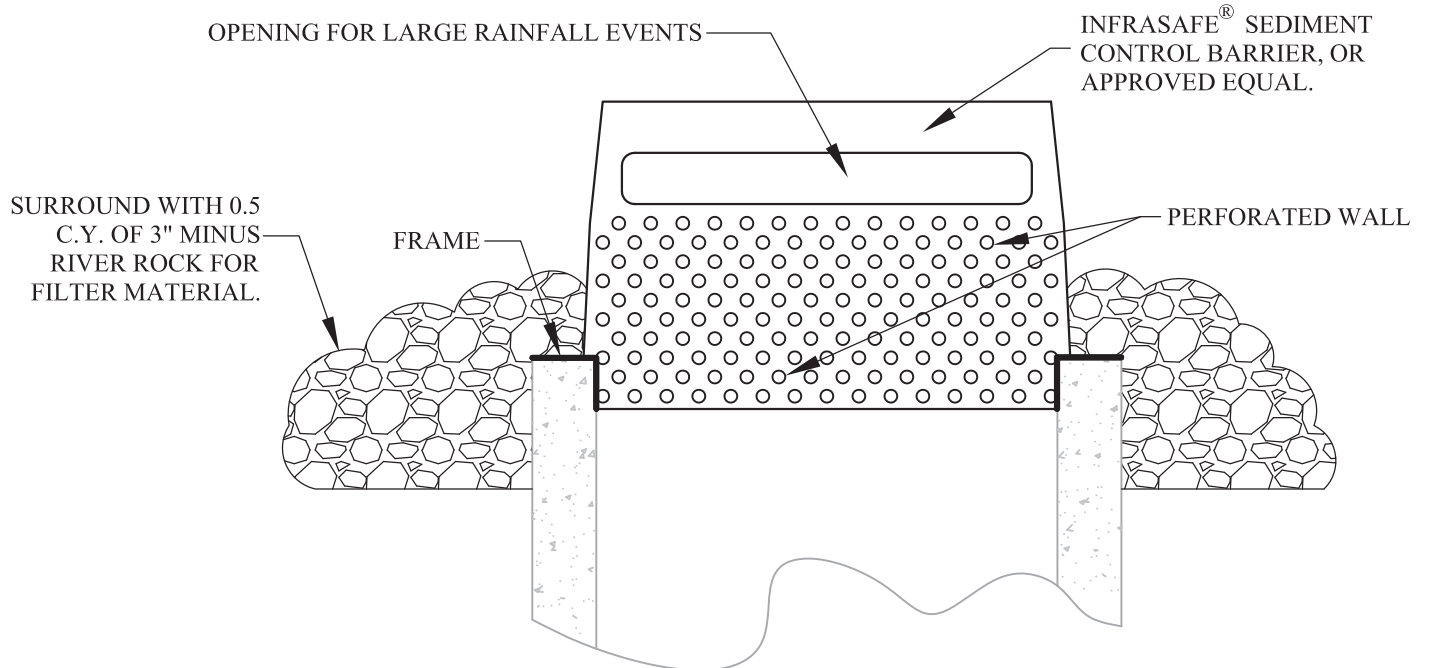
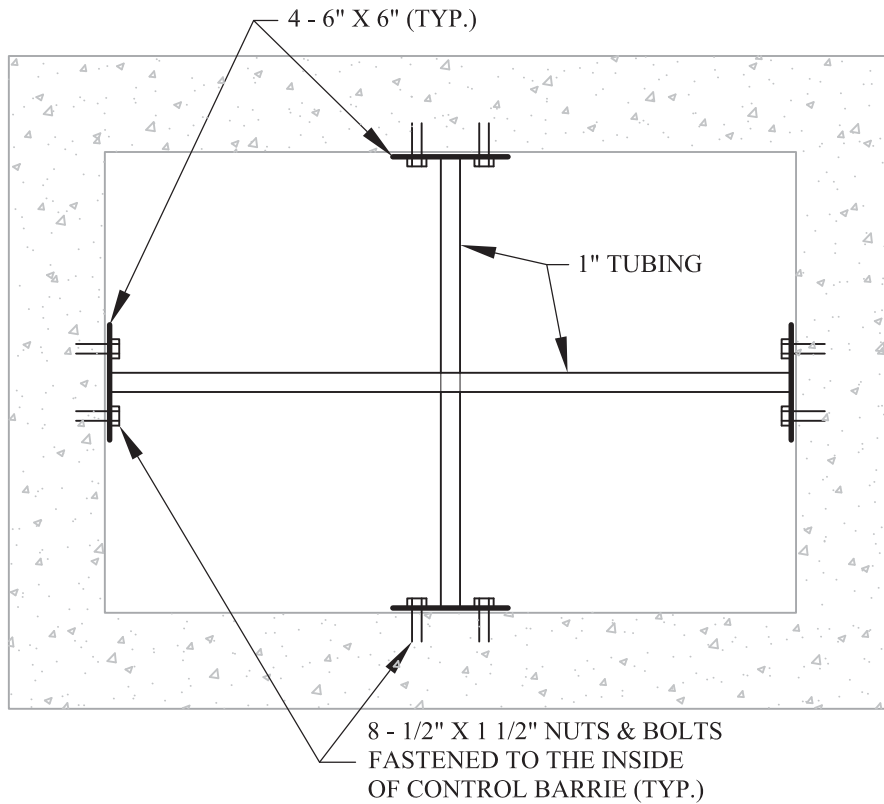




CITY OF BURNSVILLE - ENGINEERING DEPT.

STORM DRAIN INLET PROTECTION (TOP HAT)

Plate No.

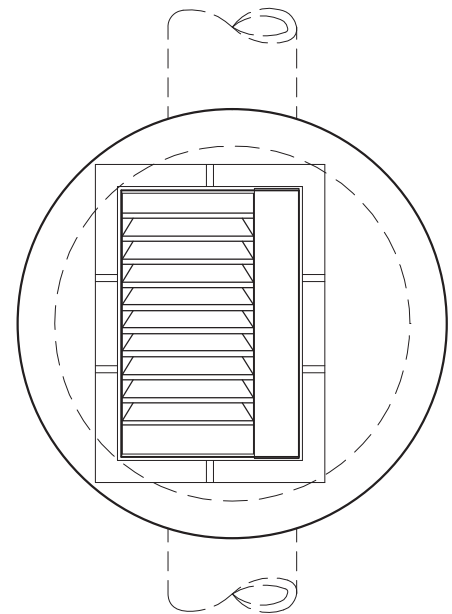
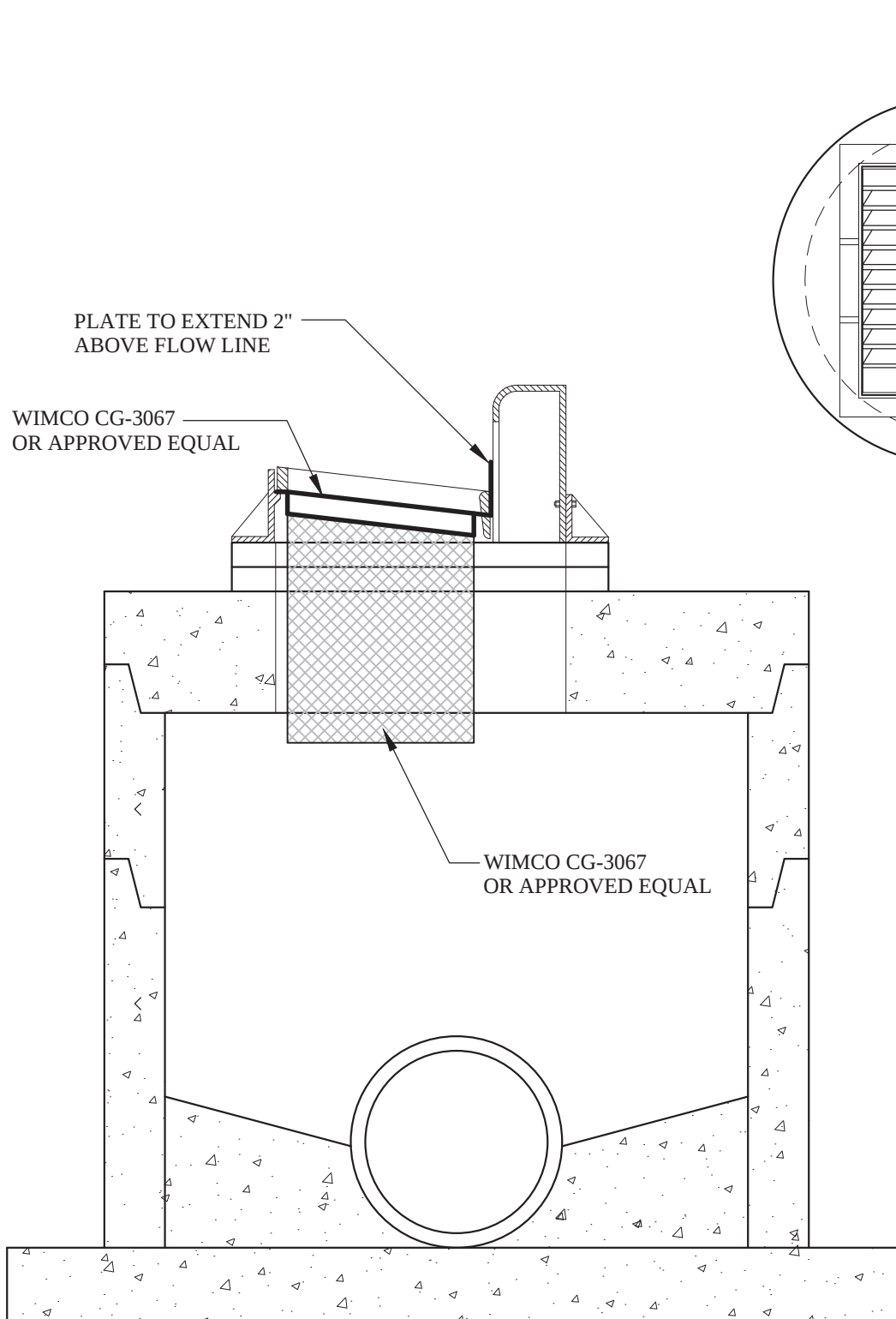
EC - 1

Revision Date

11/2013

File Location:

S:\Details\english\Erosion Control\EC01Storm Drain Inlet Protection.dwg



PLAN

ELEVATION



CITY OF BURNSVILLE - ENGINEERING DEPT.

**STORM DRAIN INLET
PROTECTION (DROP IN)**

Plate No.

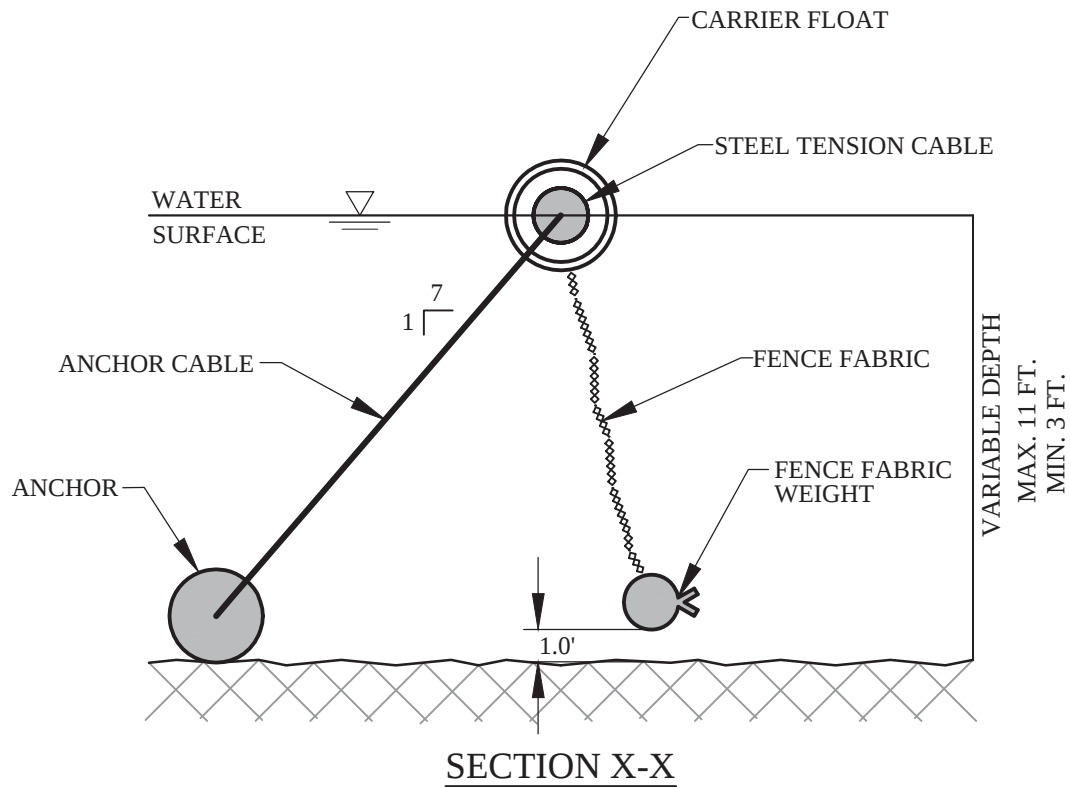
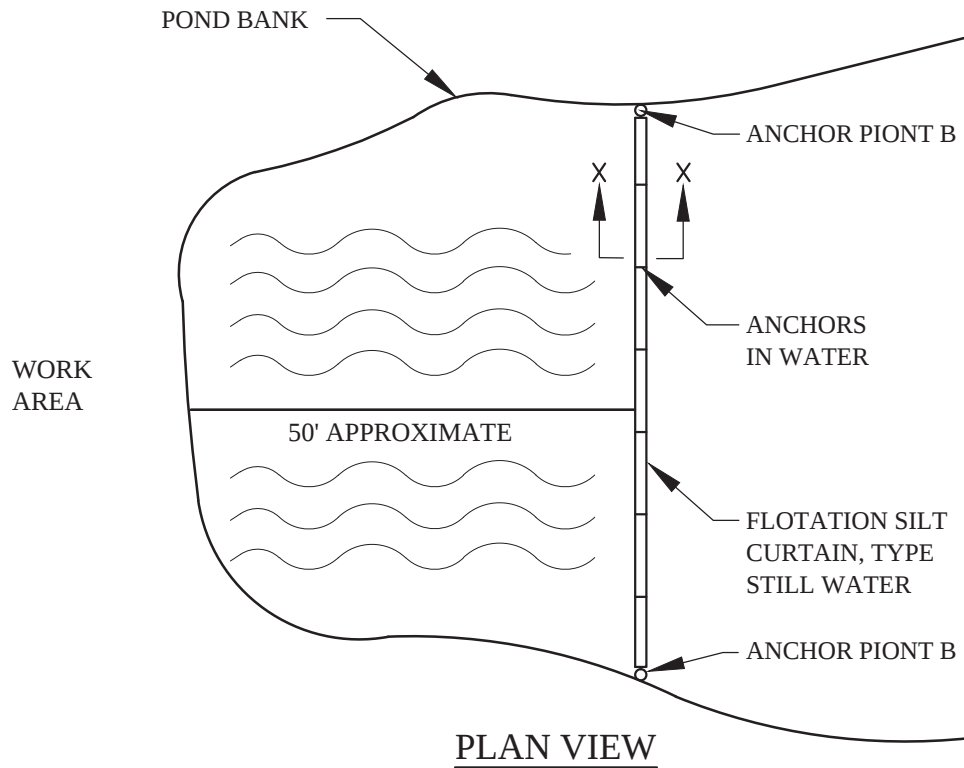
EC - 2

Revision Date

11/2013

File Location:

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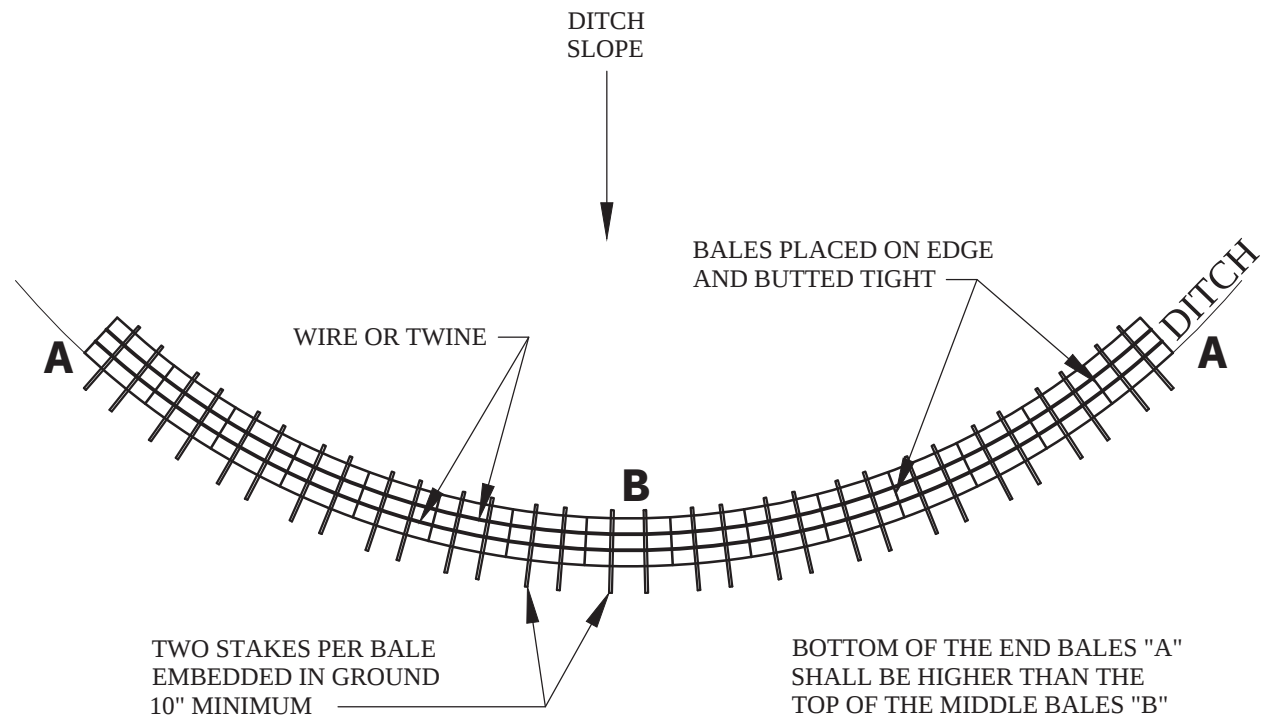


CITY OF BURNSVILLE - ENGINEERING DEPT.

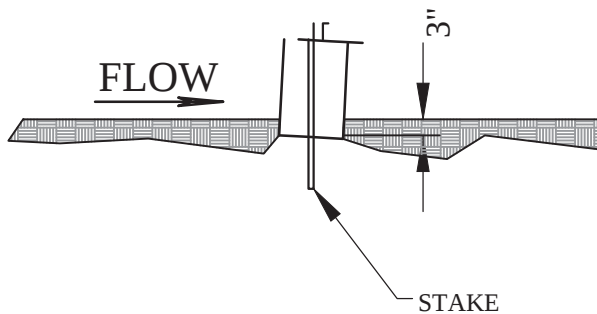
FLOTATION SILT CURTAIN

TYPE STILL WATER

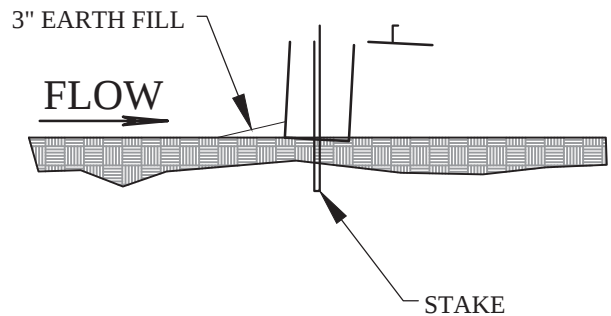
Plate No.	EC - 3
Revision Date	11/2013
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DITCH SECTION



OPTION 1



OPTION 2

PROFILE



CITY OF BURNSVILLE - ENGINEERING DEPT.

BALE CHECK DITCH SECTION

Plate No.

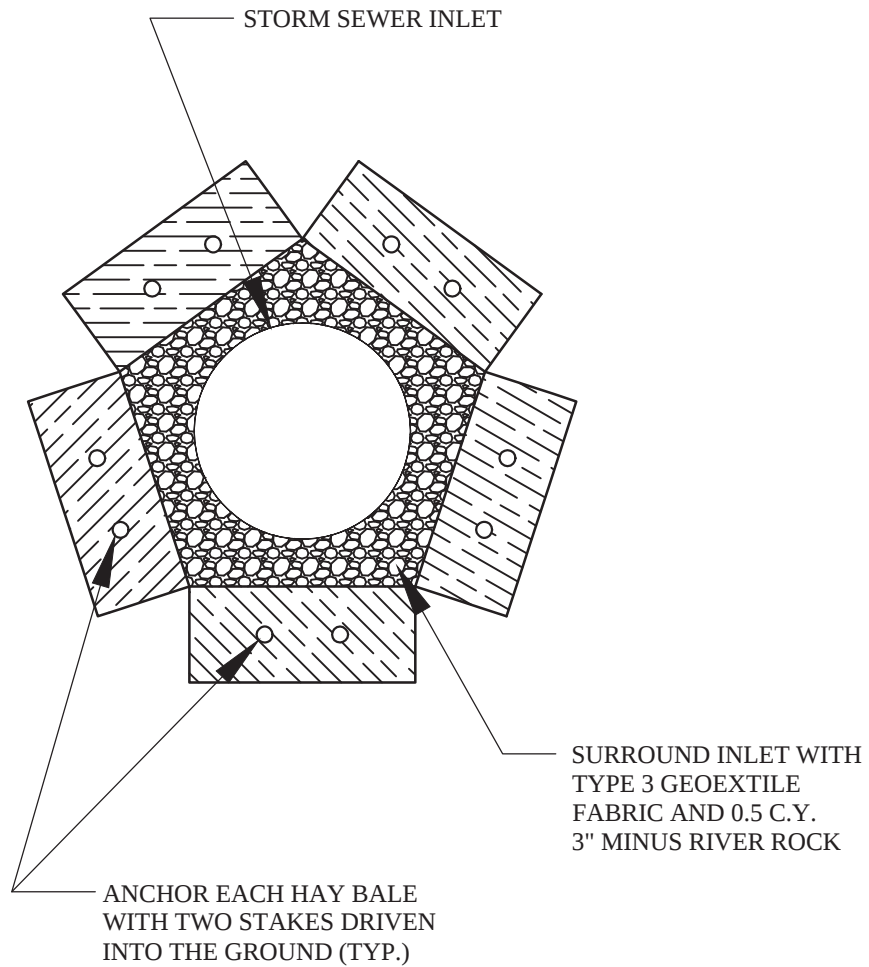
EC - 4

Revision Date

11/2013

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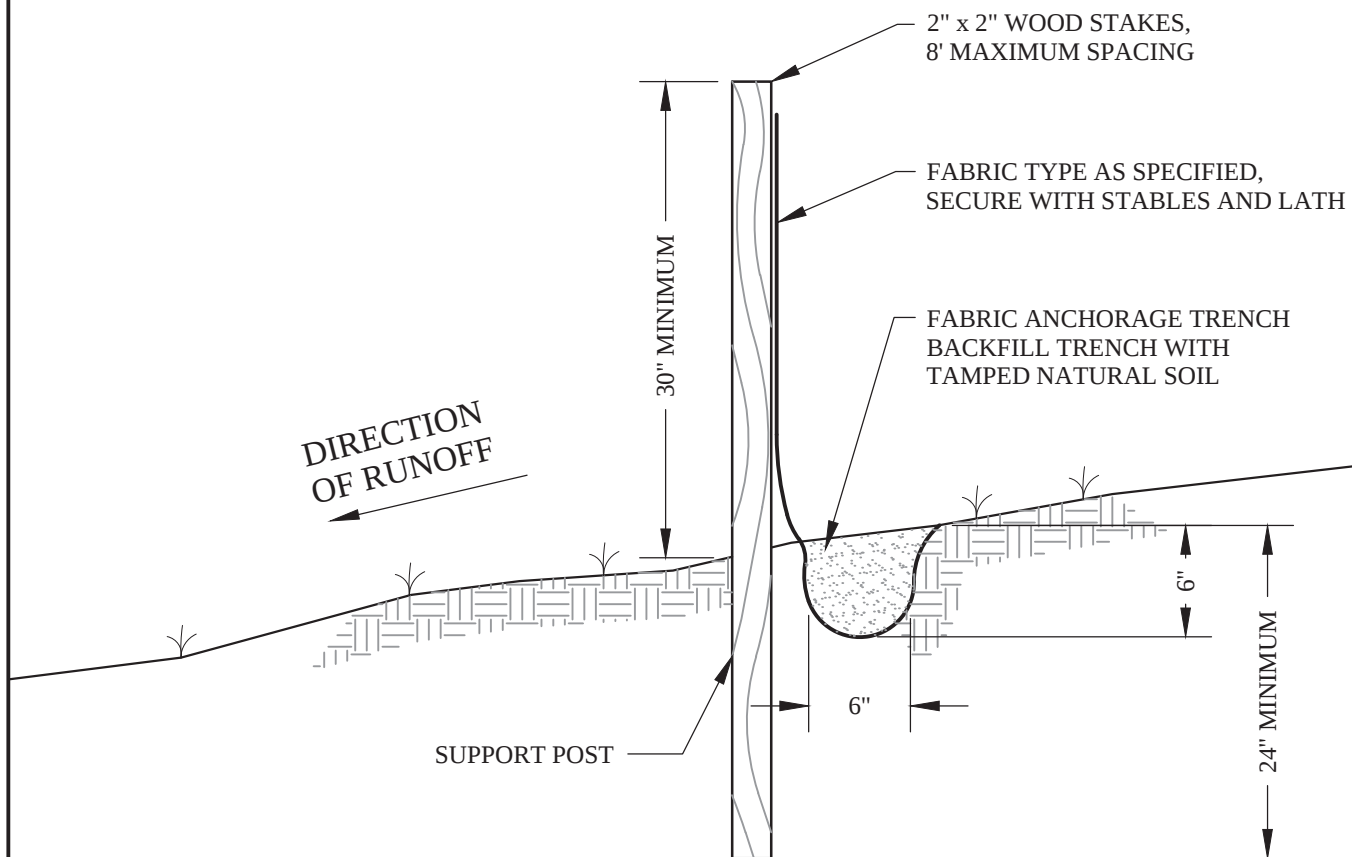
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CITY OF BURNSVILLE - ENGINEERING DEPT.

BALE CHECK INLET PROTECTION

Plate No.	EC - 5
Revision Date	11/2013
File Location: S:\Details\english\Erosion Control\EC05-Bale Check Inlet Protection.dwg	



CITY OF BURNSVILLE - ENGINEERING DEPT.

STANDARD SILT FENCE

Plate No.

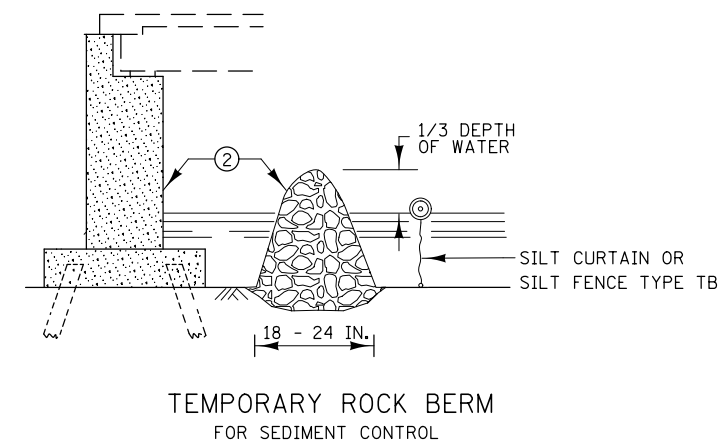
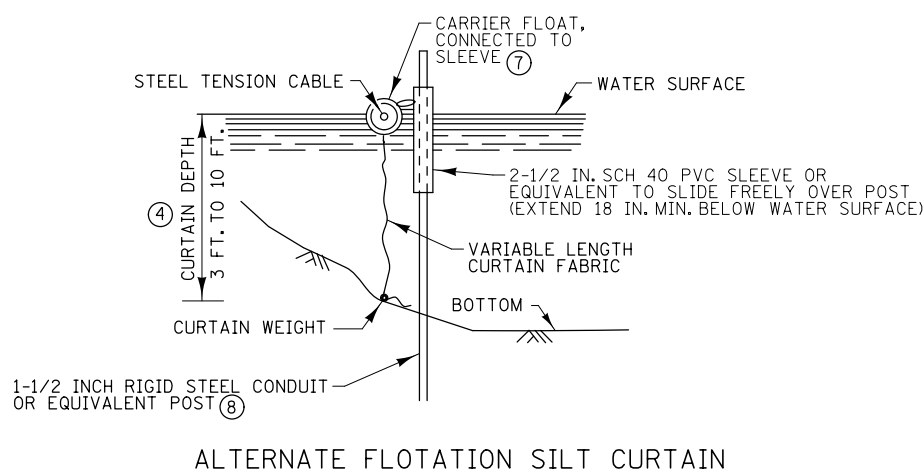
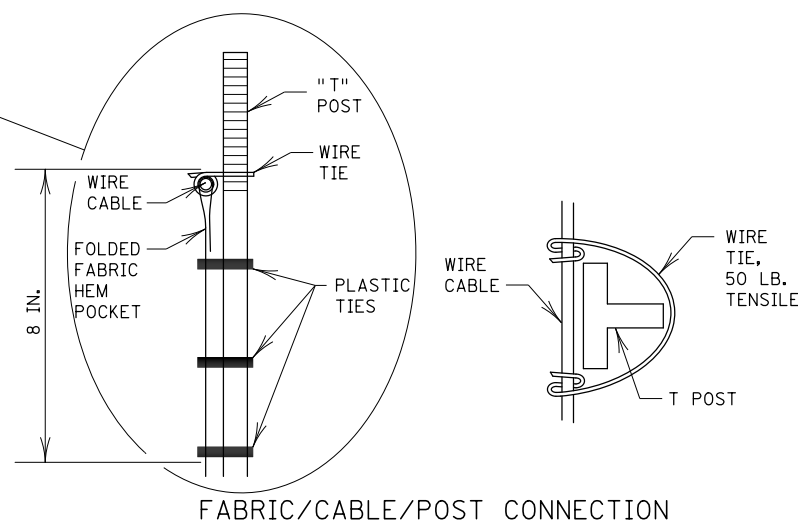
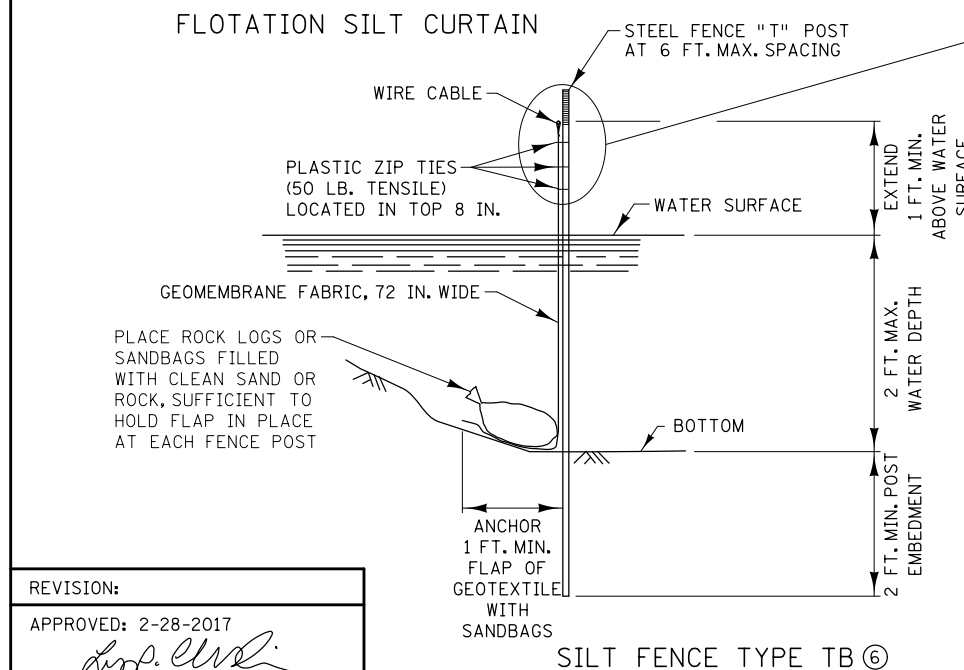
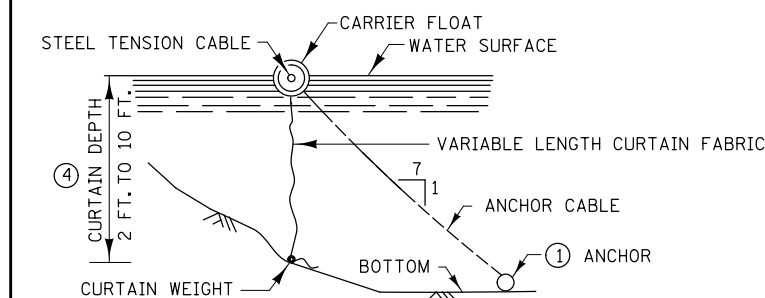
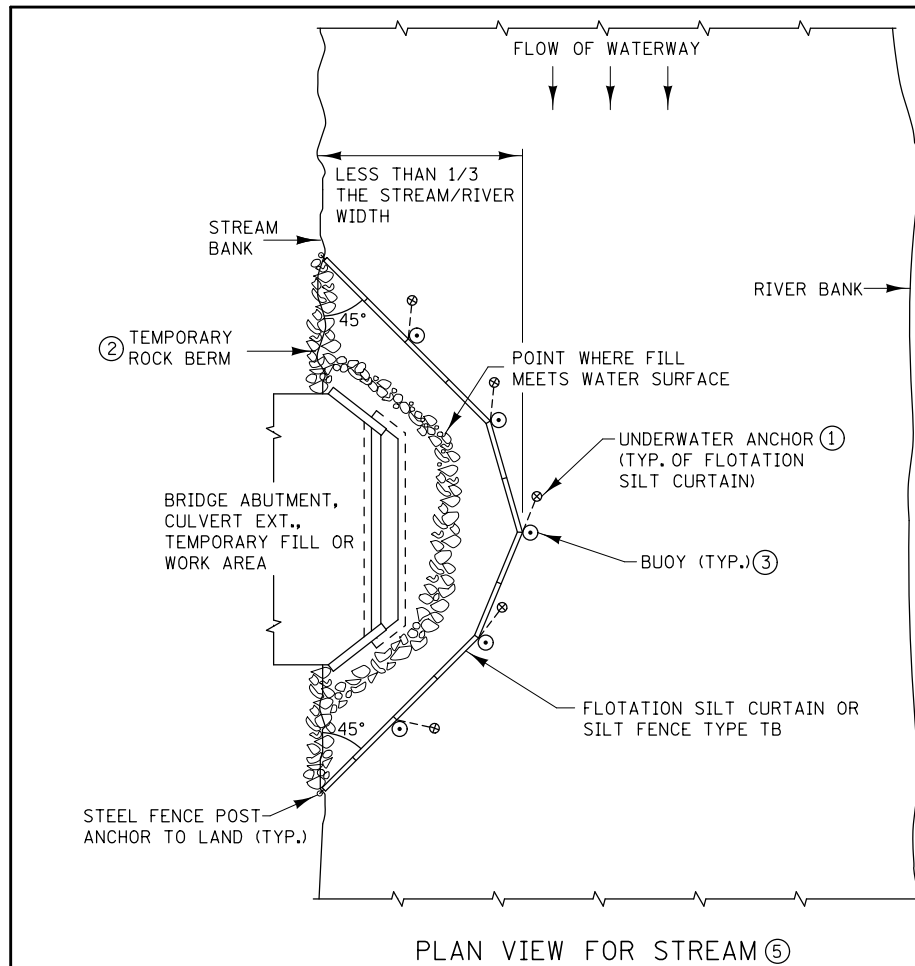
EC - 6

Revision Date

11/2013

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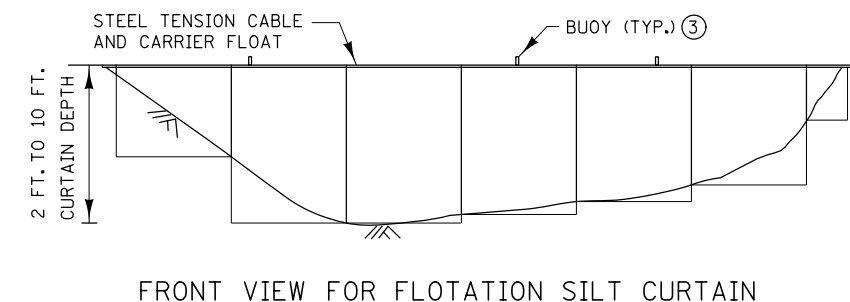
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INSTALLATION GUIDELINES
SILT FENCE TYPE TB
MINIMUM WATER DEPTH: 1 FT.
MAXIMUM WATER DEPTH: 3 FT.
MAXIMUM WATER VELOCITY: 5 FT./SEC.

