:1 IS PREFERRED. SEE STANDARD NO. C-2, SHEET 1 OF 4.



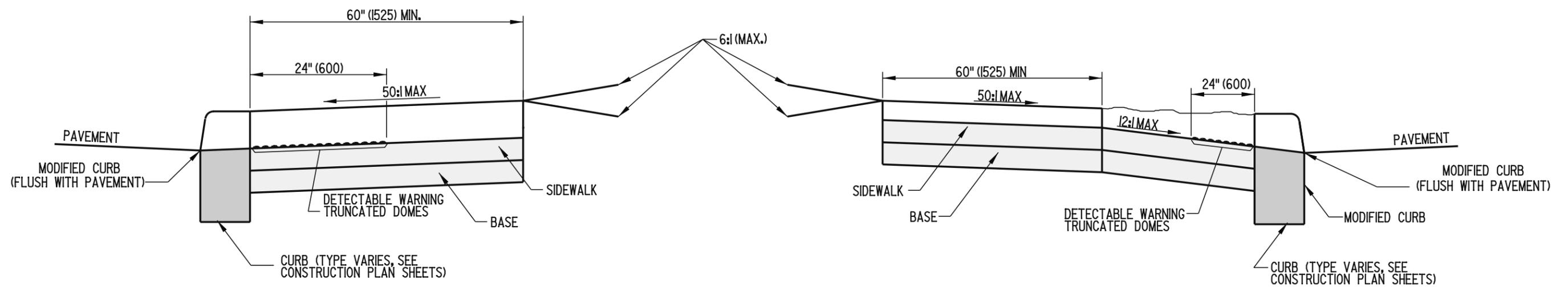
CURB RAMPS, TYPES 2, 3, & 4			
STANDARD NO.	C-2 (2006)	SHT.	2 OF 4

APPROVED *Frank Taylor* 10/10/06
CHIEF ENGINEER DATE

RECOMMENDED *Dennis Smith* 10/19/06
DESIGN ENGINEER DATE

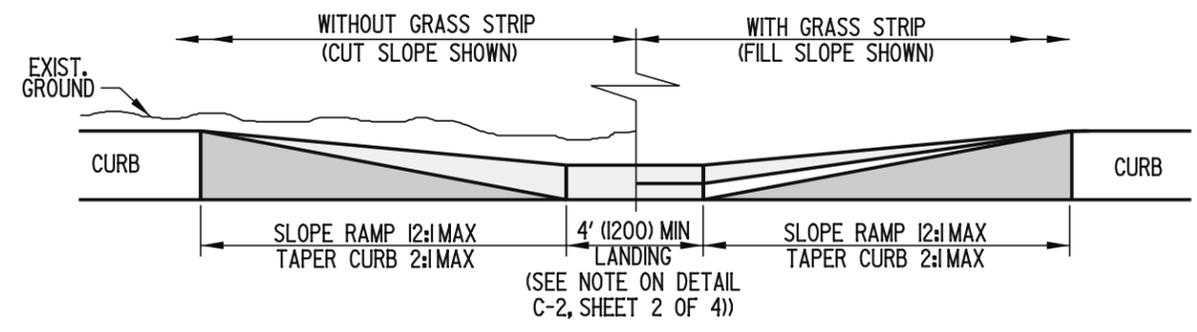


ELEVATION D-D

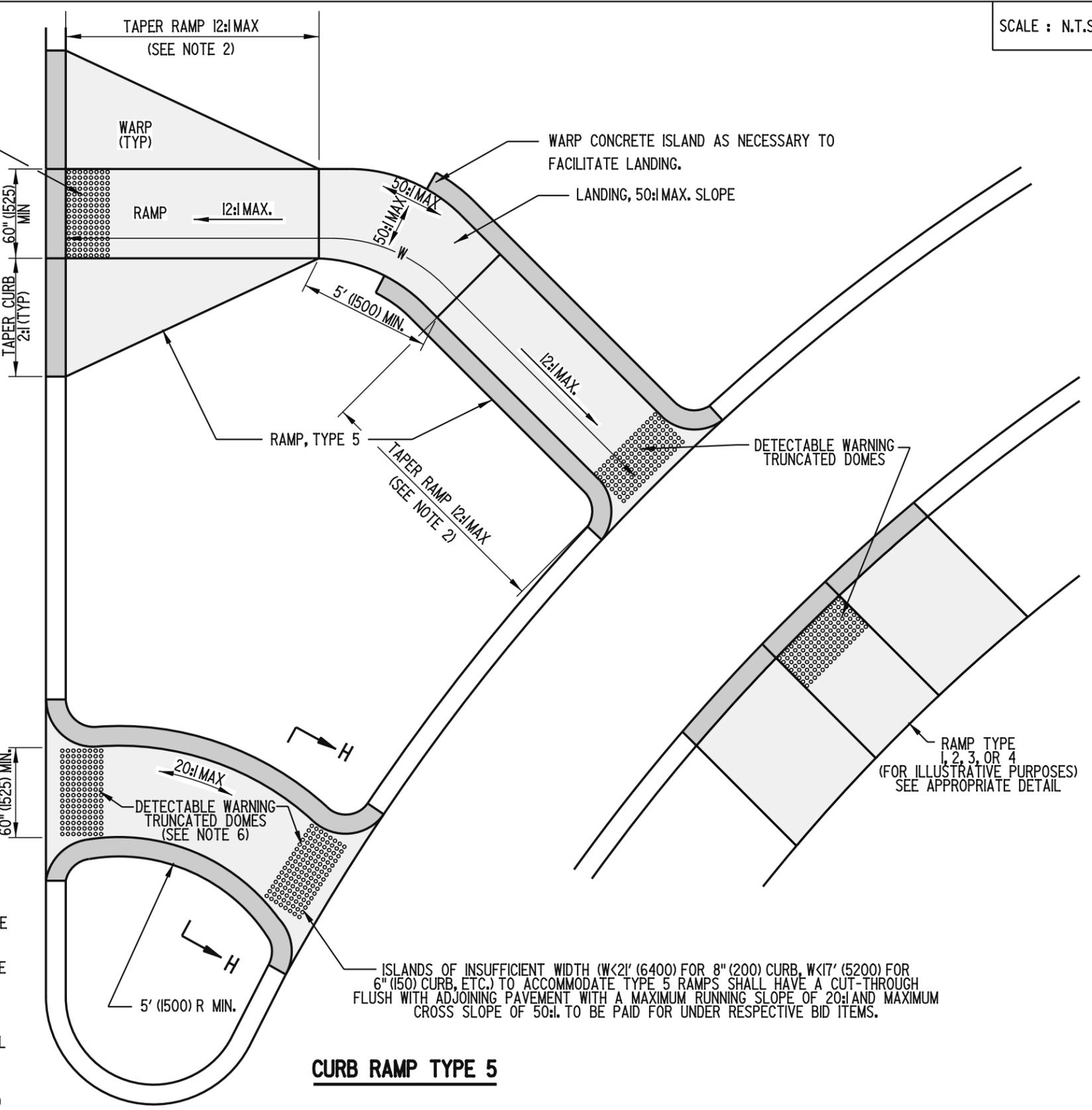
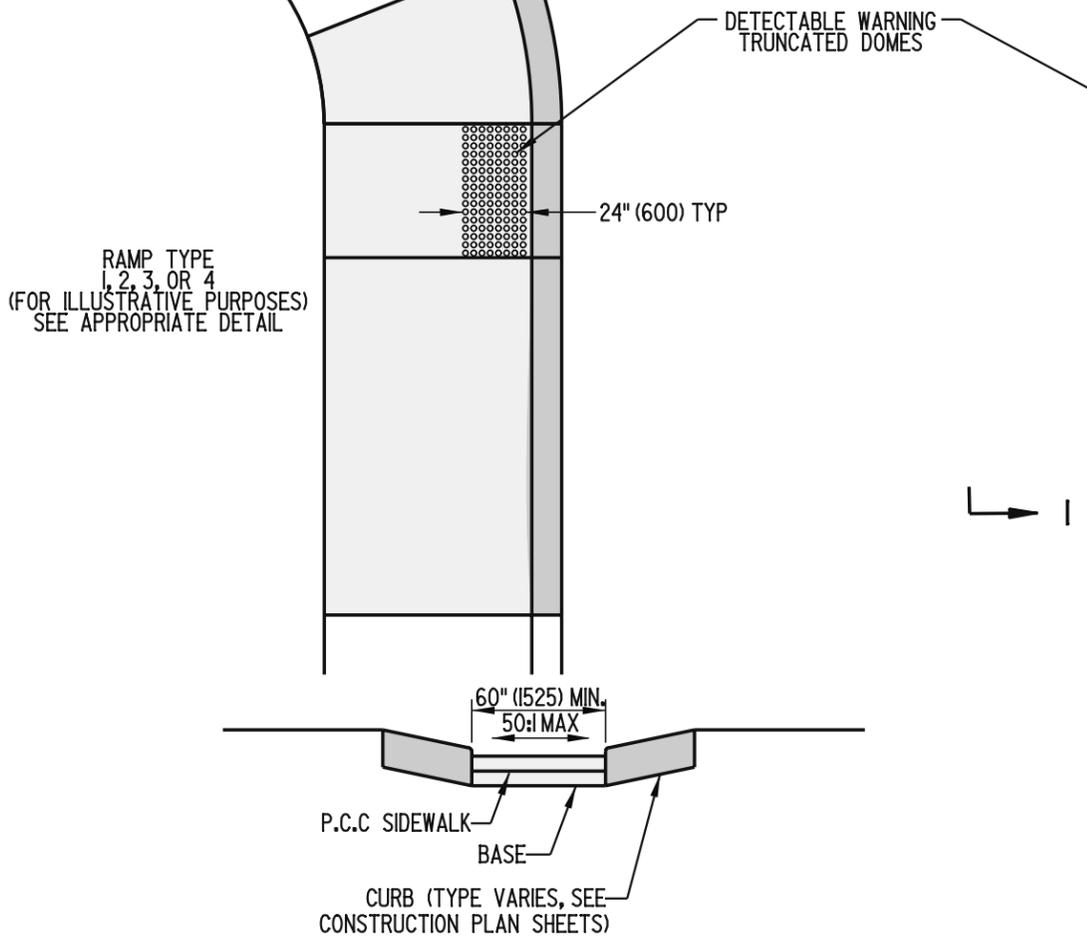


SECTION E-E

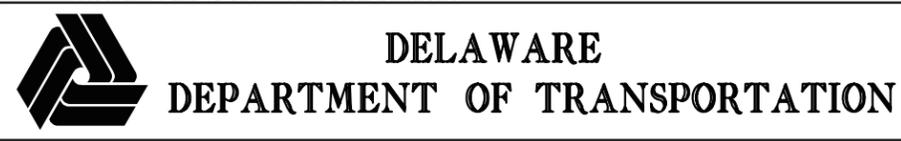
SECTION F-F



ELEVATION G-G

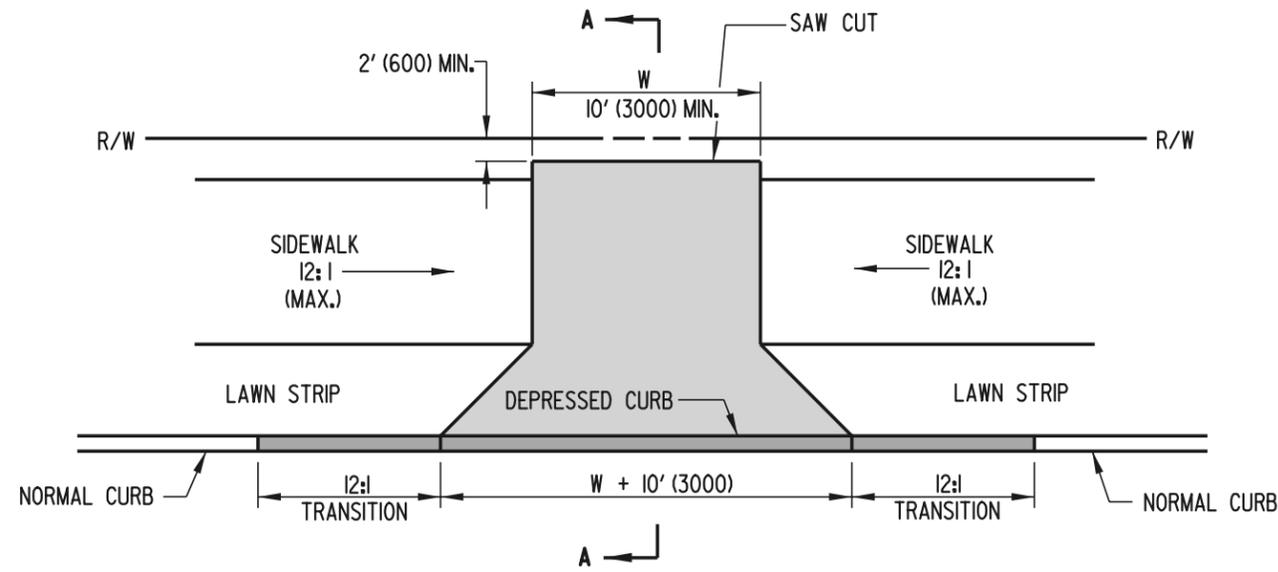


- NOTES:**
- 1). A CUT-THROUGH LEVEL WITH THE STREET IS THE PREFERRED TREATMENT FOR ISLANDS, ALTHOUGH, RAMPS CAN BE USED WHERE THE ISLAND WIDTH IS SUFFICIENT TO ACCOMMODATE THEM. POSITIVE SURFACE DRAINAGE MUST BE PROVIDED FOR EITHER TREATMENT. EITHER TREATMENT IS ACCEPTABLE.
 - 2). WHERE A 12:1 MAXIMUM SLOPE RAMP WILL NOT MEET THE SIDEWALK GRADE WITHIN A LENGTH OF 15' (4570) DUE TO STEEP ADJACENT ROADWAY, THE RAMP LENGTH MAY BE LIMITED TO 15' (4570), AND THE RAMP SLOPE ALLOWED TO EXCEED 12:1.
 - 3). A CONTINUOUS PATH MUST BE PROVIDED BETWEEN ADJACENT CURB RAMPS IN ISLANDS AND MEDIANS, WITH A MAXIMUM RUNNING SLOPE OF 20:1.
 - 4). RAMP AND SIDEWALK CROSS SLOPE SHALL BE 50:1 (2%) MAXIMUM.
 - 5). WHERE THERE IS NO DEPRESSED CURB AT A CUT-THROUGH OR CURB RAMP, THE DETECTABLE WARNING SHALL BE INSTALLED 3" (75) FROM THE ROADWAY PAVEMENT.
 - 6). IF THE MINIMUM CLEAR SPACE BETWEEN DETECTABLE WARNINGS IS LESS THAN 2' (600), THEN THE ENTIRE MEDIAN CURB RAMP AREA SHALL BE COVERED WITH DETECTABLE WARNINGS.
 - 7). PEDESTRIAN SIGNALS SHALL BE ACCESSIBLE WITH A LEVEL LANDING, WHOSE EDGE IS NO MORE THAN 10" (250) FROM ALL PEDESTRIAN PUSH BUTTONS.

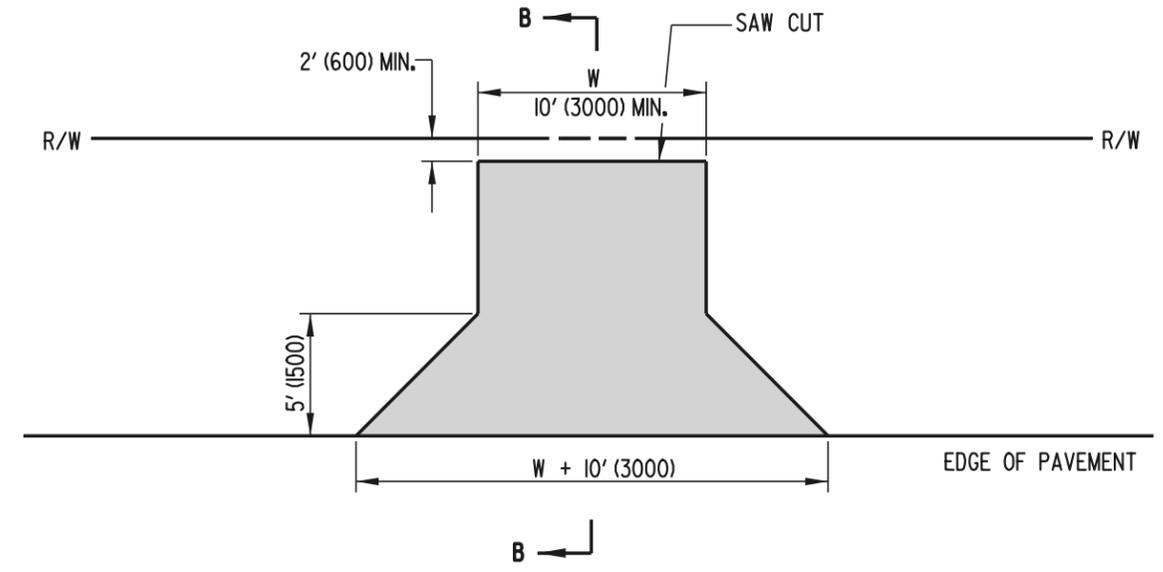


CURB RAMP TYPE 5 & SECTIONS			
STANDARD NO.	C-2 (2006)	SHT.	4 OF 4

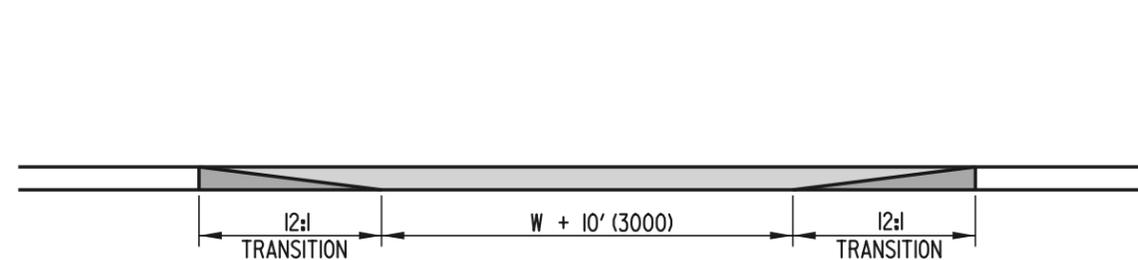
APPROVED	<i>[Signature]</i> CHIEF ENGINEER	DATE	10/10/06
RECOMMENDED	<i>[Signature]</i> DESIGN ENGINEER	DATE	10/19/06



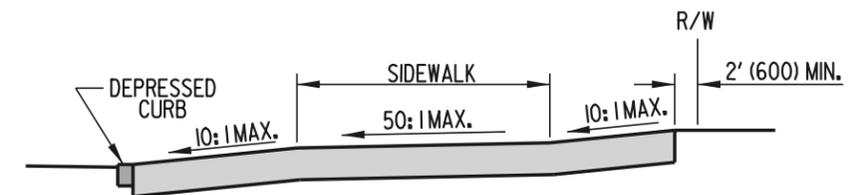
PLAN
URBAN APPLICATION



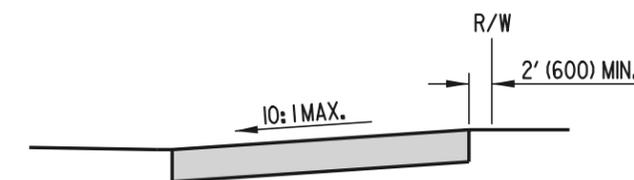
PLAN
RURAL APPLICATION



ELEVATION



SECTION A-A



SECTION B-B



DELAWARE
DEPARTMENT OF TRANSPORTATION

ENTRANCES

STANDARD NO. C-3 (2001)

SHT. 1 OF 1

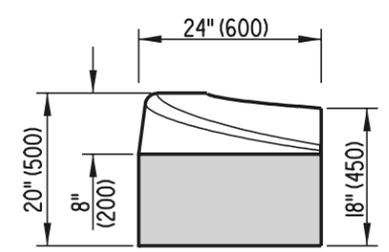
APPROVED

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

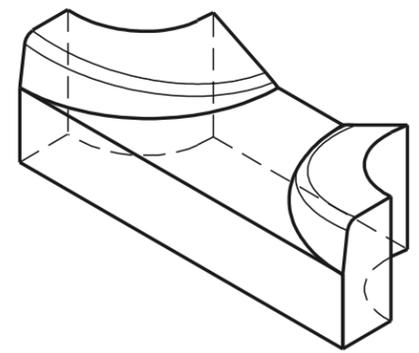
RECOMMENDED

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

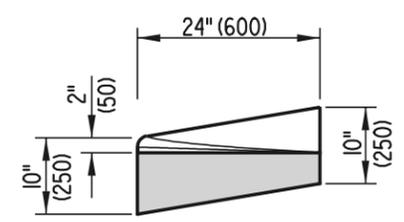
SCALE : N.T.S.