INSTALLATION GUIDELINES ④
FLOTATION SILT CURTAIN
TYPE: STILL WATER
MINIMUM WATER DEPTH: 3 FT.
MAXIMUM WATER DEPTH: 10 FT.
MAXIMUM WATER VELOCITY: 2 FT./SEC.
MAXIMUM WAVE HEIGHT: 1 FT

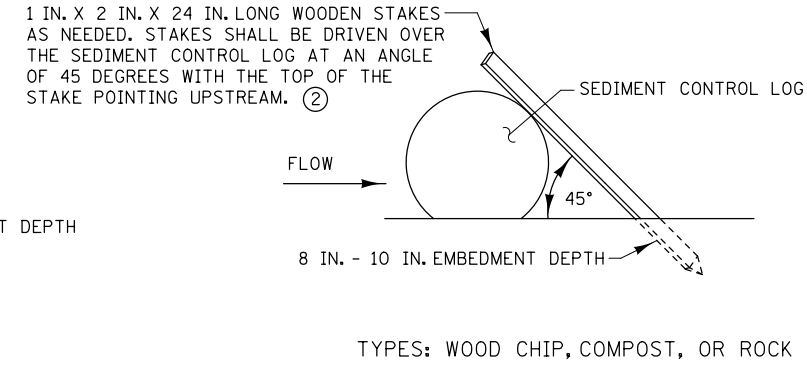
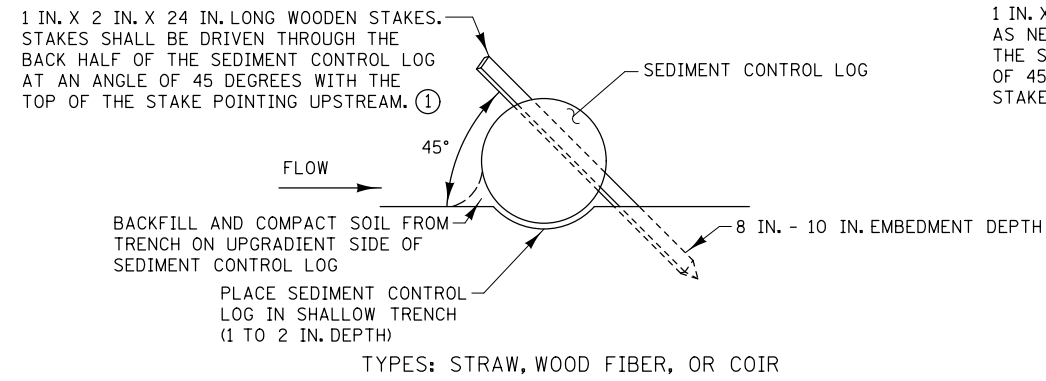
INSTALLATION GUIDELINES ④
FLOTATION SILT CURTAIN
TYPE: MOVING WATER
MINIMUM WATER DEPTH: 3 FT.
MAXIMUM WATER DEPTH: 10 FT.
MAXIMUM WATER VELOCITY: 5 FT./SEC.
MAXIMUM WAVE HEIGHT: 2 FT.



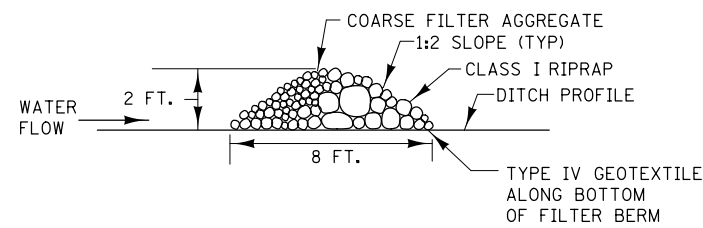
NOTES:

- SEE SPECS. 2573, 3886, 3887 & 3893.
- FOR ANCHOR SPACING AND WEIGHT REQUIREMENTS, SEE SPEC. 2573.
- IN AREAS WHERE THE PLAN CALLS FOR RIPRAP AT A BRIDGE, CULVERT, OR SLOPE, A TEMPORARY ROCK BERM CONSTRUCTED FROM THE RIPRAP CAN BE USED TO PROVIDE ADDITIONAL PROTECTION. WHEN THE WORK IS COMPLETE THE RIPRAP CAN THEN BE MOVED TO THE PERMANENT LOCATION INDICATED IN THE PLANS. THE TEMPORARY ROCK BERM IS INCIDENTAL.
- ON U.S. COAST GUARD OR OTHER MOTORIZED WATERWAYS, BUOYS ARE REQUIRED TO MARK THE ENDS AND SPECIAL AREAS FOR VISIBILITY. PLACE BUOYS AS REQUIRED FOR NAVIGATIONAL PURPOSES.
- MINIMUM WATER DEPTH APPLIES TO THE DEEPEST POINT ALONG THE FLOTATION SILT CURTAIN OR SILT FENCE TYPE TB FOR DETERMINING APPLICABILITY OF FLOTATION SILT CURTAIN OR SILT FENCE TYPE TB.
- SILT CURTAIN SHOULD BE REMOVED WHEN THE AREA CONTRIBUTING DIRECT RUNOFF HAS BEEN TEMPORARILY OR PERMANENTLY STABILIZED. SILT CURTAIN SHOULD ALSO BE REMOVED BEFORE WINTER IF ICE UP OR ICE FLOW IS ANTICIPATED.
- EMBED POST INTO BOTTOM A MINIMUM OF 40% OF THE WATER DEPTH (INCLUDING WAVE HEIGHT), BUT IN NO CASE SHALL EMBEDMENT BE LESS THAN 2 FEET.
- ANCHOR FLOAT MUST BE CONNECTED SECURELY TO SLEEVE WITH A MINIMUM TENSILE STRENGTH OF 100 LBS. CONNECTION METHOD MUST ALLOW FOR SLEEVE TO MOVE FREELY ON POST.
- PROVIDE SUFFICIENT NUMBER OF POST ANCHORS TO MAINTAIN SILT CURTAIN POSITION.

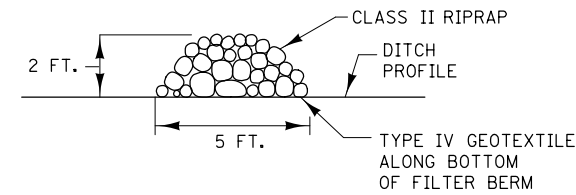
REVISION:
APPROVED: 2-28-2017
CHIEF ENVIRONMENTAL OFFICER



SEDIMENT CONTROL LOGS

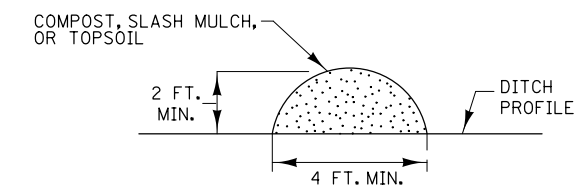


TYPE 3 (ROCK WEEPER)

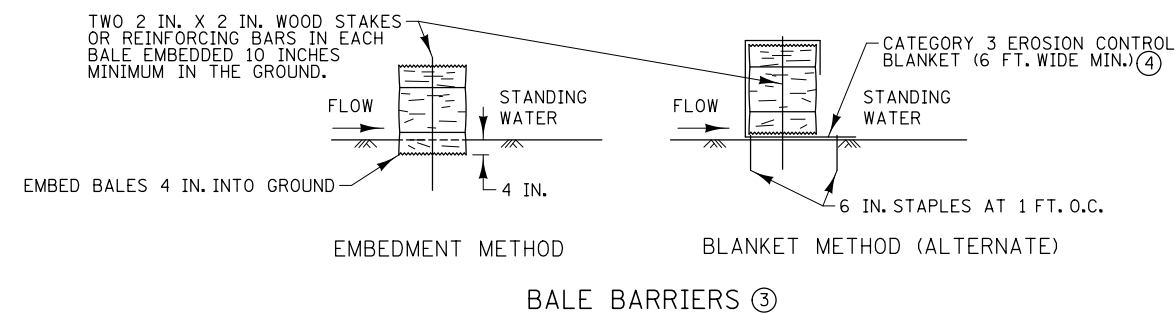


TYPE 5 (ROCK)

FILTER BERMS



TYPE 1 (COMPOST), TYPE 2 (SLASH MULCH), OR TYPE 4 (TOPSOIL)



NOTES:

SEE SPECS. 2573, 3149, 3874, 3882, 3886, & 3897.

- ① SPACE BETWEEN STAKES SHALL BE A MAXIMUM OF 1 FOOT FOR DITCH CHECKS OR 2 FEET FOR OTHER APPLICATIONS.
- ② PLACE STAKES AS NEEDED TO PREVENT MOVEMENT OF SEDIMENT CONTROL LOGS PLACED ON SLOPES OR AS NEEDED DUE TO OTHER FACTORS. STAKES SHALL BE INCIDENTAL.
- ③ TO BE USED FOR CRITICAL PERIMETER CONTROL AREAS WHERE STANDING WATER OCCURS (6 INCH MAX. DEPTH). BALES SHALL CONSIST OF TYPE 1 MULCH OF APPROXIMATELY 14 IN. X 18 IN. X 36 IN. LONG. BALES SHALL BE PLACED ON EDGE AND BUTTED TIGHT TO ADJACENT BALES.
- ④ INSTEAD OF TRENCHING, PLACE BALE ON THE BLANKET AND WRAP BLANKET AROUND THE BALE. PLACE STAKE THROUGH BALE AND BLANKET.

REVISED:

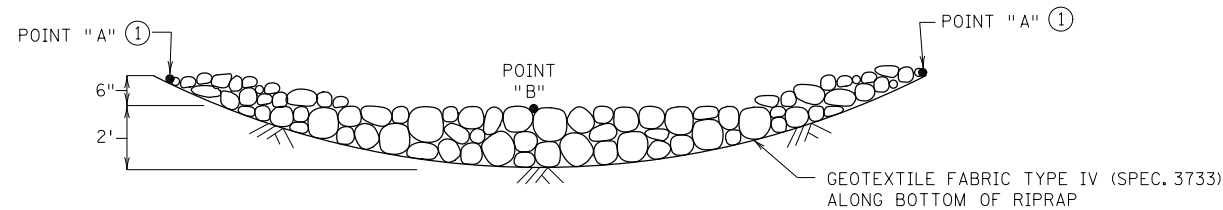
APPROVED:

2-28-2017

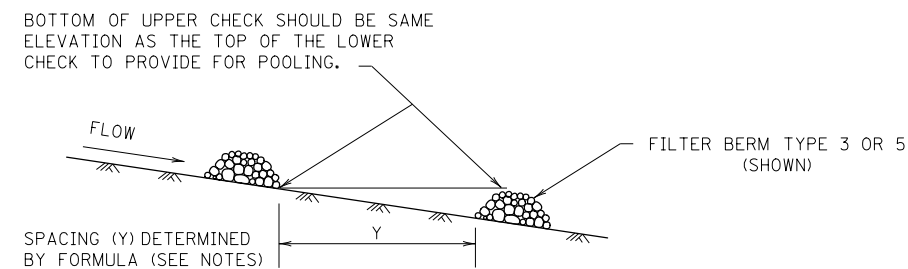
TEMPORARY SEDIMENT CONTROL
FILTER BERMS, SEDIMENT CONTROL LOGS, AND BALE BARRIERS

STANDARD PLAN 5-297.405

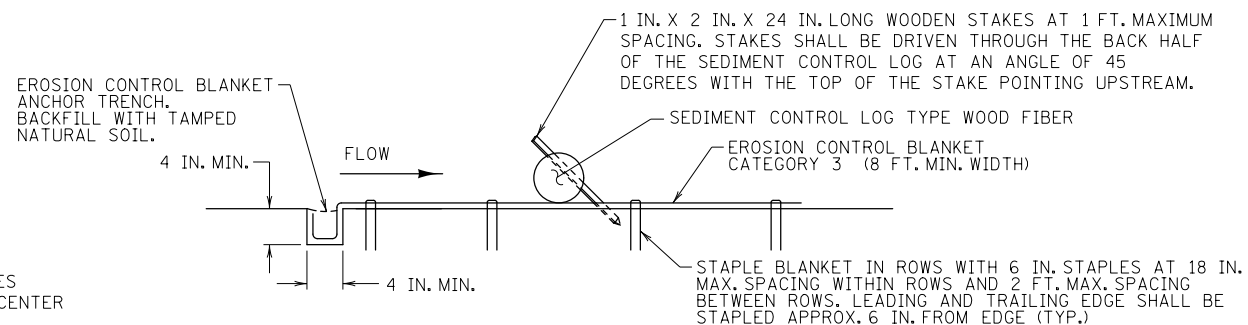
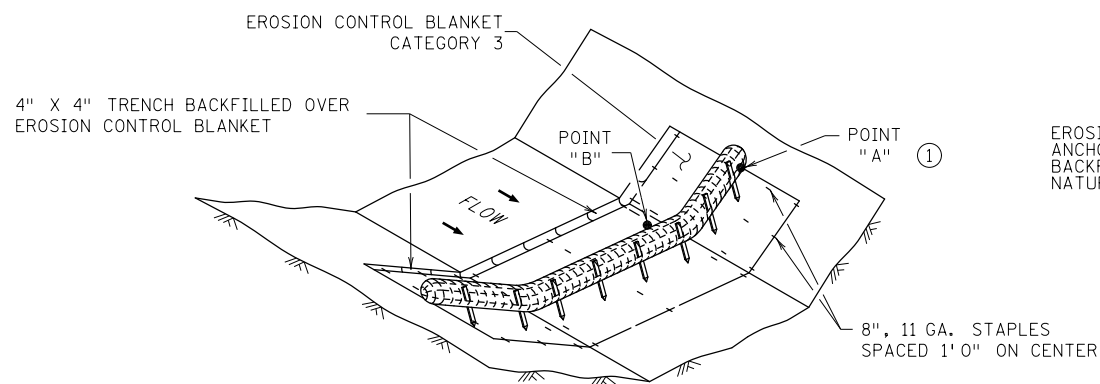
2 OF 8



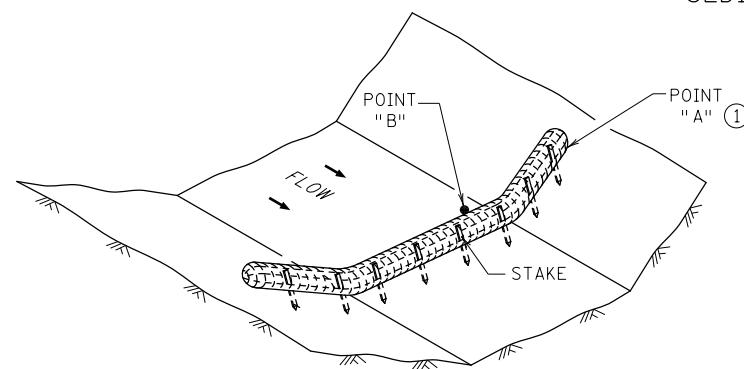
ROCK DITCH CHECKS
FILTER BERMS TYPE 3 (ROCK WEEPER) OR FILTER TYPE 5 (ROCK) ②③
(FOR USE ON ROUGH GRADED AREAS)



DITCH CHECK SPACING
(FOR ALL FILTER BERM TYPES)



SEDIMENT CONTROL LOG TYPE BLANKET SYSTEM ④



SEDIMENT CONTROL LOG TYPE WOOD FIBER, OR TYPE COMPOST ⑤
(FOR USE ON ROUGH GRADED AREAS)

NOTES:

SEE SPECS. 2573, 3601, 3733, 3885, 3886 & 3889.

FOR DITCH CHECKS, PLACE SEDIMENT CONTROL LOG PERPENDICULAR TO FLOW AND IN A CRESCENT SHAPE WITH THE ENDS FACING UPSTREAM.

APPROXIMATE SPACING BETWEEN EACH DITCH CHECK SHOULD BE DETERMINED FROM THE FOLLOWING SPACING FORMULA:

$$\text{APPROXIMATE SPACING OF DITCH CHECKS (FT.)} = Y = \frac{\text{DITCH CHECK HEIGHT (FT)}}{\% \text{ CHANNEL SLOPE}} \times 100$$

- ① POINT "A" MUST BE A MINIMUM OF 6 INCHES HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
- ② PERMANENT ROCK DITCH CHECKS PLACED WITHIN THE CLEAR ZONE ARE TO BE 18" OR LESS IN HEIGHT. A 1:6 APPROACH AND DEPARTURE SLOPE SHALL BE PROVIDED.
- ③ DITCH GRADE 3% - 5%, MAX. FLOW VELOCITY 12 FT./SEC..
- ④ DITCH GRADE 1.5% - 3%, MAX. FLOW VELOCITY 4.5 FT./SEC..
- ⑤ DITCH GRADE 1.5% - 3%, MAX. FLOW VELOCITY 1.5 FT./SEC..

REVISED:

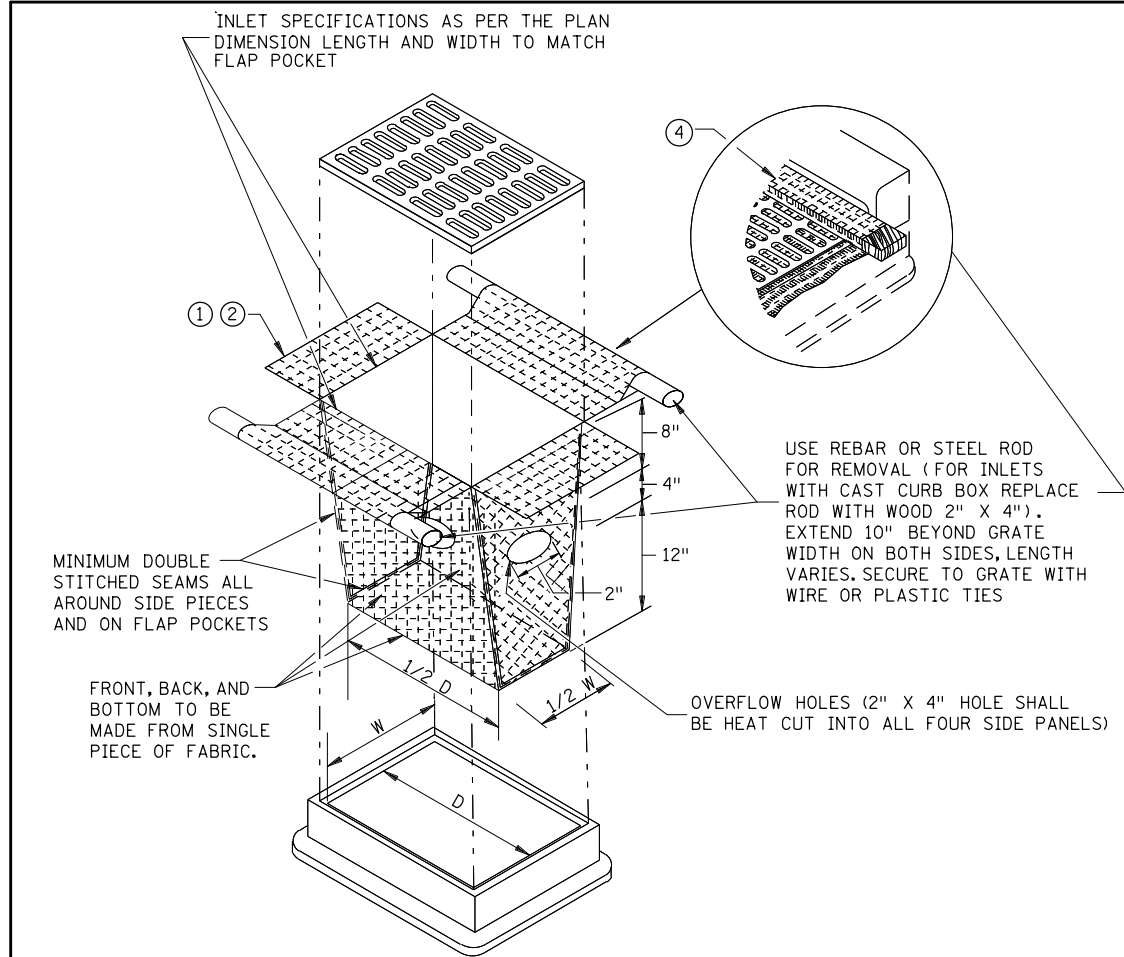
APPROVED:

2-28-2017

TEMPORARY SEDIMENT CONTROL
DITCH CHECK

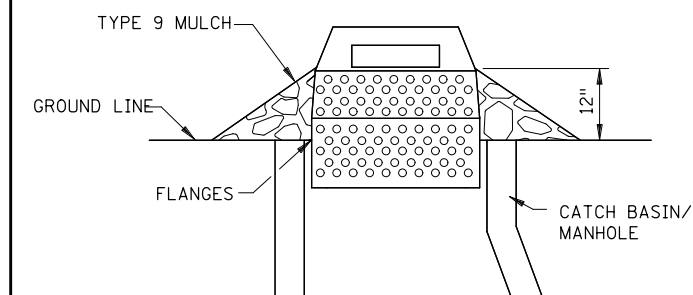
STANDARD PLAN 5-297.405

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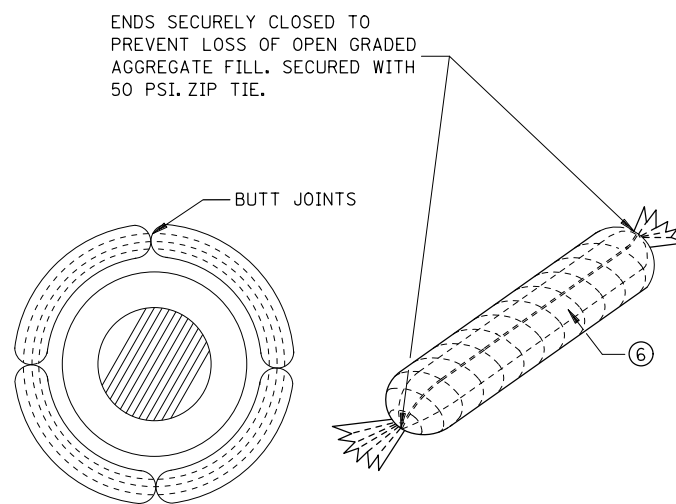
FILTER BAG INSERT ③

(CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX)

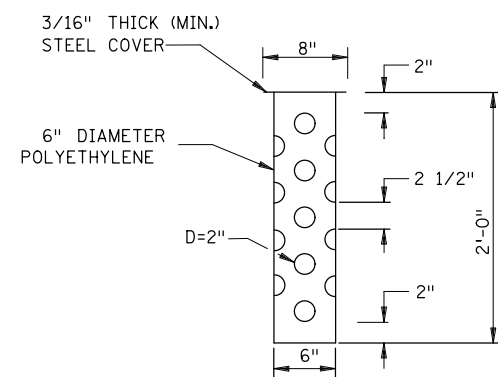


SEDIMENT CONTROL INLET HAT

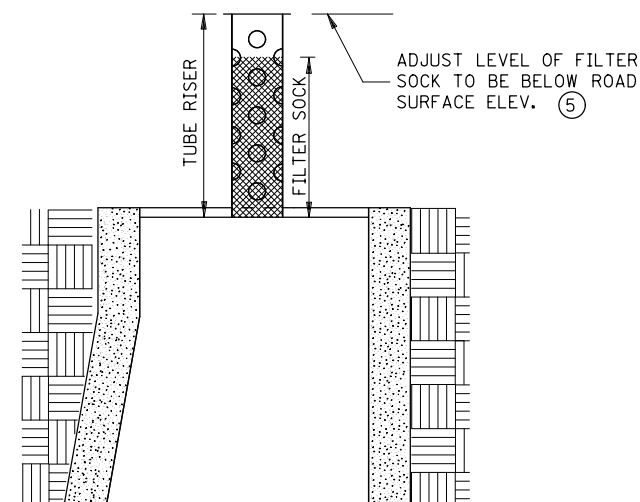
NOTE:
THE SEDIMENT CONTROL BARRIER SHALL BE A METAL OR PLASTIC/POLYETHYLENE RISER SIZED TO FIT INSIDE THE CATCH BASIN/MANHOLE; HAVE PERFORATIONS TO ALLOW FOR WATER INFILTRATION; HAVE AN OVERFLOW OPENING, FLANGES AND A LID/COVER.



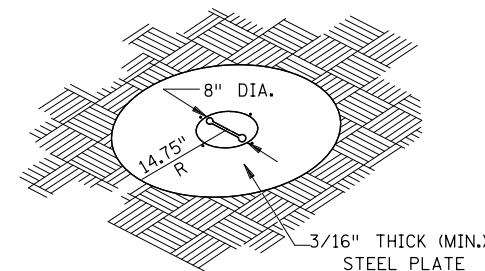
ROCK LOG/COMPOST LOG



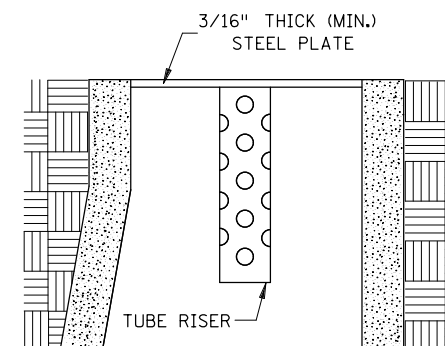
TUBE RISER



**SECTION
(UP POSITION)**

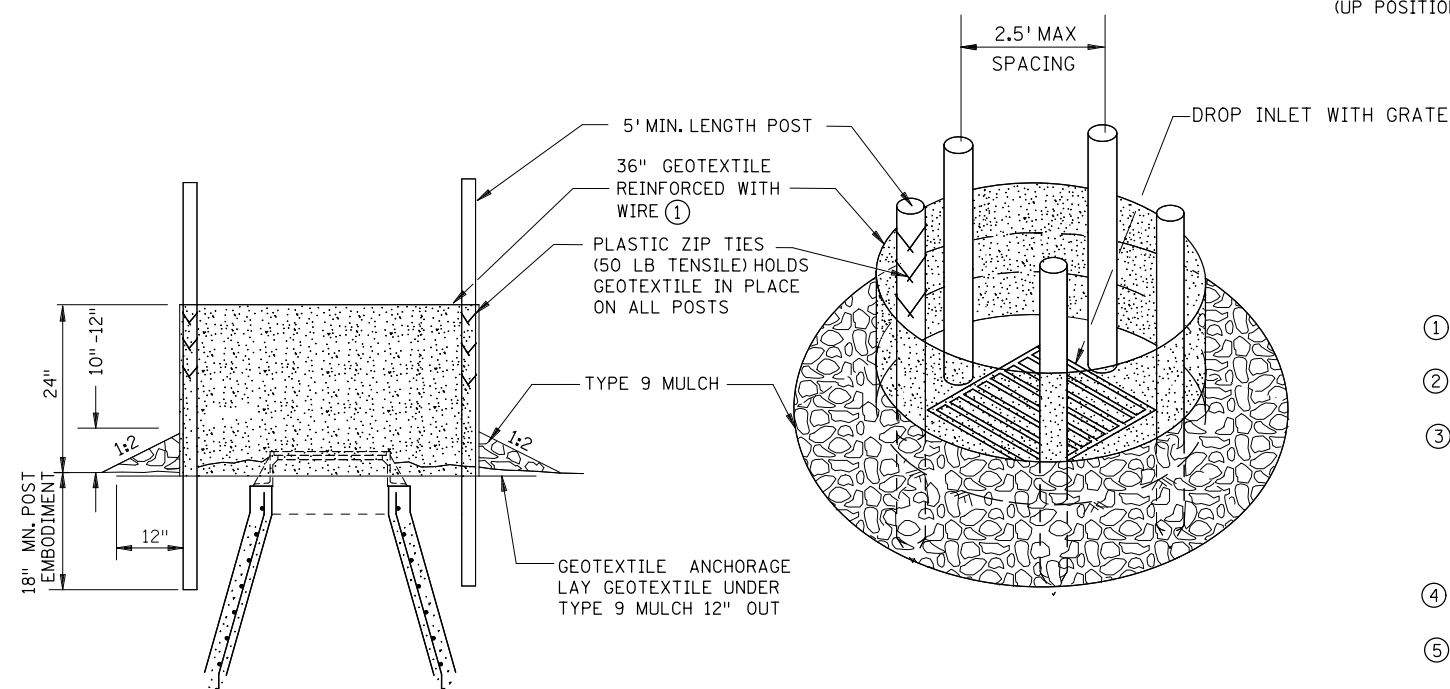


PERSPECTIVE VIEW



**SECTION
(DOWN POSITION)**

POP-UP HEAD



SILT FENCE RING AND ROCK FILTER BERM
USE WHERE INLET DRAINS IN AN AREA WITH SLOPES AT 1:3 OR LESS

NOTES:

SEE SPECS. 2573, 3137, & 3886.

DEVICES MUST BE ADJUSTED ACCORDINGLY AS TO NOT CAUSE FLOODING ON ROADWAY THAT WOULD IMPEED TRAFFIC FLOW.

- ① ALL GEOTEXTILE USED FOR INLET PROTECTION SHALL BE MONOFILAMENT IN BOTH DIRECTIONS, MEETING SPEC. 3886.
- ② FINISHED SIZE, INCLUDING POCKETS WHERE REQUIRED SHALL EXTEND A MINIMUM OF 10 INCHES AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.
- ③ INSTALLATION NOTES:
DO NOT PLACE FILTER BAG INSERT IN INLETS SHALLOWER THAN 30 INCHES, MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE. THE PLACED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE OF 3 INCHES BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES. WHERE NECESSARY THE CONTRACTOR SHALL CLINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3 INCH SIDE CLEARANCE.
- ④ FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2 INCH X 4 INCH OR USE A ROCK SOCK OR SAND BAGS IN PLACE OF THE FLAP POCKETS.
- ⑤ SOCK HEIGHT MUST NOT BE SO HIGH AS TO SLOW DOWN WATER FILTRATION TO CAUSE FLOODING OF THE ROADWAY.
- ⑥ GEOTEXTILE SOCK BETWEEN 4-10 FEET LONG AND 4-6 INCH DIAMETER. SEAM TO BE JOINED BY TWO ROWS OF STITCHING WITH A PLASTIC MESH BACKING OR PROVIDE A HEAT BONDED SEAM (OR APPROVED EQUIVALENT). FILL ROCK LOG WITH OPEN GRADED AGGREGATE CONSISTING OF SOUND DURABLE PARTICLES OF COARSE AGGREGATE CONFORMING TO SPEC. 3137 TABLE 3137-1; CA-3 GRADATION.

REVISION:

APPROVED: 2-28-2017

Dr. P. Elve
CHIEF ENVIRONMENTAL OFFICER

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MINNESOTA
DEPARTMENT
OF
TRANSPORTATION

Rom Sgh
STATE DESIGN ENGINEER

REVISED:

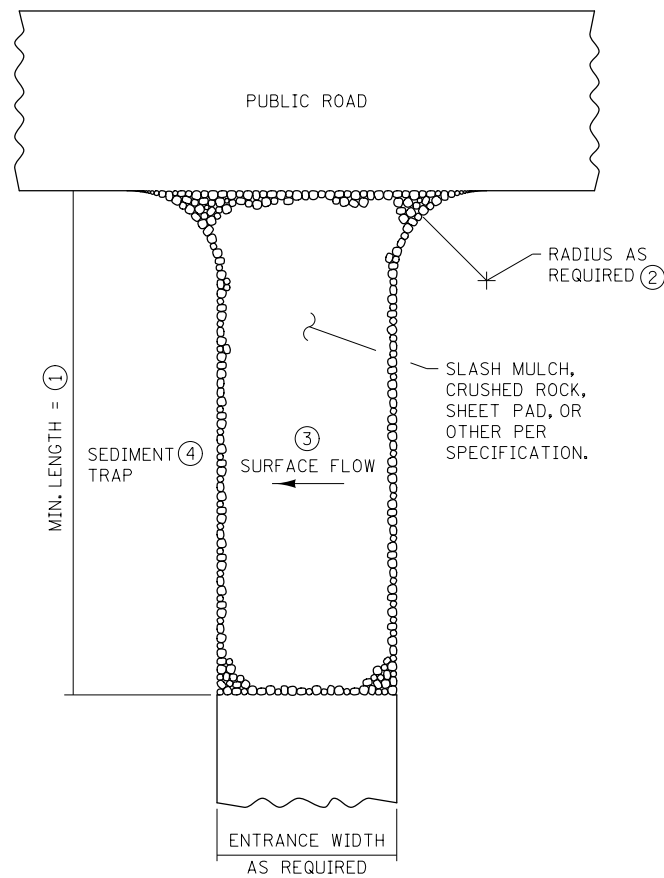
APPROVED:

2-28-2017

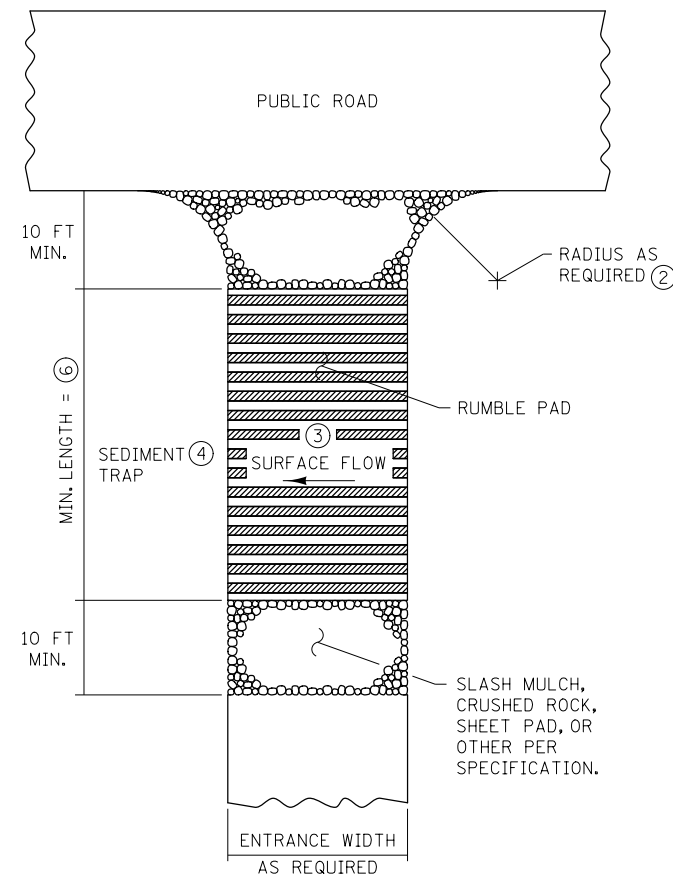
TEMPORARY SEDIMENT CONTROL
STORM DRAIN INLET PROTECTION

STANDARD PLAN 5-297.405

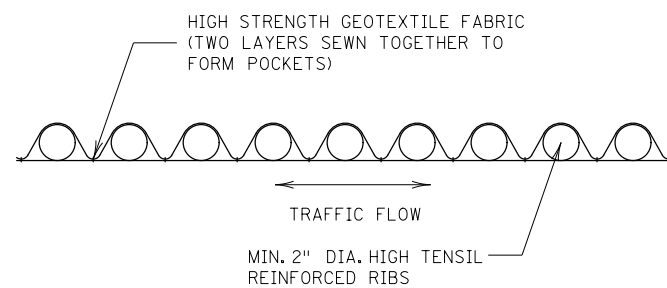
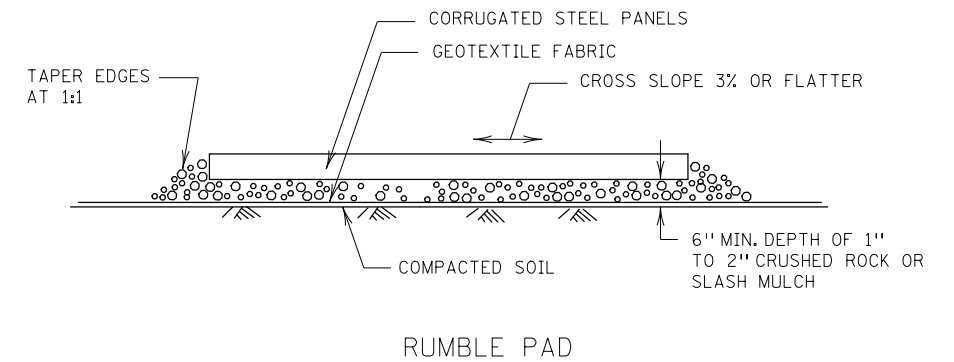
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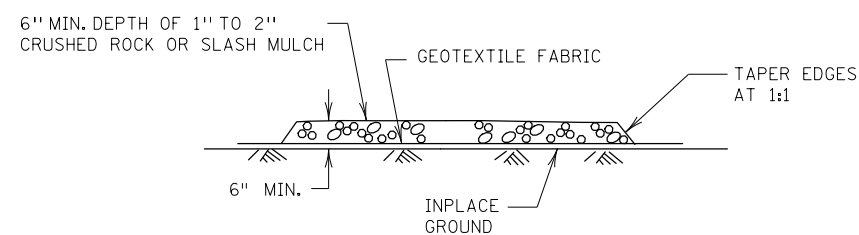
SLASH MULCH, CRUSHED ROCK, OR SHEET PAD CONSTRUCTION EXIT ⑤⑦



RUMBLE PAD CONSTRUCTION EXIT ⑤⑦



SHEET PAD



SLASH MULCH OR CRUSHED ROCK

NOTES:

SEE SPECS. 2573 & 3882.

- ① MINIMUM LENGTH SHALL BE THE GREATER OF 50 FEET OR A LENGTH SUFFICIENT TO ALLOW A MINIMUM OF 5 TIRE ROTATIONS ON THE PROVIDED PAD. MINIMUM LENGTH SHALL BE CALCULATED USING THE LARGEST TIRE WHICH WILL BE USED IN TYPICAL OPERATIONS.
- ② PROVIDE RADIUS OR WIDEN PAD SUFFICIENTLY TO PREVENT VEHICLE TIRES FROM TRACKING OFF OF PAD WHEN LEAVING SITE.
- ③ IF RUNOFF FROM DISTURBED AREAS FLOWS TOWARD CONSTRUCTION EXITS, PREVENT RUNOFF FROM DRAINING DIRECTLY TO PUBLIC ROAD OVER CONSTRUCTION EXIT BY CROWNING THE EXIT OR SLOPING TO ONE SIDE. IF SURFACE GRADING IS INSUFFICIENT, PROVIDE OTHER MEANS OF INTERCEPTING RUNOFF.
- ④ IF RUNOFF FROM CONSTRUCTION EXITS WILL DRAIN OFF OF PROJECT SITE, PROVIDE SEDIMENT TRAP WITH STABILIZED OVERFLOW.
- ⑤ IF A TIRE WASH OFF IS REQUIRED THE CONSTRUCTION EXITS SHALL BE GRADED TO DRAIN THE WASH WATER TO A SEDIMENT TRAP.
- ⑥ MINIMUM LENGTH OF RUMBLE PAD SHALL BE 20 FEET, OR AS REQUIRED TO REMOVE SEDIMENT FROM TIRES. IF SIGNIFICANT SEDIMENT IS TRACKED FROM THE SITE, THE RUMBLE PAD SHALL BE LENGTHENED OR THE DESIGN MODIFIED TO PROVIDE ADDITIONAL VIBRATION. WASH-OFF LENGTH SHALL BE AS REQUIRED TO EFFECTIVELY REMOVE CONSTRUCTION SEDIMENT FROM VEHICLE TIRES.
- ⑦ MAINTENANCE OF CONSTRUCTION EXITS SHALL OCCUR WHEN THE EFFECTIVENESS OF SEDIMENT REMOVAL HAS BEEN REDUCED. MAINTENANCE SHALL CONSIST OF REMOVING SEDIMENT AND CLEANING THE MATERIALS OR PLACING ADDITIONAL MATERIAL (SLASH MULCH OR CRUSHED ROCK) OVER SEDIMENT FILLED MATERIAL TO RESTORE EFFECTIVENESS.

REVISION:

APPROVED: 2-28-2017

[Signature]
CHIEF ENVIRONMENTAL OFFICER

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MINNESOTA
DEPARTMENT
OF
TRANSPORTATION

[Signature]
STATE DESIGN ENGINEER

REVISED:

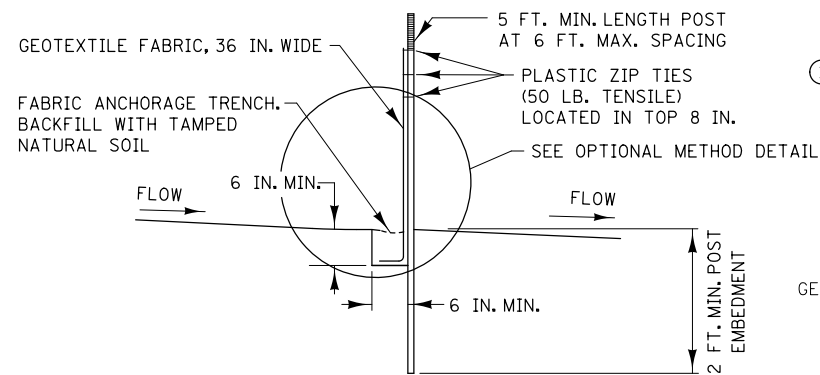
APPROVED:

2-28-2017

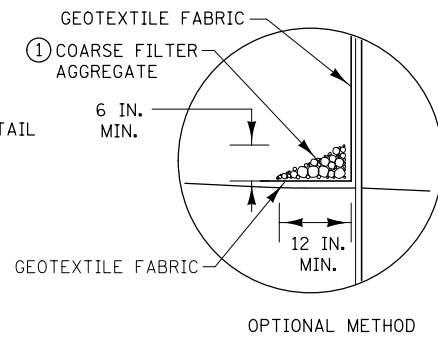
TEMPORARY SEDIMENT CONTROL
STABILIZED CONSTRUCTION EXIT

STANDARD PLAN 5-297.405

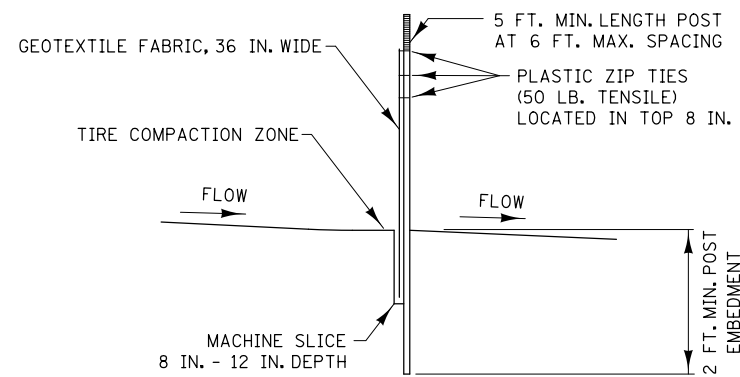
5 OF 8



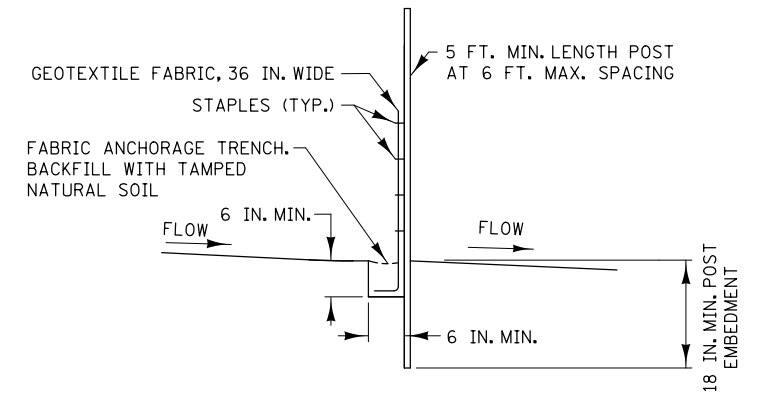
SILT FENCE TYPE HI ②
(HAND INSTALLED)



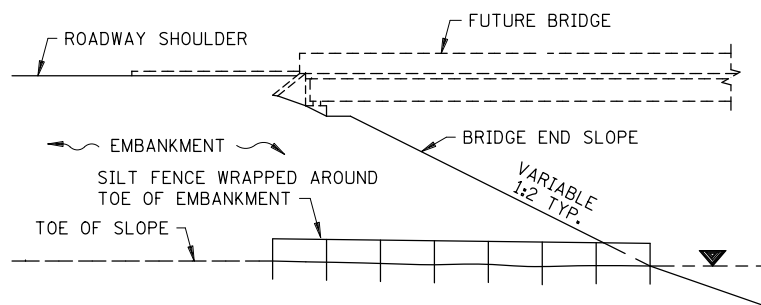
OPTIONAL METHOD



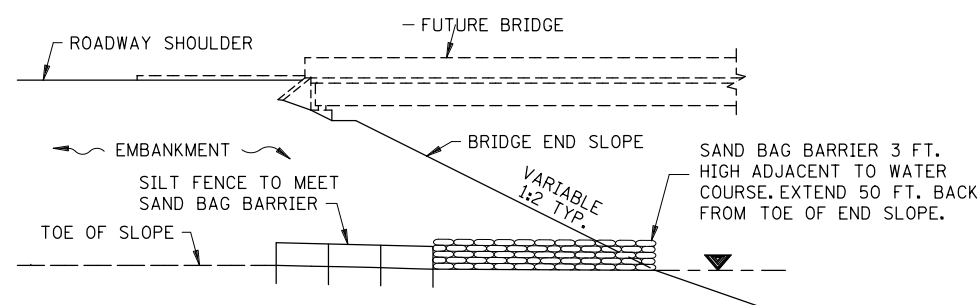
SILT FENCE TYPE MS ②
(MACHINE SLICED)



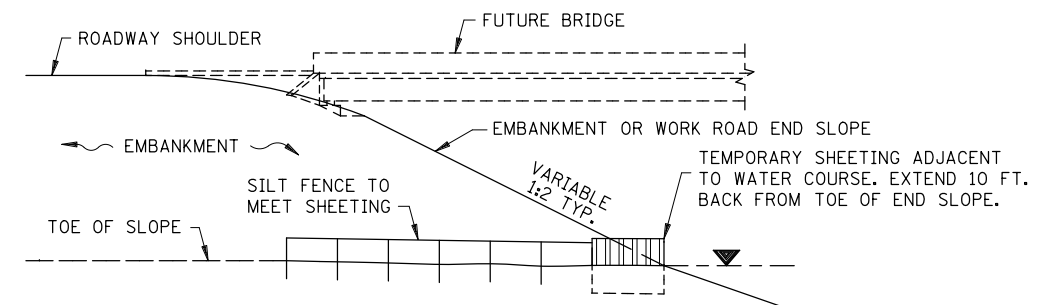
SILT FENCE TYPE PA ③
(PREASSEMBLED)



SILT FENCE ONLY ④

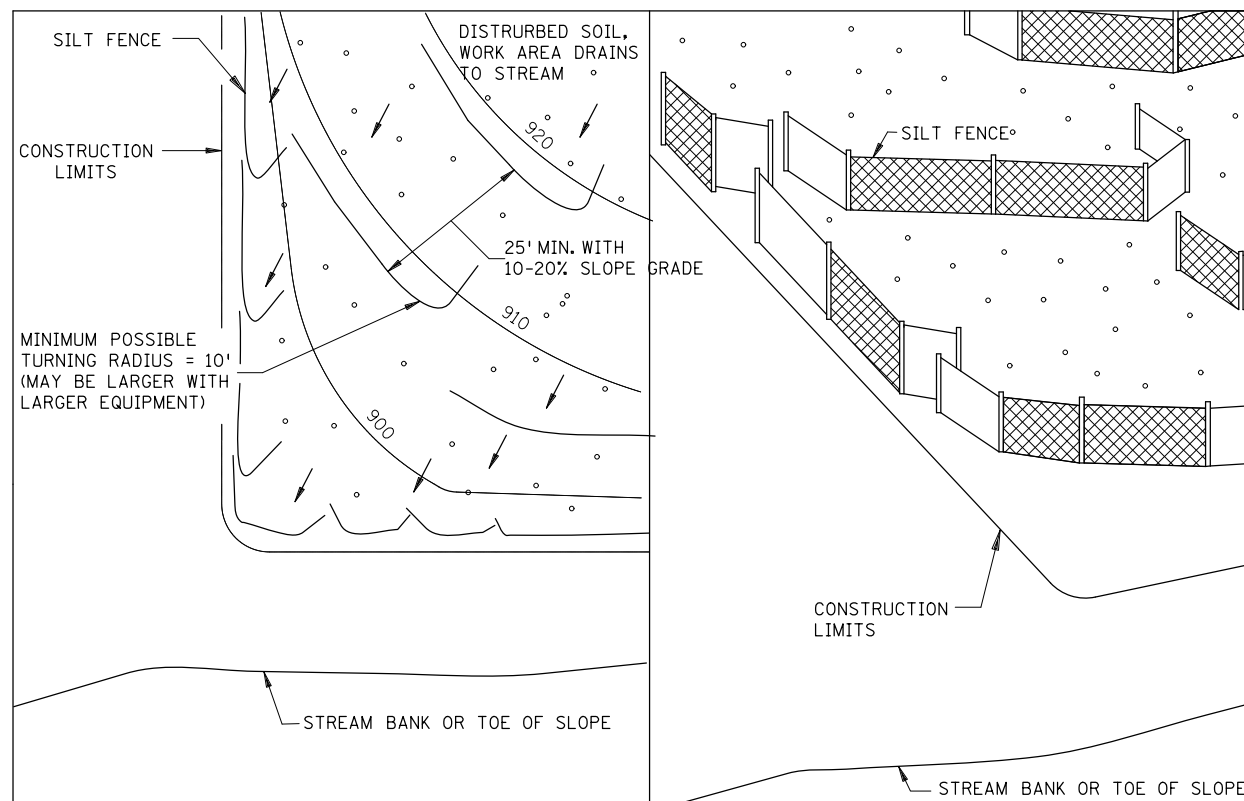


SILT FENCE WITH SAND BAGS ⑤



SILT FENCE WITH SHEETING ⑥

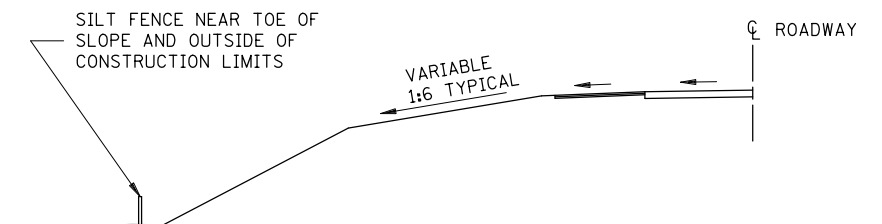
INSTALLATION AT BRIDGE EMBANKMENT ADJACENT TO WATER



PLAN VIEW

PERSPECTIVE VIEW

J-HOOK INSTALLATION



LOCATION AT TOE OF ROADWAY EMBANKMENT

NOTES:

SEE SPECS. 2573, 3149 & 3886.

- ① COARSE FILTER AGGREGATE (SPEC. 3149) SHALL BE INCIDENTAL.
- ② TO PROTECT AREAS FROM SHEET FLOW. MAXIMUM CONTRIBUTING AREA: 1 ACRE.
- ③ TO PROTECT AREAS FROM SHEET FLOW. MAXIMUM CONTRIBUTING AREA: 0.25 ACRE.
- ④ WATER COURSE FLOW VELOCITY: STANDING. CONTRIBUTING SLOPE AREA: 1/2 ACRE.
- ⑤ WATER COURSE FLOW VELOCITY: 1 TO 7 FT./SEC. CONTRIBUTING SLOPE AREA: 1 ACRE.
- ⑥ WATER COURSE FLOW VELOCITY: 8 TO 15 FT./SEC. CONTRIBUTING SLOPE AREA: 3 ACRES.

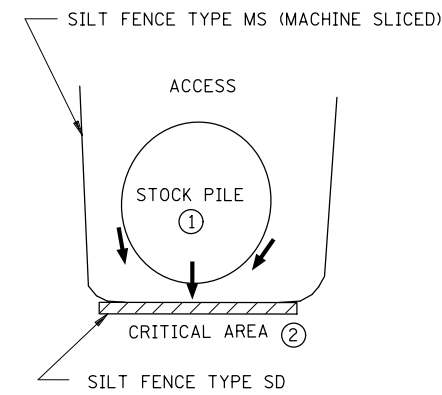
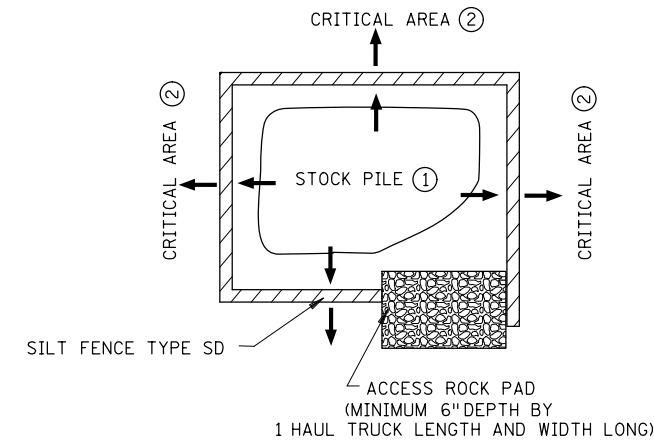
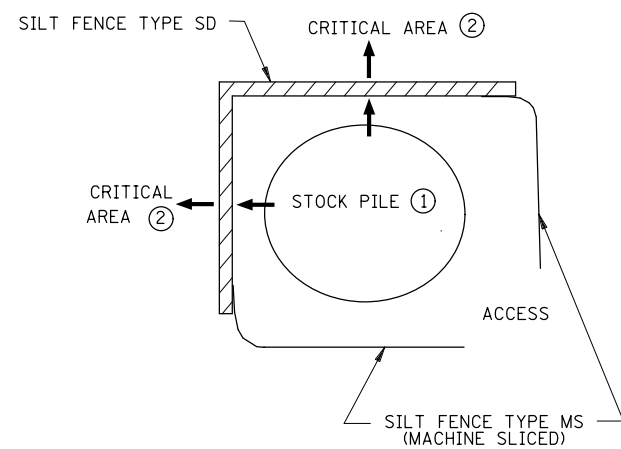
REVISION:
APPROVED: 2-28-2017
CHIEF ENVIRONMENTAL OFFICER

MINNESOTA
DEPARTMENT
OF
TRANSPORTATION

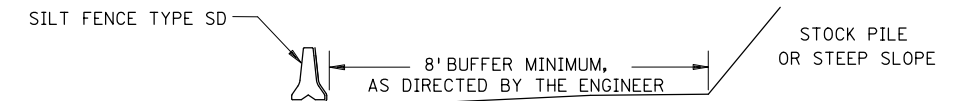
STATE DESIGN ENGINEER

REVISED:
APPROVED:
2-28-2017

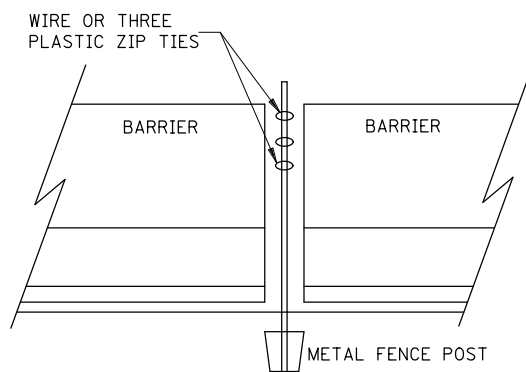
TEMPORARY SEDIMENT CONTROL
SILT FENCE
STANDARD PLAN 5-297.405
6 OF 8



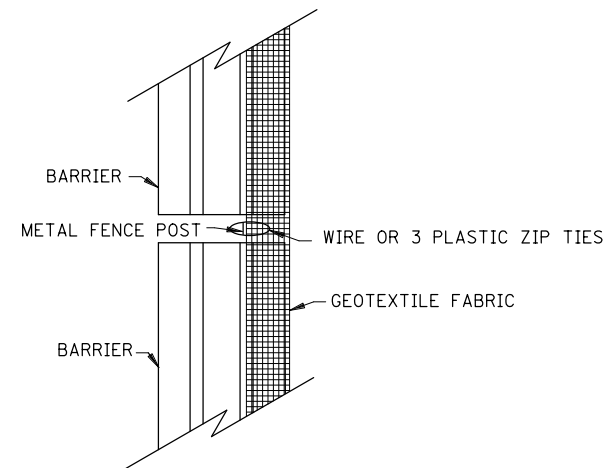
STOCK PILE CONTAINMENT



STOCKPILE SEDIMENT CONTROL

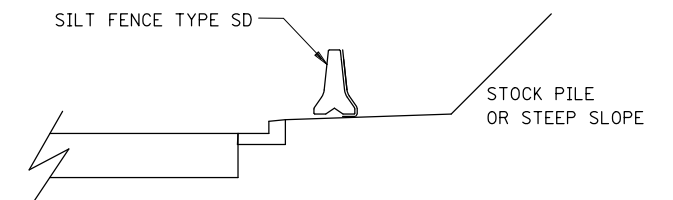


PROFILE VIEW

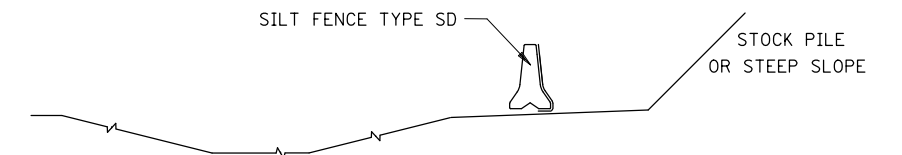


TOP VIEW

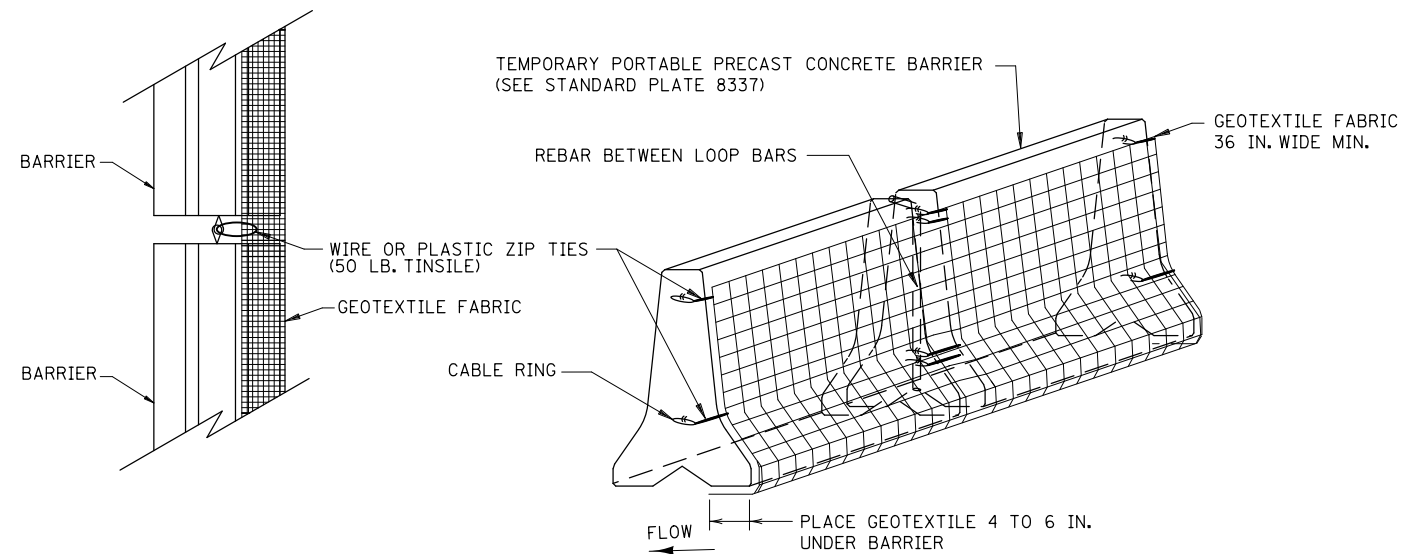
SILT FENCE TYPE SD (SUPER DUTY) BARRIER WITHOUT LOOP BARS



CURB AND GUTTER PROTECTION SYSTEM



DITCH PROTECTION SYSTEM



TOP VIEW

PERSPECTIVE VIEW

SILT FENCE TYPE SD (SUPER DUTY) BARRIER WITH LOOP BARS

NOTES:

SEE SPECS. 2533, 2573 & 3886.

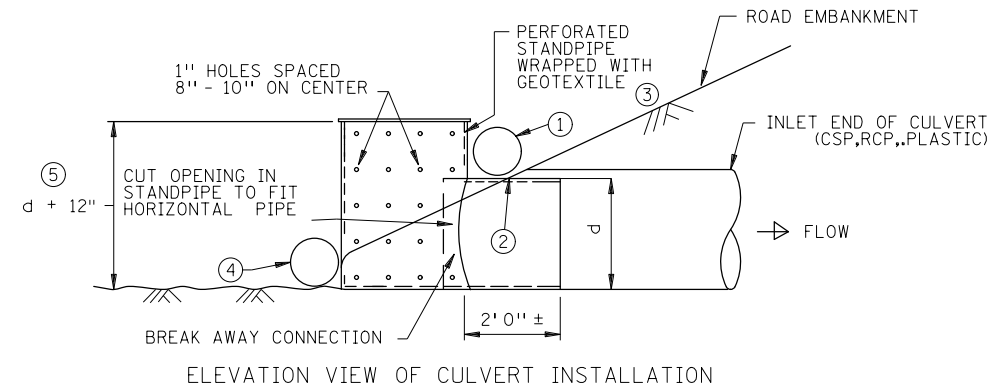
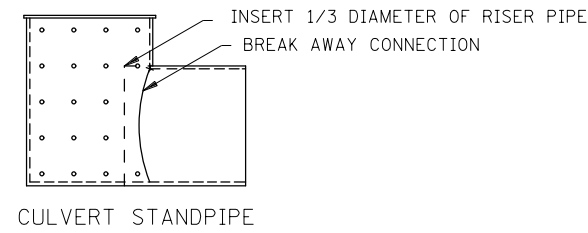
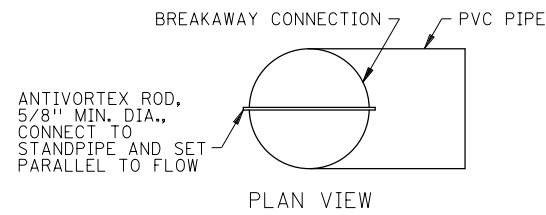
SILT FENCE TYPE SD USED TO PROTECT CRITICAL AREAS FROM SHEET FLOW, AND AREAS WHERE OTHER SILT FENCES CANNOT BE PLACED. MAXIMUM CONTRIBUTING AREA: 1 ACRE.

PLACE SILT FENCE TYPE SD ALONG A CONSTANT ELEVATION.