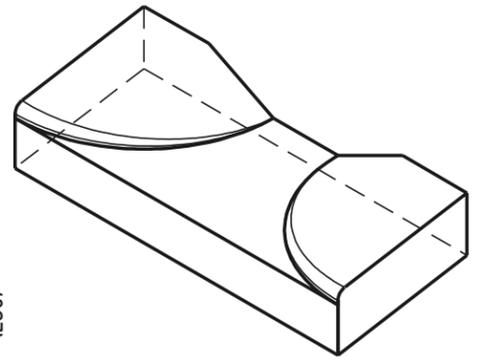
SECTION A-A



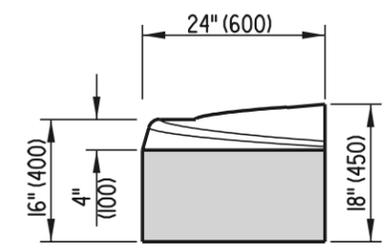
ISOMETRIC VIEW



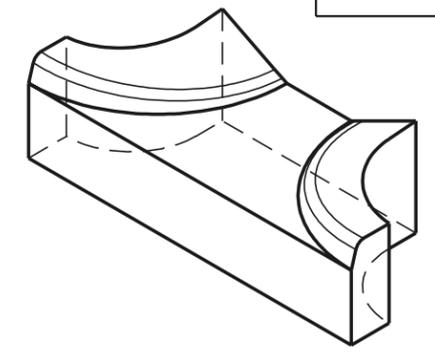
SECTION B-B



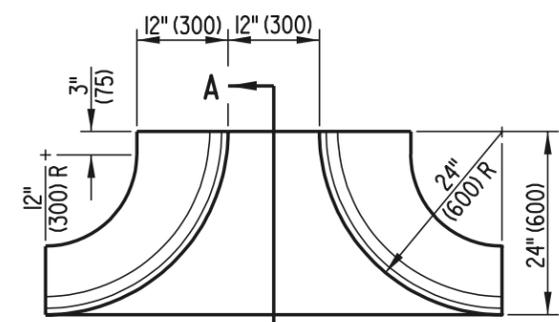
ISOMETRIC VIEW



SECTION C-C



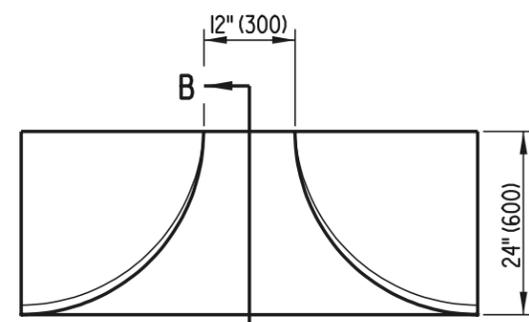
ISOMETRIC VIEW



TOP VIEW

FRONT VIEW

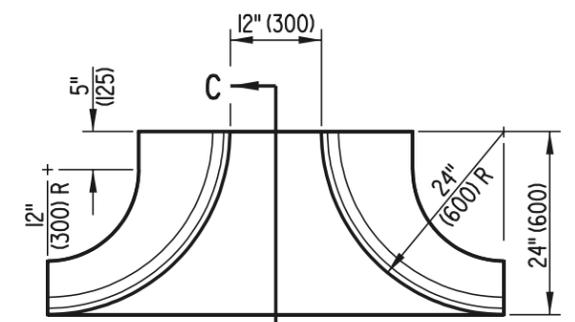
TYPE A
P.C.C. CURB, TYPE 1



TOP VIEW

FRONT VIEW

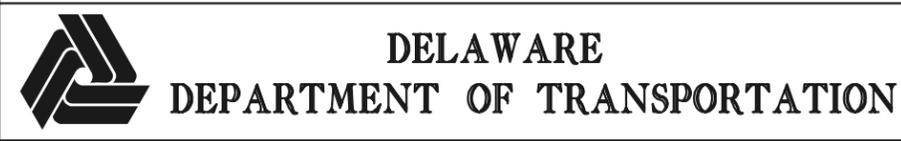
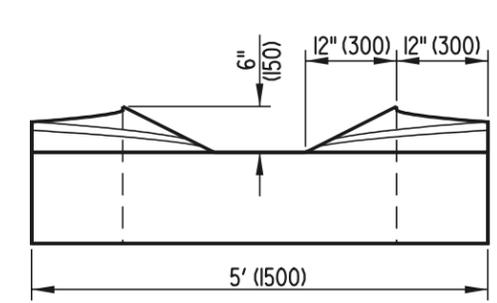
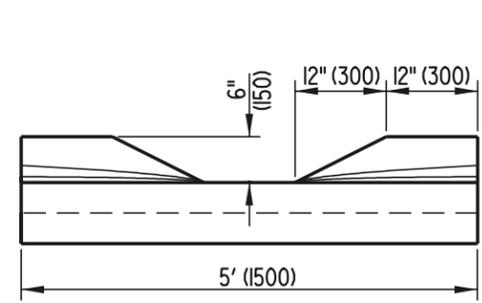
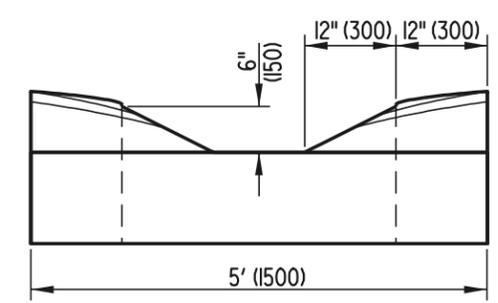
TYPE B
P.C.C. CURB, TYPE 2



TOP VIEW

FRONT VIEW

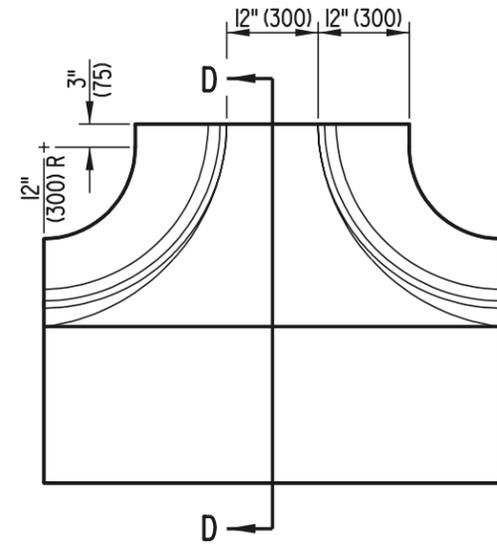
TYPE C
P.C.C. CURB, TYPE 3



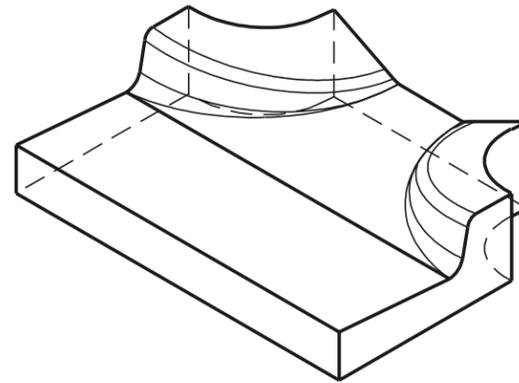
CURB OPENINGS			
STANDARD NO.	C-4 (2001)	SHT.	1 OF 3

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

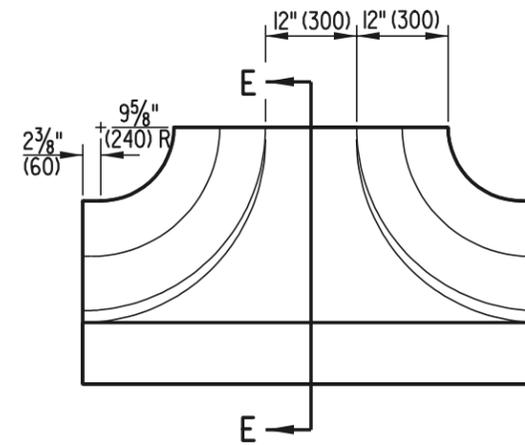
RECOMMENDED *Mehmet Aksoy* 6/18/01
DESIGN ENGINEER DATE



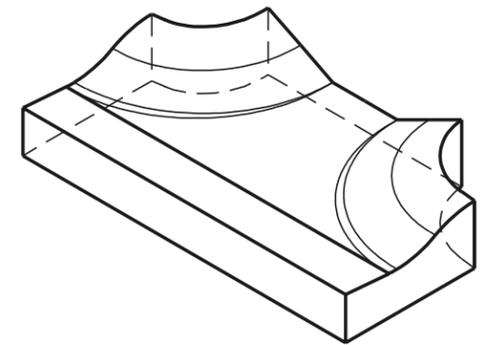
TOP VIEW



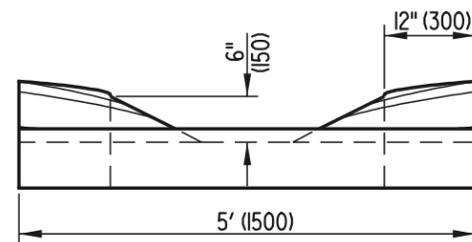
ISOMETRIC VIEW



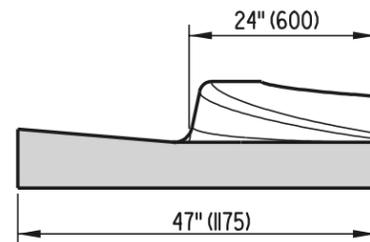
TOP VIEW



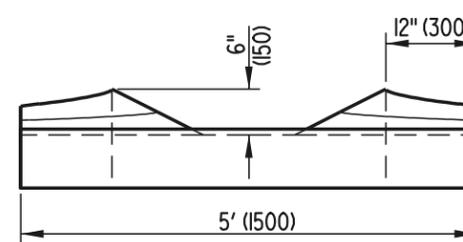
ISOMETRIC VIEW



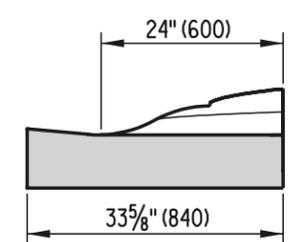
FRONT VIEW



SECTION D-D



FRONT VIEW



SECTION E-E

TYPE D
INTEGRAL P.C.C. CURB AND GUTTER, TYPE 1

TYPE E
INTEGRAL P.C.C. CURB AND GUTTER, TYPE 2

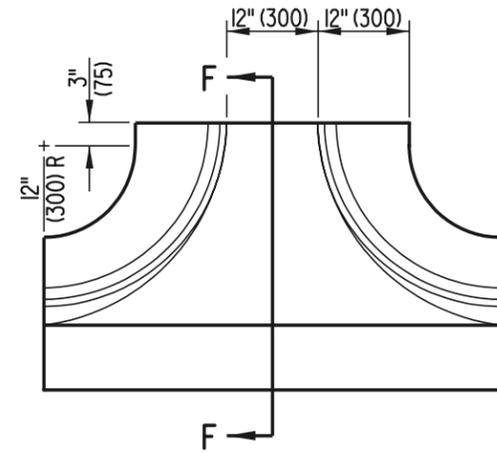


DELAWARE
DEPARTMENT OF TRANSPORTATION

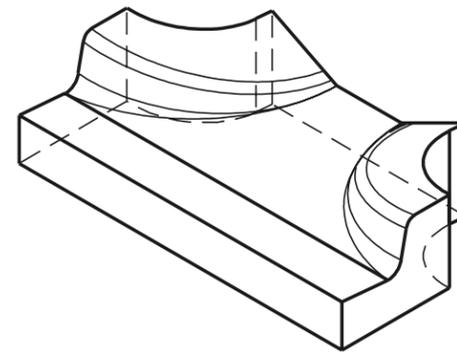
CURB OPENINGS

STANDARD NO. C-4 (2001) SHT. 2 OF 3

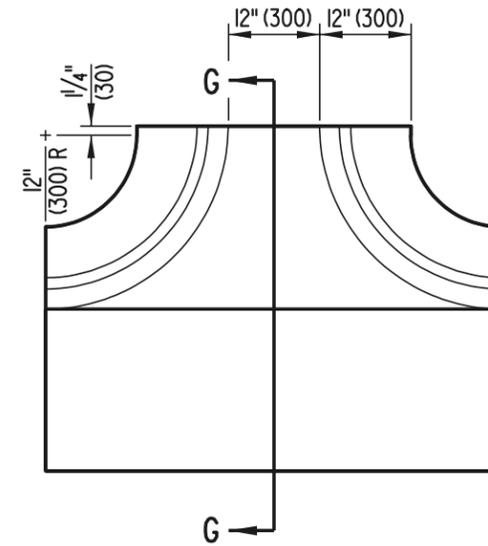
APPROVED *Ryan M. Harshbarger* 6/18/01
CHIEF ENGINEER DATE
RECOMMENDED *Mehal Alghobari* 6/18/01
DESIGN ENGINEER DATE



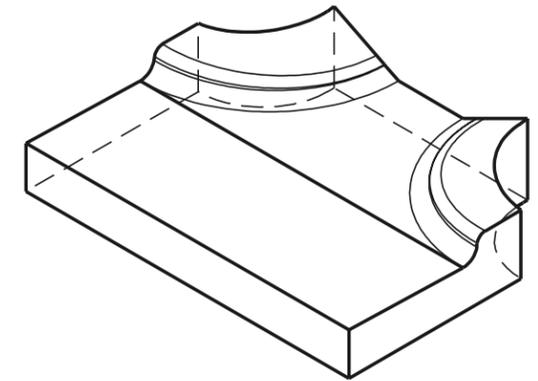
TOP VIEW



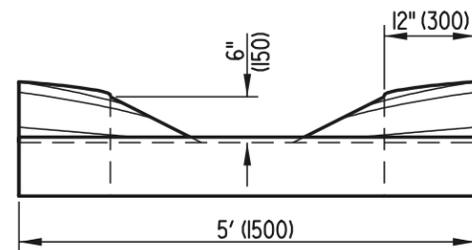
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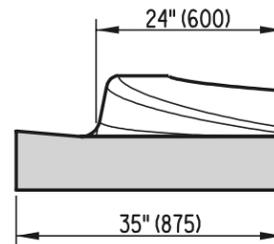
TOP VIEW