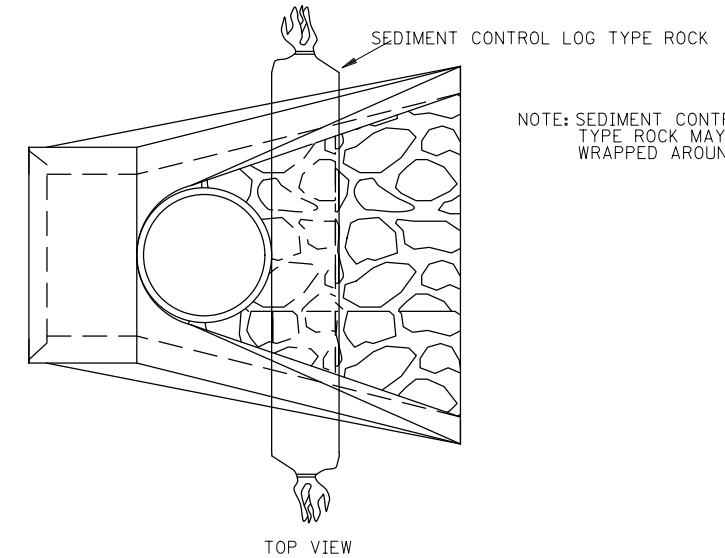
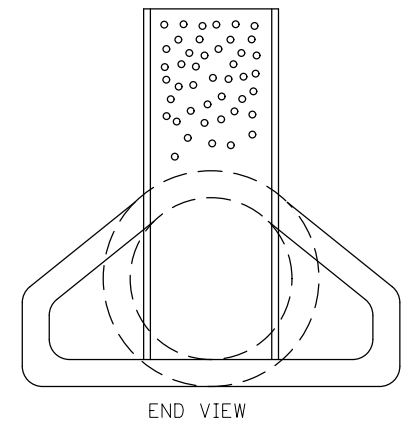
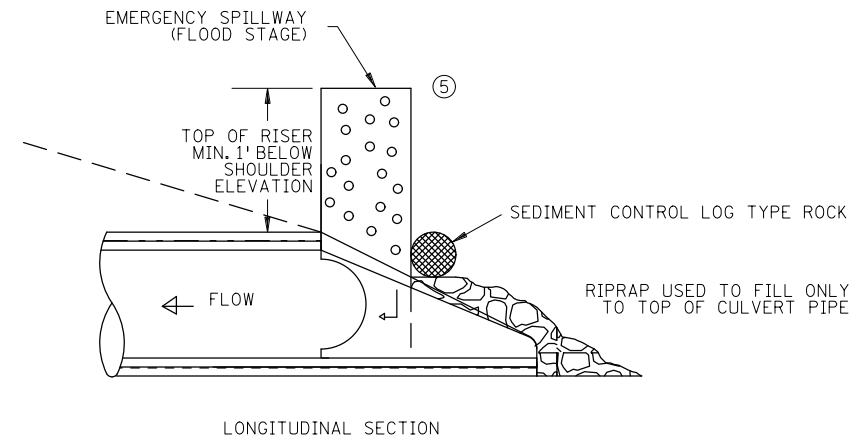
SILT FENCE TYPE SD CAN UTILIZE EITHER A CONCRETE, OR WATER FILLED, TEMPORARY MEDIAN BARRIER.

① PLACING STOCK PILES NEXT TO AN ENVIRONMENTALLY SENSITIVE AREA IS NOT RECOMMENDED. WHEN THERE ARE NO FEASIBLE ALTERNATIVES, PLACE SILT FENCE SD AS SHOWN OR AS DIRECTED BY THE ENGINEER.

② CRITICAL AREAS INCLUDE WETLANDS, JUDICIAL DITCHES, STREAMS, WATER BODIES, AND OTHER AREAS REQUIRING PROTECTION.

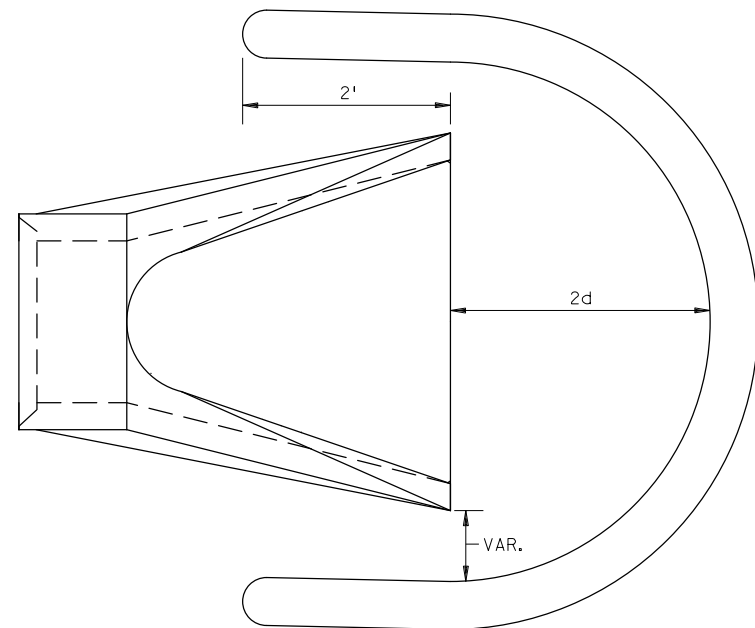


CULVERT STANDPIPE INSERT (D-RISER)
d= CULVERT SIZE: 12" - 36"

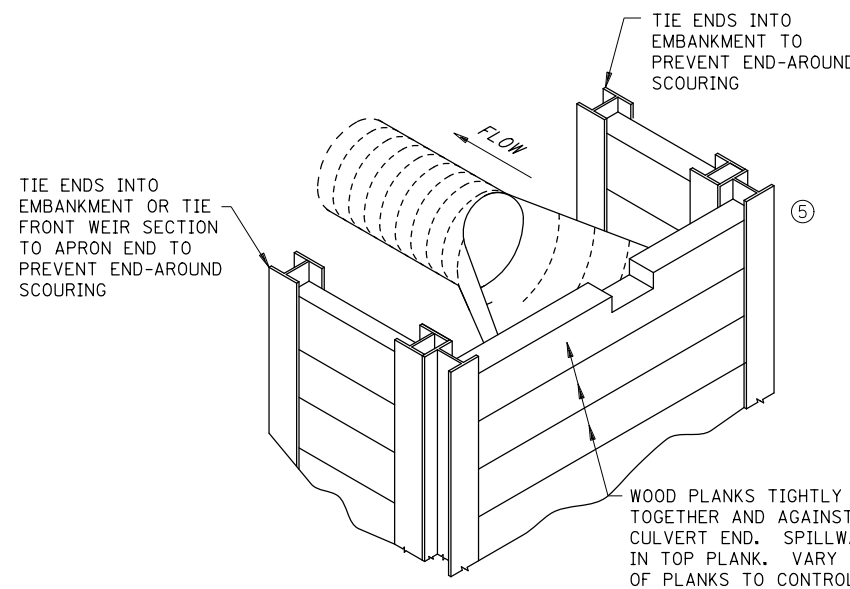


CULVERT STANDPIPE INSERT (D-RISER)

NOTE: SEDIMENT CONTROL LOG TYPE ROCK MAY BE WRAPPED AROUND RISER



SEDIMENT CONTROL LOG WEIR
(COMPOST, WOOD CHIP, OR ROCK)
d = CULVERT SIZE: 12" - 36"



WOOD PLANK WEIR

NOTES:

SEE SPECS. 2573, 3891 & 3893.

FOR USE WHEN TEMPORARY PONDING IS NEEDED IN DITCH SECTIONS FOR SEDIMENT CONTROL.

MANUFACTURED ALTERNATIVES LISTED ON MnDOT'S APPROVED PRODUCTS LIST MAY BE SUBSTITUTED AT NO ADDITIONAL COST.

- ① ROCK LOG OR SANDBAG TO HOLD STANDPIPE AND ACT AS A SEAL BETWEEN RISER PIPE AND CULVERT.
- ② PLACE CULVERT APRON AND SLIDE TEMPORARY STANDPIPE INTO CSP OR RCP CULVERT.
- ③ ALL GEOTEXTILE USED FOR CULVERT PROTECTION SHALL BE MONOFILAMENT IN BOTH DIRECTIONS, MEETING SPEC. 3886 FOR MACHINE SLICED.
- ④ ROCK LOG OR RIP RAP TO HOLD STANDPIPE AND ACT AS A FILTER BETWEEN RISER PIPE AND CULVERT.
- ⑤ HEIGHT OVERFLOW NOT TO CAUSE FLOODING OF ROAD OR ADJACENT PROPERTIES.

REVISION:

APPROVED: 2-28-2017

[Signature]
CHIEF ENVIRONMENTAL OFFICER

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MINNESOTA
DEPARTMENT
OF
TRANSPORTATION

[Signature]
STATE DESIGN ENGINEER

REVISED:

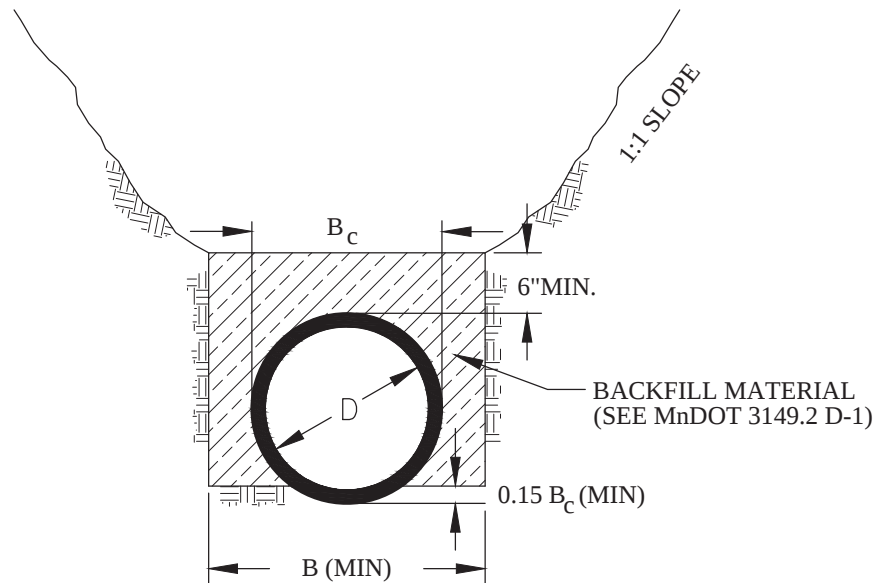
APPROVED:

2-28-2017

TEMPORARY SEDIMENT CONTROL
CULVERT END CONTROLS

STANDARD PLAN 5-297.405

8 OF 8



SHAPED SUBGRADE

Pipe Dia. (D)	B
36" or less	$B_c + 24"$
42" - 54"	$1.5 \times B_c$
60" & Over	$B_c + 36"$

LEGEND

B_c = OUTSIDE DIAMETER

B = WIDTH OF TRENCH BOTTOM (SEE TABLE)

D = INSIDE DIAMETER



CITY OF BURNSVILLE - ENGINEERING DEPT.
CLASS C PIPE BEDDING
RCP/DIP CIRCULAR PIPE

Plate No.

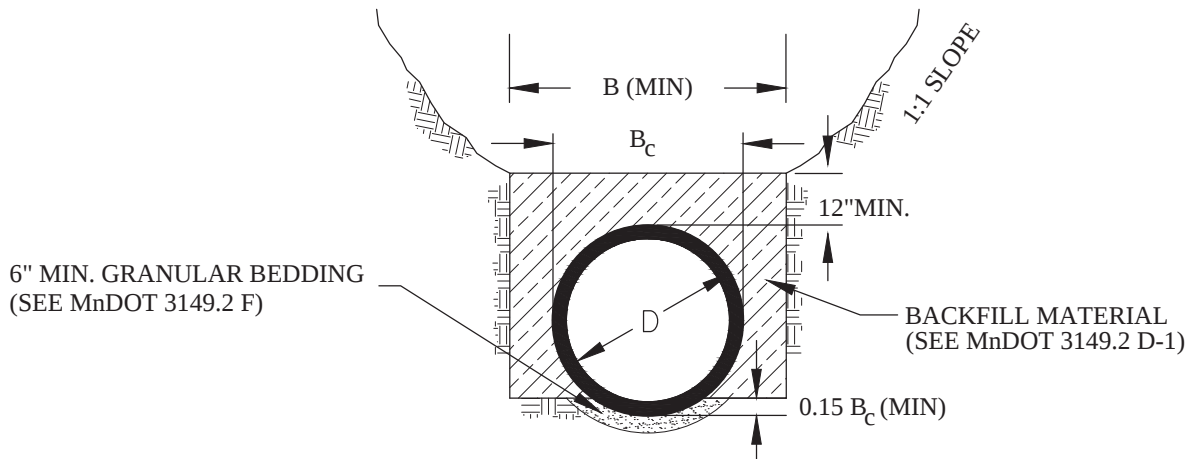
PB-1

Revision Date

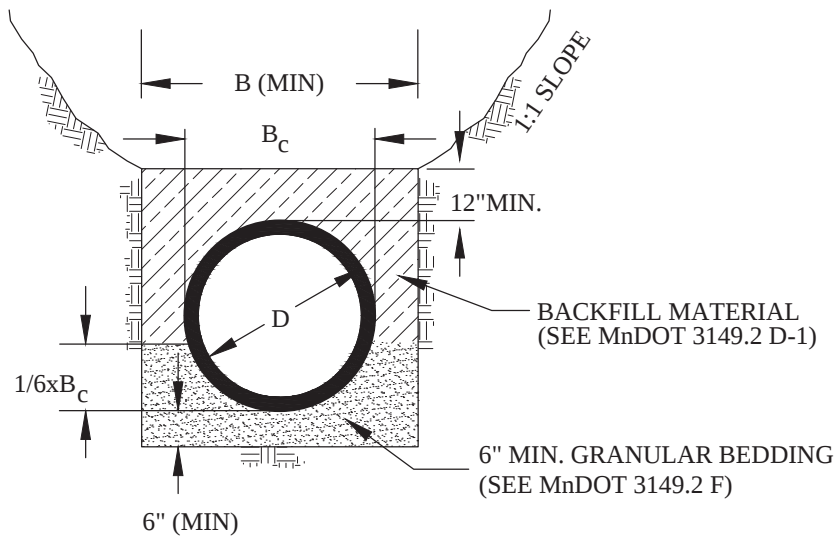
1/2018

File Location:

S:\Details\english\Pipe Bedding\PB-01-Class C Bedding.dwg



SHAPED SUBGRADE WITH
GRANULAR FOUNDATION



GRANULAR FOUNDATION

Pipe Dia. (D)	B
36" or less	$B_c + 24"$
42" - 54"	$1.5 \times B$
60" & Over	$B_c + 36"$

LEGEND

B_c = OUTSIDE DIAMETER

B = WIDTH OF TRENCH BOTTOM (SEE TABLE)

D = INSIDE DIAMETER



CITY OF BURNSVILLE - ENGINEERING DEPT.
CLASS B PIPE BEDDING
RCP/DIP CIRCULAR PIPE

Plate No.

PB-2

Revision Date

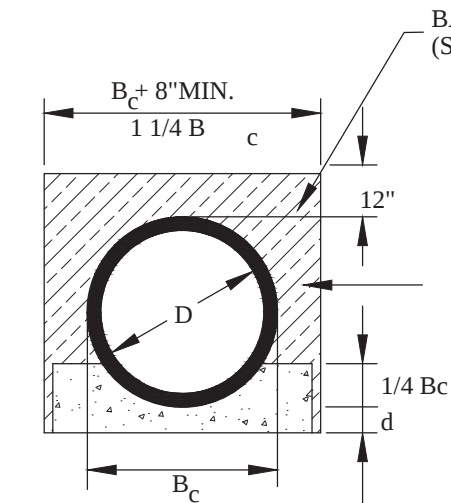
1/2018

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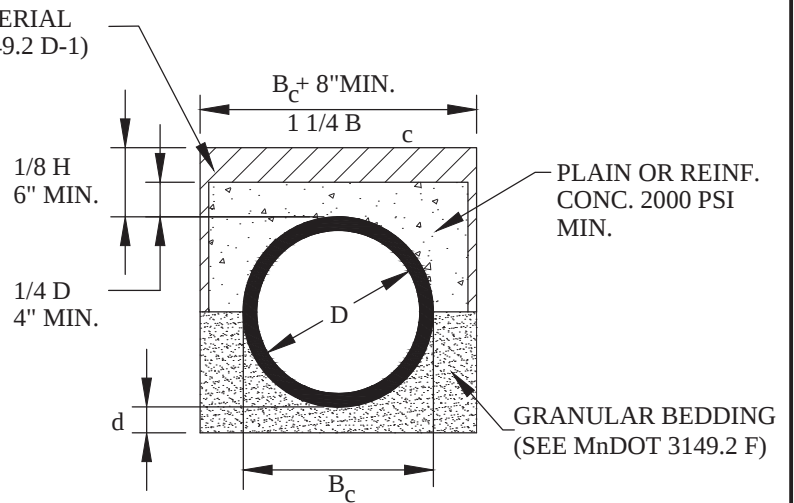
S:\Details\english\Pipe Bedding\PB02-Class B Bedding.dwg

REINFORCED $A_s = 1.0\%$
 REINFORCED $A_s = 0.4\%$
 PLAIN

$B_f = 4.8$
 $B_f = 3.4$
 $B_f = 2.8$



CONCRETE CRADLE



CONCRETE ARCH

LEGEND

B_c = OUTSIDE DIAMETER
 H = BACKFILL COVER OVER TOP OF PIPE
 D = INSIDE DIAMETER
 d = DEPTH OF BEDDING MATERIAL BELOW PIPE
 A_s = AREA OF TRAVERSE STEEL IN THE CRADLE OR ARCH EXPRESSED AS A PERCENTAGE OF AREA OF CONCRETE AT INVERT OR CROWN
 B_f = BEDDING FACTOR

DEPTH OF BEDDING MATERIAL BELOW PIPE	
D	d MIN.
27" & SMALLER	3"
30" TO 60"	4"
66" & LARGER	5"



CITY OF BURNSVILLE - ENGINEERING DEPT.

CLASS A PIPE BEDDING

Plate No.

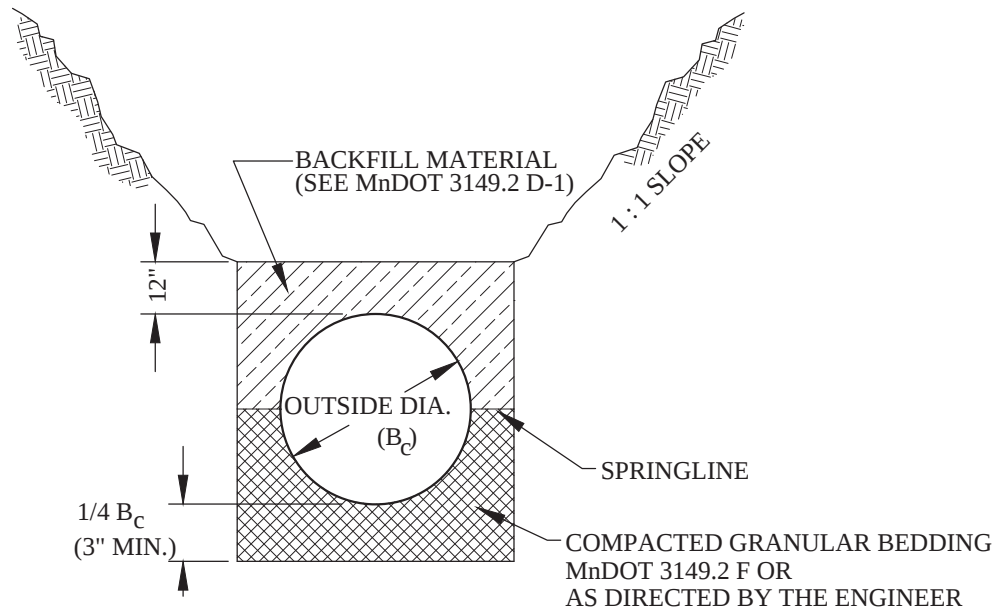
PB-3

Revision Date

1/2018

File Location:

S:\Details\english\Pipe Bedding\PB03-Class A Bedding.dwg



NOTES:

1. THE PIPE WILL BE BEDDED IN COMPACTED GRANULAR MATERIAL PLACED ON A FLAT TRENCH BOTTOM. THE GRANULAR BEDDING WILL HAVE A MINIMUM THICKNESS OF $\frac{1}{4}$ THE OUTSIDE DIAMETER (3" MIN.) AND WILL EXTEND UP TO THE SPRINGLINE.
2. THE TRENCH WILL BE FILLED WITH CAREFULLY COMPACTED BACKFILL TO A MIN. DEPTH OF 12" OVER THE TOP OF THE PIPE.



CITY OF BURNSVILLE - ENGINEERING DEPT.
PVC & HDPE PIPE BEDDING

Plate No.

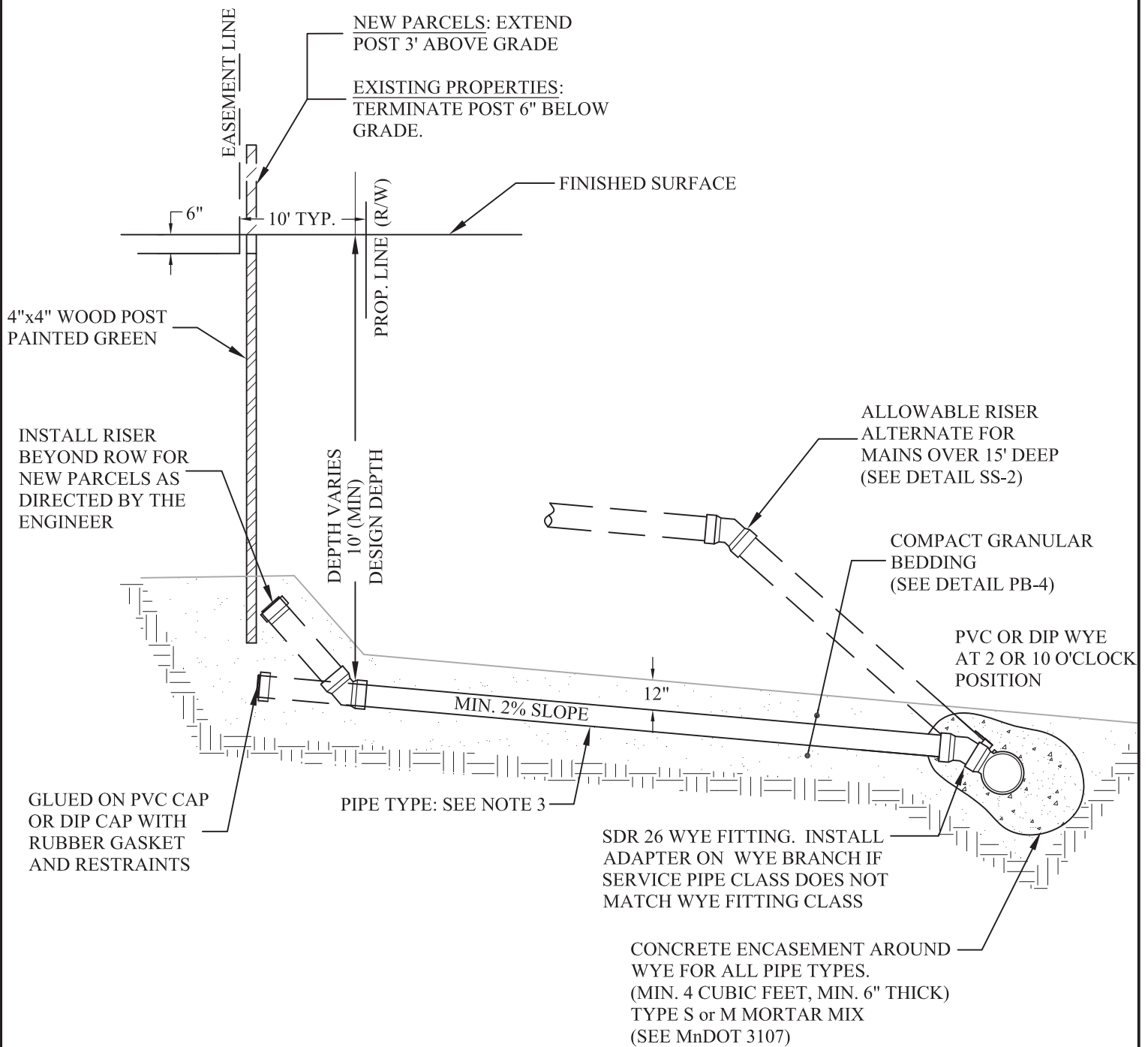
PB-4

Revision Date

1/2018

File Location:

S:\Details\english\Pipe Bedding\PB04-PVC HDPE Bedding.dwg



NOTES

1. IN AREAS OF HIGH GROUNDWATER, WHERE SERVICE DEPTH IS SHALLOWER THAN 10', THE SERVICE MAY BE BROUGHT UP THROUGH USE OF RISERS AND BENDS AT THE DIRECTION OF THE ENGINEER.
2. ALL SERVICE CONNECTION, INCLUDING NECESSARY BENDS AND FITTINGS, WILL BE PAID AT THE CONTRACT UNIT PRICE PER LINEAR FOOT OF PVC.
3. WHERE NOT NOTED IN THE PLANS, SERVICE PIPING AND FITTINGS WILL BE SDR 26.



CITY OF BURNSVILLE - ENGINEERING DEPT. SANITARY SEWER SERVICE

Plate No.

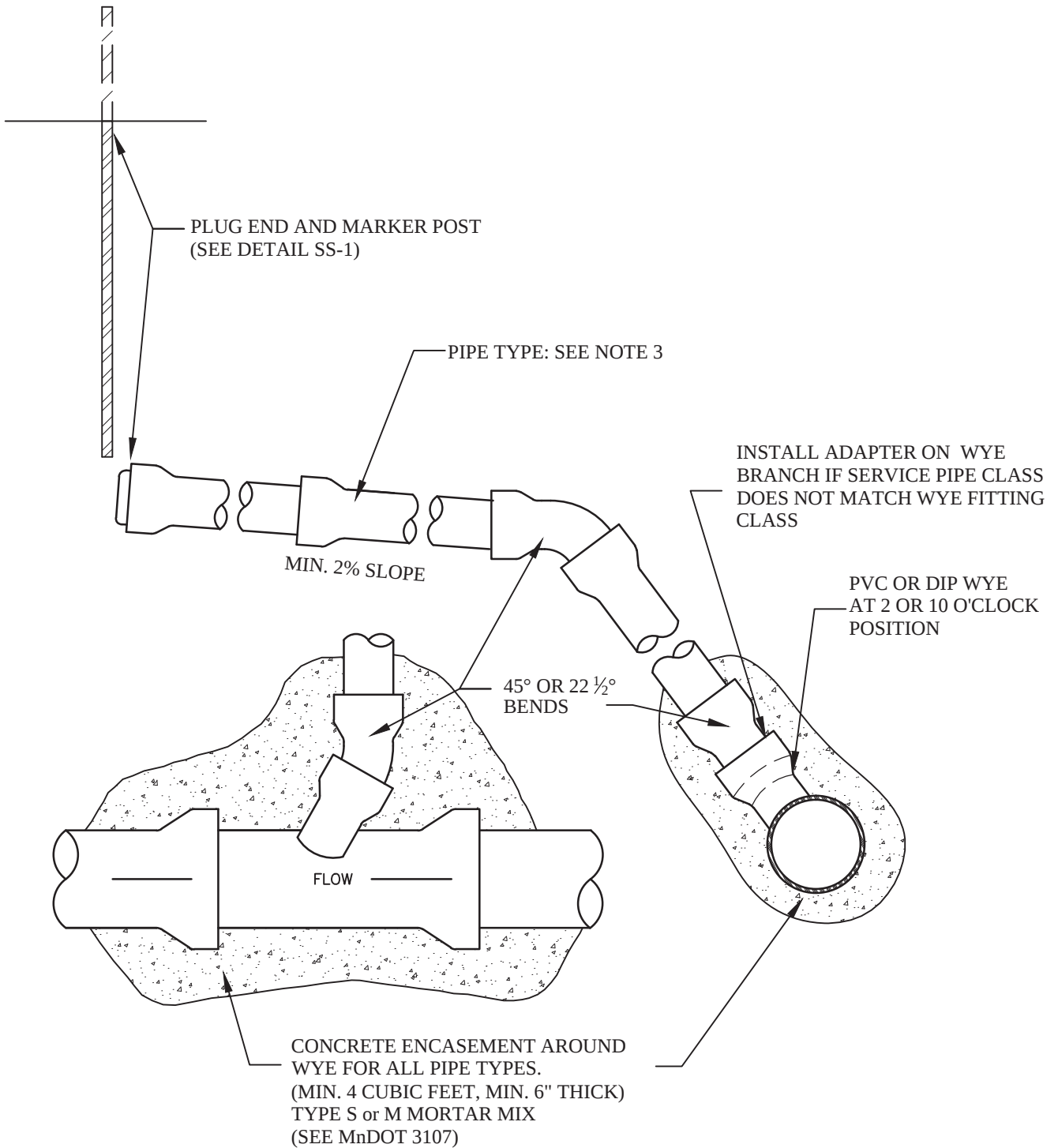
SS-1

Revision Date

11/2013

File Location:

S:\Details\english\Sanitary Sewer\SS01 - SS Service Replacement.dwg.



NOTES

1. RISERS WILL BE USED WHERE SEWER MAIN IS DEEPER THAN 15'
2. ALL SERVICE CONNECTION, INCLUDING NECESSARY BENDS AND FITTINGS, WILL BE PAID AT THE CONTRACT UNIT PRICE PER LINEAR FOOT OF PVC.
3. WHERE NOT NOTED IN THE PLANS, SERVICE PIPING AND FITTINGS WILL BE SDR 26.



CITY OF BURNSVILLE - ENGINEERING DEPT.
**SANITARY SEWER
SERVICE RISER**

Plate No.

SS-2

Revision Date

11/2013

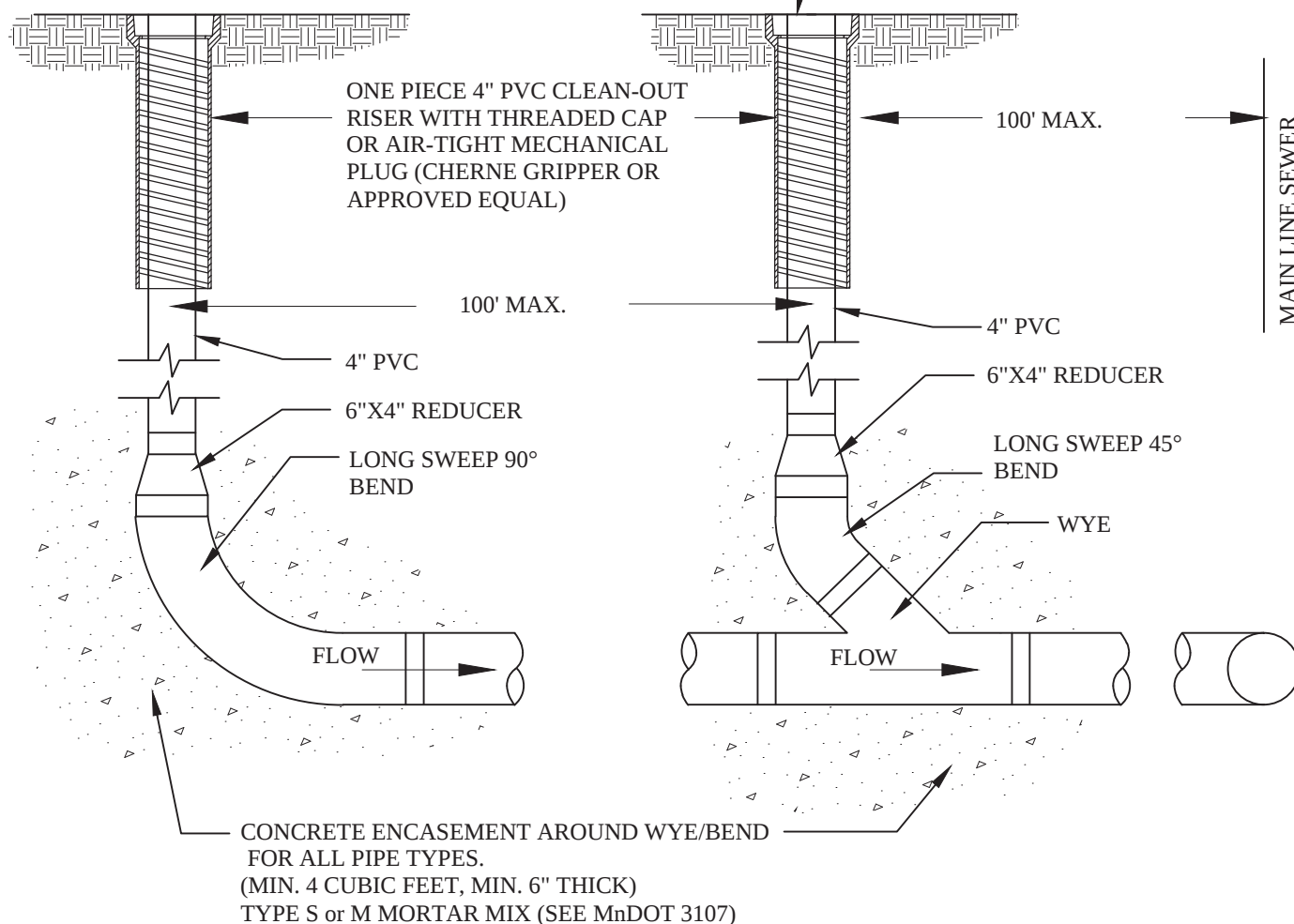
File Location:

S:\Details\english\Sanitary Sewer\SS01 - Service Riser.dwg



COVER WILL BE
MARKED "SEWER"

TOP SECTION OF VALVE BOX
(SEE CEAM 2611.2-C1 FOR VALVE
BOX REQUIREMENTS)



END OF LINE CLEANOUT

IN LINE CLEANOUT

NOTES

1. LOCATION OF CLEAN-OUTS ARE NOTED IN THE PLANS.
2. PAYMENT FOR CLEANOUTS WILL INCLUDE ALL FITTINGS, PIPE, VALVE BOX, AND APPURTENANT ITEMS TO CONSTRUCTION THE CLEANOUT AS DETAILED.
3. WHERE NOT NOTED IN THE PLANS, PIPING AND FITTINGS WILL BE SDR 26.



CITY OF BURNSVILLE - ENGINEERING DEPT. SANITARY SEWER CLEAN-OUT

Plate No.