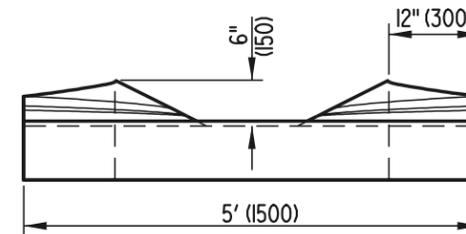
ISOMETRIC VIEW



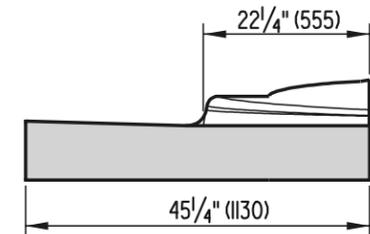
FRONT VIEW



SECTION F-F



FRONT VIEW



SECTION G-G

TYPE F
INTEGRAL P.C.C. CURB AND GUTTER, TYPE 3

TYPE G
INTEGRAL P.C.C. CURB AND GUTTER, TYPE 4

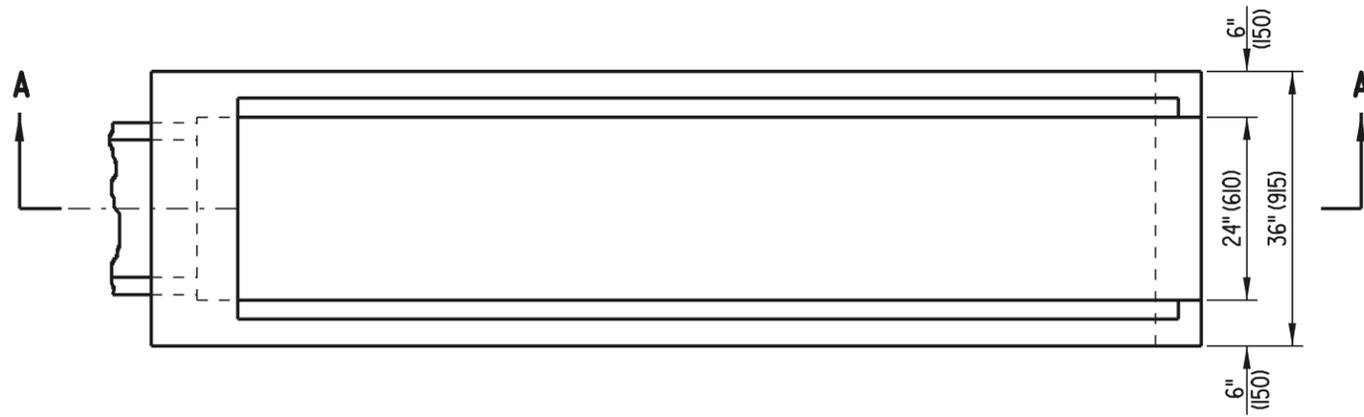


DELAWARE
DEPARTMENT OF TRANSPORTATION

CURB OPENINGS

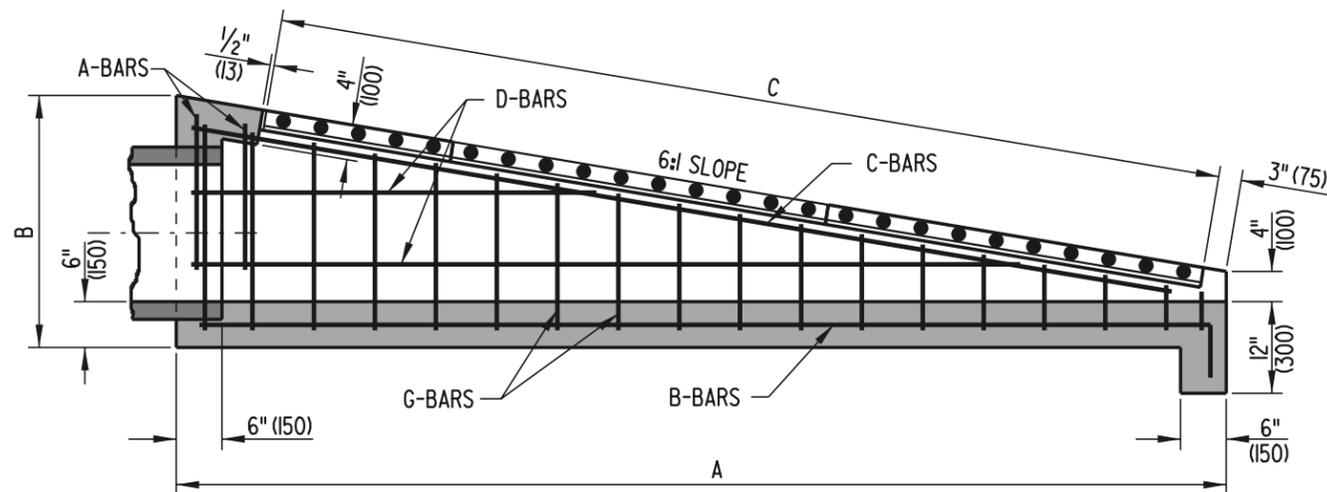
STANDARD NO. C-4 (2001) SHT. 3 OF 3

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

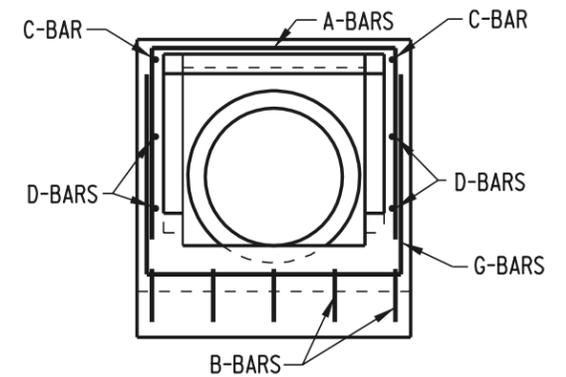


PLAN VIEW
SHOWN WITHOUT GRATE

NOTE: 6:1 SAFETY END STRUCTURE TO BE PRECAST



SECTION A-A



FRONT VIEW



DELAWARE
DEPARTMENT OF TRANSPORTATION

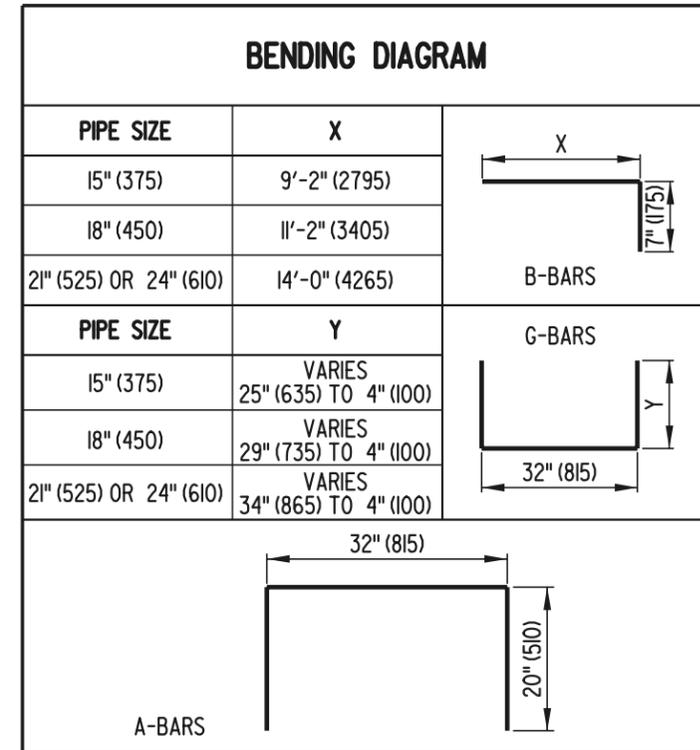
6:1 SAFETY END STRUCTURE

STANDARD NO. D-1 (2001)

SHT. 1 OF 2

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

DIMENSIONS			
PIPE SIZE	A	B	C
15" (375)	9'-6" (2895)	2'-5" (735)	8'-4" (2540)
18" (450)	11'-6" (3505)	2'-9" (840)	10'-5" (3175)
21" (525) OR 24" (600)	14'-4" (4370)	3'-2 ⁵ / ₈ " (980)	12'-6" (3810)



APPROXIMATE QUANTITIES							
PIPE SIZE	CONCRETE FT ³ (m ³)		REINF. STEEL LBS. (kg)	NO. OF GRATES	LENGTH TO BE CUT FROM 1 GRATE	WEIGHT OF FULL SIZE GRATE LBS. (kg)	WEIGHT OF CUT GRATE LBS. (kg)
	CONC. PIPE	C.M. PIPE					
15" (375)	25 (0.708)	25.43 (0.720)	121.12 (54.94)	2	--	270.92 (122.89)	--
18" (450)	31.5 (0.892)	32.07 (0.908)	156.7 (71.08)	3	2'-1" (635)	270.92 (122.89)	135.47 (61.45)
21" (525) OR 24" (600)	40.75 (1.154)	39.87 (1.129)	194.0 (88.00)	3	--	270.92 (122.89)	--

SCHEDULE OF REINFORCING STEEL																				
PIPE SIZE	A-BARS				B-BARS				C-BARS				D-BARS				G-BARS			
	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH
15" (375)	#4 (#13)	2	8" (200)	72" (1830)	#4 (#13)	5	8" (200)	9'-9" (2970)	#4 (#13)	2	-	9'-3" (2820)	#4 (#13)	4	8" (200)	VARIES 50" (1270) TO 100" (2540)	#4 (#13)	15	8" (200)	VARIES 40" (1015) TO 82" (2085)
18" (450)	#4 (#13)	2	8" (200)	72" (1830)	#4 (#13)	5	8" (200)	11'-9" (3580)	#4 (#13)	2	-	11'-5" (3480)	#4 (#13)	6	8" (200)	VARIES 43 ¹ / ₂ " (1105) TO 130 ¹ / ₂ " (3315)	#4 (#13)	18	8" (200)	VARIES 40" (1015) TO 90" (2285)
21" (525) OR 24" (600)	#4 (#13)	2	8" (200)	72" (1830)	#4 (#13)	5	8" (200)	14'-7" (4445)	#4 (#13)	2	-	14'-3" (4345)	#4 (#13)	6	8" (200)	VARIES 51" (1295) TO 153" (3885)	#4 (#13)	22	8" (200)	VARIES 40" (1015) TO 100" (2540)



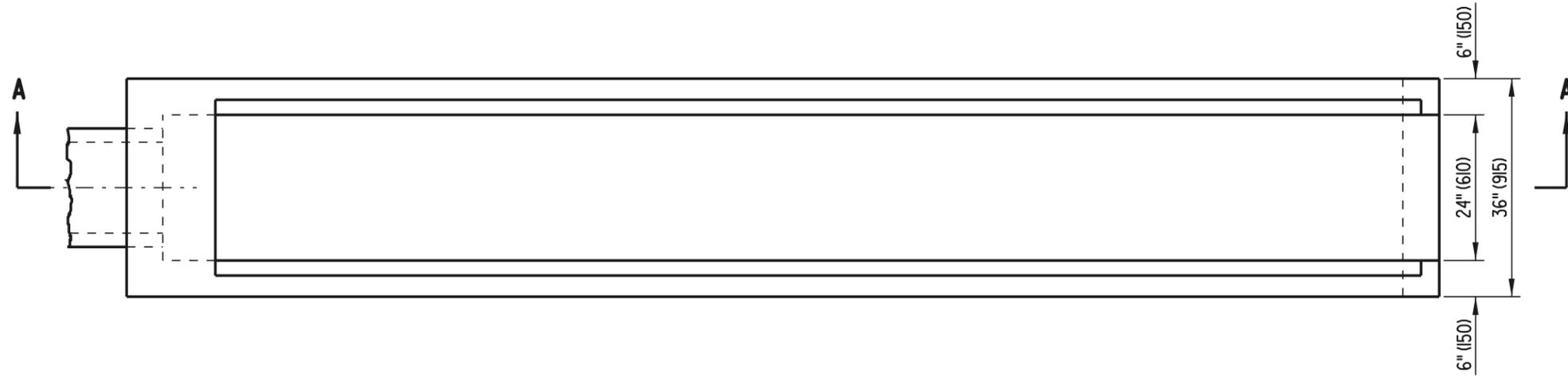
DELAWARE
DEPARTMENT OF TRANSPORTATION

6:1 SAFETY END STRUCTURE

STANDARD NO. D-1 (2001)

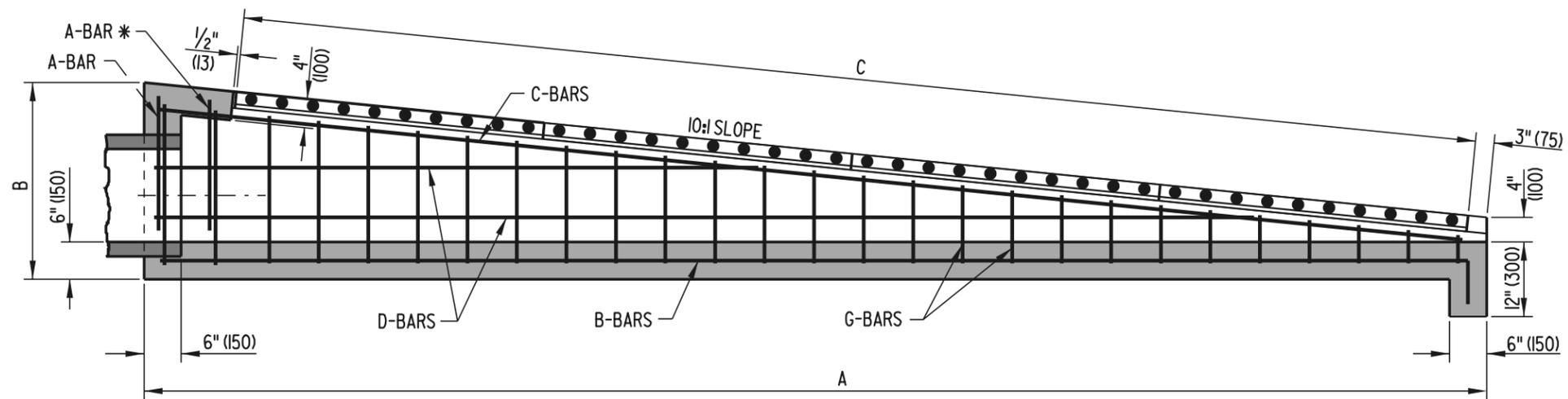
SHT. 2 OF 2

APPROVED *Ryan M. Hershman* 6/18/01
CHIEF ENGINEER DATE
 RECOMMENDED *Mehal Rajda* 6/18/01
DESIGN ENGINEER DATE



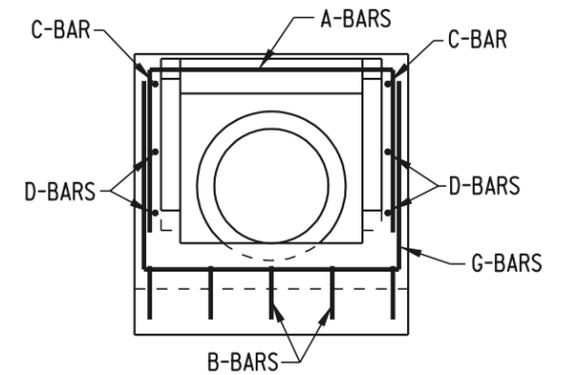
PLAN VIEW
SHOWN WITHOUT GRATE

NOTE: 10:1 SAFETY END STRUCTURE TO BE PRECAST



SECTION A-A

* REQUIRED ONLY FOR PIPE SIZE OF 21" (525) OR 24" (600)



FRONT VIEW



DELAWARE
DEPARTMENT OF TRANSPORTATION

10:1 SAFETY END STRUCTURE

STANDARD NO. D-2 (2001)

SHT. 1 OF 2

APPROVED

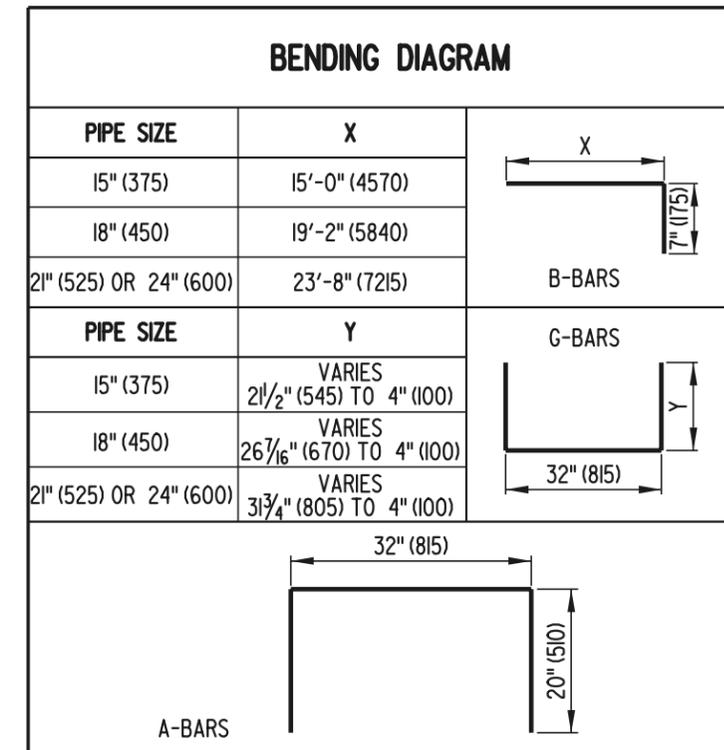
Ryan M. Harshbarger
CHIEF ENGINEER DATE 6/18/01

RECOMMENDED

Mehal Akhavan
DESIGN ENGINEER DATE 6/18/01

DIMENSIONS			
PIPE SIZE	A	B	C
15" (375)	15'-4" (4675)	2'-4 ³ / ₈ " (720)	14'-7" (4445)
18" (450)	19'-6" (5945)	2'-9 ³ / ₈ " (850)	18'-9" (5715)
21" (525) OR 24" (600)	24'-0" (7315)	3'-2 ¹³ / ₁₆ " (985)	22'-11" (6985)

APPROXIMATE QUANTITIES							
PIPE SIZE	CONCRETE FT ³ (m ³)		REINF. STEEL LBS. (kg)	NO. OF GRATES	LENGTH TO BE CUT FROM 1 GRATE	WEIGHT OF FULL SIZE GRATE LBS. (kg)	WEIGHT OF CUT GRATE LBS. (kg)
	CONC. PIPE	C.M. PIPE					
15" (375)	41.35 (1.171)	41.78 (1.183)	175.0 (79.38)	4	2'-1" (635)	270.92 (122.89)	135.47 (61.45)
18" (450)	50.11 (1.419)	50.68 (1.435)	227.0 (102.98)	5	2'-1" (635)	270.92 (122.89)	135.47 (61.45)
21" (525) OR 24" (600)	69.43 (1.966)	70.31 (1.991)	310.4 (140.79)	6	2'-1" (635)	270.92 (122.89)	135.47 (61.45)



SCHEDULE OF REINFORCING STEEL																				
PIPE SIZE	A-BARS				B-BARS				C-BARS				D-BARS				G-BARS			
	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH	SIZE	NO.	SPA.	LENGTH
15" (375)	*4 (#13)	1	-	72" (1830)	*4 (#13)	5	8" (200)	15'-7" (4750)	*4 (#13)	2	-	15'-1 1/16" (4600)	*4 (#13)	4	8" (200)	VARIES 72 13/16" (1850) TO 145 5/8" (3700)	*4 (#13)	24	8" (200)	VARIES 40" (1015) TO 75 11/16" (1920)
18" (450)	*4 (#13)	1	-	72" (1830)	*4 (#13)	5	8" (200)	19'-9" (6020)	*4 (#13)	2	-	19'-3 3/8" (5875)	*4 (#13)	4	8" (200)	VARIES 89 5/8" (2275) TO 179 3/16" (4550)	*4 (#13)	30	8" (200)	VARIES 40" (1015) TO 85 3/4" (2180)
21" (525) OR 24" (600)	*4 (#13)	2	-	72" (1830)	*4 (#13)	5	8" (200)	24'-3" (7390)	*4 (#13)	2	-	23'-9 5/8" (7255)	*4 (#13)	6	8" (200)	VARIES 80 3/4" (2050) TO 242 1/8" (6150)	*4 (#13)	37	8" (200)	VARIES 40" (1015) TO 96 9/16" (2455)



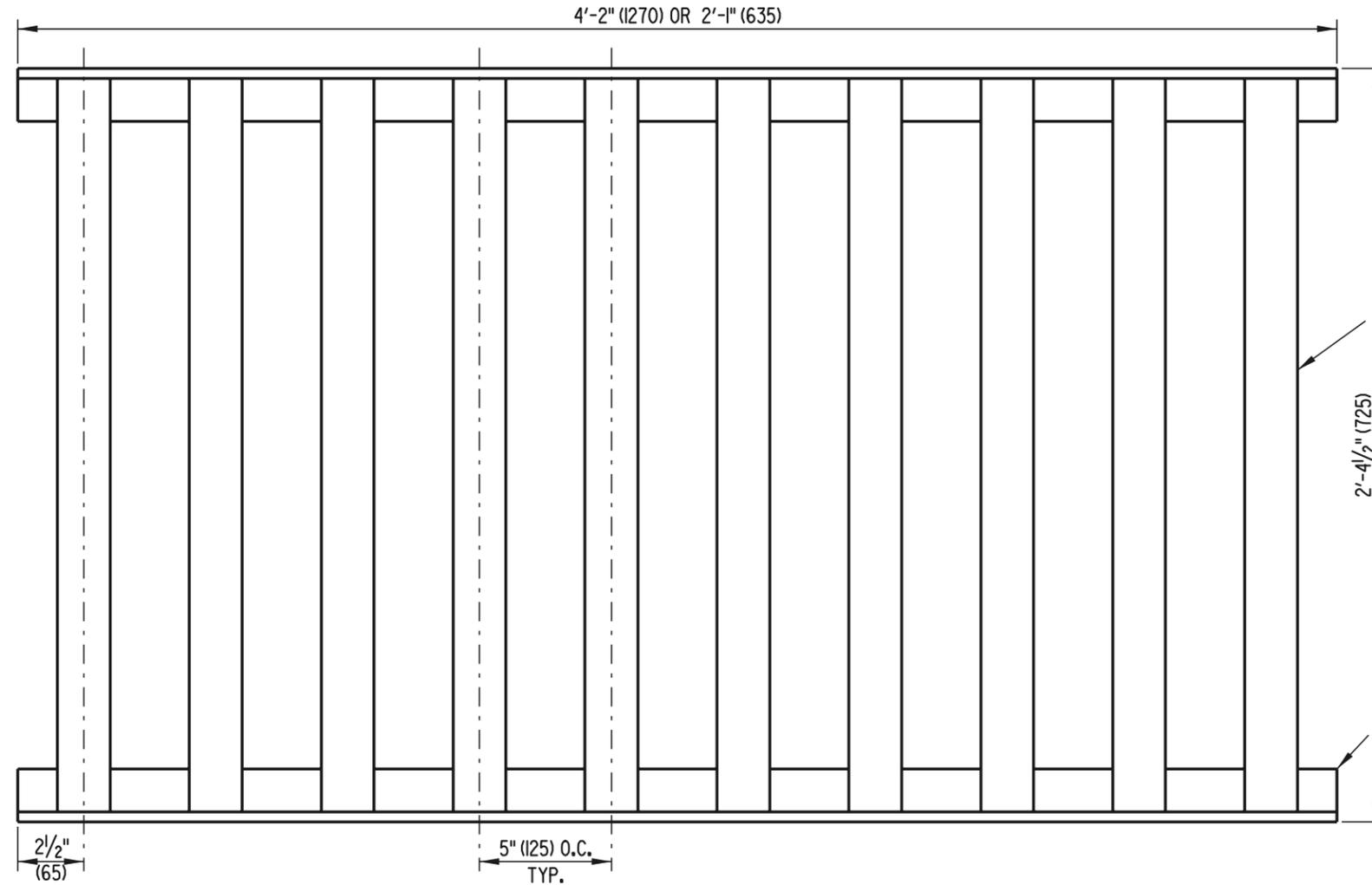
DELAWARE
DEPARTMENT OF TRANSPORTATION

10:1 SAFETY END STRUCTURE

STANDARD NO. D-2 (2001)

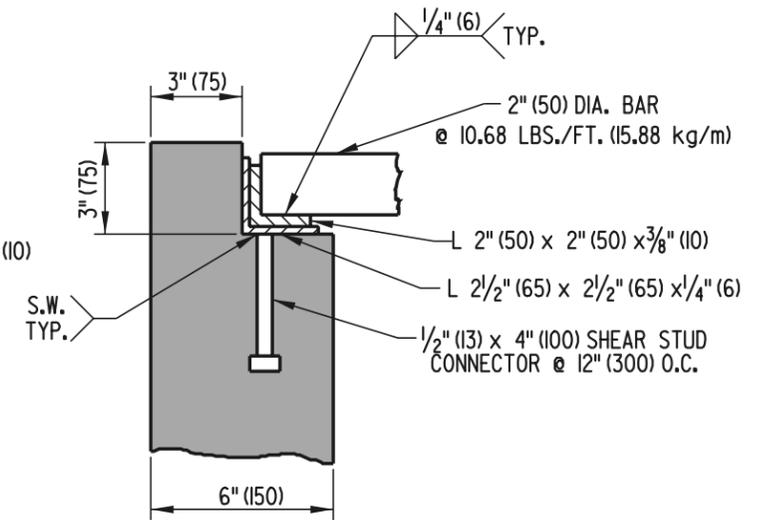
SHT. 2 OF 2

APPROVED *Ryan M. Hershberg* 6/18/01
CHIEF ENGINEER DATE
 RECOMMENDED *Mehal Rajda* 6/18/01
DESIGN ENGINEER DATE



GRATE DETAIL

2" (50) DIA. BAR @ 10.68 LBS./FT. (15.88 kg/m)



FRAME & GRATE ASSEMBLY DETAIL



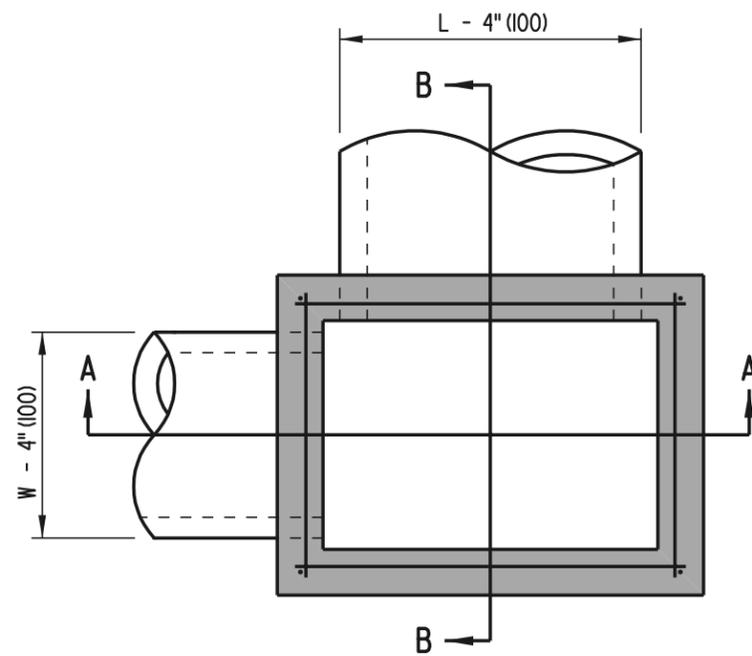
DELAWARE
DEPARTMENT OF TRANSPORTATION

SAFETY END STRUCTURE GRATE

STANDARD NO. **D-3 (2001)** SHT. **1** OF **1**

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

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



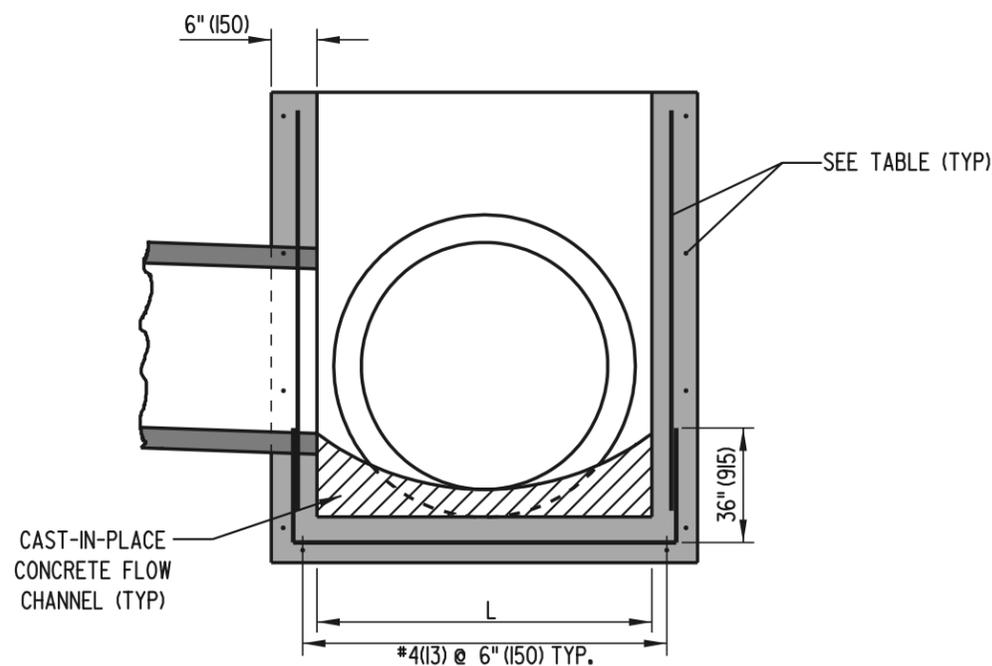
TOP VIEW

WALL REINFORCEMENT SCHEDULE		
INTERIOR WALL DIMENSION	AREA OF HORIZONTAL REINFORCEMENT PER FOOT (mm ²)	AREA OF VERTICAL REINFORCEMENT PER FOOT (mm ²)
	IN ² (mm ²)	IN ² (mm ²)
LESS THAN 4' (1220)	0.132 (85)	0.132 (85)
4' (1220) TO 4.5' (1370)	0.163 (105)	0.132 (85)
4.5' (1370) TO 5' (1525)	0.198 (128)	0.132 (85)
5' (1525) TO 5.5' (1675)	0.239 (154)	0.132 (85)
5.5' (1675) TO 6' (1830)	0.284 (183)	0.132 (85)

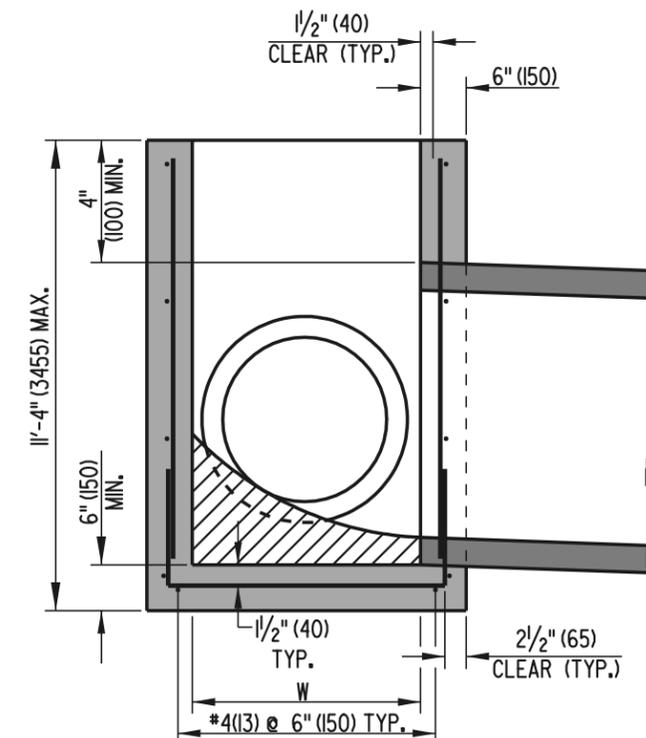
INLET BOX SCHEDULE			
L	W	L MAX	W MAX
34" (865)	18" (455)	34" (865)	18" (455)
34" (865)	24" (610)	34" (865)	24" (610)
48" (1220)	30" (760)	54" (1370)	36" (915)
48" (1220)	48" (1220)	54" (1370)	54" (1370)
66" (1675)	30" (760)	72" (1830)	36" (915)
66" (1675)	48" (1220)	72" (1830)	54" (1370)
66" (1675)	66" (1675)	72" (1830)	72" (1830)
72" (1830)	24" (610)	72" (1830)	30" (760)
72" (1830)	48" (1220)	72" (1830)	54" (1370)
72" (1830)	72" (1830)	72" (1830)	72" (1830)

NOTES:

1. INLET BOXES SHALL BE PRE-CAST OR CAST-IN-PLACE.
2. OUTSIDE OF PIPE MUST FIT INTO THE INTERIOR OF THE BOX.
3. STEPS ARE TO BE INSTALLED IN BACK WALL AS PER SPECIFICATIONS.
4. NO PIPES WITH AN OUTSIDE DIAMETER LARGER THAN 11" (275) WILL BE PERMITTED TO ENTER THE BACK WALL OF A DRAINAGE INLET OR MANHOLE TO ACCOMMODATE STEPS IF REQUIRED. A LARGER BOX MAY BE USED IN ORDER TO FIT THE STEPS AND A LARGER PIPE IN THE BACK WALL, IF NECESSARY.



SECTION A-A



SECTION B-B

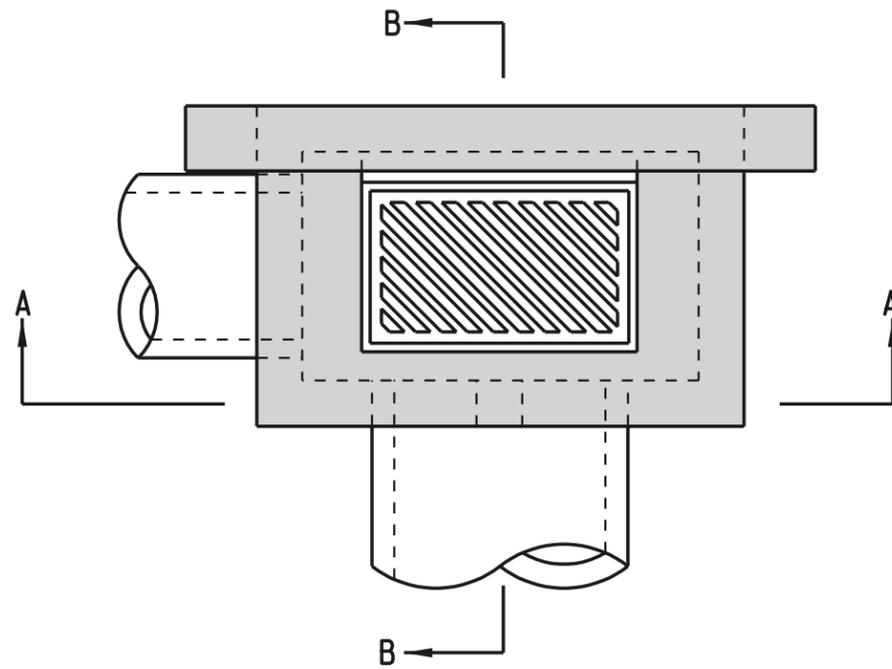


DELAWARE
DEPARTMENT OF TRANSPORTATION

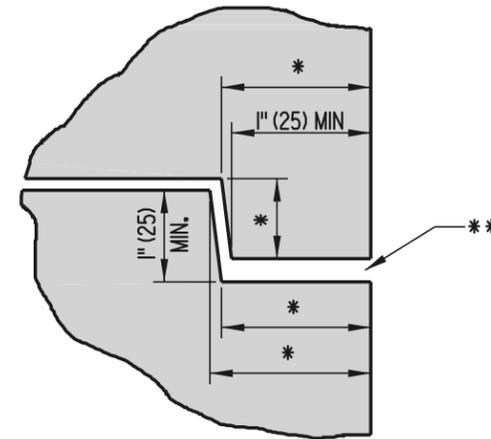
INLET BOX DETAILS

STANDARD NO. D-4 (2002) SHT. 1 OF 1

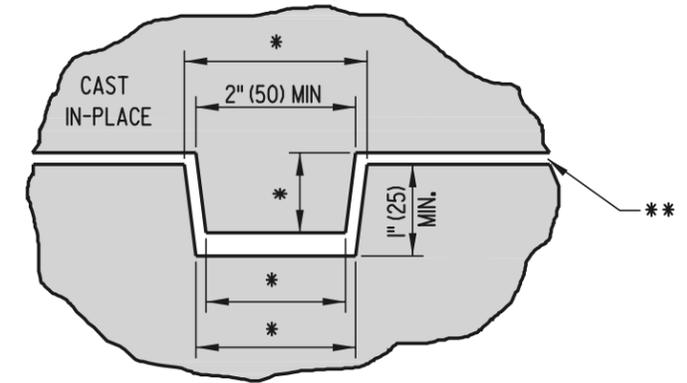
APPROVED *Caution Wicks* 9/6/02
CHIEF ENGINEER DATE
RECOMMENDED *Therese Delgado* 8/19/02
DESIGN ENGINEER DATE



PLAN

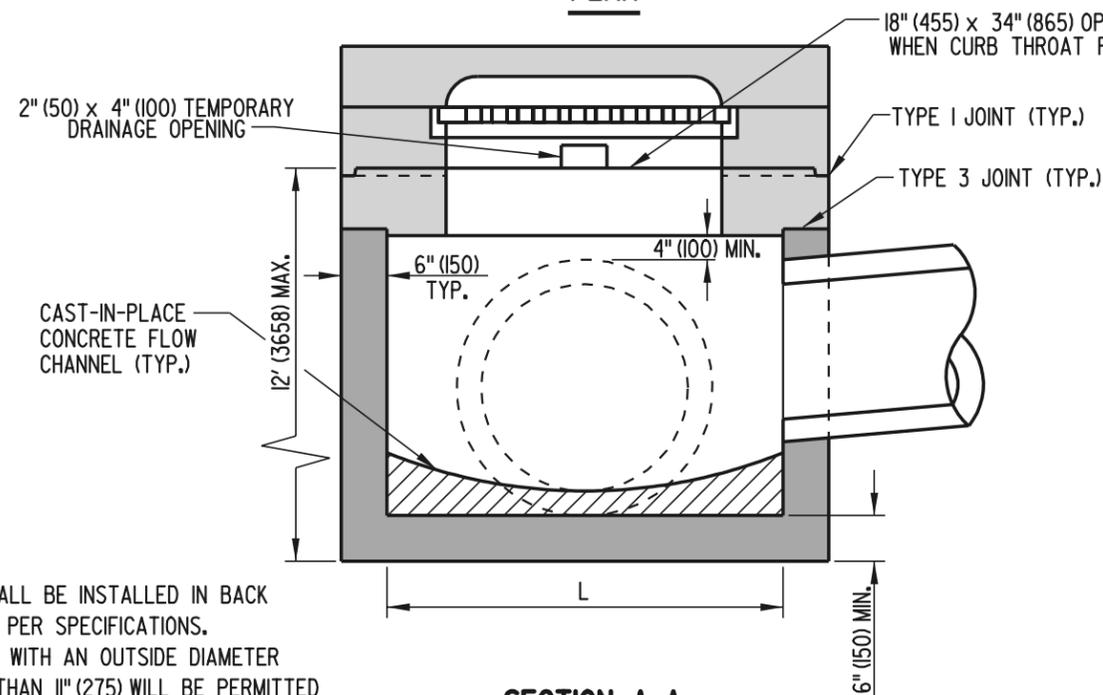


TYPE 1 JOINT DETAIL



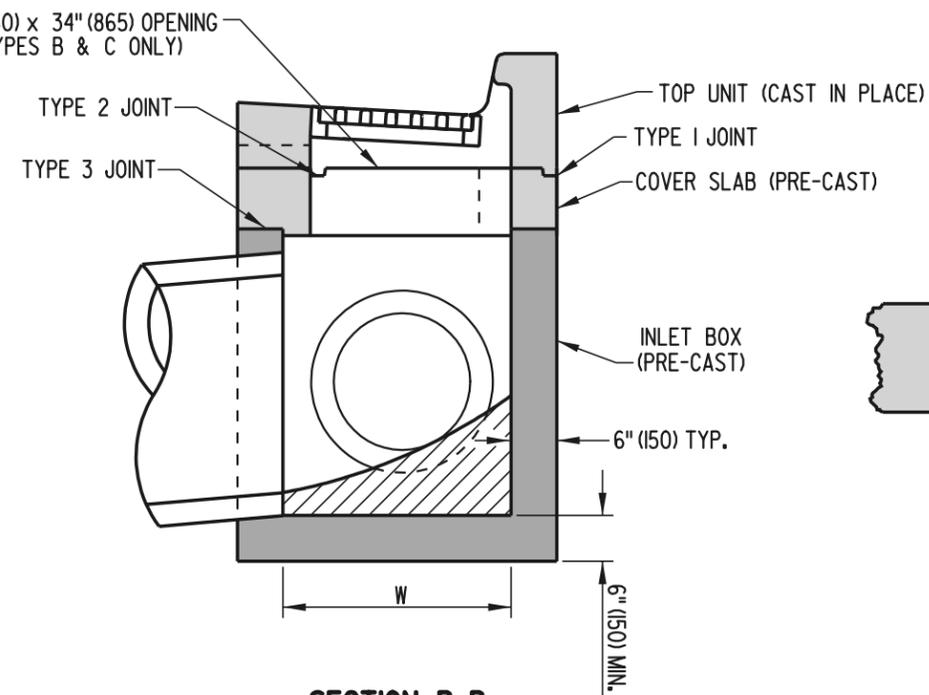
TYPE 2 JOINT DETAIL

* DIMENSIONS WILL VARY
 ** JOINT SEALANT AS PER SPECIFICATIONS

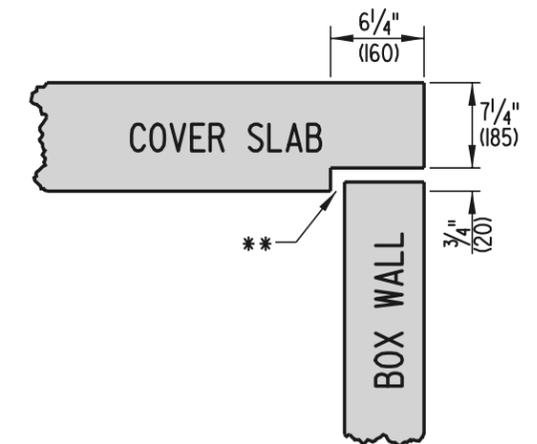


SECTION A-A

DRAINAGE INLET ASSEMBLY



SECTION B-B



TYPE 3 JOINT DETAIL

- NOTES:**
- 1.) STEPS SHALL BE INSTALLED IN BACK WALL AS PER SPECIFICATIONS.
 - 2.) NO PIPES WITH AN OUTSIDE DIAMETER LARGER THAN 11" (275) WILL BE PERMITTED TO ENTER THE BACK WALL OF A DRAINAGE INLET, IF IT IMPEDES THE INSTALLATION OF STEPS IN THE BACK WALL.
 - 3.) IF NECESSARY, A LARGER BOX MAY BE USED IN ORDER TO FIT THE STEPS AND A LARGER PIPE IN THE BACK WALL.