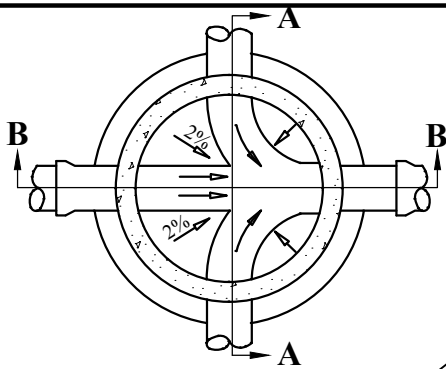
SS-3

Revision Date

11/2013

File Location:

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PRECAST INVERT MUST BE $\frac{1}{2}$ THE DIAMETER OF PIPE AND BENCHES SHOULD BE SLOPED APPROXIMATELY 2% TOWARD THE INVERT.

MANHOLE WILL CONFORM TO THE REQUIREMENTS OF ASTM C-478

NEENAH R-1642-B FRAME AND LID W/2 CONCEALED PICK HOLES. (SEE NOTE 4)

ADJUSTING RINGS
MIN. 2, MAX. 4
(SEE NOTE 5)
ENCASE W/CONCRETE
(SEE MnDOT STD. PLATE 4026)

CHIMNEY SEAL AT LOW POINTS IN GRADE (SEE PLANS)

27" DIA.

4'-0"

VARIES

48" DIA.

DEPTH VARIES

ALL JOINTS IN MANHOLE TO HAVE RUBBER O-RING GASKET JOINTS PER ASTM C443

VARIABLE

VARIES

PRECAST BOTTOM SECTION WITH PREFORMED INVERT

2%

6" MIN. BASE THICKNESS

SECTION A-A

PRECAST ECCENTRIC CONE SECTION

GROUT DOGHOUSES (NON-SHRINK CEMENT)

GASKETED BOOT CONNECTION (SEE NOTE 2)

VARIABLE

FLOW DIRECTION

SECTION B-B

NOTES

1. ALL CONNECTIONS TO EXISTING STRUCTURES WILL BE CORE DRILLED.
2. "KOR-N-SEAL" OR APPROVED EQUIVALENT GASKETED BOOT CONNECTION WILL BE USED FOR CONNECTING PIPE TO MANHOLE.
3. ECCENTRIC CONE WILL BE OFFSET TO THE OUTLET (LOWEST) INVERT SIDE.
4. MANHOLE COVERS WILL BE CAST WITH THE WORDS "SANITARY SEWER".
5. INDIVIDUAL ADJUSTMENT RINGS MAY BE CONCRETE OR HDPE.
6. FOR NEW STRUCTURES, THE "CASTING ASSEMBLY" BID ITEM WILL INCLUDE THE FURNISHING AND INSTALLATION OF THE CASTING, RINGS, AND MORTAR TO INSTALL THE CASTING TO INTERIM (BASE COURSE) OR FINAL (WEAR COURSE) GRADE.
7. REFER TO MnDOT 2506 AND DIVISION 2, PART A - 2506 FOR FURTHER DETAILS REGARDING CASTING ASSEMBLIES AND CASTING ADJUSTMENT REQUIREMENTS.



CITY OF BURNSVILLE - ENGINEERING DEPT.
SANITARY MANHOLE

Plate No.

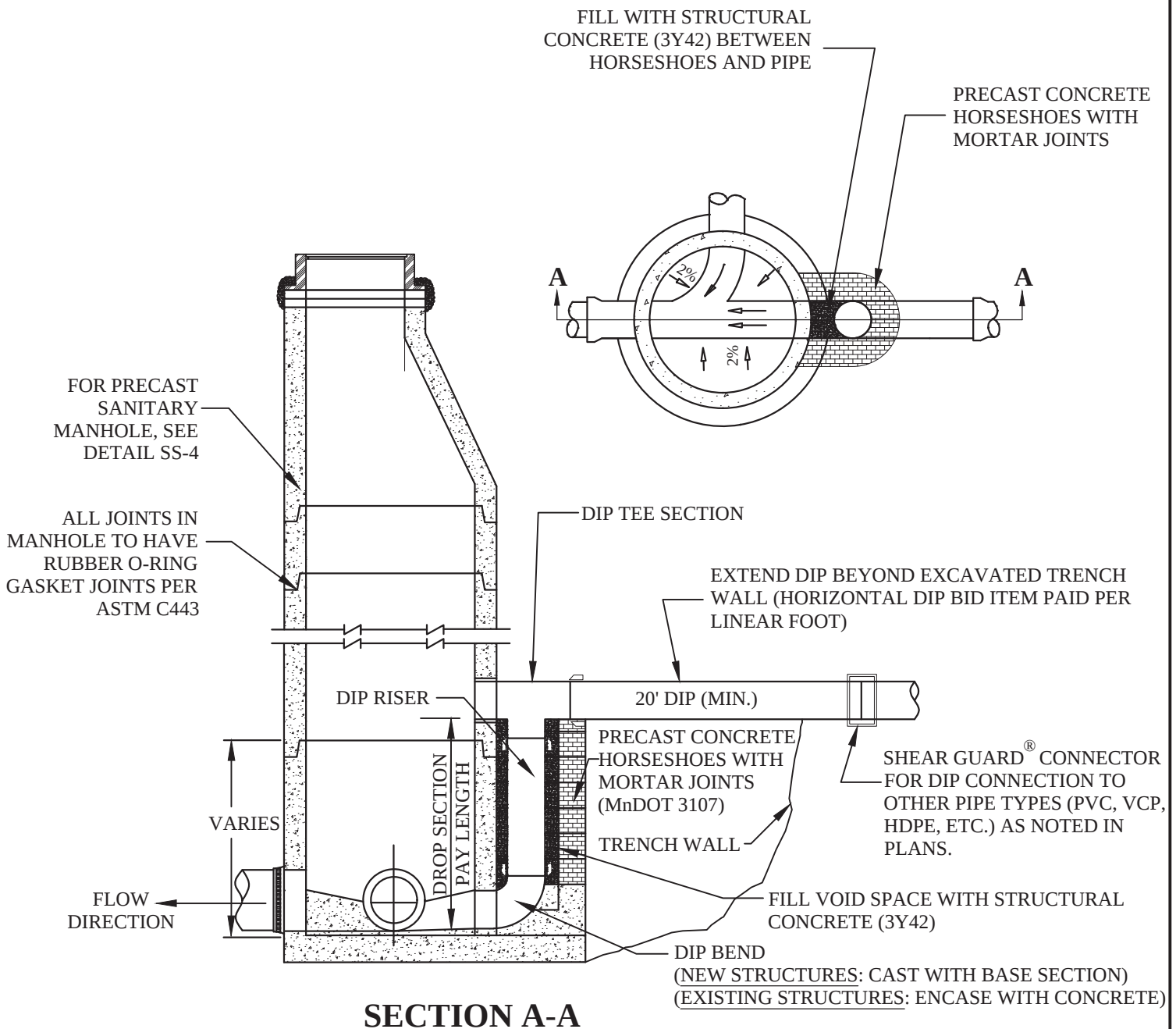
SS-4

Revision Date

02/2021

File Location:

S:\Details\english\Sanitary\SS04-SMH.dwg



NOTES

1. ALL DROP COMPONENTS (BENDS, TEES, VERTICAL DUCTILE IRON PIPE, PRECAST HORSESHOES, MORTAR, CONNECTIONS TO EXISTING STRUCTURES, AND IF APPLICABLE, REMOVAL OF THE EXISTING DROP SECTION) ARE CONSIDERED INCIDENTAL TO THE "OUTSIDE DROP" BID ITEM.
2. "KOR-N-SEAL" OR APPROVED EQUIVALENT GASKETED BOOT CONNECTION WILL BE USED FOR CONNECTING PIPE TO MANHOLE FOR PRECAST SECTIONS (SEE DETAIL SS-4).
3. ALL CONNECTIONS TO EXISTING STRUCTURES WILL BE CORE DRILLED.
4. ECCENTRIC CONE WILL BE OFFSET TO THE OUTLET (LOWEST) INVERT SIDE.
5. REFER TO DIVISION 2, PART B, SECTION 2621.3.D.1 FOR ADDITIONAL CONSTRUCTION REQUIREMENTS.
6. REFER TO DIVISION 2, PART A, SECTION 2503.4.C FOR METHOD OF MEASUREMENT.



CITY OF BURNSVILLE - ENGINEERING DEPT.

SANITARY SEWER OUTSIDE DROP SECTION

Plate No.

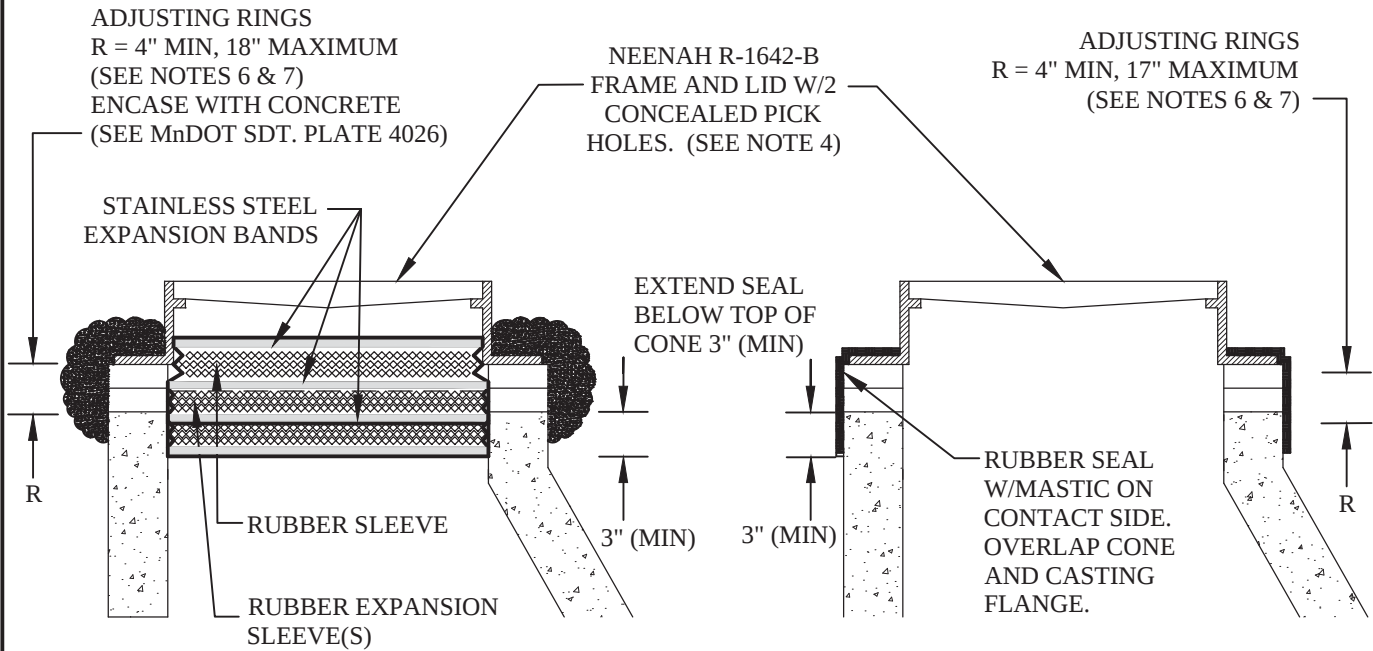
SS-5

Revision Date

1/2018

File Location:

S:\Details\english\Sanitary Sewer\SS05-Outside Drop MH.dwg



INTERNAL CHIMNEY SEAL

EXTERNAL CHIMNEY SEAL

NOTES

1. THE CONTRACTOR MAY USE EITHER INTERIOR OR EXTERIOR CHIMNEY SEALS.
2. CHIMNEY SEALS WILL BE INSTALLED AT ALL SANITARY SEWER MANHOLES LOCATED AT OR NEAR A LOW-POINT IN THE STREET GRADE, AND WHERE OTHERWISE INDICATED IN THE PLANS.
3. CHIMNEY SEALS AND CHIMNEY SEAL EXTENSIONS WILL BE INSTALLED TO COMPLETELY SPAN THE CHIMNEY HEIGHT OF THE MANHOLE.
4. CHIMNEY SEALS WILL BE INSTALLED AFTER THE CASTING IS RAISED TO FINISHED GRADE.
5. INSTALL CHIMNEY SEALS IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATIONS.
6. INDIVIDUAL ADJUSTMENT RINGS MAY BE CONCRETE OR HDPE, AND MAY RANGE IN THICKNESS FROM 1.5" TO 4".
7. WHERE APPLICABLE, "EXTRA DEPTH" CASTING ADJUSTMENT MAY INCREASE DEPTH OF RINGS TO 36" (3.0').



CITY OF BURNSVILLE - ENGINEERING DEPT.
CHIMNEY SEALS
INTERNAL & EXTERNAL

Plate No.

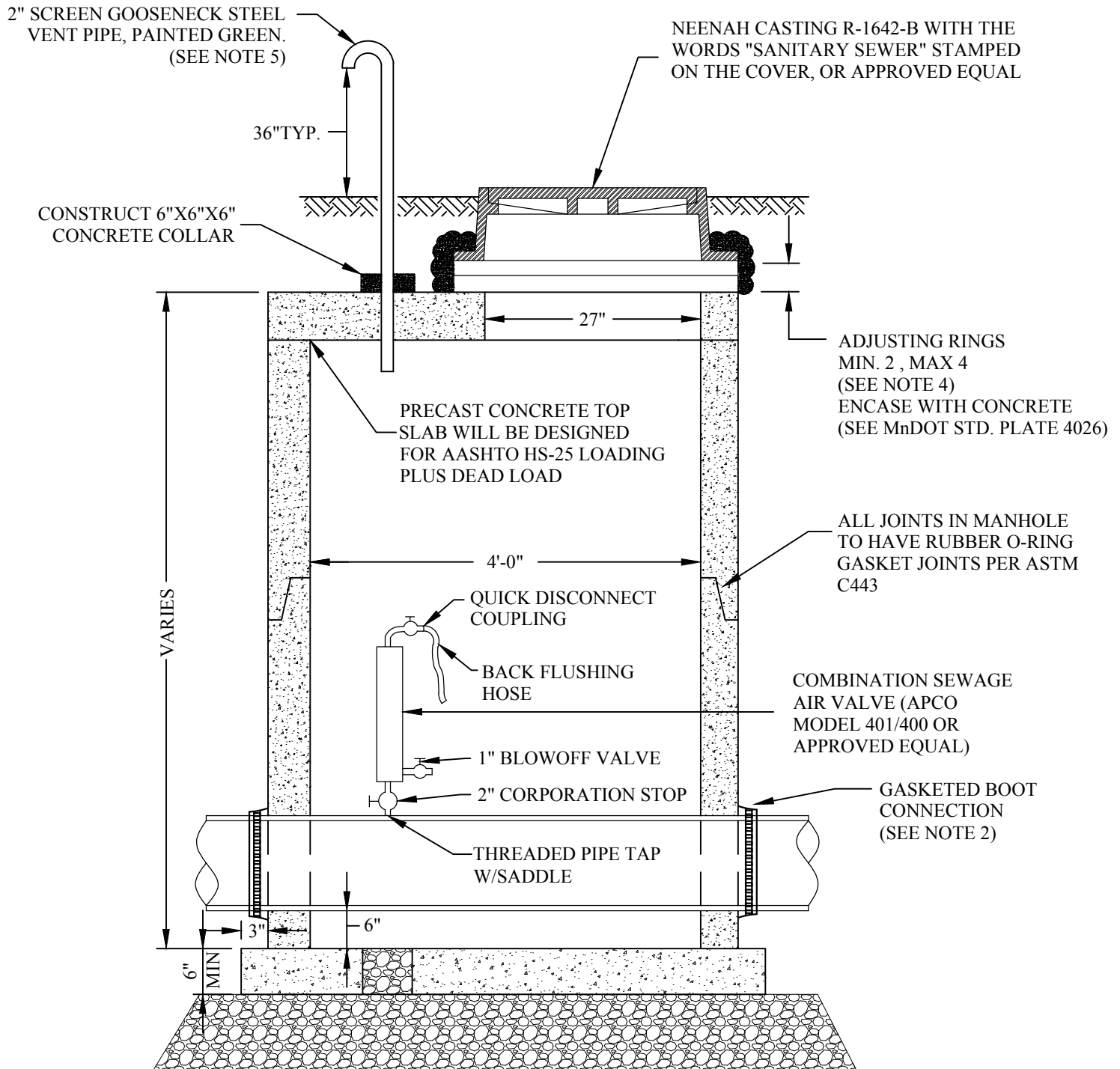
SS-6

Revision Date

11/2013

File Location:

S:\Details\english\Sanitary Sewer\SS06-Chimney Seal.dwg



NOTES

1. ALL CONNECTIONS TO EXISTING STRUCTURES WILL BE CORE DRILLED.
2. "KOR-N-SEAL" OR APPROVED EQUIVALENT PRE-CAST GASKETED BOOT CONNECTION WILL BE USED FOR CONNECTING PIPE TO MANHOLE.
3. MANHOLE COVERS WILL BE CAST WITH THE WORDS "SANITARY SEWER".
4. INDIVIDUAL ADJUSTMENT RINGS MAY BE CONCRETE OR HDPE.
5. IF MANHOLE IS IN AN IMPERVIOUS (PAVEMENT/CONCRETE) AREA, VENT MAY BE EXTENDED TO ADJACENT BOULEVARD AREA.



CITY OF BURNSVILLE - ENGINEERING DEPT.
SANITARY SEWER FORCEMAIN
AIR RELEASE MANHOLE

Plate No.

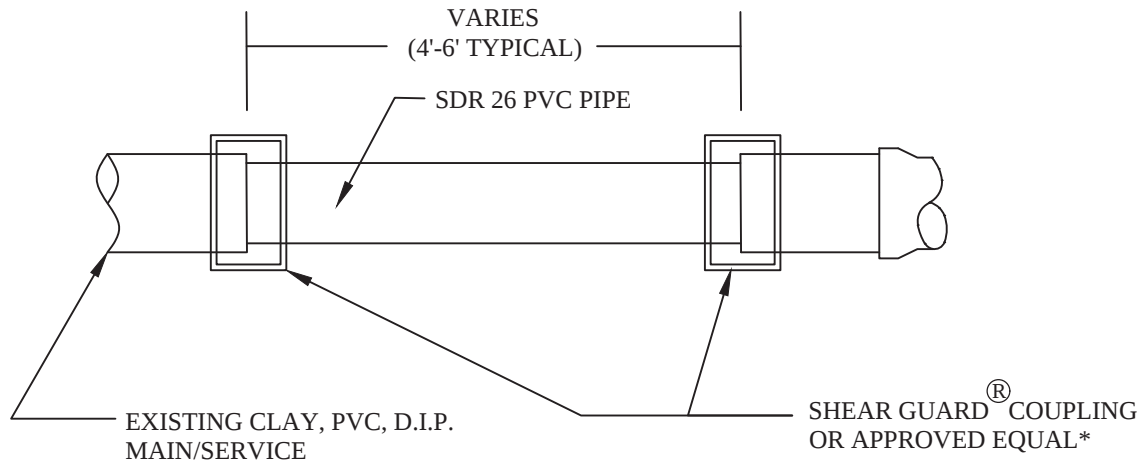
SS-7

Revision Date

02/2021

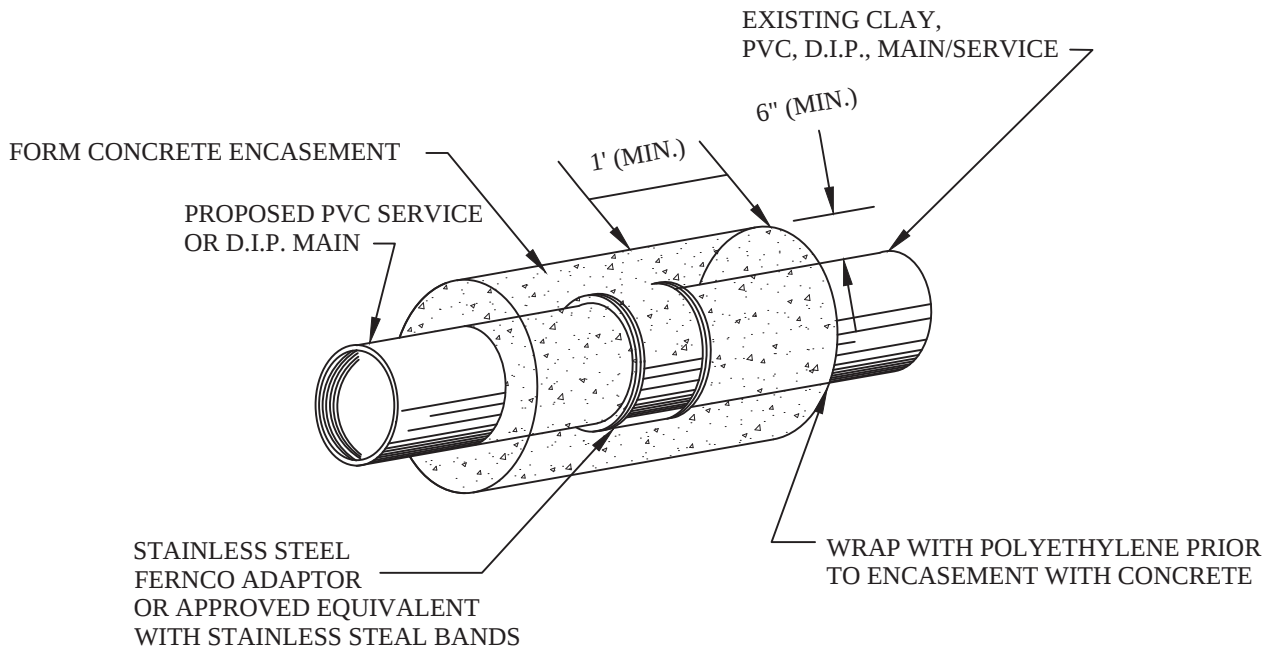
File Location:

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*IF THE PIPE OUTSIDE DIMETER IS DEEMED INCOMPATIBLE WITH THE SHEAR GUARD[®] COUPLING, OR STAINLESS STEEL FERNCO WITH CONCRETE COLLAR MAYBE SUBSTITUTED AS DETAILED BELOW

SANITARY SEWER OR SERVICE SPOT REPAIR



STAINLESS STEEL FERNCO WITH CONCRETE COLLAR



CITY OF BURNSVILLE - ENGINEERING DEPT.
**SANITARY SEWER OR
SERVICE SPOT REPAIR**

Plate No.

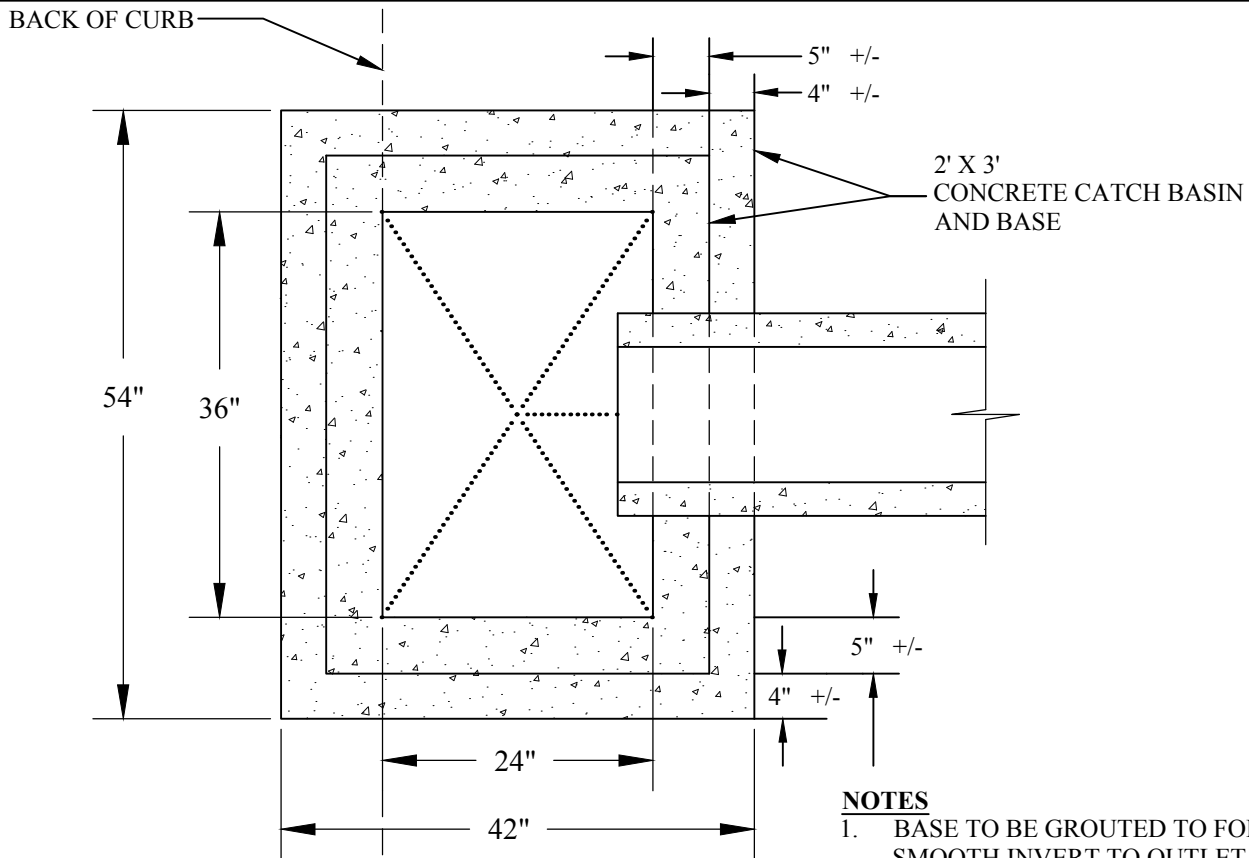
SS-8

Revision Date

1/2018

File Location:

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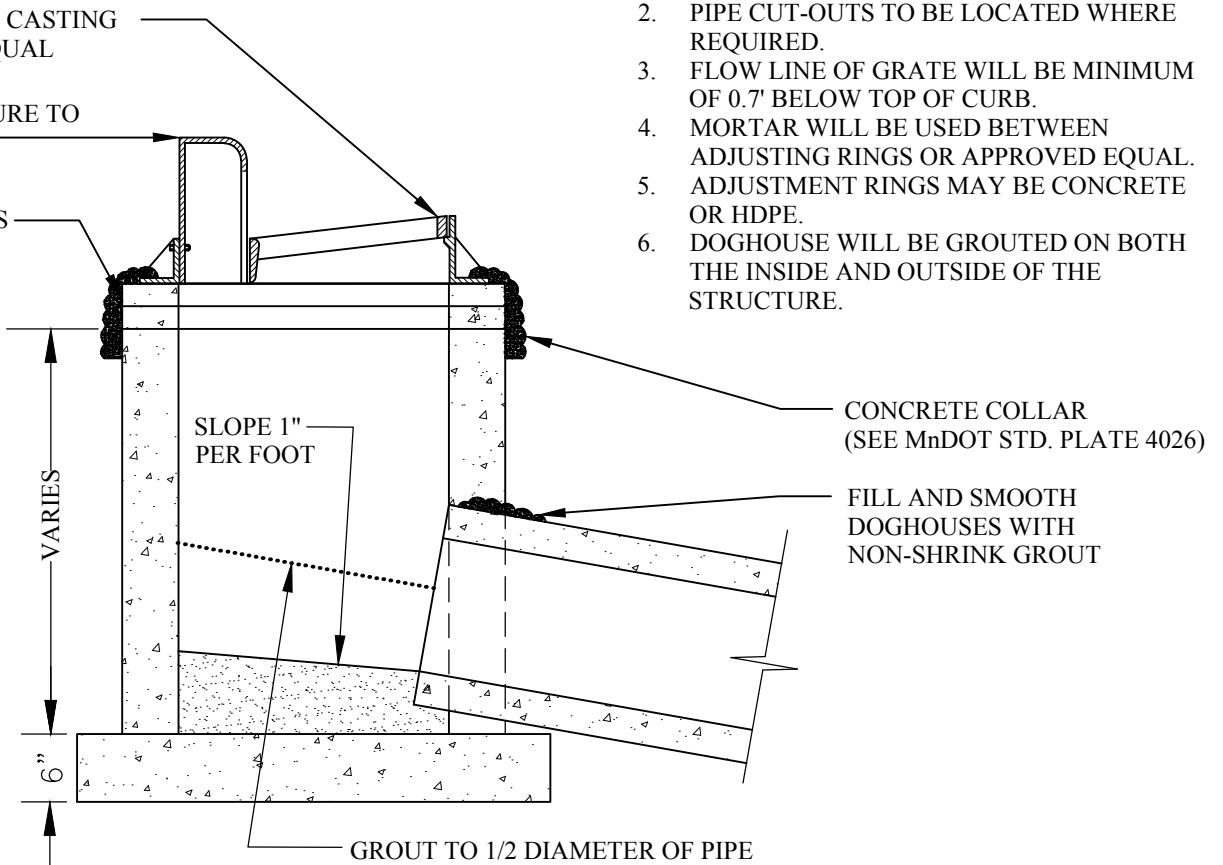
NOTES

1. BASE TO BE GROUTED TO FORM A SMOOTH INVERT TO OUTLET
2. PIPE CUT-OUTS TO BE LOCATED WHERE REQUIRED.
3. FLOW LINE OF GRATE WILL BE MINIMUM OF 0.7' BELOW TOP OF CURB.
4. MORTAR WILL BE USED BETWEEN ADJUSTING RINGS OR APPROVED EQUAL.
5. ADJUSTMENT RINGS MAY BE CONCRETE OR HDPE.
6. DOGHOUSE WILL BE GROUTED ON BOTH THE INSIDE AND OUTSIDE OF THE STRUCTURE.

NEENAH R-3067-V CASTING OR APPROVED EQUAL

CENTER STRUCTURE TO BACK OF CURB

ADJUSTING RINGS
MIN. 1, MAX. 3



CITY OF BURNSVILLE - ENGINEERING DEPT.

STANDARD CATCH BASIN

Plate No.

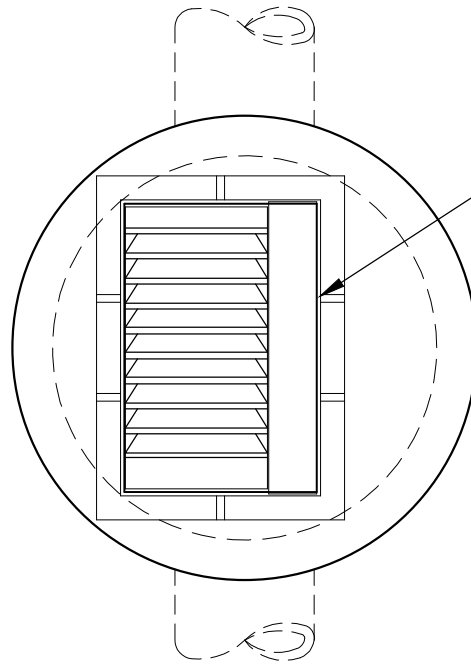
STM-1

Revision Date

02/2021

File Location:

S:\Details\english\Storm\STM01-Std CB.dwg



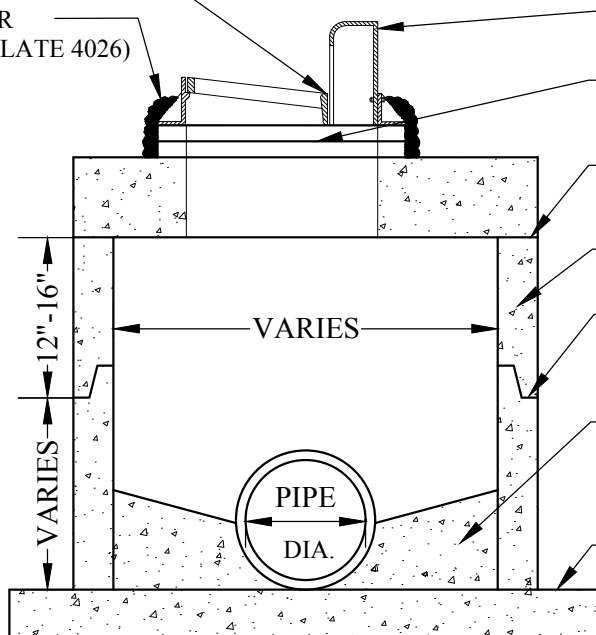
TOP SLAB - SEE MNDOT STD. PLATE 4022A
2' x 3' SLAB OPENING

DIMENSION FROM BACK OF CURB TO
CENTER OF PIPE
48" DIA. MH = 9" IN FRONT OF BACK OF CURB
60" DIA. MH = 3" IN FRONT OF BACK OF CURB
72" DIA. MH = 3" BEHIND BACK OF CURB
84" DIA. MH = 9" BEHIND BACK OF CURB
96" DIA. MH = 15" BEHIND BACK OF CURB

PLAN

FLOW LINE WILL BE 0.7'
BELOW TOP OF CURB

CONCRETE COLLAR
(SEE MNDOT STD. PLATE 4026)



NEENAH R-3067-V CASTING
OR APPROVED EQUAL

ADJUSTING RINGS (MIN. 1, MAX. 3)
ENCASE WITH CONCRETE COLLAR

PRECAST REINFORCED CONCRETE SLAB
SEALED WITH SINGLE ROPE OF MASTIC

PRECAST CONCRETE SECTION

ALL JOINTS IN MANHOLE TO HAVE
"O" RING RUBBER GASKET JOINTS
PER ASTM C443

DOGHOUSES WILL BE GROUTED ON
BOTH THE OUTSIDE AND INSIDE
GROUT BOTTOM TO 1/2 DIA. OF PIPE

BASE SLAB - SEE MNDOT STD. PLATE 4011E

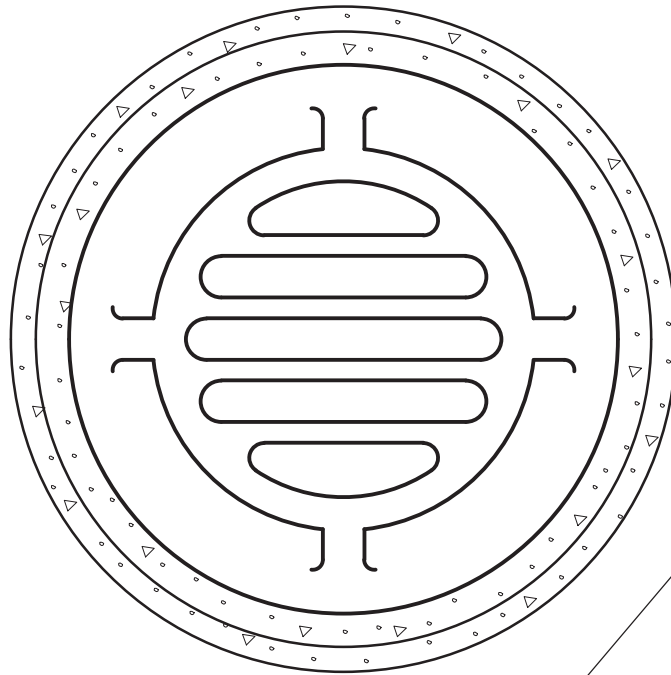
SECTION



CITY OF BURNSVILLE - ENGINEERING DEPT.