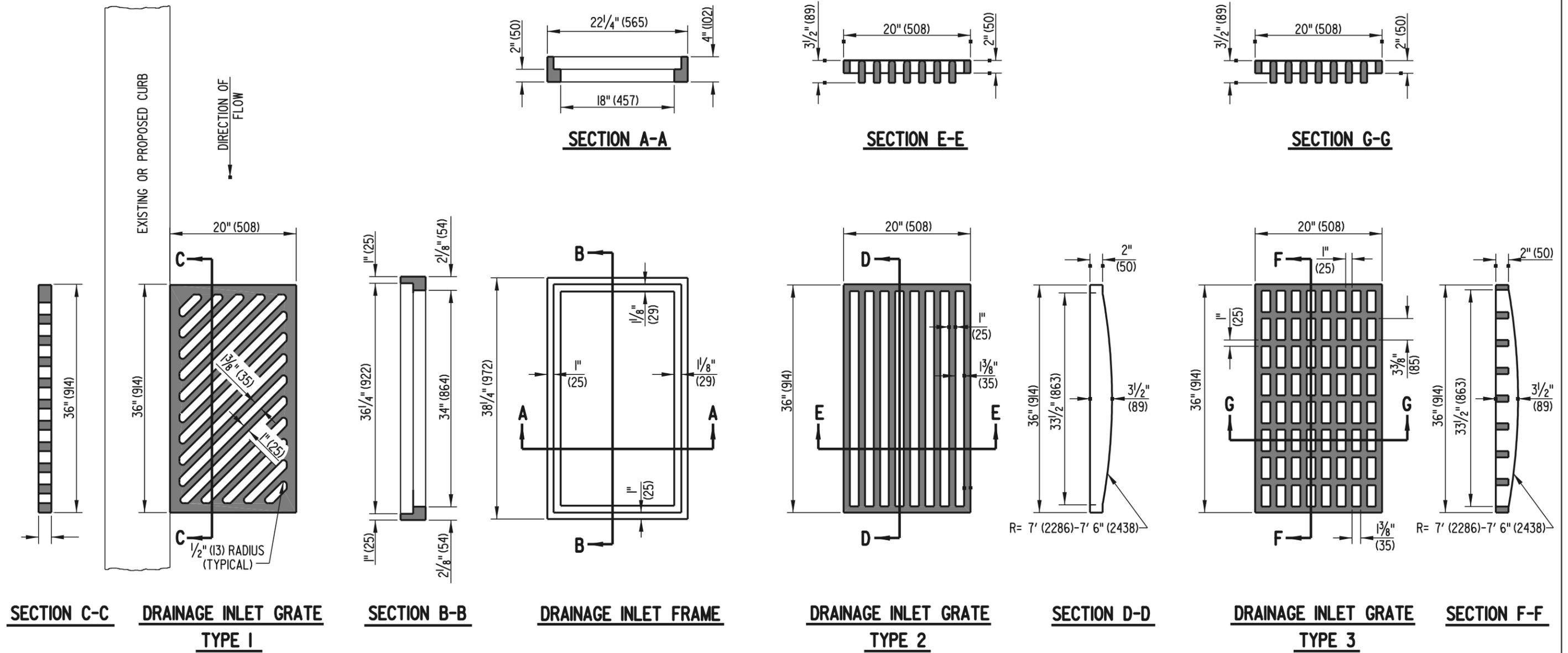


**DELAWARE
 DEPARTMENT OF TRANSPORTATION**

DRAINAGE INLET DETAILS

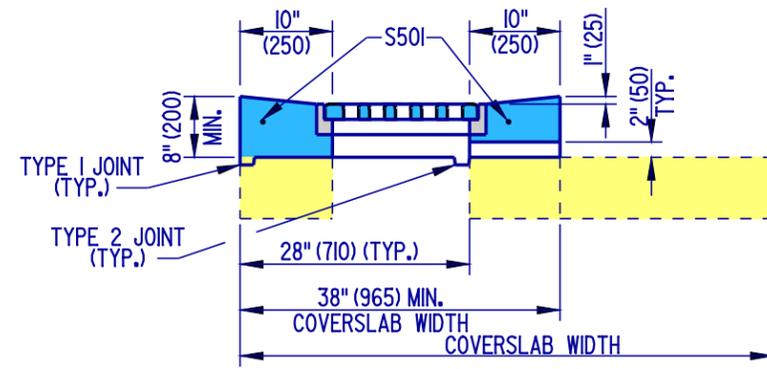
STANDARD NO. **D-5 (2002)** SHT. **1** OF **8**

APPROVED *Caution Wicks* 9/6/02
CHIEF ENGINEER DATE
 RECOMMENDED *Therese Delpho* 8/19/02
DESIGN ENGINEER DATE

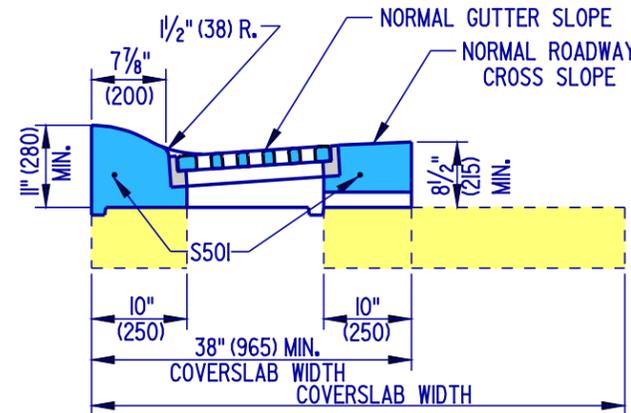


DRAINAGE INLET FRAME AND GRATES

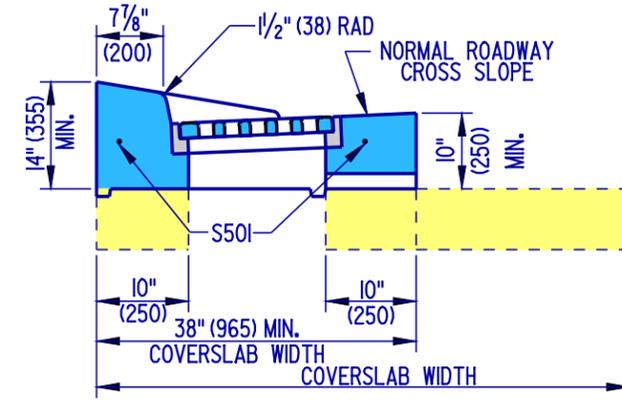
- NOTE: 1. BOTTOM OF TYPE 1 GRATE TO BE FLAT AND TRUE.
 2. TYPE 2 GRATE SHALL NOT BE INSTALLED WHERE BICYCLE TRAFFIC MAY BE PRESENT.



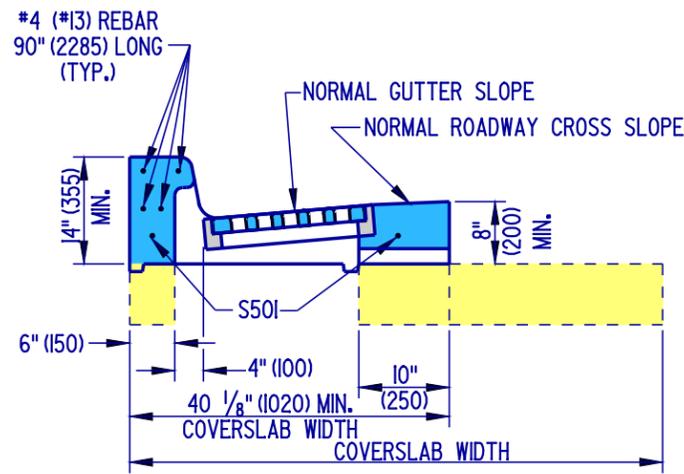
TYPE A



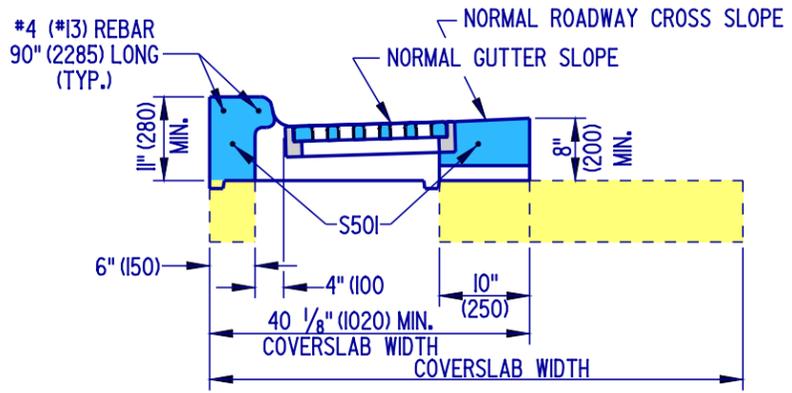
TYPE D



TYPE E

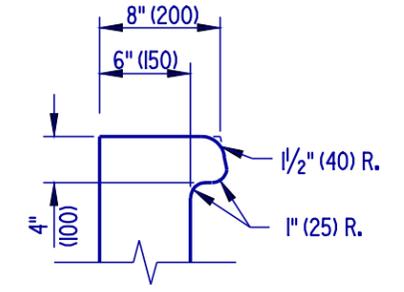


TYPE B

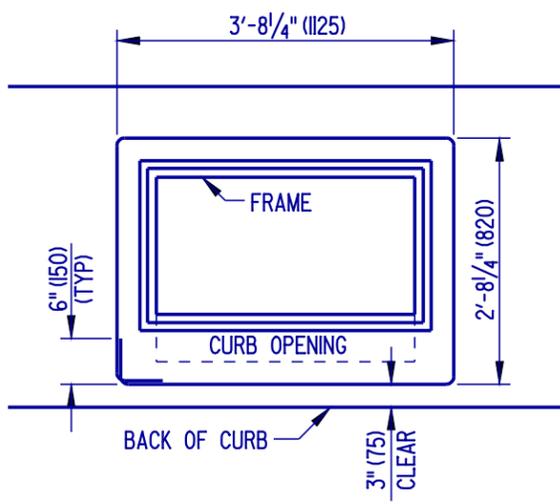


TYPE C

INLET TOP UNIT APPLICATIONS	
TOP UNIT	CURB
TYPE A	USE IN DRAINAGE SWALE
TYPE B	INTEGRAL PCC CURB & GUTTER, TYPE 1 & 3, PCC CURB TYPE 1
TYPE C	INTEGRAL PCC CURB & GUTTER, TYPE 4, PCC CURB TYPE 3
TYPE D	INTEGRAL PCC CURB & GUTTER, TYPE 2
TYPE E	PCC CURB TYPE 2



CURB OPENING DETAIL

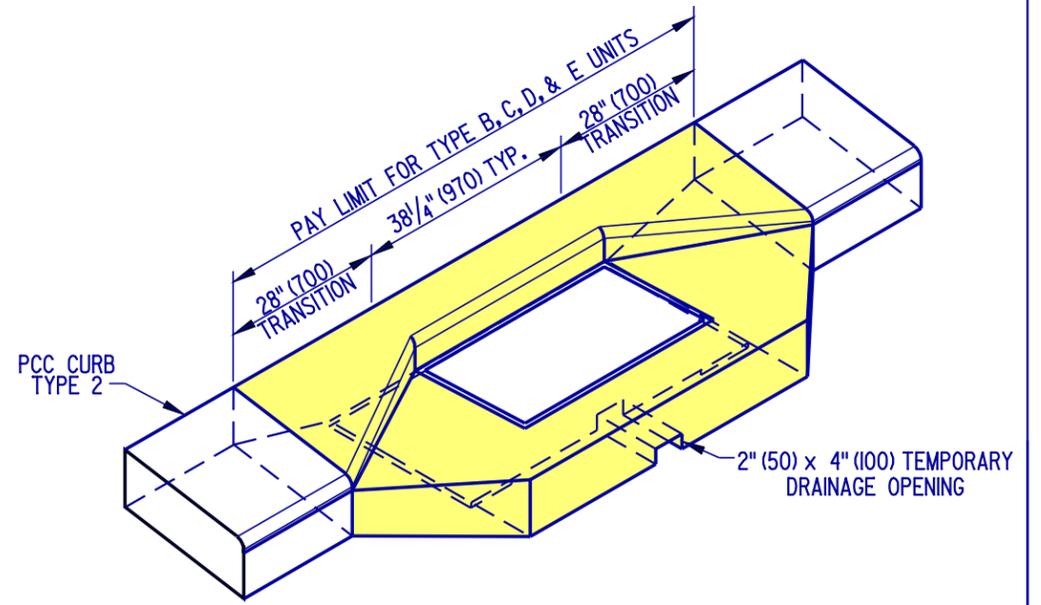


S501 BENDING DIAGRAM

S501 IS NOT REQUIRED TO BE ONE CONTINUOUS BAR. IF MORE THAN ONE BAR IS USED, THERE MUST BE A 12" (300) OVERLAP BETWEEN BARS.

DRAINAGE INLET TOP UNITS

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



ISOMETRIC VIEW

TYPE E UNIT SHOWN



DELAWARE DEPARTMENT OF TRANSPORTATION

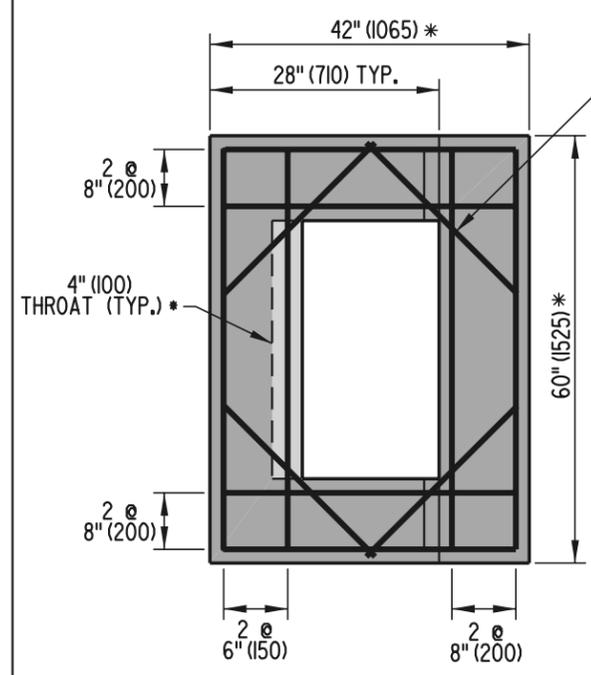
DRAINAGE INLET DETAILS
 STANDARD NO. **D-5 (2004)** SHT. **3** OF **8**

APPROVED *Carolann Wicks* 1/10/05
 CHIEF ENGINEER DATE
 RECOMMENDED *Dennis M. O'Flaherty* 1/13/05
 DESIGN ENGINEER DATE

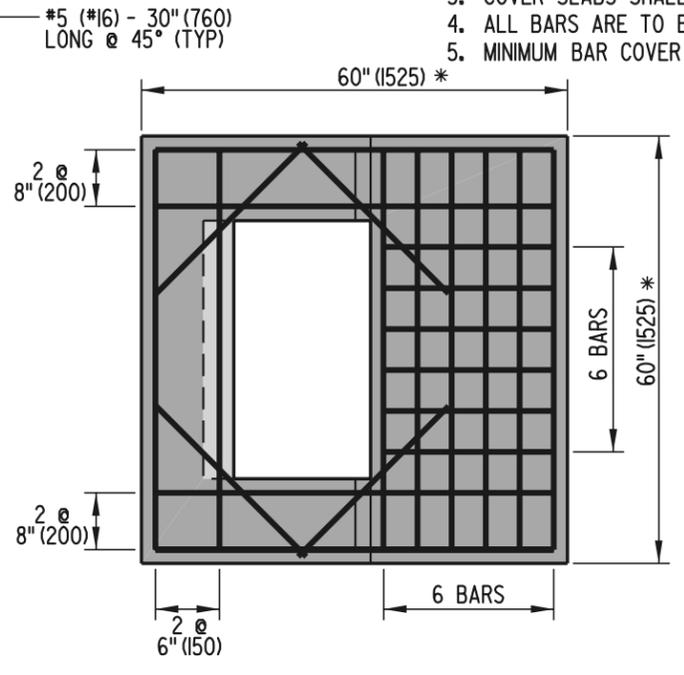
SCALE : N.T.S.

- NOTE :**
- 4" (100) THROAT IS FOR TYPES B AND C TOP UNITS ONLY.
 - RELOCATE ENCROACHING REINFORCING BARS WHEN USING TYPES B & C TOP UNITS.
 - COVER SLABS SHALL BE PRE-CAST AND MUST BE SIZED TO FIT INLET BOX DIMENSIONS.
 - ALL BARS ARE TO BE #5 (#16) SPACED @ 6" (150) ± UNLESS NOTED OTHERWISE.
 - MINIMUM BAR COVER = 1 1/2" (38).

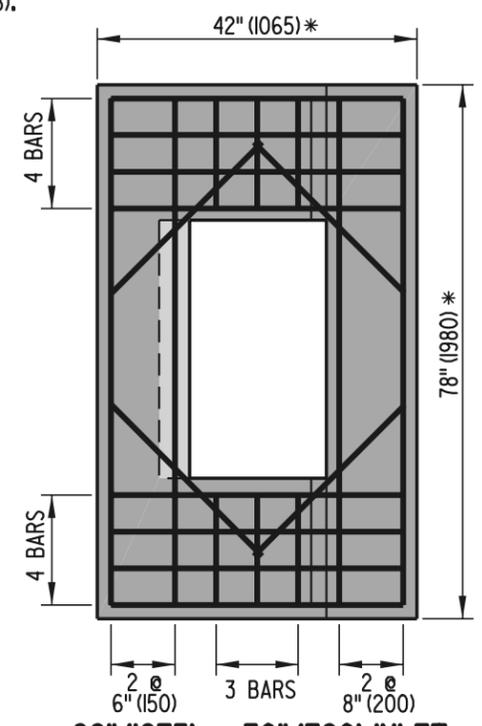
* - DIMENSIONS TO MATCH OUTSIDE TO OUTSIDE DIMENSIONS OF BOX



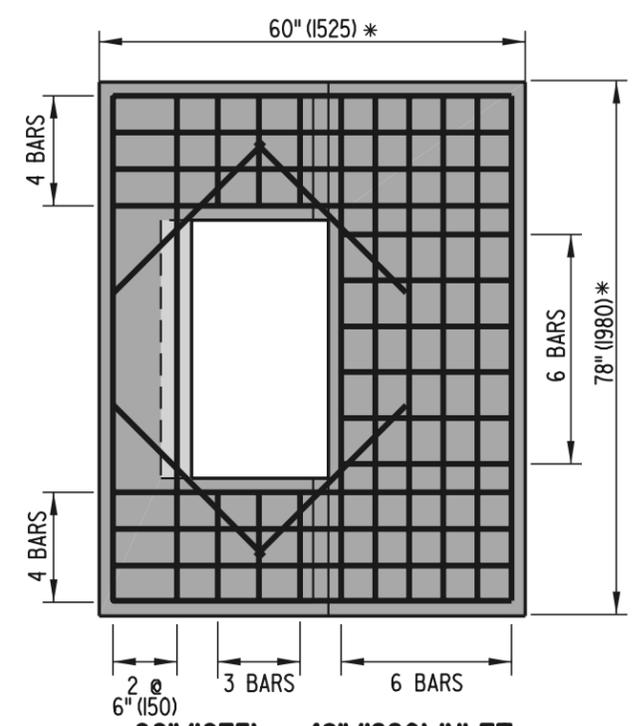
48" (1220) x 30" (760) INLET



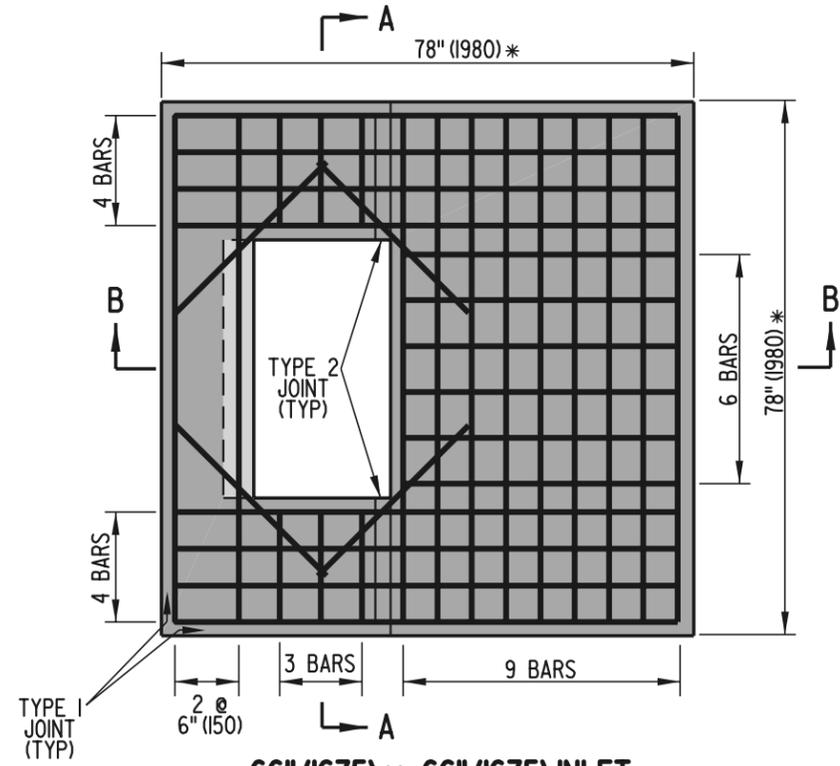
48" (1220) x 48" (1220) INLET



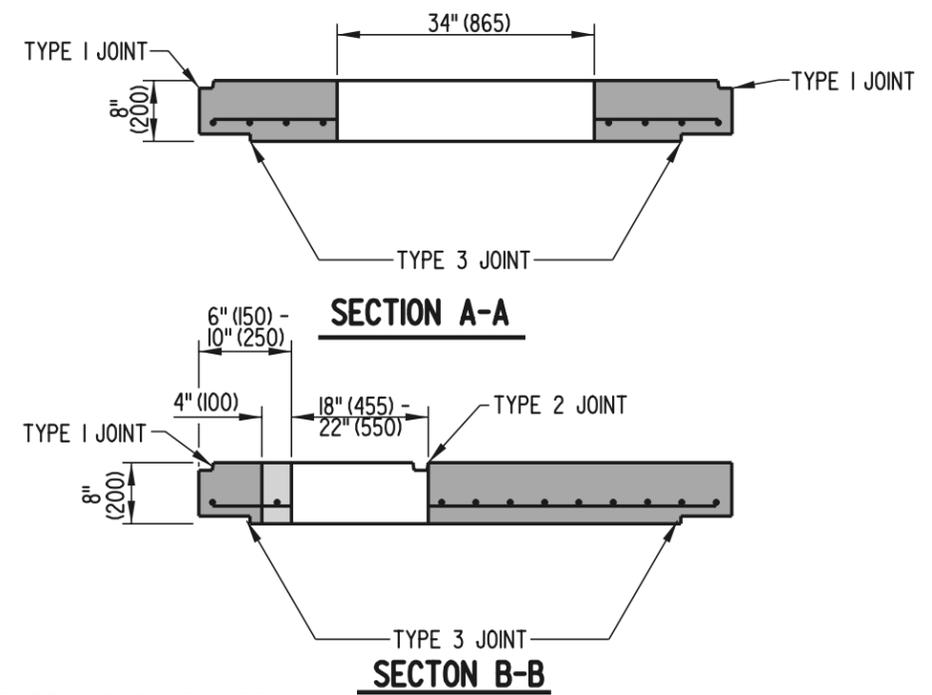
66" (1675) x 30" (760) INLET



66" (1675) x 48" (1220) INLET



66" (1675) x 66" (1675) INLET



DRAINAGE INLET COVER SLAB DETAILS

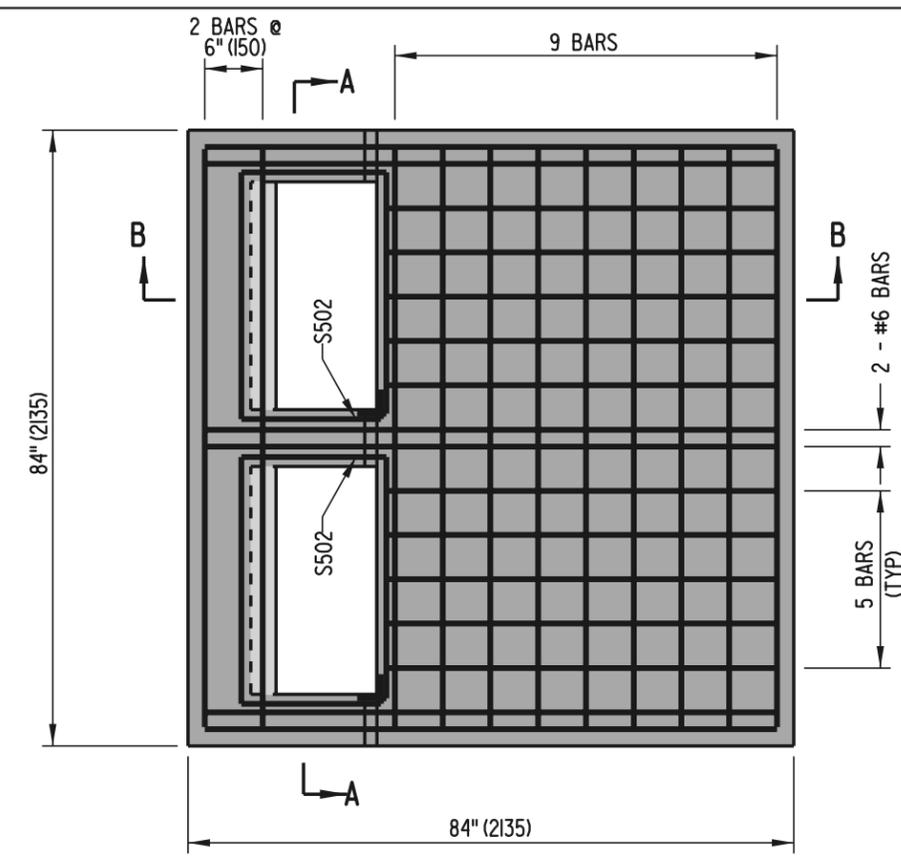
DELAWARE
DEPARTMENT OF TRANSPORTATION

DRAINAGE INLET DETAILS			
STANDARD NO.	D-5 (2002)	SHT.	4 OF 8

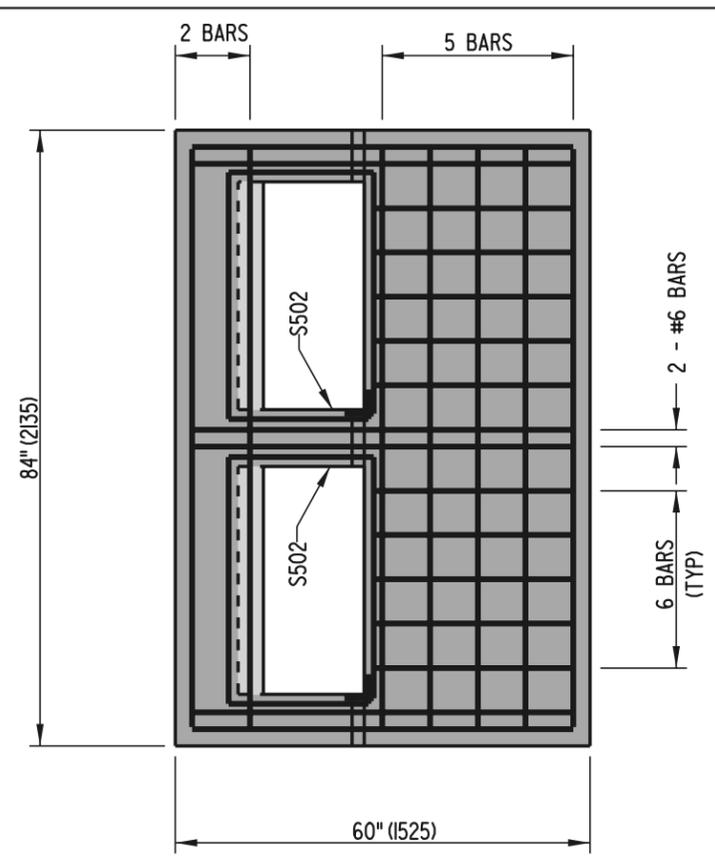
APPROVED *Caution Wicks* 9/6/02
CHIEF ENGINEER DATE

RECOMMENDED *Therese Delph* 8/19/02
DESIGN ENGINEER DATE

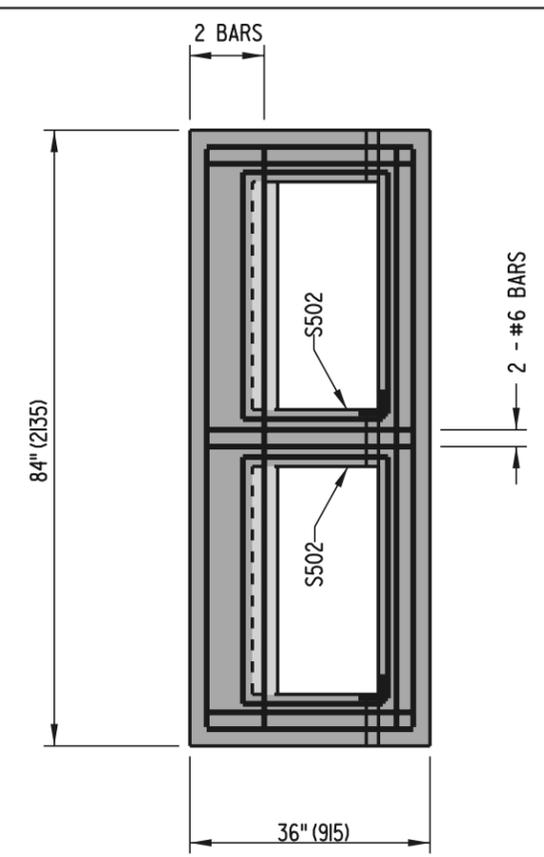
SCALE : N.T.S.



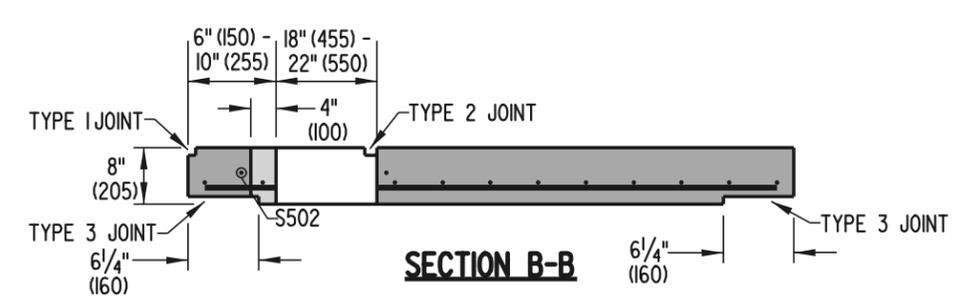
72" (1830) x 72" (1830) INLET



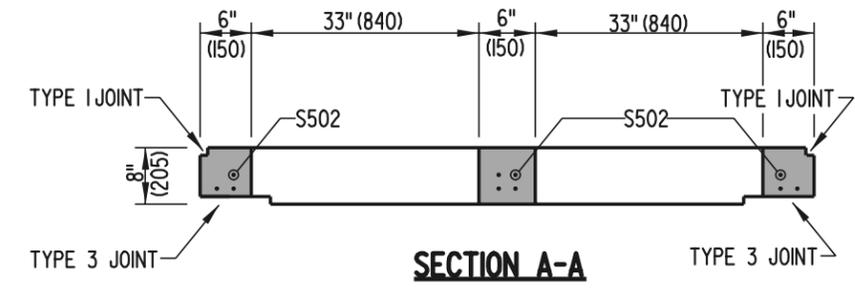
72" (1830) x 48" (1220) INLET



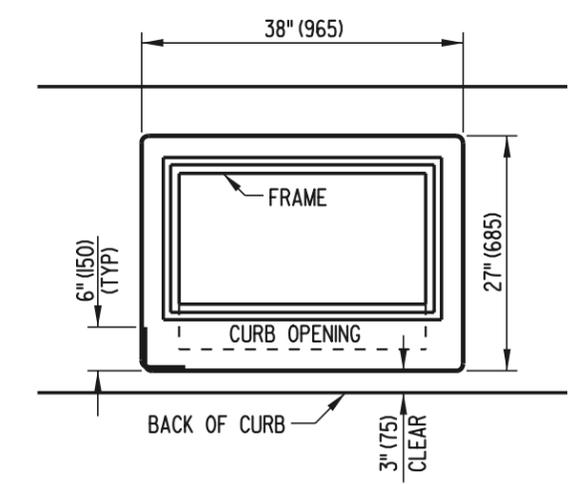
72" (1830) x 24" (610) INLET



SECTION B-B



SECTION A-A



S502 BENDING DIAGRAM

S502 IS NOT REQUIRED TO BE ONE CONTINUOUS BAR. IF MORE THAN ONE BAR IS USED, THERE MUST BE A 12" (300) OVERLAP BETWEEN BARS.

- NOTE :**
1. 4" (100) THROAT IS FOR TYPES B AND C TOP UNITS ONLY.
 2. RELOCATE ENCRANCHING REINFORCING BARS WHEN USING TYPES B & C TOP UNITS.
 3. COVER SLABS ARE TO BE PRE-CAST AND MUST BE SIZED TO FIT INLET BOX DIMENSIONS.
 4. ALL BARS ARE TO BE #5 (#16) SPACED @ 6" (150) ± UNLESS NOTED OTHERWISE.
 5. MINIMUM BAR COVER = 1/2" (38).



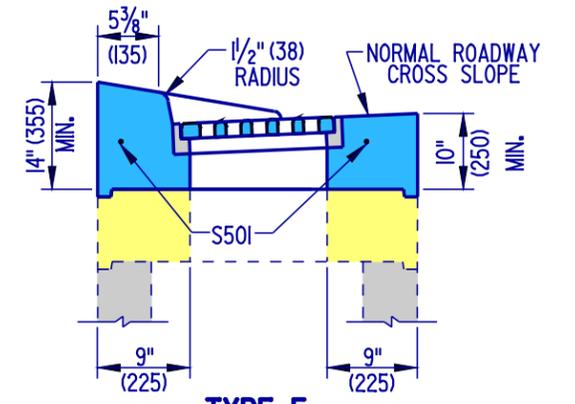
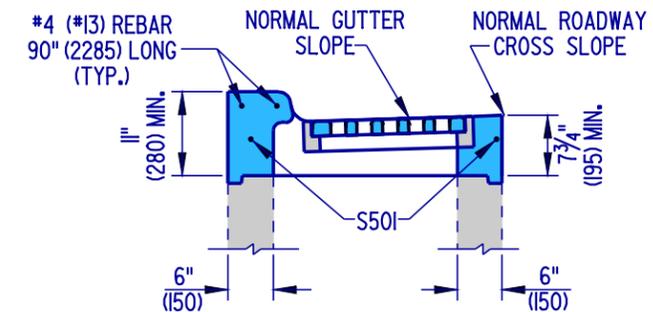
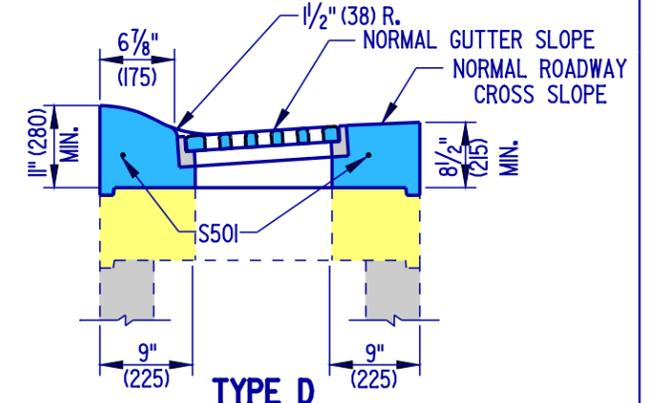
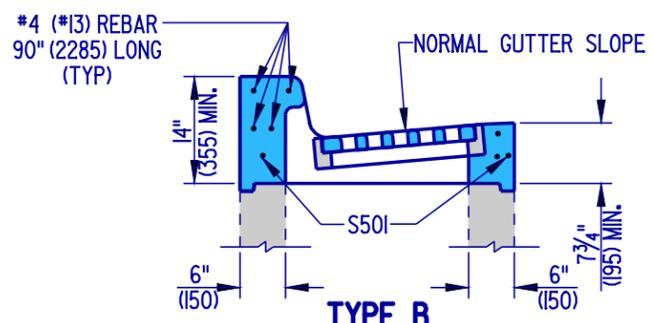
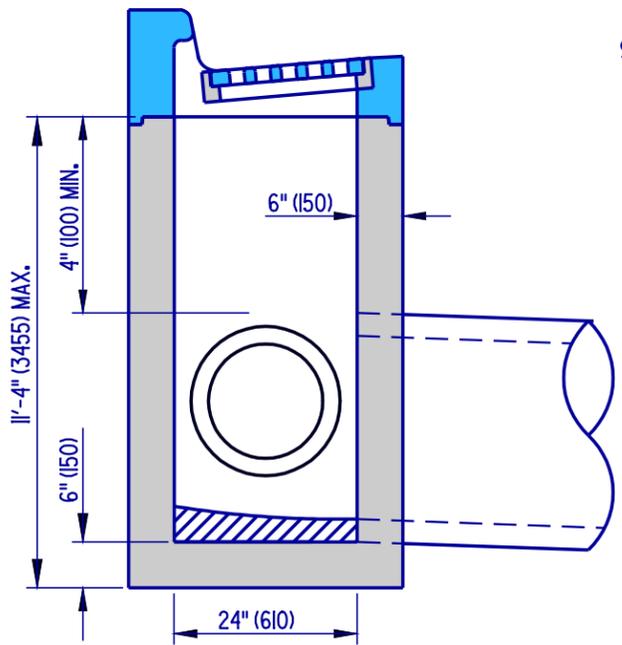
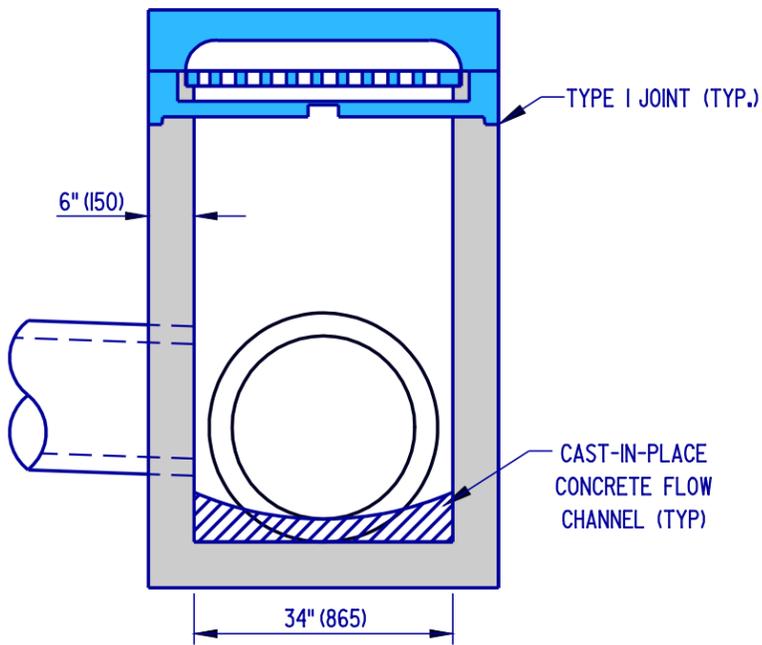
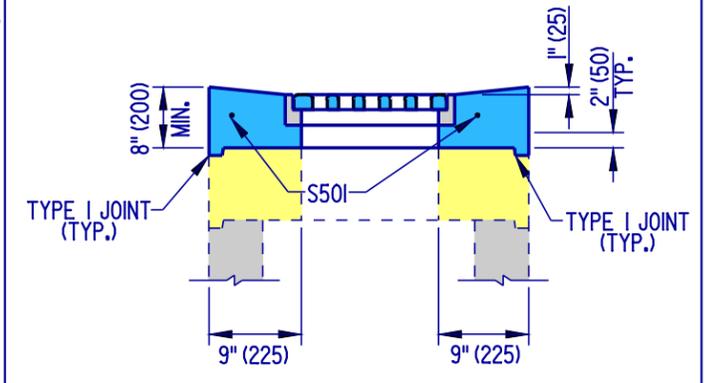
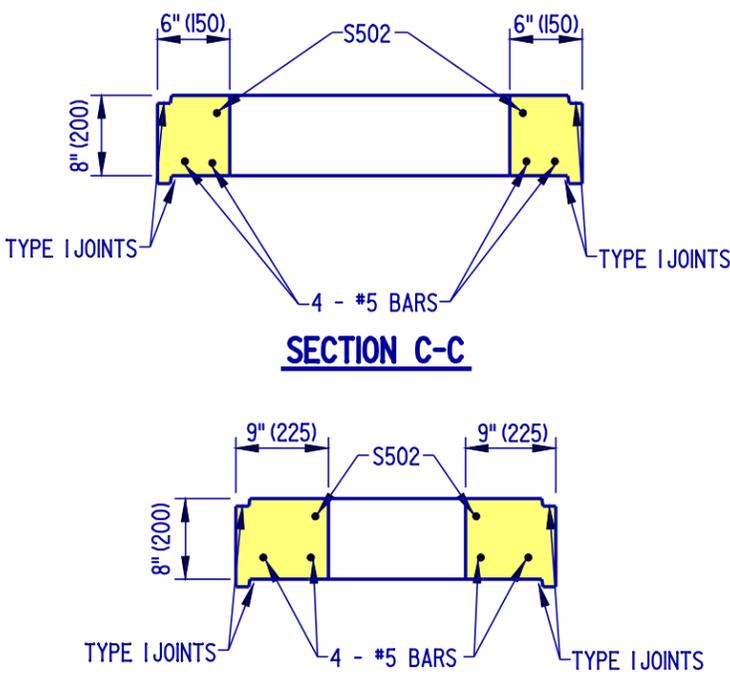
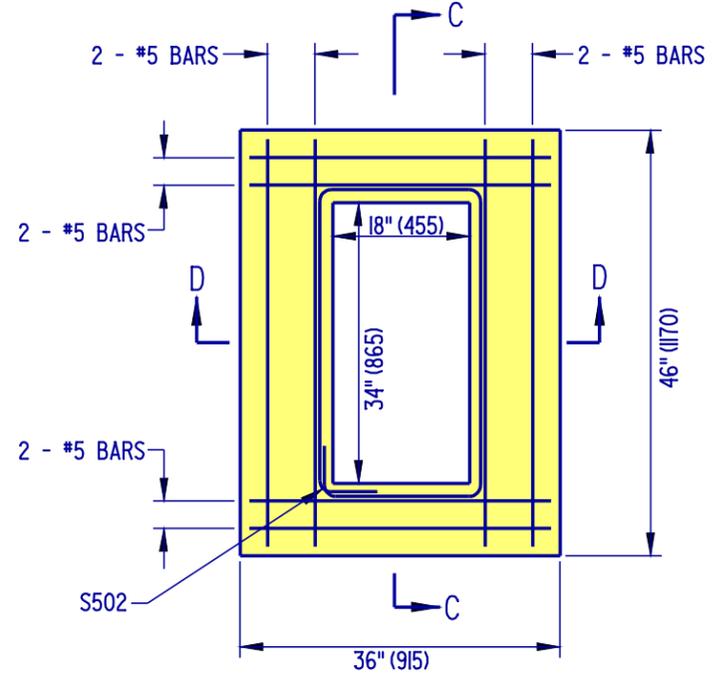
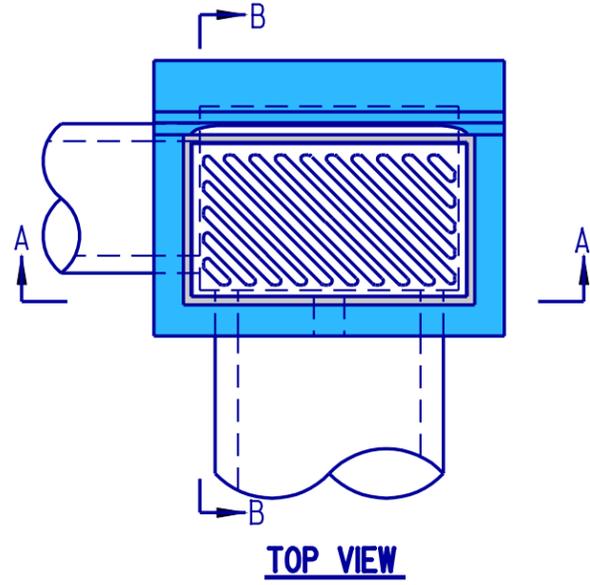
**DELAWARE
DEPARTMENT OF TRANSPORTATION**