CATCH BASIN MANHOLE

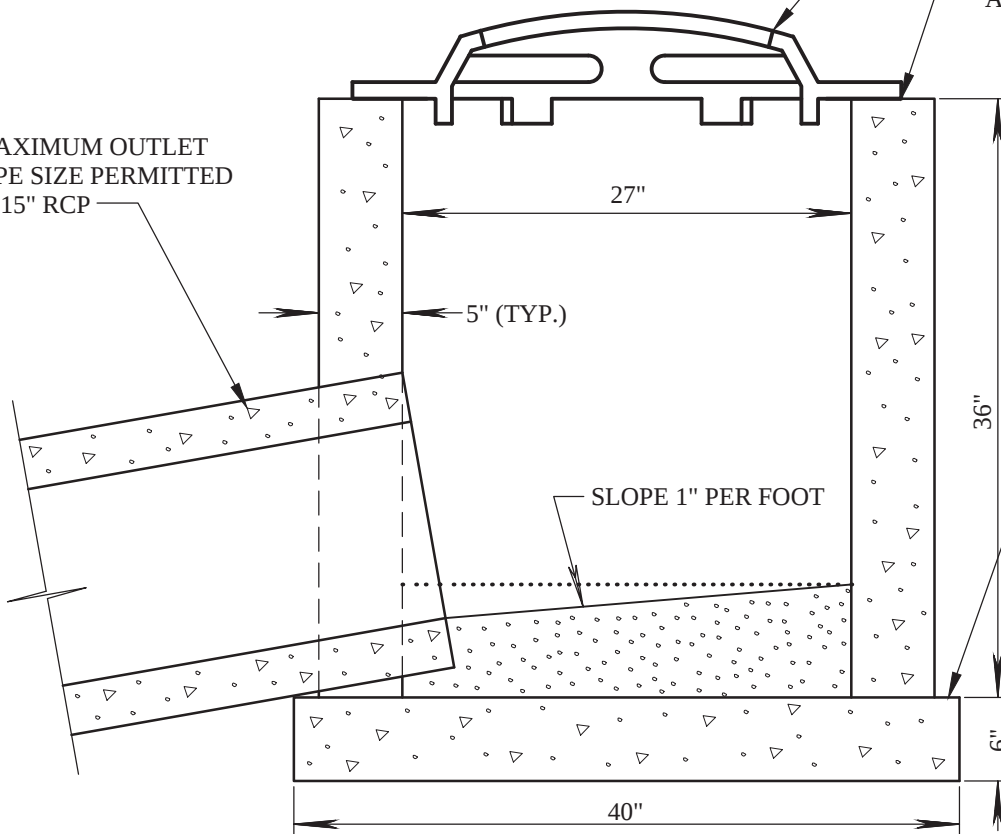
Plate No.	STM - 2
Revision Date	02/2021
File Location: S:\Details\english\Storm Sewer\STM02-CATCH BASIN MH.dwg	



DITCH GRATE, STOOL TYPE NEENAH R-4342, OR APPROVED EQUAL

SET STRUCTURE TO INLET GRADE. USE OF ADJUSTMENT RINGS IS NOT ALLOWED WITHOUT ENGINEER APPROVAL

MAXIMUM OUTLET PIPE SIZE PERMITTED IS 15" RCP



BASE SLAB SEE MnDOT STANDARD PLATE 4011E



CITY OF BURNSVILLE - ENGINEERING DEPT.

ROUND CATCH BASIN

Plate No.

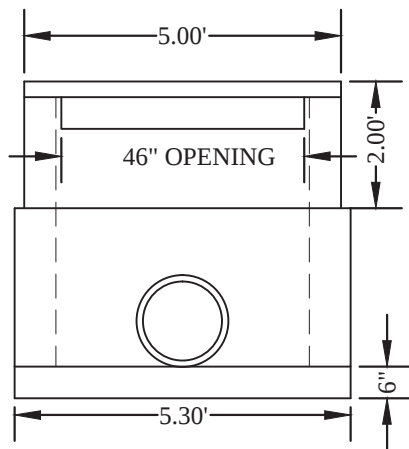
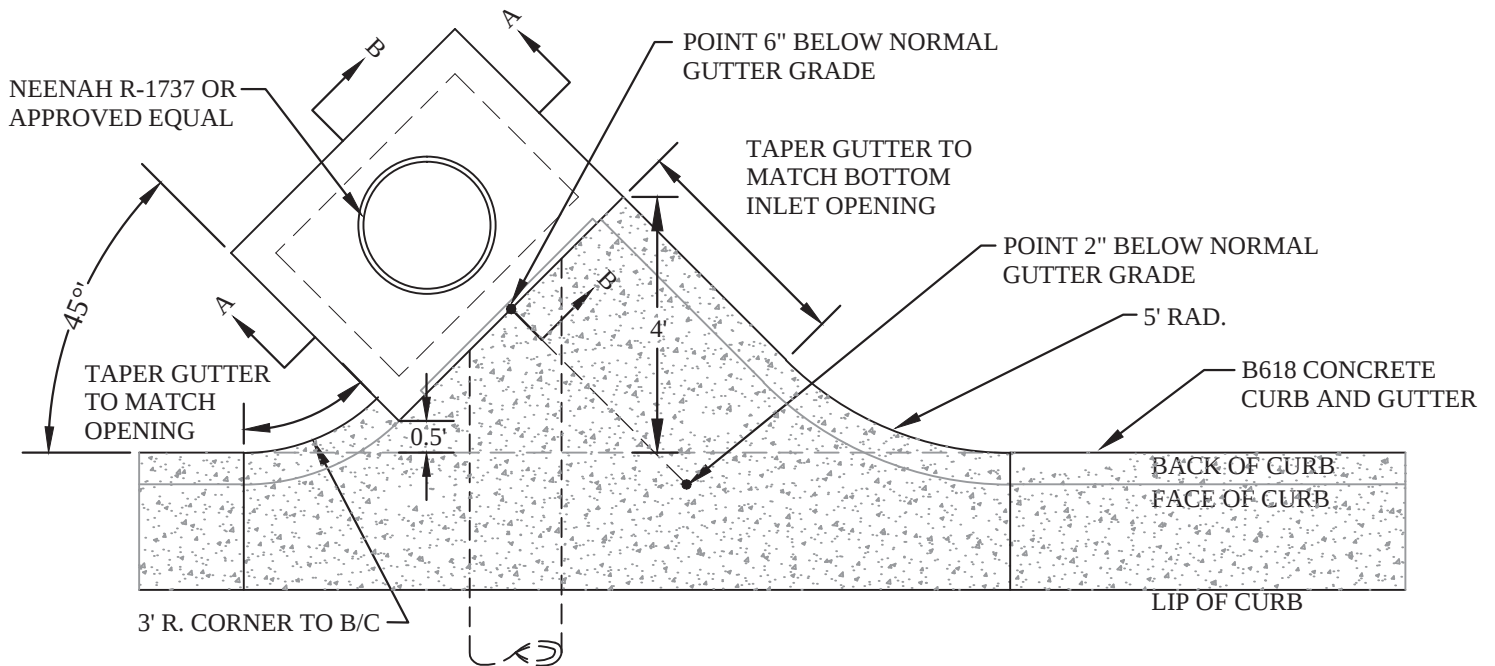
STM - 3

Revision Date

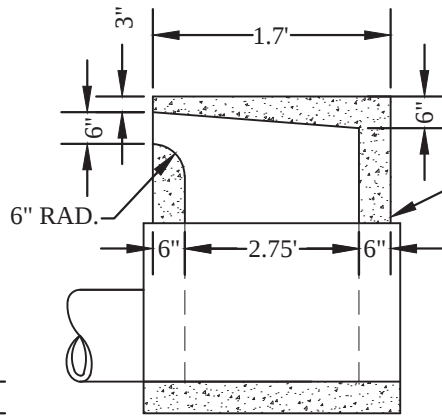
1/2018

File Location:

S:\Details\english\Storm Sewer\STM03- ROUND CB.dwg



SECTION A-A



SECTION B-B



CITY OF BURNSVILLE - ENGINEERING DEPT.

HIGH INLET CATCH BASIN

Plate No.

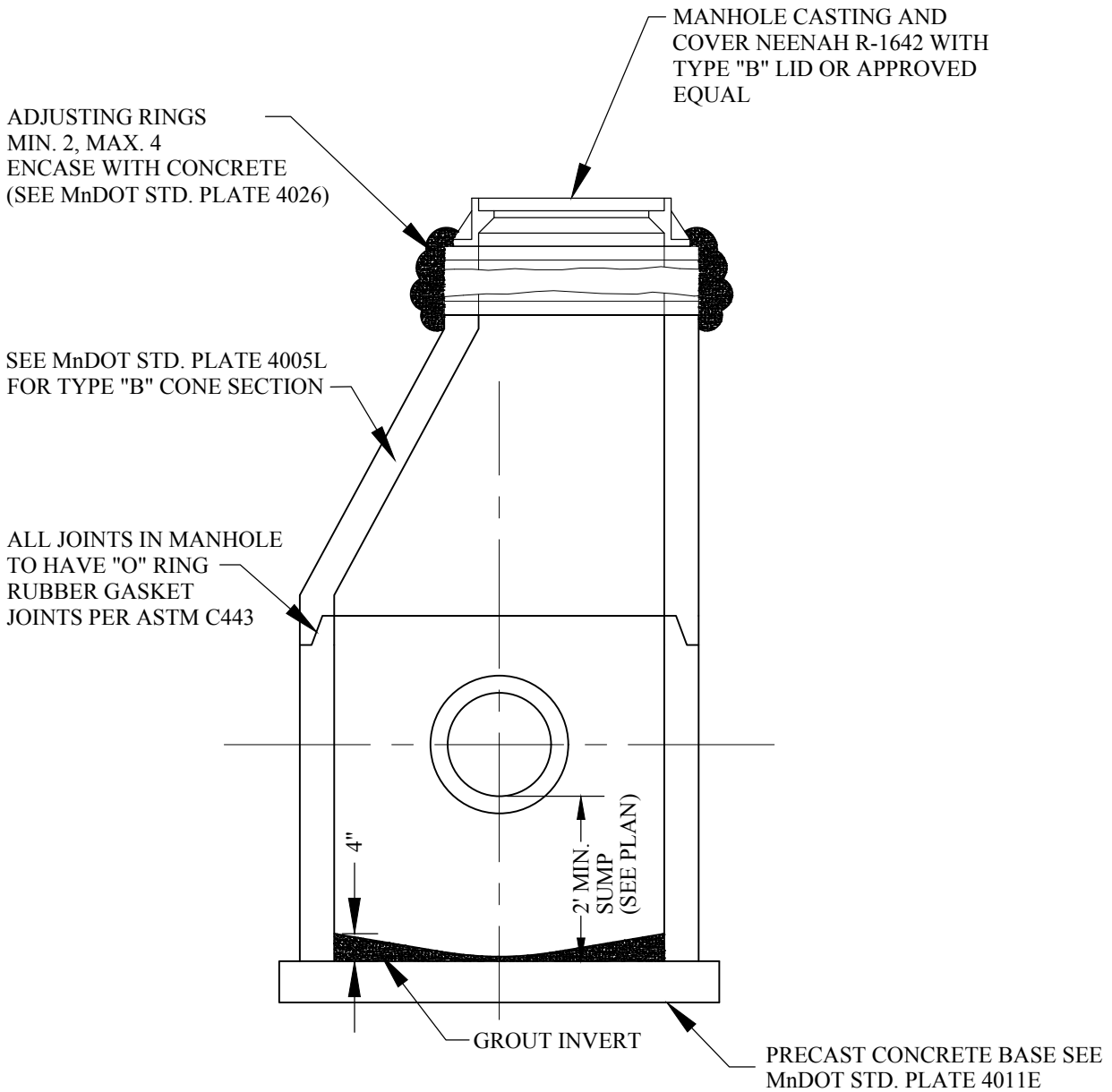
STM - 4

Revision Date

11/2013

File Location:

S:\Details\english\Storm Sewer\STM04-High Inlet.dwg



CITY OF BURNSVILLE - ENGINEERING DEPT.

SUMP MANHOLE

Plate No.

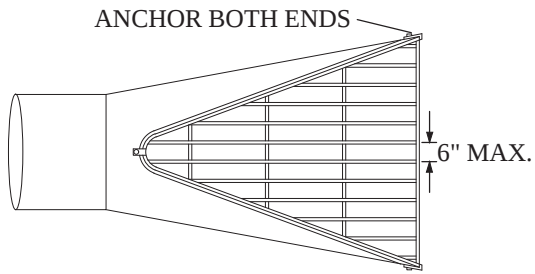
STM - 5

Revision Date

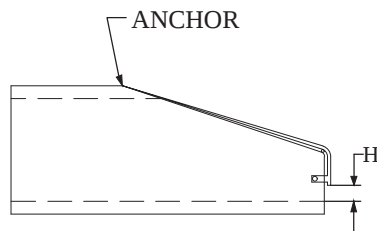
02/2021

File Location:

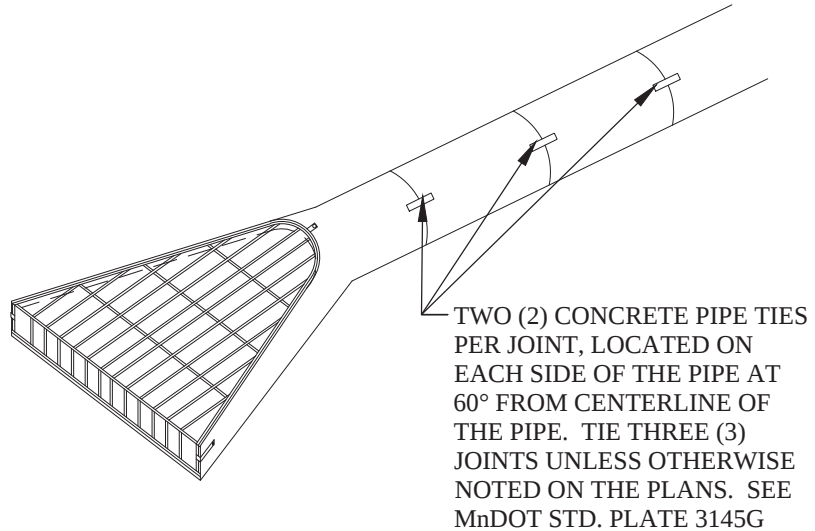
S:\Details\english\Storm Sewer\STM05-Sump Manhole.dwg



TOP VIEW



SIDE VIEW



SIZE OF PIPE	BARS	"H"	BOLTS
12" - 18"	3/4"	4"	5/8"
21" - 48"	1"	6"	3/4"
54" - 90"	1 1/4"	12"	1"

NOTES

1. FLARED END SECTION SHALL CONFORM TO MnDOT STD. PLATE 3100G
2. DESIGN OF END SECTION WILL CONFORM TO STANDARD REINFORCED CONCRETE PIPE CLASS II. ROUNDED EDGE PERMITTED ON SLOPED END
3. ALL BARS AND ANCHOR BOLTS WILL BE GALVANIZED
4. ALL TRASH GUARDS WILL HAVE A MINIMUM OF ONE (1) CROSS BAR
5. ROUNDED EDGE PERMITTED ON SLOPE END



CITY OF BURNSVILLE - ENGINEERING DEPT.

**FLARED END SECTION
WITH TRASH GUARD**

Plate No.

STM - 6

Revision Date

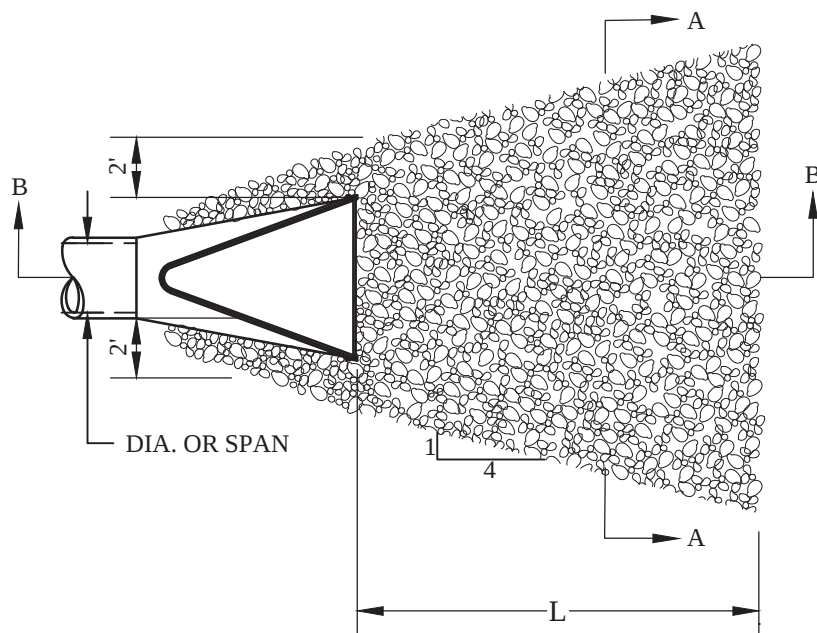
1/2018

File Location:

S:\Details\english\Storm Sewer\STM06-FES Trashguard.dwg

6:1 SLOPE					
DIA. OF PIPE (IN.)	L (FT.)	CLASS II d ₅₀ =6"	CLASS III d ₅₀ =9"	CLASS IV d ₅₀ =12"	MIN. GEOTEX AREA
		12" DEPTH RIPRAP (C.Y.)	18" DEPTH RIPRAP (C.Y.)	24" DEPTH RIPRAP (C.Y.)	(SQ.YD.)
12	8	3.5	5.2	6.9	8
15	8	3.6	5.3	7.1	9
18	10	4.5	6.7	8.9	12
24	12	6.0	8.9	11.9	17

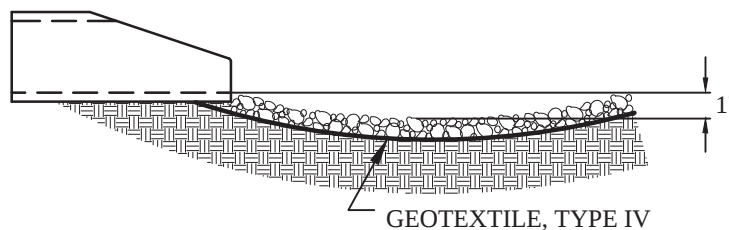
4:1 SLOPE					
DIA. OF PIPE (IN.)	L (FT.)	CLASS II d ₅₀ =6"	CLASS III d ₅₀ =9"	CLASS IV d ₅₀ =12"	MIN. GEOTEX AREA
		12" DEPTH RIPRAP (C.Y.)	18" DEPTH RIPRAP (C.Y.)	24" DEPTH RIPRAP (C.Y.)	(SQ.YD.)
24	12	5.4	8.1	10.8	17
30	14	6.5	9.7	12.9	22
36	16	8.1	12.1	16.1	28
42	18	10.0	14.9	19.9	33
48	20	12.0	18.0	24.0	39



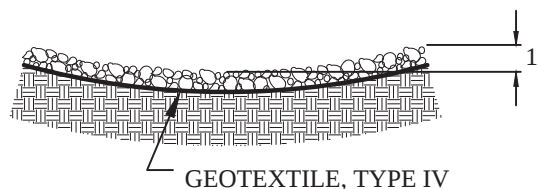
PLAN VIEW

NOTES:

1. THE GEOTEXTILE WILL COVER THE AREA OF THE RIPRAP AND EXTEND UNDER THE CULVERT APRON 3 FT.



SECTION B - B



SECTION A - A



CITY OF BURNSVILLE - ENGINEERING DEPT.

FLARED END SECTION RIP RAP

Plate No.

STM - 7

Revision Date

11-2013

File Location:

S:\Details\english\Storm Sewer\STM07-FES RipRap.dwg

(3) 1- $\frac{1}{4}$ " HOLES
USE 3-1" BY 12" L-SHAPED
BOLTS AND TIE REBAR
VERTICAL AND
HORIZONTAL

2'-0" TYPICAL

FLOW

12" TYPICAL 3G52 CONCRETE

PLAN

EXTEND POURED HEADWALL
UP TO A POINT THAT WILL NOT
HINDER THE INSTALLATION
ACCESS OF THE TRASH GUARD.

NOTES:

1. TRASH GUARD AND JOINT TIES PER
DETAIL STM-6.

2'-0" TYPICAL

3G52 CONCRETE

SEE SHEET 2 FOR
REBAR LAYOUT

SHEET PILE LIGHTWEIGHT
ASTM A-857, GR 33 TO 36
OR A =525 SUPER 5-5 GA

#4 AT 12" O.C.
STAGGERED VERTICAL

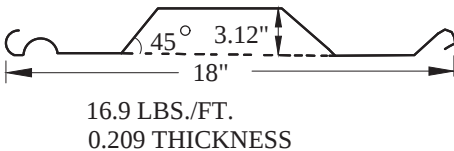
#4 AT 16" O.C.

7'-0" TYP.

SHEET
PILING

OUTSIDE WIDTH OF FLARED
END SECTION PLUS 4'-0"

ELEVATION



CITY OF BURNSVILLE - ENGINEERING DEPT.

FLARED END SECTION WITH SHEET PILING

Plate No.

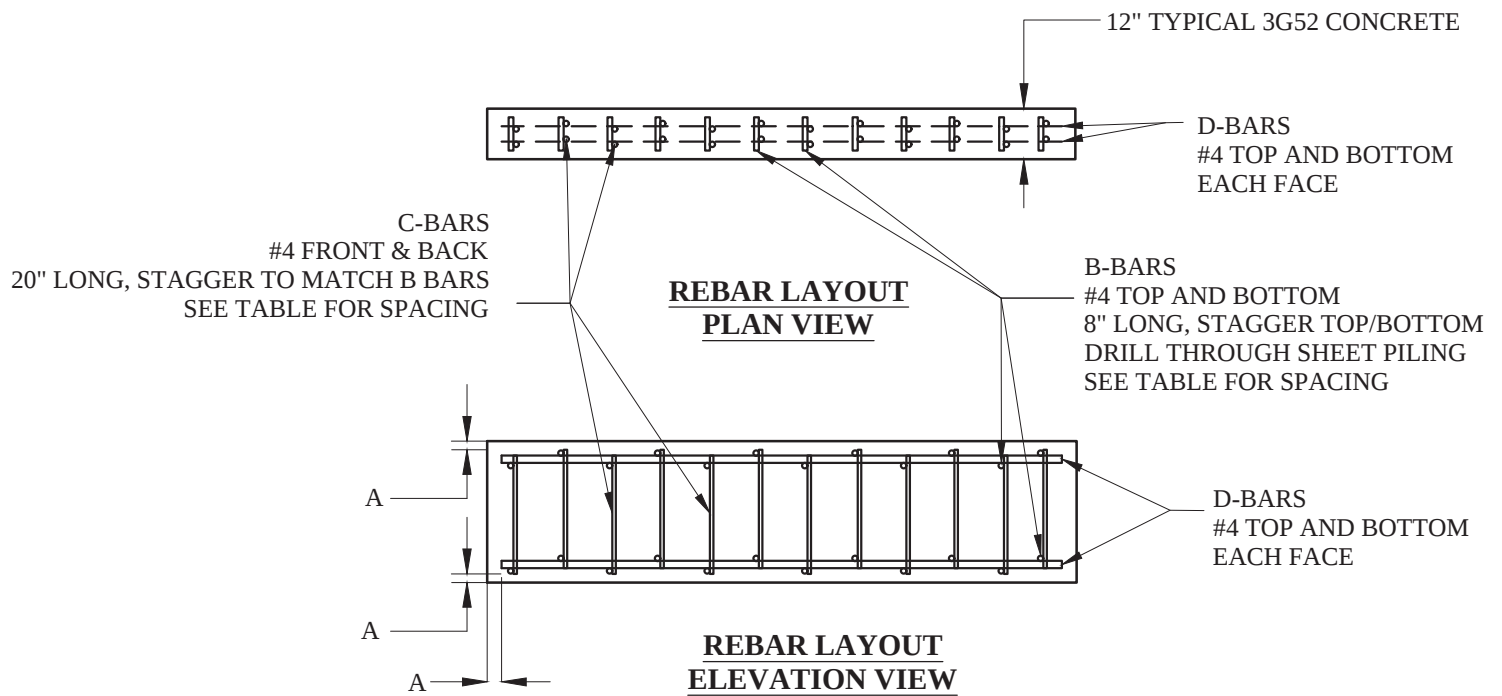
STM-8(1)

Revision Date

1/2018

File Location:

S:\Details\english\Storm Sewer\STM08-FESwSheetPiling.dwg



FES SIZE	PILING CAP WIDTH		A	8" #4 "B" BARS 12"-16" O.C.		20" #4 "C" BARS 12"-16" O.C.		#4 "D" BARS 8" O.C.		
	INCHES	FEET		O.C.	QTY.	O.C.	QTY.	LENGTH		QTY.
								INCHES	FEET	
36"	120"	10'	4"	16"	14	16"	14	112"	9' 4"	4
42"	126"	10' 6"	3"	15"	16	15"	16	120"	10'	4
48"	132"	11'	2"	16"	16	16"	16	128"	10' 8"	4
54"	138"	11' 6"	4	13"	20	13"	20	130"	10' 10"	4
60"	144"	12'	2"	14"	20	14"	20	140"	11' 8"	4
66"	150"	12' 6"	3"	16"	18	16"	18	147"	12' 3"	4
72"	156"	13'	3"	15"	20	15"	20	150"	12" 6"	4
78"	162"	13' 6"	4	14"	22	14"	22	154"	12' 10"	4
84"	168"	14'	4"	16"	20	16"	20	160"	13' 4"	4
90"	174"	14' 6"	3"	14"	24	14"	24	168"	14'	4

NOTES:

- A. REBAR OFFSET FROM OUTSIDE EDGE
- B. #4 REBAR, 8" LONG, HORIZONTAL BARS, DRILLED THROUGH SHEET PILING (TOP & BOTTOM)
- C. #4 REBAR, 20" LONG, VERTICAL BARS (FRONT & BACK)
- D. #4 REBAR, FORMS CORNERS OF REBAR CAGE (LENGTH VARIES)



CITY OF BURNSVILLE - ENGINEERING DEPT.

FLARED END SECTION WITH SHEET PILING

Plate No.

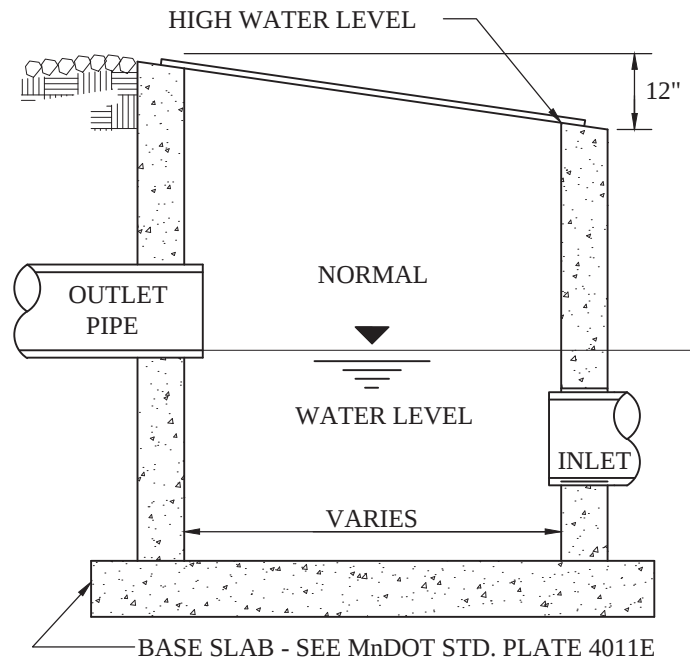
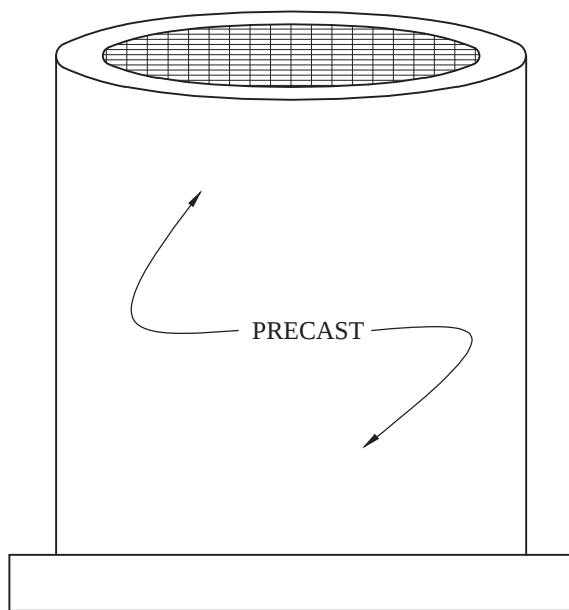
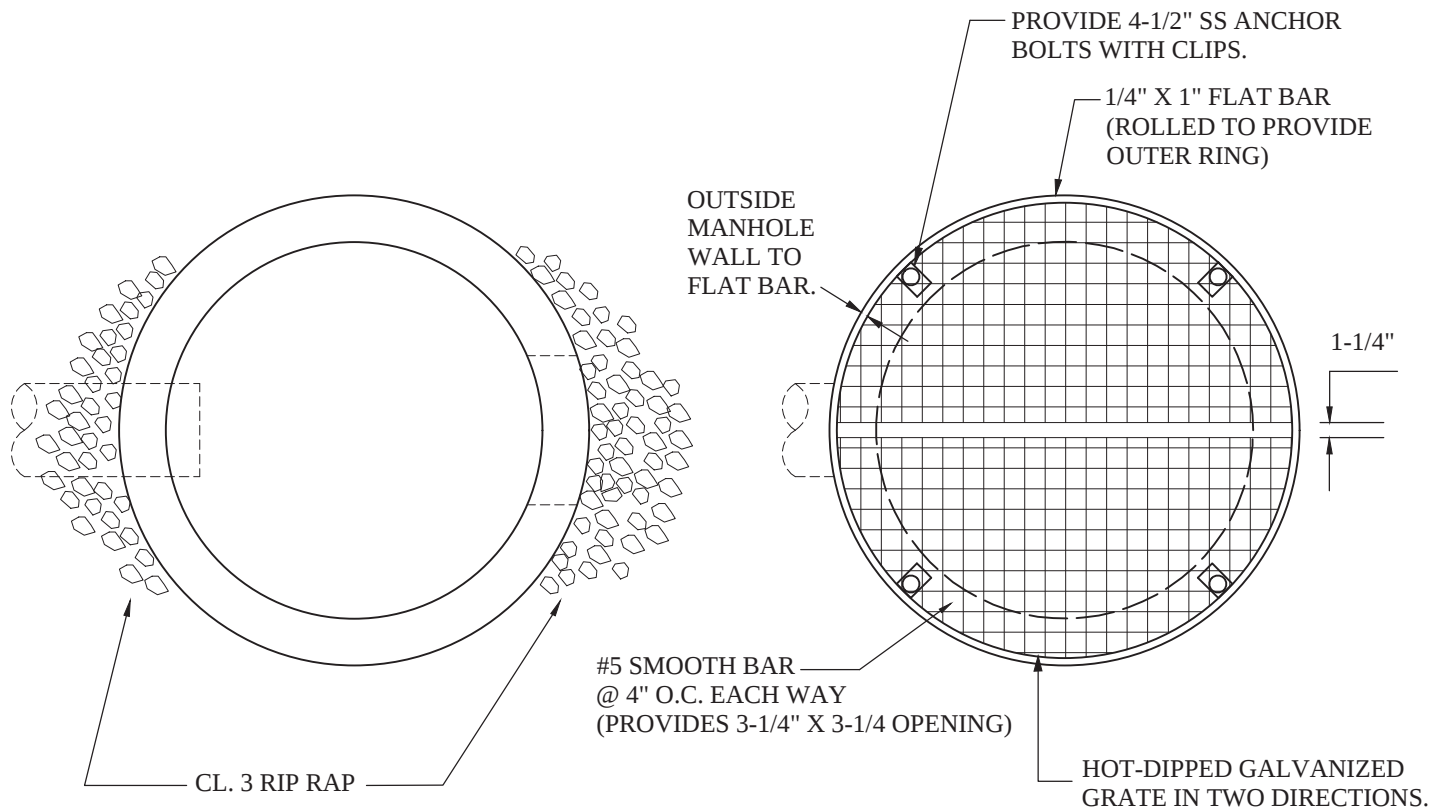
STM-8(2)

Revision Date

1/2018

File Location:

S:\Details\english\Storm Sewer\STM08-FESwSheetPiling.dwg



NOTES:

1. REFER TO PLANS FOR SPECIAL STRUCTURE AND PIPE DIMENSIONS AND ELEVATIONS.



CITY OF BURNSVILLE - ENGINEERING DEPT.