DOUBLE INLET COVER SLAB DETAILS

STANDARD NO. **D-5 (2002)** SHT. **5** OF **8**

APPROVED *Carsten Wicks* 9/6/02
CHIEF ENGINEER DATE
 RECOMMENDED *Therese Delph* 8/19/02
DESIGN ENGINEER DATE

SCALE : N.T.S.



34" (865) x 24" (610) DRAINAGE INLET DETAILS
NOTE: REFER TO PREVIOUS SHEETS FOR REINFORCING REQUIREMENTS

TOP UNIT DETAILS



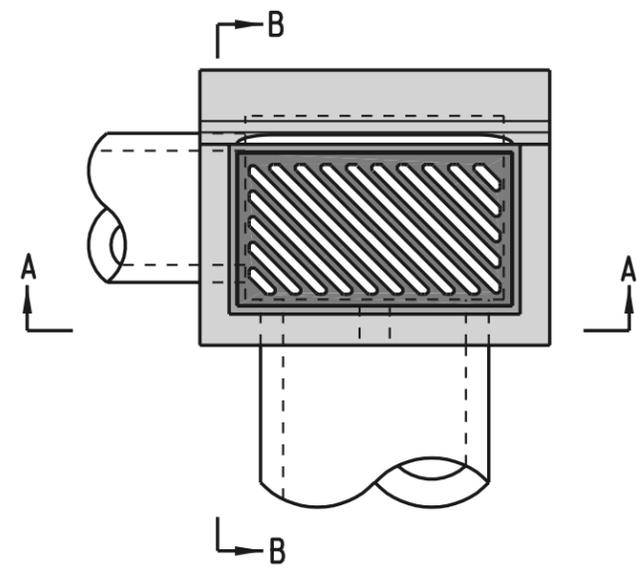
DELAWARE
DEPARTMENT OF TRANSPORTATION

DRAINAGE INLET DETAILS

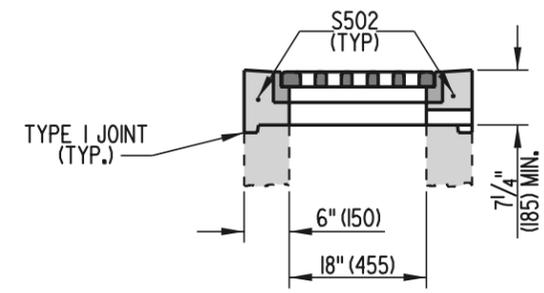
STANDARD NO. **D-5 (2004)** SHT. **6** OF **8**

APPROVED *Carolann Wicks* 1/10/05
CHIEF ENGINEER DATE

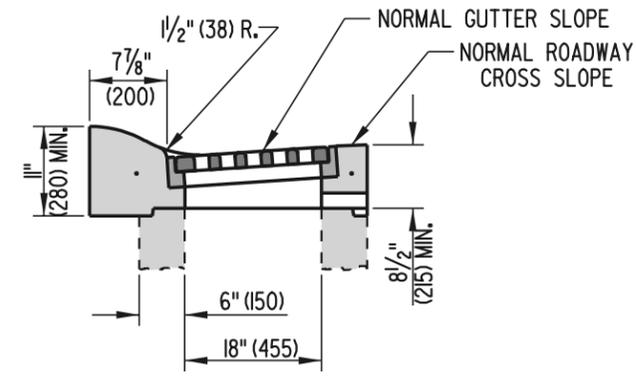
RECOMMENDED *Dennis M. O'Flaherty* 1/13/05
DESIGN ENGINEER DATE



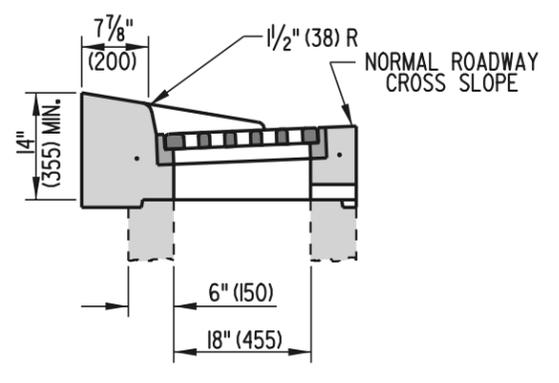
TOP VIEW



TYPE A

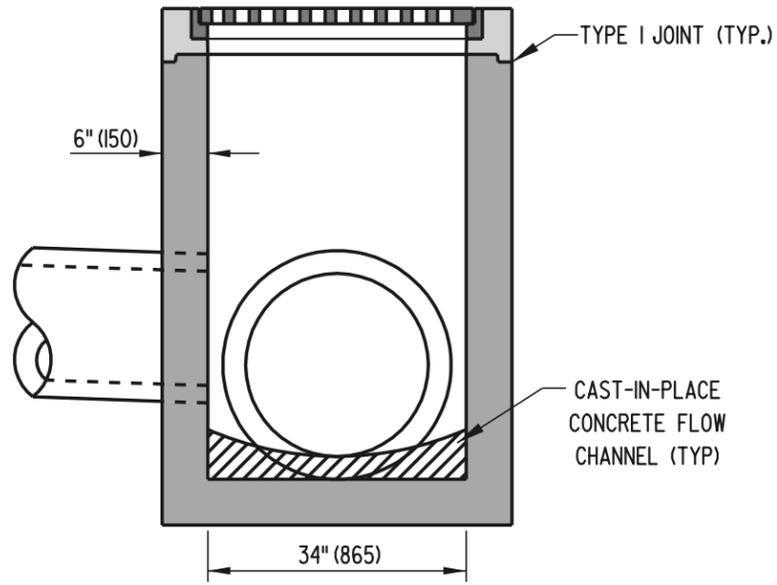


TYPE D

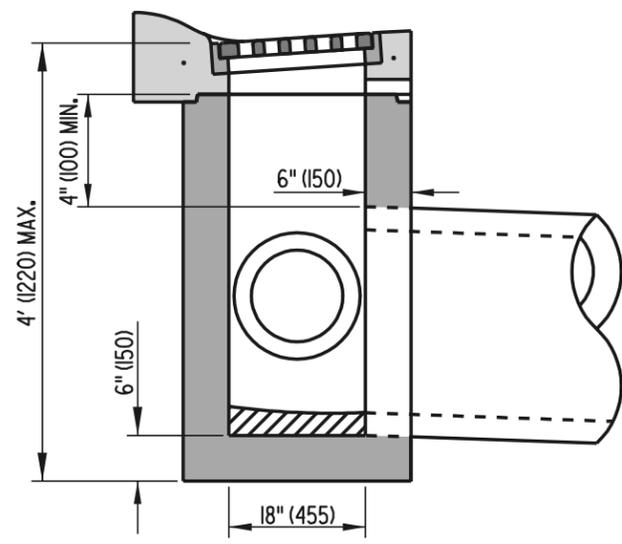


TYPE E

TOP UNIT DETAILS



SECTION A-A

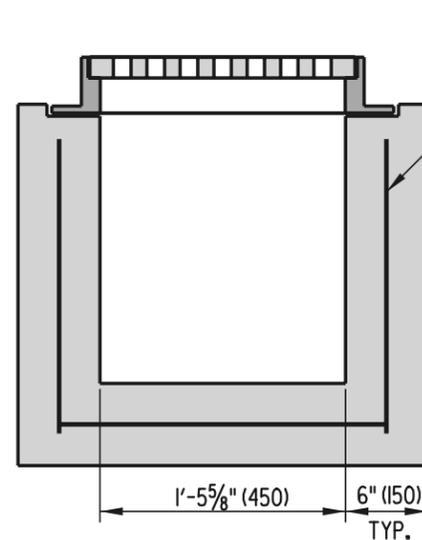
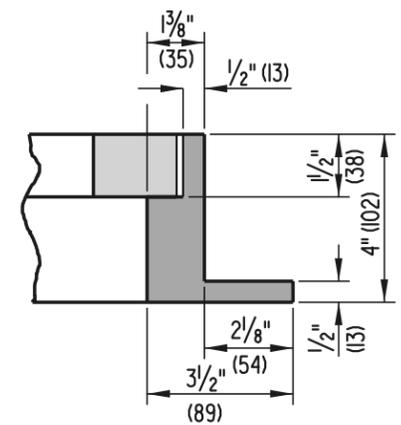
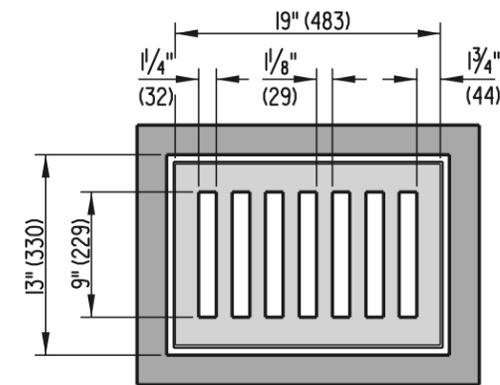
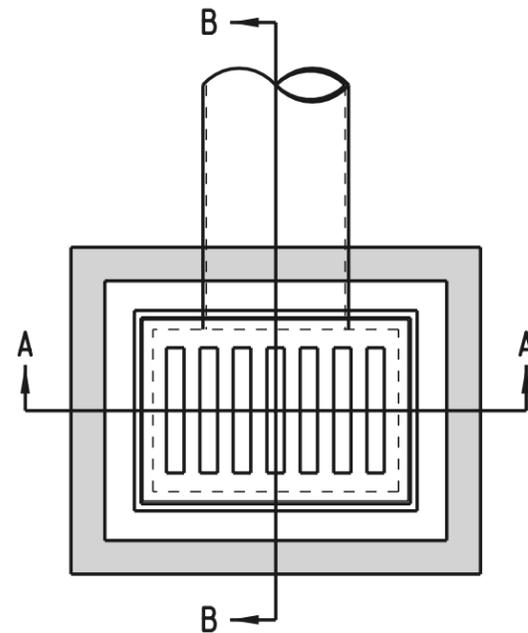


SECTION B-B

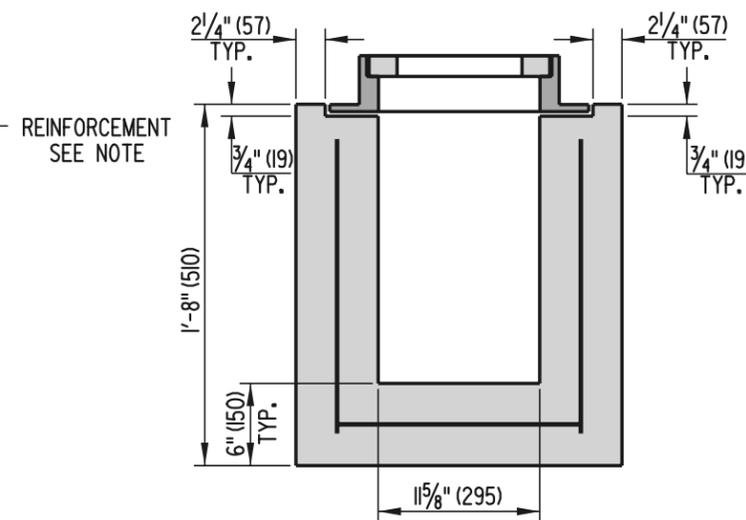
34" (865) x 18" (455) DRAINAGE INLET DETAILS

- 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.

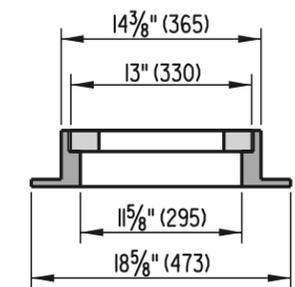
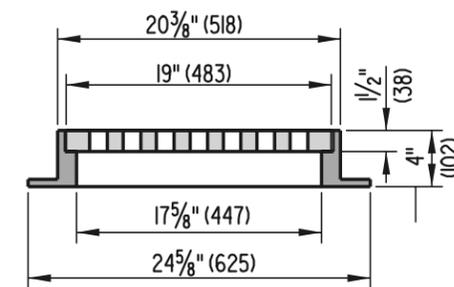
NOTE: 1. REINFORCEMENT SHALL BE 4" (102) X 4" (102) W4 X W4 (W26 X W26)
 2. INLET BOXES ARE TO BE PRE-CAST OR CAST-IN-PLACE.