POND OUTLET SKIMMER

Plate No.

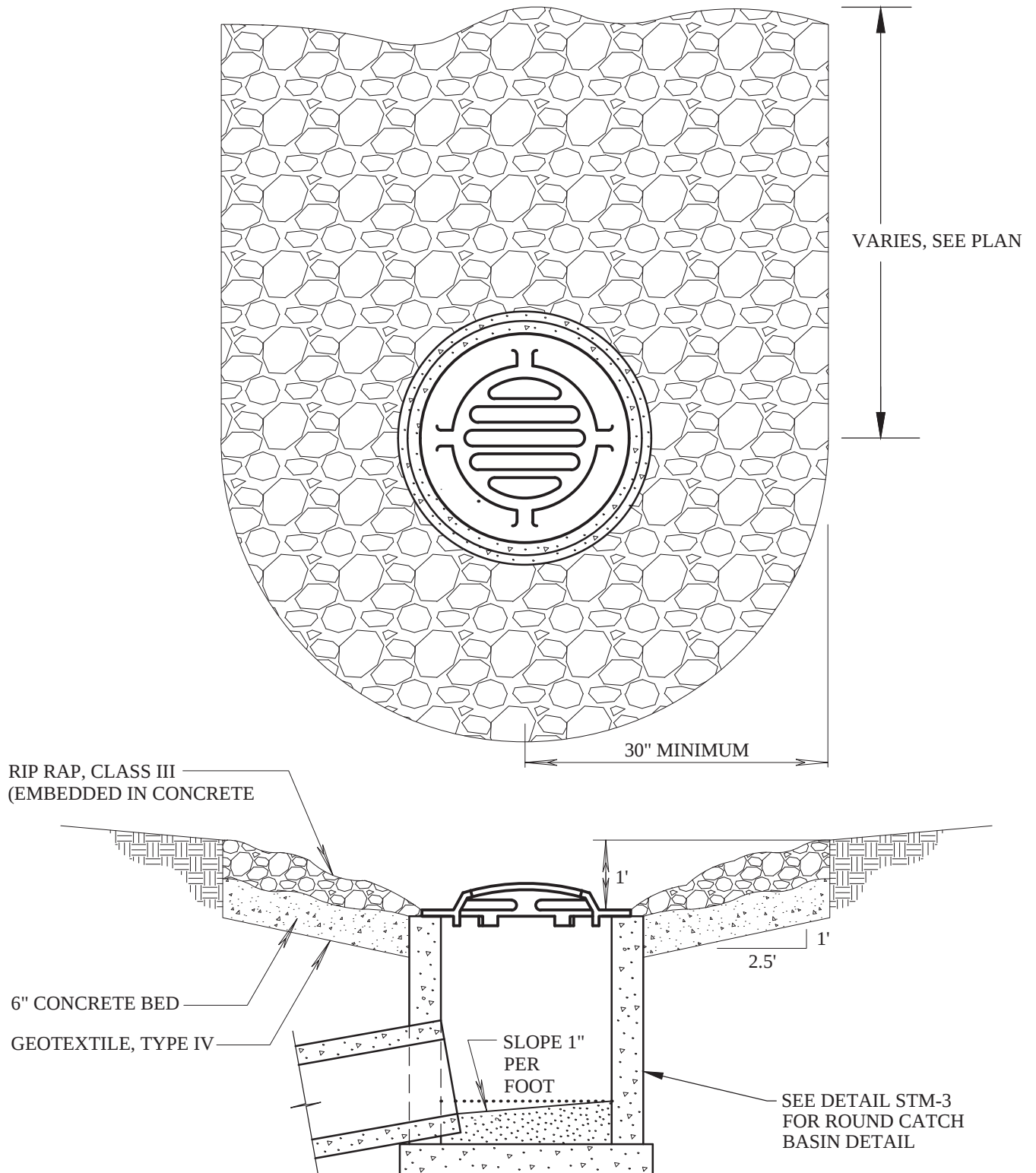
STM - 10

Revision Date

1/2018

File Location:

S:\Details\english\Storm Sewer\STM10-Pond Skimmer.dwg

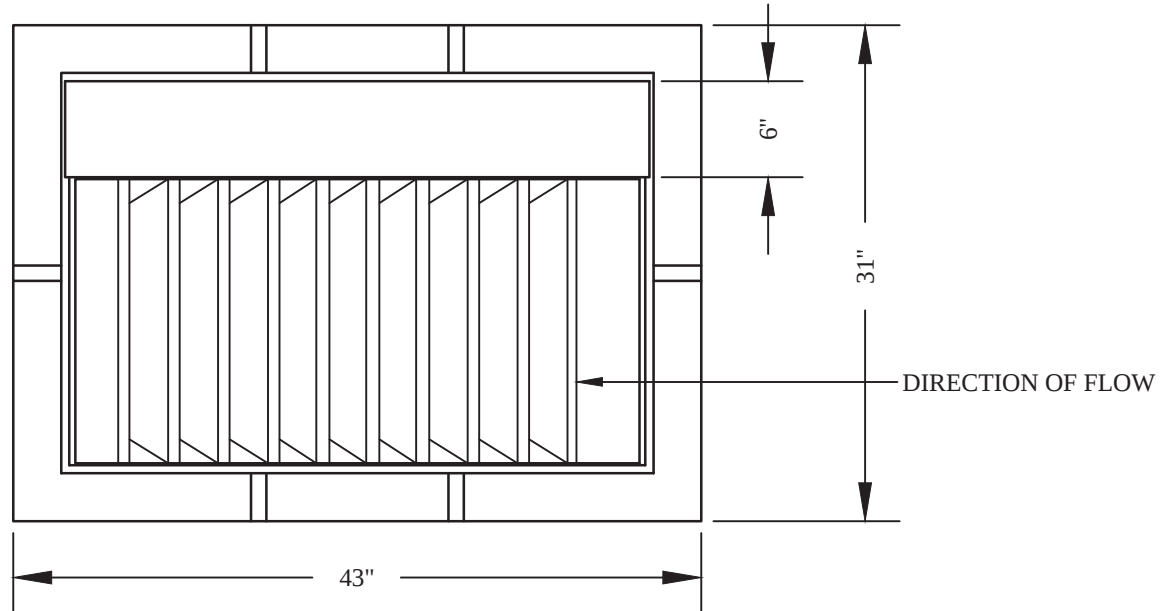


CITY OF BURNSVILLE - ENGINEERING DEPT.

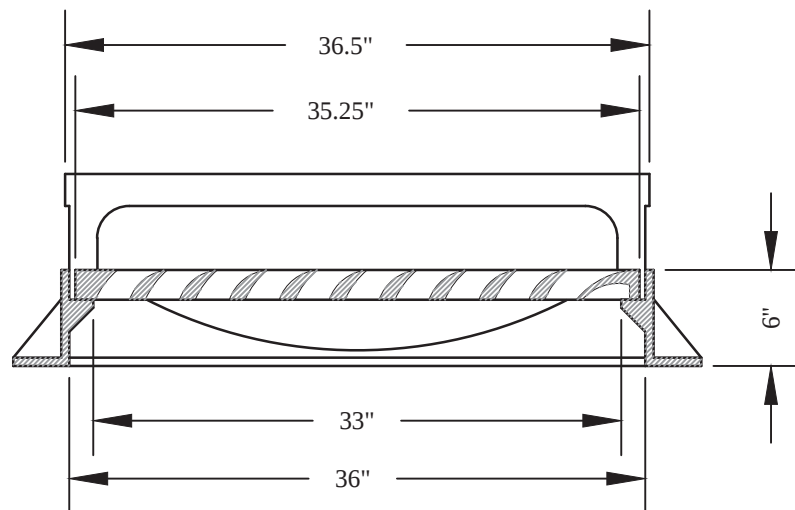
RIP RAP SURFACE DRAIN SWALE

Plate No.	STM - 11
Revision Date	1/2018
File Location: S:\Details\english\Storm Sewer\STM11-Surface Drain SPILLWAY.dwg	

CURB INLET FRAME AND CURB BOX SHALL BE
NEENAH NO. 3067, TYPE "V" GRATE AND 3"
CURB BOX OR APPROVED EQUAL.



VANES IN GRATE SHALL BE POINTED TOWARDS
THE DIRECTION OF GUTTERLINE WATER.



CITY OF BURNSVILLE - ENGINEERING DEPT.

STANDARD CATCH BASIN CASTING

Plate No.

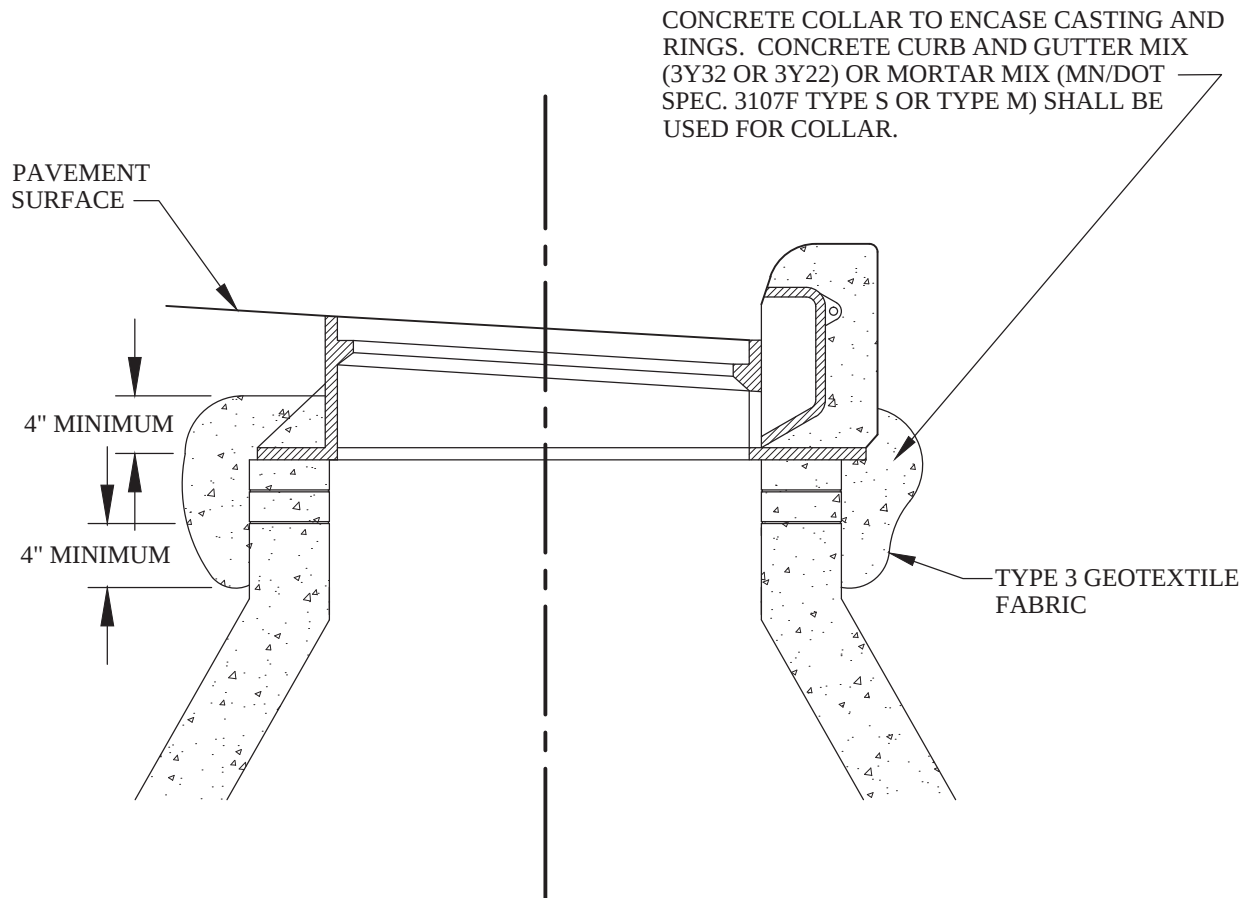
STM - 12

Revision Date

11/2013

File Location:

S:\Details\english\Storm Sewer\STM12-CB Casting.dwg



CITY OF BURNSVILLE - ENGINEERING DEPT.

CONCRETE ENCASED CASTING

Plate No.

SM - 13

Revision Date

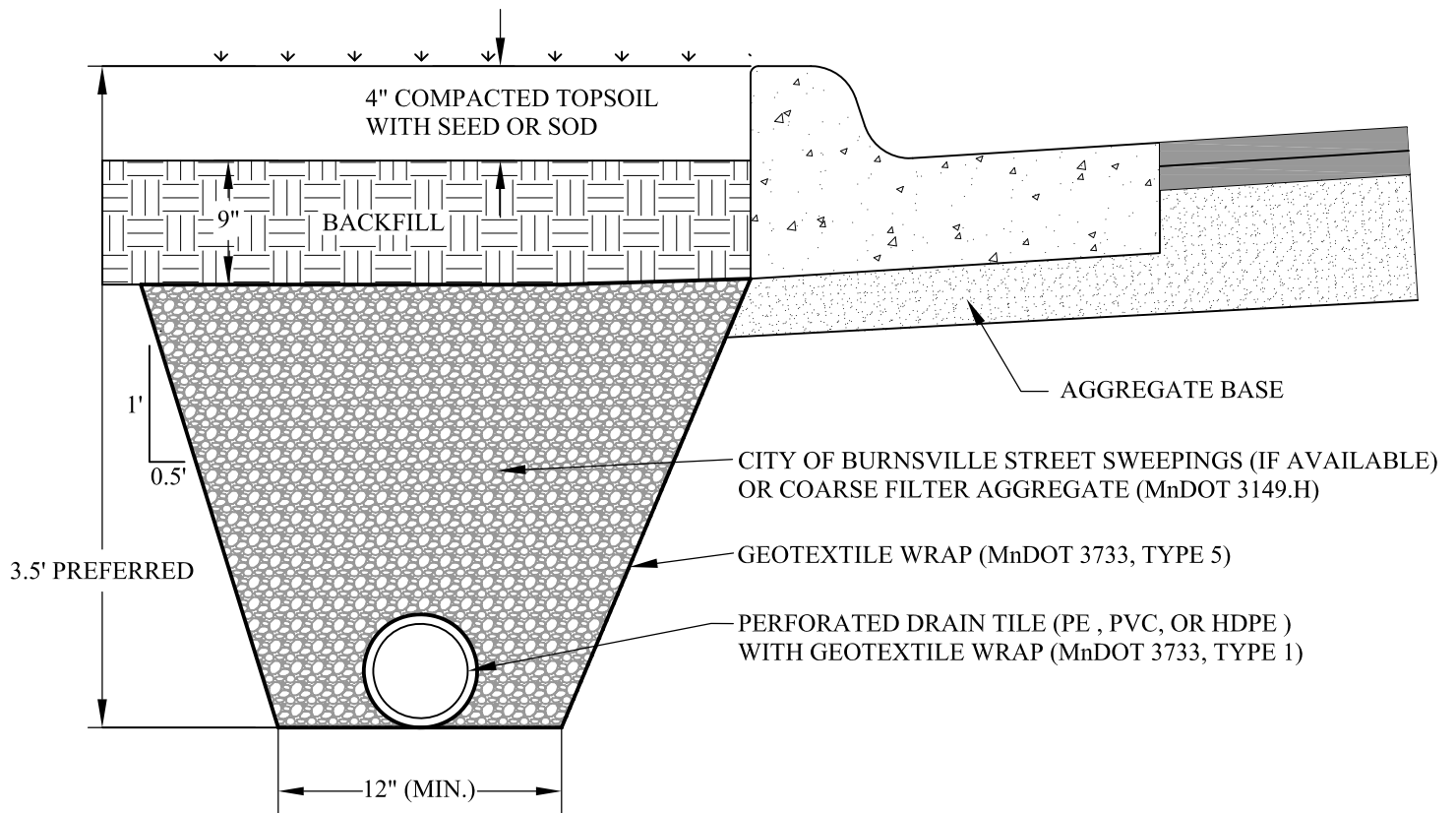
11/2013

File Location:

S:\Details\english\Storm Sewer\STM13- Conc Encased Casting.dwg

NOTES

1. SLICE 4" SLITS IN FABRIC AS DIRECTED BY THE ENGINEER PRIOR TO BACKFILLING PIPE.
2. HOLES FOR DRAIN TILE IN STORM STRUCTURE WILL BE PRECAST OR CORE DRILLED.
3. SEE MnDOT 2502 FOR MATERIAL REFERENCES.



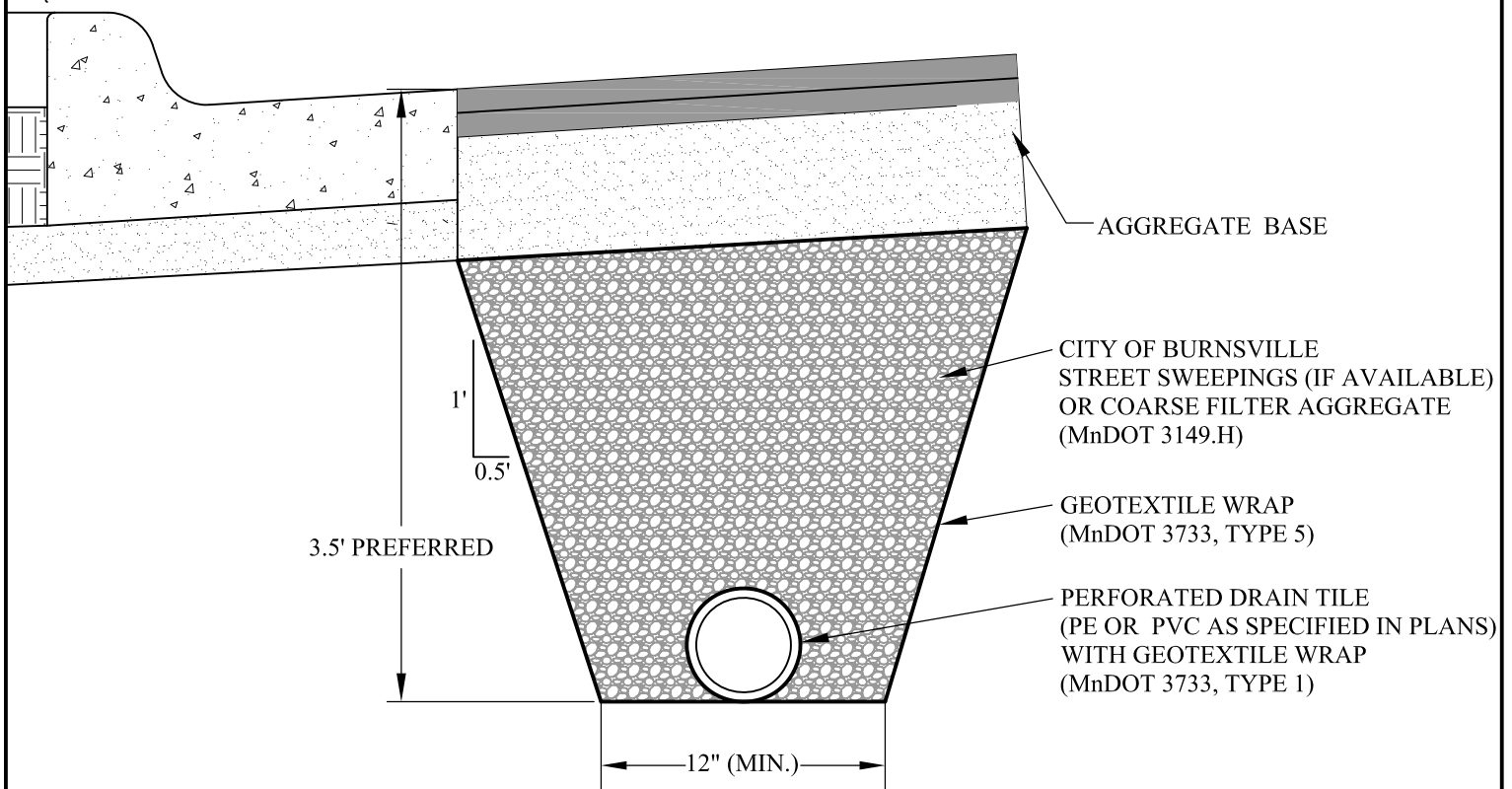
CITY OF BURNSVILLE - ENGINEERING DEPT.

PERFORATED DRAIN TILE (BEHIND CURB)

Plate No.	STM - 14
Revision Date	10/2020
File Location: S:\Details\english\Storm Sewer\STM14-Street Drain Tile.dwg	

NOTES

1. SLICE 4" SLITS IN FABRIC AS DIRECTED BY THE ENGINEER PRIOR TO BACKFILLING PIPE.
2. HOLES FOR DRAIN TILE IN STORM STRUCTURE WILL BE PRECAST OR CORE DRILLED.
3. SEE MnDOT 2502 FOR MATERIAL REFERENCES.



CITY OF BURNSVILLE - ENGINEERING DEPT.

PERFORATED DRAIN TILE (IN STREET)

Plate No.

STM - 15

Revision Date

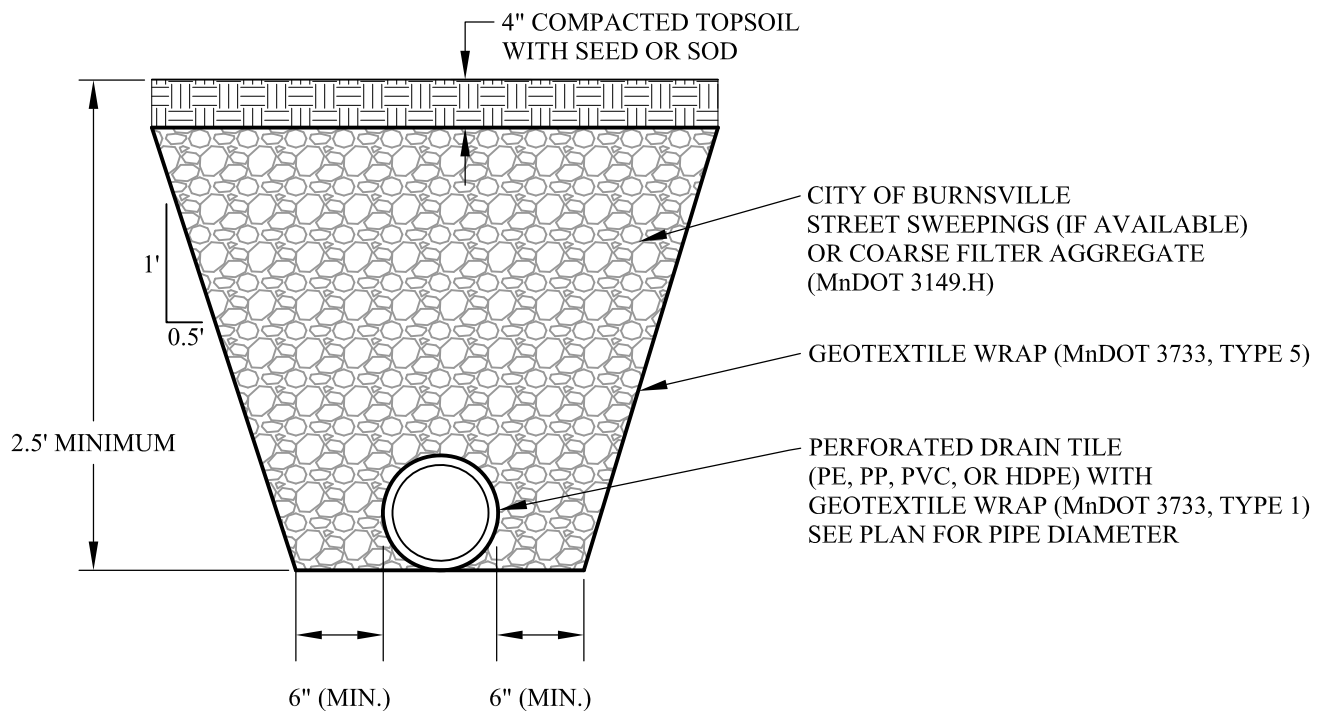
01/2021

File Location:

S:\Details\english\Storm Sewer\STM15-Street Drain Tile in street.dwg

NOTES

1. SLICE 4" SLITS IN FABRIC AS DIRECTED BY THE ENGINEER PRIOR TO BACKFILLING PIPE.
2. HOLES FOR DRAIN TILE IN STORM STRUCTURE WILL BE PRECAST OR CORE DRILLED.
3. SEE MnDOT 2502 FOR MATERIAL REFERENCES.



CITY OF BURNSVILLE - ENGINEERING DEPT. **PERFORATED DRAIN TILE** **(GREEN AREA)**

Plate No.

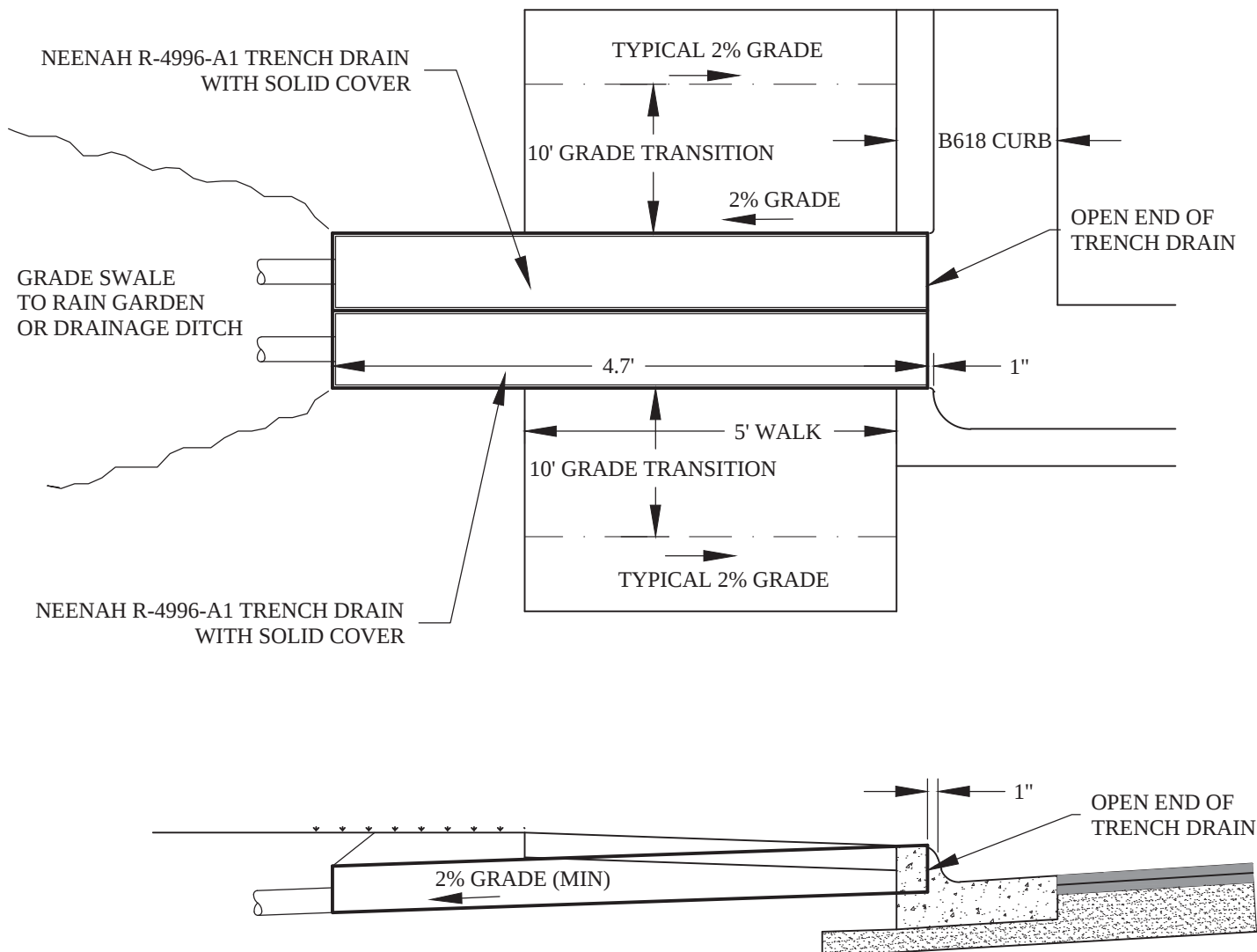
STM - 16

Revision Date

10/2020

File Location:

S:\Details\english\Storm Sewer\STM16-Perforated Drain Tile green area.dwg



CITY OF BURNSVILLE - ENGINEERING DEPT.

TRENCH DRAIN THROUGH SIDEWALK

Plate No.

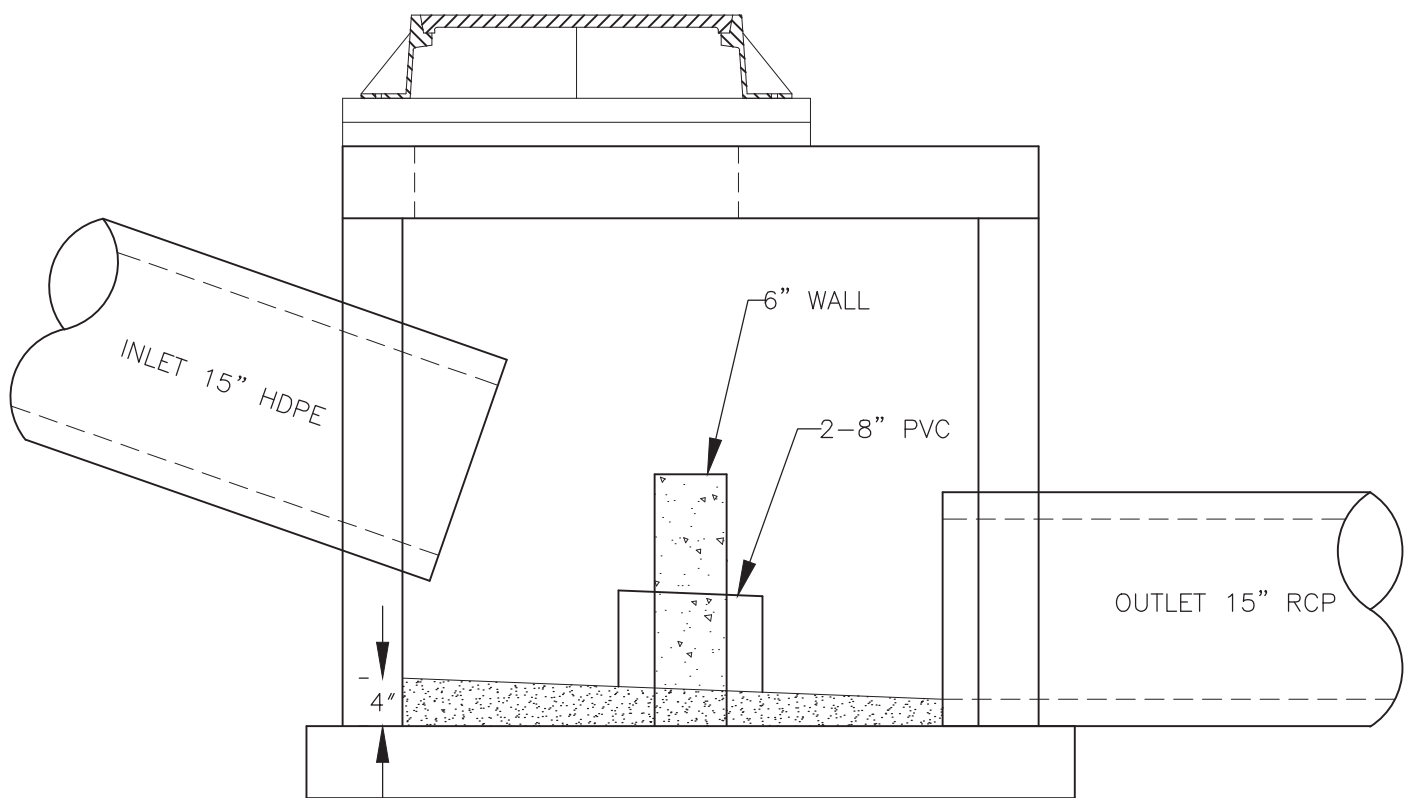
STM - 17

Revision Date

11/2013

File Location:

S:\Details\english\Storm Sewer\STM17-TRENCH_DRAIN.dwg



CITY OF BURNSVILLE - ENGINEERING DEPT.

MANHOLE ENERGY DISSIPATOR

Plate No.