SECTION A-A



SECTION B-B

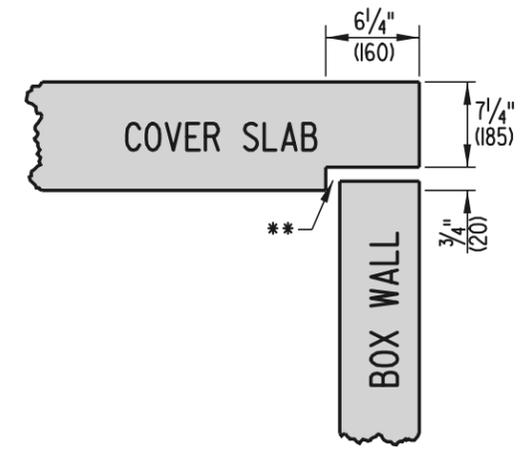
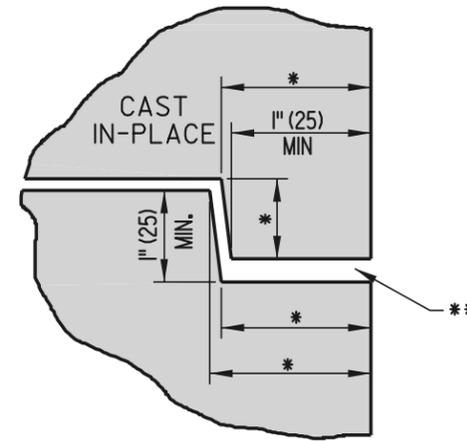
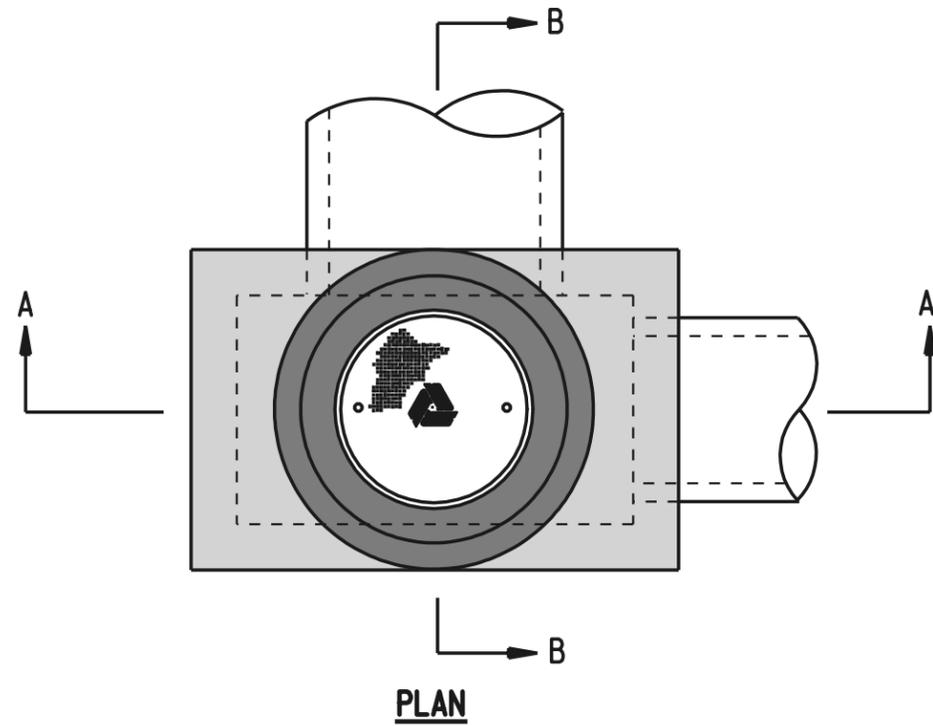


DELAWARE
 DEPARTMENT OF TRANSPORTATION

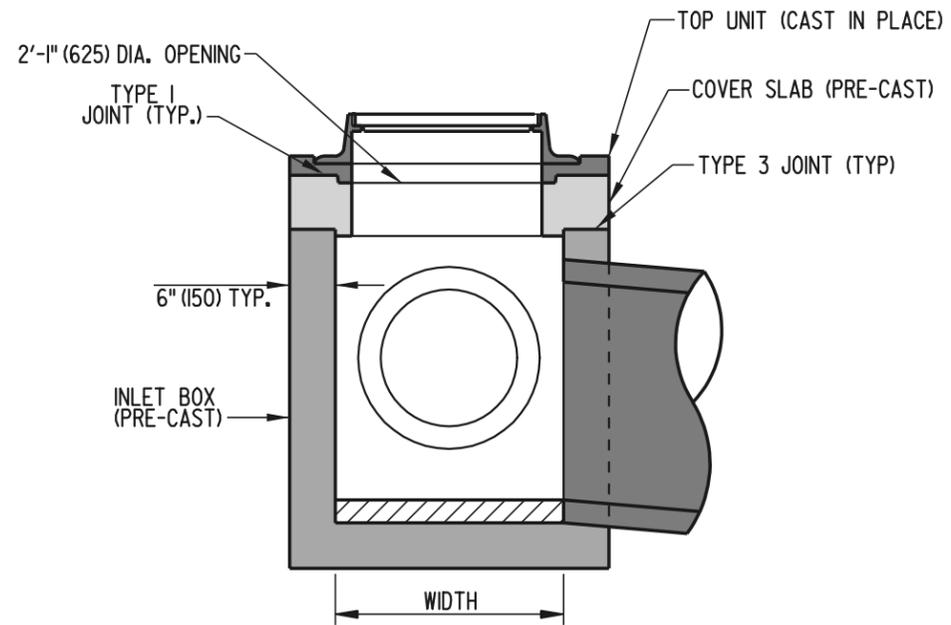
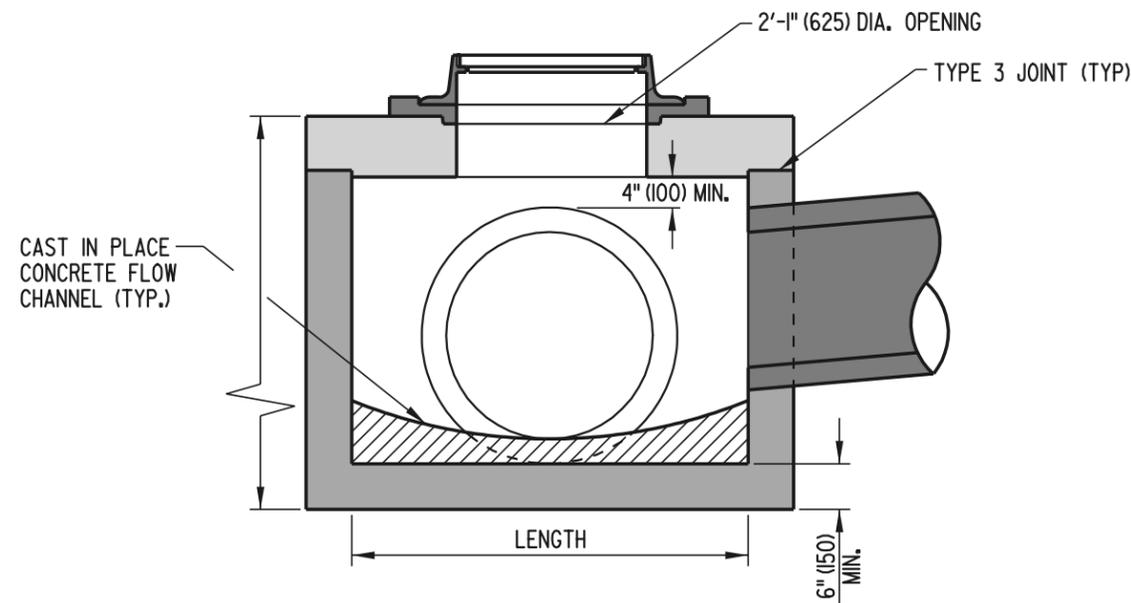
LAWN INLET

STANDARD NO. D-5 (2002) SHT. 8 OF 8

APPROVED *Caution Wicks* 9/6/02
CHIEF ENGINEER DATE
 RECOMMENDED *Therese Delgado* 8/19/02
DESIGN ENGINEER DATE



* DIMENSIONS WILL VARY
 ** JOINT SEALANT



BOX MANHOLE ASSEMBLY

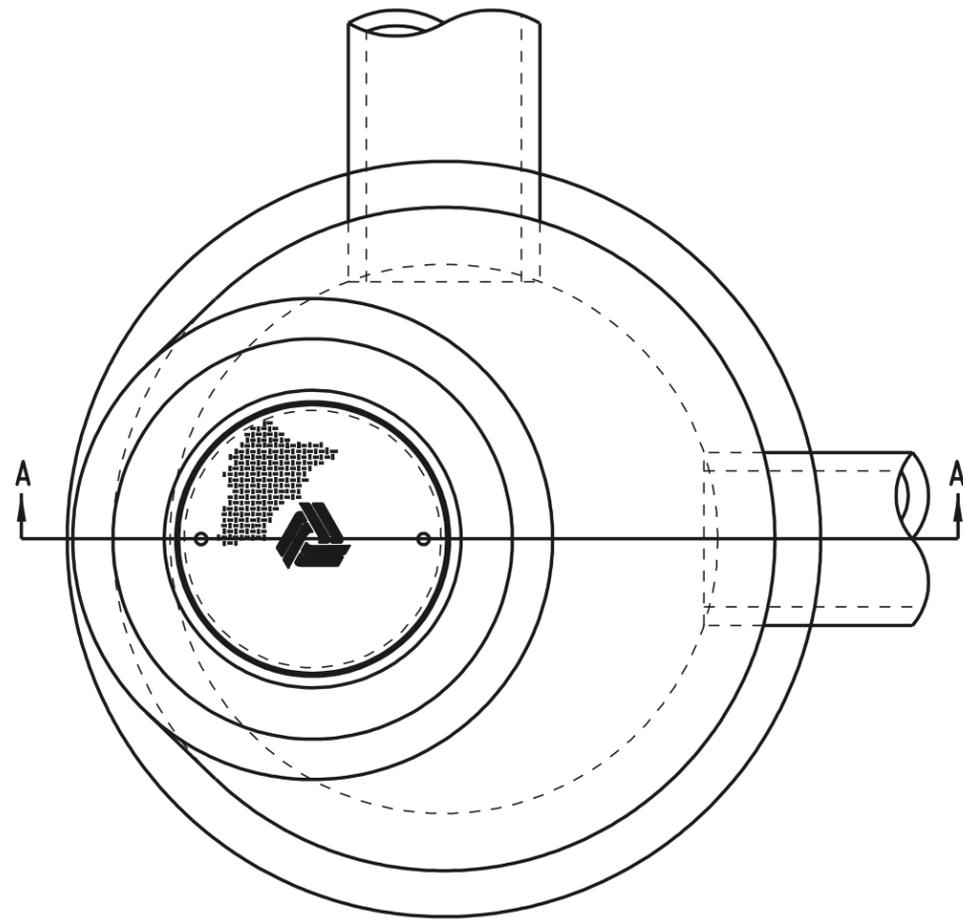


**DELAWARE
 DEPARTMENT OF TRANSPORTATION**

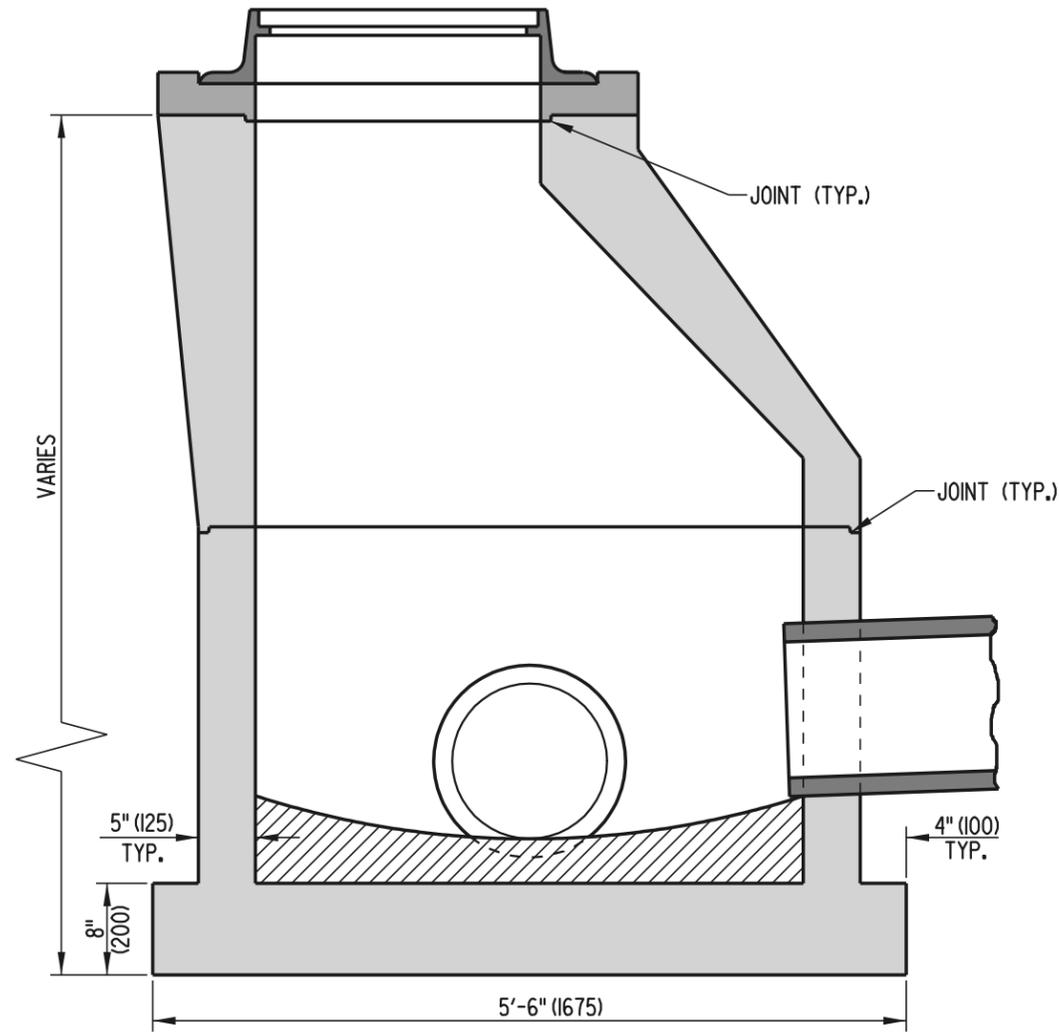
MANHOLE DETAILS

STANDARD NO. **D-6 (2001)** SHT. **1** OF **4**

APPROVED *Ryan M. Harkness* 6/18/01
CHIEF ENGINEER DATE
 RECOMMENDED *Michael R. [Signature]* 6/18/01
DESIGN ENGINEER DATE



PLAN



SECTION A-A

ROUND MANHOLE ASSEMBLY

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



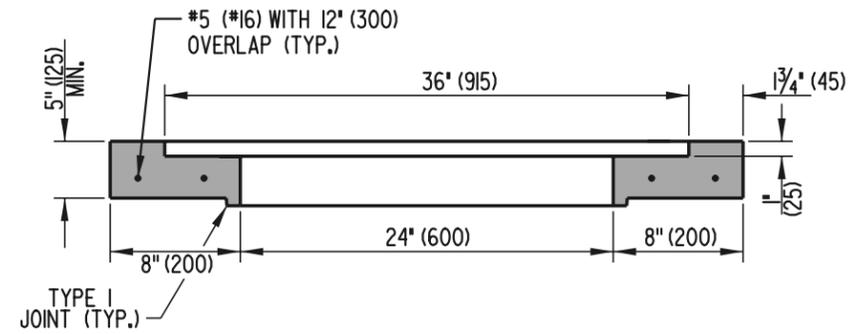
DELAWARE
DEPARTMENT OF TRANSPORTATION

MANHOLE DETAILS

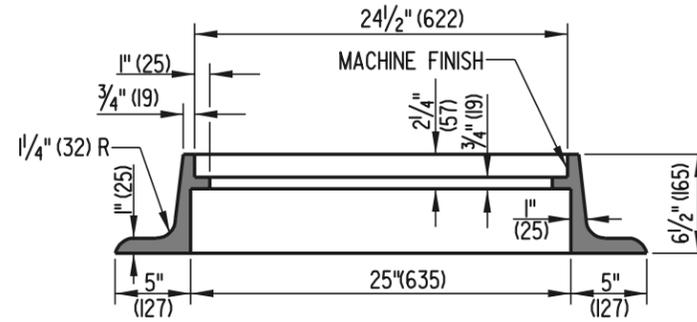
STANDARD NO. D-6 (2001) SHT. 2 OF 4

APPROVED *Ryan M. Harkness* 6/18/01
CHIEF ENGINEER DATE
 RECOMMENDED *Mehal Alghob* 6/18/01
DESIGN ENGINEER DATE

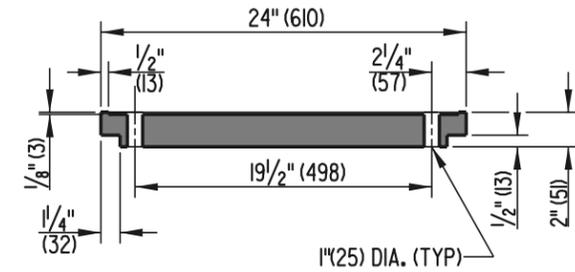
NOTE: TOP UNIT IS TO BE CAST IN PLACE TO GRADE AS SPECIFIED ON PLAN SHEETS OR AS DIRECTED BY ENGINEER.



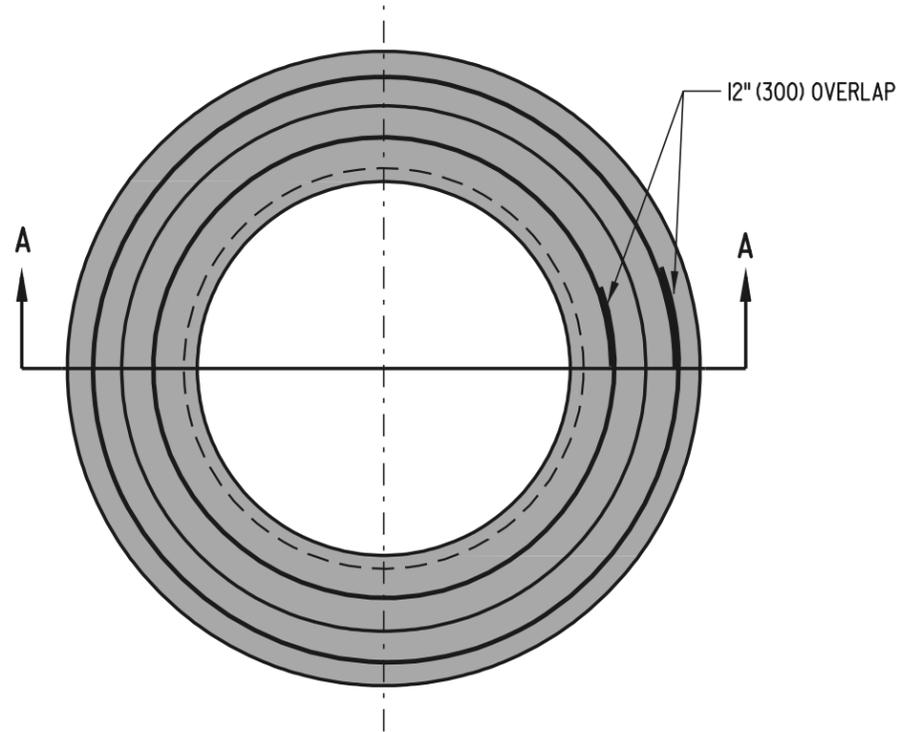
SECTION A-A



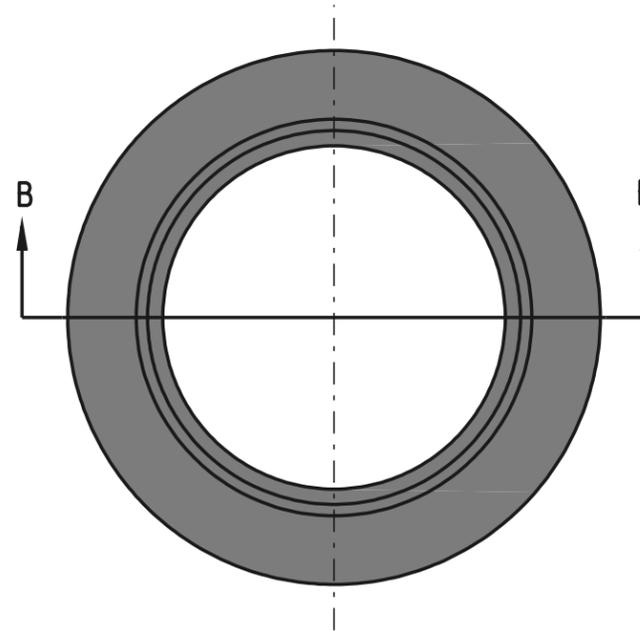
SECTION B-B



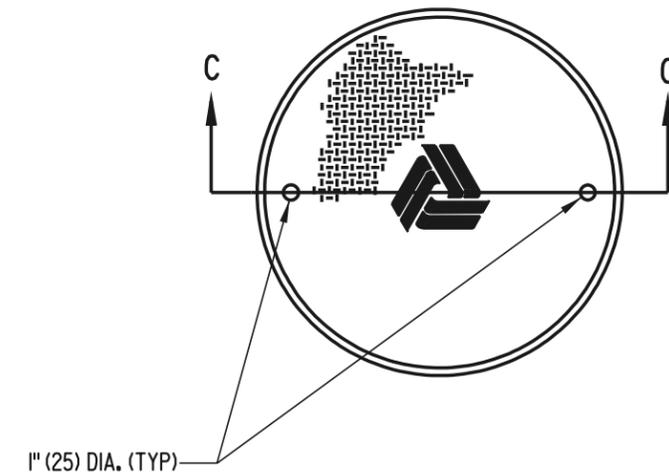
SECTION C-C



TOP UNIT



FRAME



COVER



DELAWARE
DEPARTMENT OF TRANSPORTATION

MANHOLE DETAILS

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

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

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