STM - 18

Revision Date

11/2013

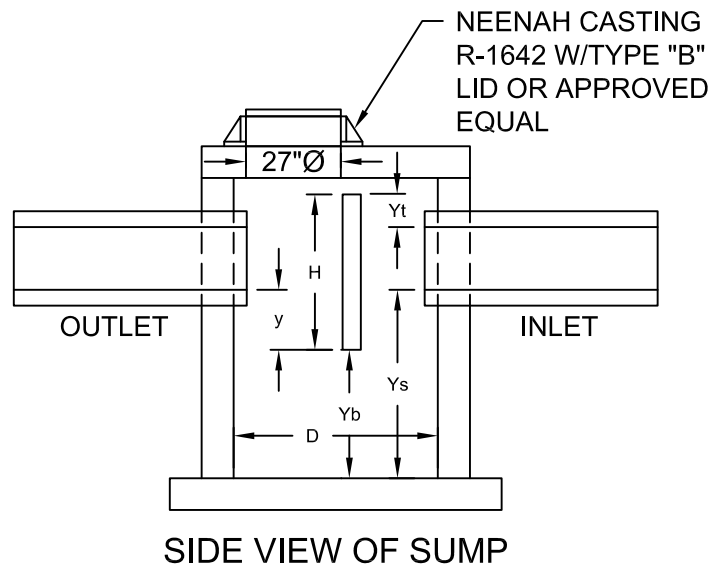
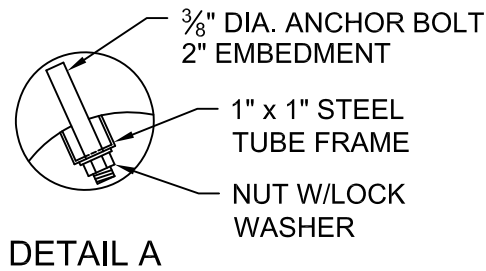
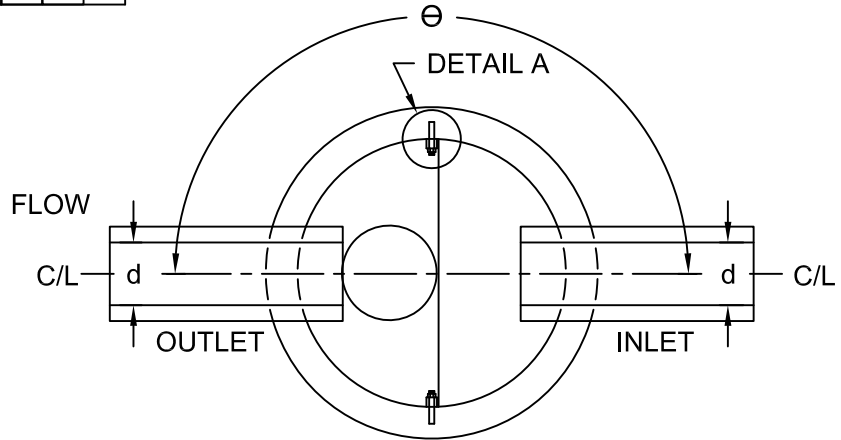
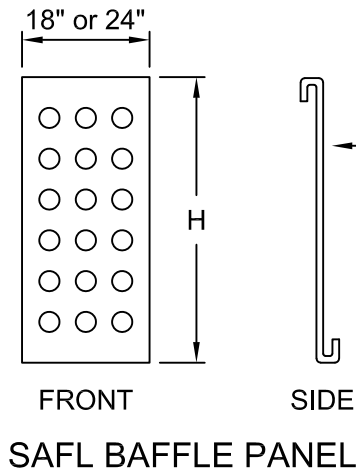
File Location:

S:\Details\english\Storm Sewer\STM10-Pond Skimmer.dwg

d (IN.)	H (IN.)	Θ (DEG.)		y (IN.)	Y_s	Y_b	Y_t	D
		MIN.	MAX.					
12	36	130	230	12	MIN. 4 FT.	MIN. 3 FT.	0" to 6"	VARIES
15	36	130	230	12				
18	36	130	230	12				
21	46	140	220	12				
24	46	140	220	12				
27	46	140	220	12				
30	57	150	210	12				
36	57	150	210	12				

NOTES:

- * Ideal Baffle height = distance from top of the highest Inlet pipe to the bottom of the outlet pipe plus 18" or greater
- * Minimum acceptable Baffle Height = distance from top of the highest inlet pipe to the bottom of the outlet pipe plus 12"
- * Heights greater than 57" require 2 Baffles stacked
- * Contact Upstream Technologies for pipes larger than 48" I.D.
- * Baffle shall be no more than 1' off center horizontally. center is preferred



PATENT PROTECTED

Patents: US #8663466B2 - US #8715507B2 - US #9506237B2 - CA #2742207

This generic detail does not encompass the sizing, fit, and applicability of the SAFL Baffle for this specific project. It is the ultimate responsibility of the design engineer to assure that the design is in compliance with all applicable laws and regulations. The SAFL Baffle is a patented technology of Upstream Technologies, Inc. and the University of Minnesota. Neither Upstream Technologies nor the University of Minnesota approves plans, sizing, or system designs.

SAFL BAFFLE STANDARD DETAIL
UPSTREAM TECHNOLOGIES INC.
 600 COUNTY ROAD D WEST, STE 14
 NEW BRIGHTON, MN 55112
 651.237.5123



CITY OF BURNSVILLE - ENGINEERING DEPT.

SAFL BAFFLE MANHOLE

Plate No.

STM - 19

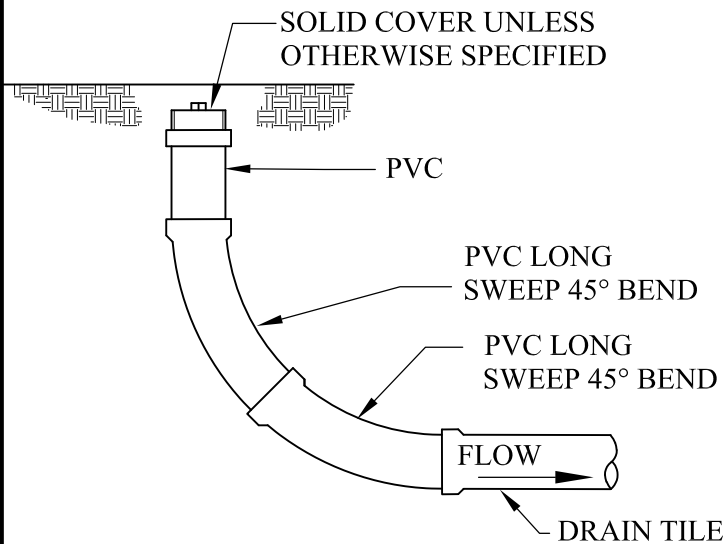
Revision Date

11/2019

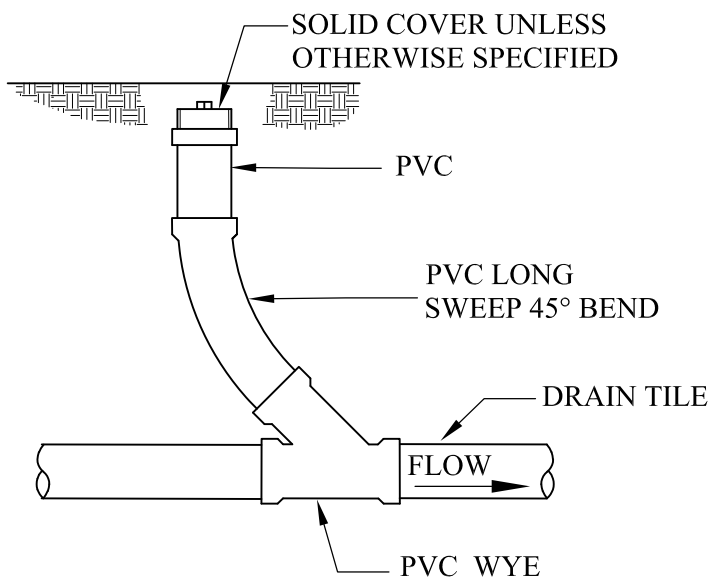
File Location:

S:\Details\english\Storm Sewer\STM19-BAFFLE.dwg

END-LINE CLEANOUT

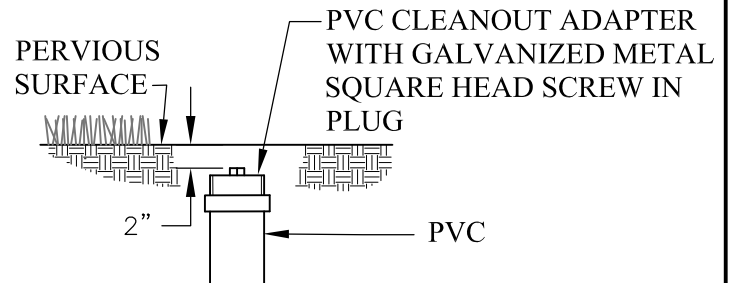


IN-LINE CLEANOUT

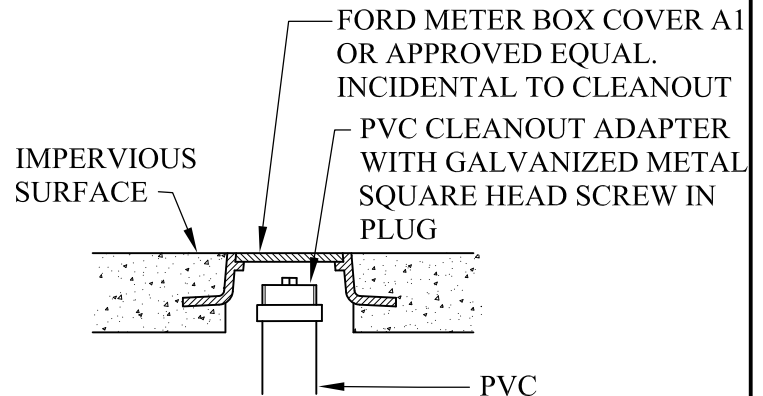


BENDS AND RISER TO BE THE SAME SIZE AS DRAIN TILE

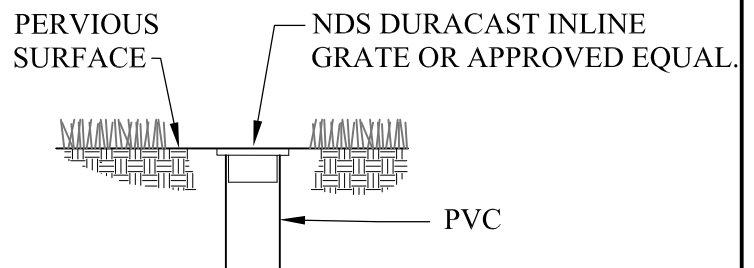
SOLID COVER



SOLID COVER PAVED AREA



OPEN GRATE COVER



CITY OF BURNSVILLE - ENGINEERING DEPT.

SEWER CLEANOUT

Plate No.	STM - 20
Revision Date	10/2020
File Location: S:\Details\english\Storm Sewer\STM14-Street Drain Tile.dwg	

STATE OF MINNESOTA
 DEPARTMENT OF TRANSPORTATION
 REINFORCED CONCRETE PIPE
 B WALL

SPECIFICATION
 REFERENCE
 2501, 2502, 2503
 REVISED
 4-30-99 A.K.J.

STANDARD
 PLATE
 NO.
 3000L
 1 OF 5

INTERNAL DIA. OF PIPE, INCHES	WEIGHT PER LIN. FT. OF PIPE	MIN. WALL THICKNESS	CLASS I		CLASS II		CLASS III		CLASS IV		CLASS V	
			D - LOAD TO PRODUCE A 0.01 INCH CRACK (LBS./LIN. FT. OF DIA.)		D - LOAD TO PRODUCE ULTIMATE LOAD (LBS./LIN. FT. OF DIA.)		CONCRETE 4000 P.S.I.		CONCRETE 4000 P.S.I.		CONCRETE 6000 P.S.I.	
			800		1000		1350		2000		3000	
			1200		1500		2000		3000		3750	
D	POUNDS	INCHES	CONCRETE 4000 P.S.I.		MINIMUM REINFORCEMENT		CONCRETE 4000 P.S.I.		CONCRETE 4000 P.S.I.		CONCRETE 4000 P.S.I.	
			INNER CAGE	OUTER CAGE	INNER CAGE	OUTER CAGE	INNER CAGE	OUTER CAGE	INNER CAGE	OUTER CAGE	INNER CAGE	OUTER CAGE
12	92	2	—	—	0.07 ②	—	0.07 ②	—	0.07	—	0.10	—
15	127	2-1/4	—	—	0.07 ②	—	0.07 ②	—	0.10	—	0.14	—
18	168	2-1/2	—	—	0.07 ②	—	0.07 ②	—	0.14	—	0.19	—
21	214	2-3/4	—	—	0.07 ②	—	0.07 ②	—	0.20	—	0.24	—
24	265	3	—	—	0.07 ②	—	0.07 ②	—	0.27	—	0.30	—
27	322	3-1/4	—	—	0.13	—	0.16	—	0.31	—	0.38	0.23
30	384	3-1/2	—	—	0.14	—	0.18	—	0.35	—	0.41	0.25
33	452	3-3/4	—	—	0.15	—	0.20	—	0.27	—	0.46	0.28
36	524	4 ③	—	—	0.12	0.07	0.17 ③	0.10	0.30	0.18	0.50	0.30
42	685	4-1/2	—	—	0.15	0.09	0.21	0.13	0.35	0.21	0.60	0.36
48	867	5	—	—	0.18	0.11	0.24	0.14	0.42	0.25	0.73	0.44
54	1070	5-1/2	—	—	0.22	0.13	0.29	0.17	0.50	0.30	0.74 ①	0.44
			CONCRETE 5000 PSI									
60	1296	6	0.21	0.13	0.25	0.15	0.34	0.20	0.59	0.35	0.81 ①	0.49
66	1542	6-1/2	0.25	0.15	0.31	0.19	0.41	0.25	0.69	0.41	0.88 ①	0.53
72	1810	7	0.29	0.17	0.35	0.21	0.49	0.29	0.79	0.47	0.95 ①	0.57
78	2098	7-1/2	0.32	0.19	0.40	0.24	0.57	0.34	0.70 ①	0.42	1.03 ①	0.62
84	2410	8	0.37	0.22	0.46	0.28	0.64	0.38	0.75 ①	0.45	1.12 ①	0.67
			CONCRETE 5000 PSI									
90	2740	8-1/2	0.41	0.25	0.51	0.31	0.69	0.41	0.82 ①	0.49	1.20 ①	0.72
96	3090	9	0.46	0.28	0.57	0.34	0.76	0.46	0.88 ①	0.53	1.30 ①	0.78
			CONCRETE 5000 PSI									
102	3470	9-1/2	0.54	0.32	0.68	0.41	0.90	0.54	0.94 ①	0.56	1.42 ①	0.85
108	3860	10	0.61	0.37	0.76	0.46	1.08	0.65	1.00 ①	0.60	1.50 ①	0.90

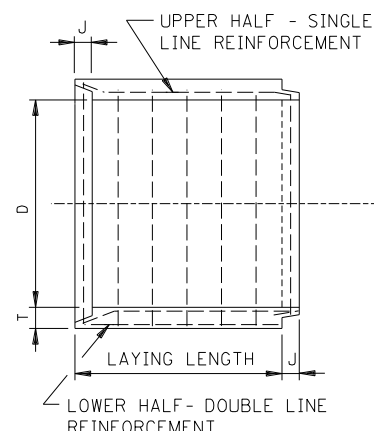
NOTES:

SEE SHEETS 2 TO 5 FOR ADDITIONAL INFORMATION ON PIPE SECTIONS AND GENERAL NOTES.

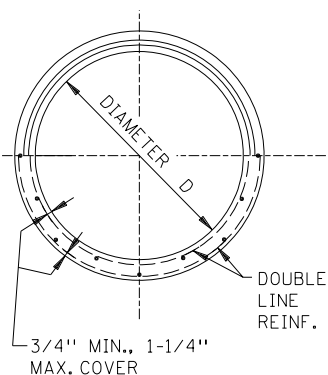
STANDARD PLATE 3006, GASKET JOINT R.C. PIPE, MAY BE FURNISHED IN LIEU OF 3000 PIPE, THE GASKET REQUIRED FOR 3006 PIPE WILL NOT BE REQUIRED; HOWEVER, THE APPROPRIATE PROVISIONS OF THE SPECIFICATIONS RELATING TO FILLING THE JOINT SPACE WITH AN APPROVED SEALER OR FULL CIRCUMFERENTIAL WRAP OF GEOTEXTILE MATERIAL SHALL APPLY.

- ① CLASS IV PIPE 78 INCHES OR MORE IN DIAMETER AND CLASS V PIPE 54 INCHES OR MORE IN DIAMETER ARE SPECIAL DESIGNS AND REQUIRE SHEAR STEEL. FOR SPECIAL DESIGNS SEE SHEET 4 OF 5.
- ② FOR THESE CLASSES AND SIZES, THE MINIMUM PRACTICAL STEEL REINFORCEMENT IS SPECIFIED. THE ACTUAL ULTIMATE STRENGTH IS GREATER THAN THE MINIMUM STRENGTH SPECIFIED FOR NONREINFORCED PIPE OF EQUIVALENT DIAMETERS IN AASHTO M86.
- ③ AS AN ALTERNATIVE, SINGLE CAGE REINFORCEMENT MAY BE USED. THE REINFORCEMENT AREA IN SQUARE INCHES PER LINEAR FOOT SHALL BE 0.30 FOR WALL B.

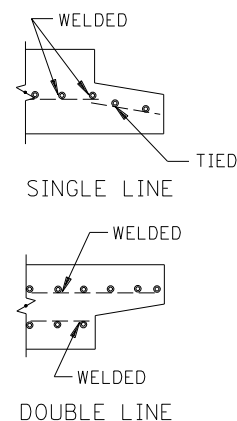
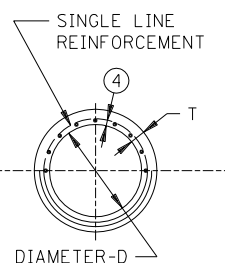
INTERNAL DIA. OF PIPE, (INCHES)	WEIGHT PER LIN. FT. OF PIPE	WALL THICKNESS	CLASS II		CLASS III		CLASS IV		CLASS V	
			D - LOAD TO PRODUCE A 0.01 INCH CRACK (POUNDS PER LIN. FT. PER FT. OF DIA.)							
			1000		1350		2000		3000	
			D - LOAD TO PRODUCE ULTIMATE LOAD (LBS. PER LIN. FT. PER FT. OF DIA.)							
			1500		2000		3000		3750	
			CONCRETE 4000 P.S.I.		CONCRETE 4000 P.S.I.		CONCRETE 4000 P.S.I.		CONCRETE 6000 P.S.I.	
T		MINIMUM REINFORCEMENT SQUARE INCHES PER LINEAL FOOT OF BARREL ①								
D	LBS.	INCHES	INNER CAGE	OUTER CAGE	INNER CAGE	OUTER CAGE	INNER CAGE	OUTER CAGE	INNER CAGE	OUTER CAGE
12	140	2-3/4	— ②	—	— ②	—	— ②	—	0.08 ⑤	—
15	180	3	— ②	—	— ②	—	— ②	—	0.08 ⑤	—
18	230	3-1/4	— ②	—	— ②	—	— ②	—	0.10 ⑤	—
21	280	3-1/2	— ②	—	— ②	—	— ②	—	0.15 ⑤	—
24	340	3-3/4	— ②	—	—	—	0.07	0.07	0.12	0.07
27	410	4	— ②	—	—	—	0.08	0.07	0.14	0.08
30	480	4-1/4	— ②	—	—	—	0.09	0.07	0.18	0.11
33	510	4-1/2	— ②	—	—	—	0.11	0.07	0.23	0.14
36	630	4-3/4 ③	0.07	0.07	0.08 ③	0.07	0.14	0.08	0.27	0.16
42	810	5-1/4	0.10	0.07	0.12	0.07	0.20	0.12	0.36	0.22
48	1010	5-3/4	0.14	0.08	0.16	0.10	0.26	0.16	0.47	0.28
54	1230	6-1/4	0.17	0.10	0.21	0.13	0.34	0.20	0.58	0.35
60	1470	6-3/4	0.22	0.13	0.25	0.15	0.41	0.25	0.70 ①	0.42
66	1740	7-1/4	0.25	0.15	0.31	0.19	0.51	0.31	0.84 ①	0.50
72	2010	7-3/4	0.30	0.18	0.36	0.22	CONCRETE 5000 P.S.I.		0.99 ①	0.59
78	2330	8-1/4	0.35	0.21	0.42	0.25	0.61	0.37		
84	2640	8-3/4	0.41	0.25	0.50	0.30	0.85	0.51		
90	3000	9-1/4	0.48	0.29	CONCRETE 5000 P.S.I.					
96	3370	9-3/4	0.55	0.33	0.59	0.35				
102	3760	10-1/4	CONCRETE 5000 P.S.I.		0.70	0.42				
108	4170	10-3/4	0.62	0.37	0.83	0.50				
			0.70	0.42	0.99	0.59				



TYPICAL LONGITUDINAL SECTION



HALF SECTIONS



REINFORCING AT ENDS OF PIPE

NOTES:

SEE SHEET 5 OF 5 FOR ADDITIONAL INFORMATION ON C WALL PIPE SECTIONS AND GENERAL NOTES.

STANDARD PLATE 3006, GASKET JOINT R.C. PIPE, MAY BE FURNISHED IN LIEU OF 3000 PIPE. THE GASKET REQUIRED FOR 3006 PIPE WILL NOT BE REQUIRED; HOWEVER, THE APPROPRIATE PROVISIONS OF THE SPECIFICATIONS RELATING TO FILLING THE JOINT SPACE WITH AN APPROVED SEALER OR FULL CIRCUMFERENTIAL WRAP OF GEOTEXTILE MATERIAL SHALL APPLY.

- ① AN INNER CIRCULAR CAGE PLUS AN ELLIPTICAL CAGE SUCH THAT THE AREA OF THE ELLIPTICAL CAGE SHALL NOT BE LESS THAN THAT SPECIFIED FOR THE OUTER CAGE IN THE TABLE AND THE TOTAL AREA OF THE INNER CIRCULAR CAGE PLUS THE ELLIPTICAL CAGE SHALL NOT BE LESS THAN THAT SPECIFIED FOR THE INNER CAGE IN THE TABLE.
- ② FOR THESE CLASSES AND SIZES, THE MINIMUM PRACTICAL STEEL REINFORCEMENT IS SPECIFIED. THE ACTUAL ULTIMATE STRENGTH IS GREATER THAN THE MINIMUM STRENGTH SPECIFIED FOR NONREINFORCED PIPE OF EQUIVALENT DIAMETERS IN AASHTO M86.
- ③ AS AN ALTERNATIVE, FOR CLASS II AND III A SINGLE CAGE REINFORCEMENT MAY BE USED. THE REINFORCEMENT AREA IN SQUARE INCHES PER LINEAL FOOT SHALL BE 0.20 FOR WALL C.
- ④ 35 TO 50 PERCENT OF T EXCEPT WHEN WALL THICKNESS IS LESS THAN 3-1/2 INCHES-THEN 3/4 INCHES OF COVER.
- ⑤ SINGLE LINE REINFORCEMENT.

APPROVED Aug. 31, 1989

 Director
 Materials, Research and Standards

STATE OF MINNESOTA
 DEPARTMENT OF TRANSPORTATION
REINFORCED CONCRETE PIPE
 C WALL

SPECIFICATION
 REFERENCE
 2501, 2502, 2503
 REVISED
 4-30-99 A.K.J.

STANDARD
 PLATE
 NO.
3000L
 2 OF 5

INTERNAL DIAMETER OF PIPE IN INCHES	CROSS SECTION WATER AREA	LENCTH OF JOINT	NOMINAL - A				
		J					
D	SQ. FT.	INCHES					
12	0.79	1-3/4	3/16	13-1/4	13-5/8	13-7/8	14-1/4
15	1.23	2	3/16	16-1/2	16-7/8	17-1/4	17-5/8
18	1.77	2-1/4	3/16	19-5/8	20	20-3/8	20-3/4
21	2.40	2-1/2	3/16	22-7/8	23-1/4	23-3/4	24-1/8
24	3.14	2-3/4	3/16	26	26-3/8	27	27-3/8
27	3.98	3	3/16	29-1/4	29-5/8	30-1/4	30-5/8
30	4.91	3-1/4	3/16	32-3/8	32-3/4	33-1/2	33-7/8
33	5.94	3-1/2	1/4	35-1/2	36	36-3/4	37-1/4
36	7.07	3-3/4	1/4	38-3/4	39-1/4	40	40-1/2
42	9.62	4	1/4	45-1/8	45-5/8	46-1/2	47
48	12.57	4-1/4	1/4	51-1/2	52	53	53-1/2
54	15.90	4-1/2	1/4	57-7/8	58-3/8	59-3/8	59-7/8
60	19.63	5	1/4	64-1/4	64-3/4	66	66-1/2
66	23.76	5-1/2	1/4	70-5/8	71-1/8	72-1/2	73
72	28.27	6	1/4	77	77-1/2	79	79-1/2
78	33.18	6-1/2	1/4	83-3/8	83-7/8	85-5/8	86-1/8
84	38.48	7	1/4	89-3/4	90-1/4	92-1/8	92-5/8
90	44.18	7	1/4	95-3/4	96-1/4	98-1/8	98-5/8
96	50.27	7	1/4	102-1/8	102-5/8	104-1/2	105
102	56.75	7-1/2	1/4	109	109-1/2	111-1/2	112
108	63.62	7-1/2	1/4	115-1/2	116	118	118-1/2

TOLERANCES IN DIMENSIONS:

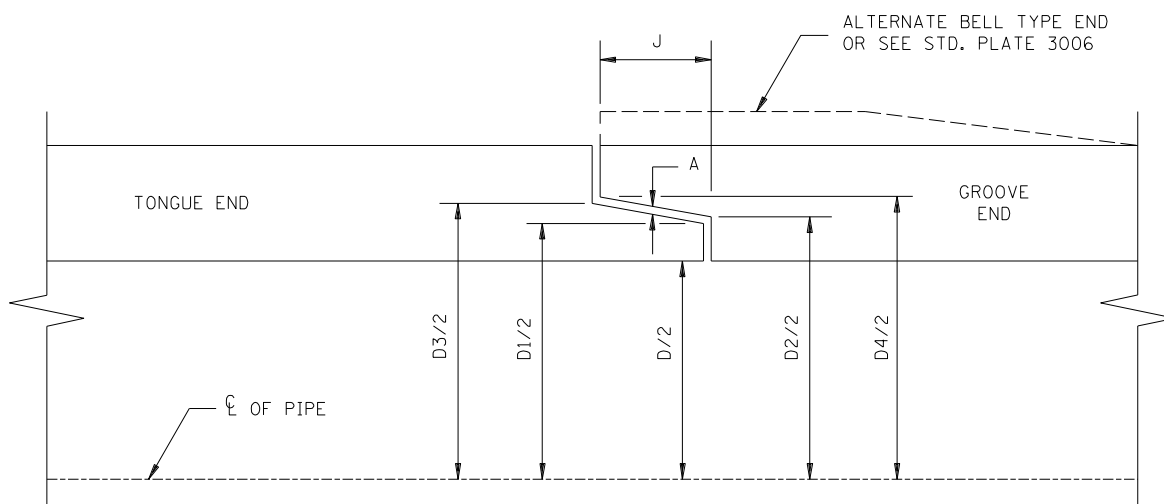
D: $\pm 1.5\%$ FOR 12" TO 24" D, $\pm 1\%$ OR 3/8"
WHICHEVER IS GREATER FOR 27" TO 108" D.

D1, D2, D3, AND D4: $\pm 3/16"$ FOR 12" TO 30" D,
 $\pm 1/4"$ FOR 33" TO 108" D.

T: NOT LESS THAN THE DESIGN T BY MORE THAN
5% OR 3/16" WHICHEVER IS GREATER.

J: ALL SIZES $\pm 1/4"$.

LAYING LENGTH: SHALL NOT UNDERRUN BY MORE
THAN 1/2".



SECTION AT PIPE JOINT

APPROVED Aug. 31, 1989

R. H. Sullivan

Director

Materials, Research and Standards

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

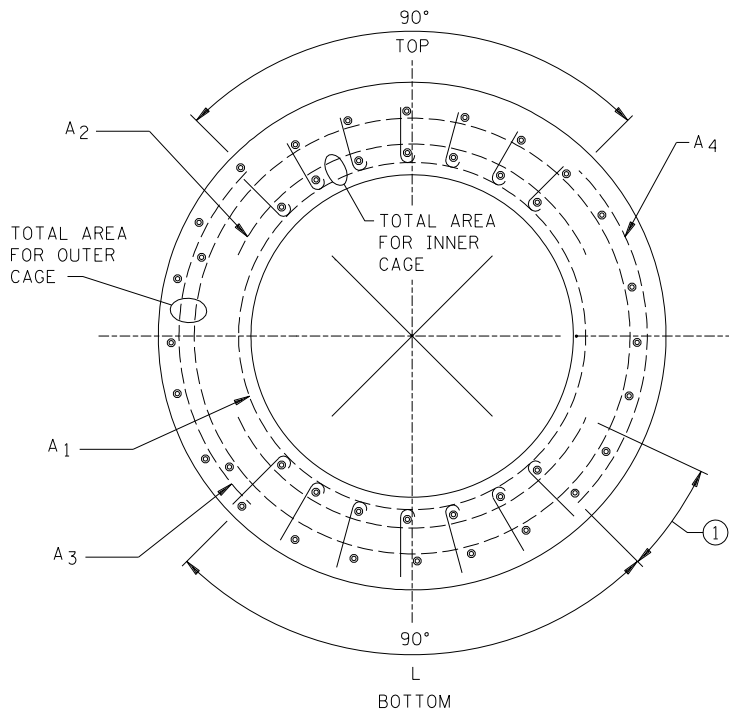
REINFORCED CONCRETE PIPE
JOINT DIMENSIONS FOR B-WALL AND C-WALL

SPECIFICATION
REFERENCE

2501
2502
2503

STANDARD
PLATE
NO.

3000L
3 OF 5



CROSS SECTION FOR
SPECIAL DESIGN PIPES

NOTES:

SEE SHEET 1 FOR INNER AND OUTER CAGE REINFORCEMENT.

$A_1 + A_2$ = TOTAL INNER CAGE REINFORCEMENT.

$A_3 + A_4$ = TOTAL OUTER CAGE REINFORCEMENT.

POINT OR INDENT LEGIBLE MARKS AT ONE END OF EACH SECTION ON THE INSIDE AND OUTSIDE OF OPPOSITE WALLS DESIGNATING THE CENTER OF STIRRUP REINFORCEMENT.

THE TOP OF THE PIPE SHALL BE APPROPRIATELY MARKED OR STENCILED BOTH ON THE INSIDE AND OUTSIDE SURFACES.

① THE CAGES MUST BE ASSEMBLED WITH THE OUTER MAT OVERLAPPING THE INNER MAT BY A DISTANCE EQUAL TO ONE PIPE WALL THICKNESS OR GREATER.

A_1 = REINFORCING OF FULL CIRCULAR INNER CAGE.

A_2 = REINFORCING OF INNER LAP SECTION, 90° MINIMUM ARC.

A_3 = REINFORCING OF FULL CIRCULAR OUTER CAGE.

A_4 = REINFORCING OF OUTER LAP SECTION, 90° MINIMUM ARC.

A_r = MINIMUM RADIAL REINFORCING REQUIRED IN SQUARE INCHES PER SQUARE FOOT OF PIPE OVER A MINIMUM 90° ARC AT TOP AND BOTTOM OF PIPE. HOOK DESIGN MUST BE APPROVED BY MATERIALS SECTION.

THE FULL CIRCULAR CAGES MUST HAVE AN AREA EQUAL TO AT LEAST 40% OF THE REQUIRED TOTAL AREA.

L = LENGTH OF 90° ARC MEASURED AT INNER CAGE.

N = MINIMUM NUMBER OF ROWS OF RADIAL REINFORCING AT TOP AND BOTTOM OF PIPE.

S = MAXIMUM CIRCUMFERENTIAL SPACING OF ROWS OR RADIAL REINFORCING AT OUTER CAGE.

INTERNAL DIA. OF PIPE	LENGTH OF 90° ARC	WALL THICKNESS	SHEAR STEEL					
			CLASS IV			CLASS V		
D	L	T	N	S	A_r	N	S	A_r
54"	44"	5-1/2"	—	—	—	12	4"	0.22
60"	49"	6"	—	—	—	10	6"	0.22
66"	54"	6-1/2"	—	—	—	10	6"	0.22
72"	59"	7"	—	—	—	11	6"	0.23
78"	63"	7-1/2"	12	6"	0.25	12	6"	0.25
84"	68"	8"	13	6"	0.28	13	6"	0.28
90"	73"	8-1/2"	13	6"	0.31	13	6"	0.31
96"	77"	9"	14	6"	0.34	14	6"	0.34
102"	82"	9-1/2"	15	6"	0.37	15	6"	0.37
108"	87"	10"	16	6"	0.40	16	6"	0.40

APPROVED Aug. 31, 1989

R. H. Sullivan

Director

Materials, Research and Standards

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

REINFORCED CONCRETE PIPE

REINFORCEMENT INFORMATION
SPECIAL DESIGN PIPES

SPECIFICATION
REFERENCE

2501
2502
2503

STANDARD
PLATE
NO.

3000L

4 OF 5

REINFORCEMENT:

REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS AASHTO M 170.

IF THE SPLICES ARE NOT WELDED, CIRCUMFERENTIAL REINFORCEMENT SHALL BE LAPPED NOT LESS THAN 20 DIAMETERS FOR DEFORMED BARS AND DEFORMED COLD-WORKED WIRE, AND 40 DIAMETERS FOR PLAIN BARS AND COLD-DRAWN WIRE. IN ADDITION, WHERE LAPPED CAGES OF WELDED-WIRE FABRIC ARE USED WITHOUT WELDING, THE LAP SHALL CONTAIN A LONGITUDINAL WIRE. ALL CIRCULAR AND LONGITUDINAL REINFORCEMENT SHALL BE ASSEMBLED AND SECURELY FASTENED CAGE FASHION SO AS TO MAINTAIN REINFORCEMENT IN EXACT SHAPE AND CORRECT POSITION WITHIN THE FORM.

REINFORCEMENT WILL BE CONSIDERED AS MEETING THE DESIGN REQUIREMENTS IF THE AREA, COMPUTED ON THE BASIS OF NOMINAL AREA OF THE WIRE OR BARS USED, EQUALS OR EXCEEDS THE ABOVE REQUIREMENT. ACTUAL AREA OF THE REINFORCING USED MAY VARY FROM THE NOMINAL AREA ACCORDING TO PERMISSIBLE VARIATIONS OF THE STANDARD SPECIFICATIONS FOR THE REINFORCING.

THE COVER OVER THE CIRCUMFERENTIAL STEEL SHALL BE AS SHOWN ON THIS PLATE BUT IN NO CASE SHALL THE COVER BE LESS THAN 3/4 INCHES AS MEASURED TO THE INSIDE WALL SURFACE OR THE OUTSIDE WALL SURFACE, EXCEPT IN THE TONGUE AND GROOVE. REINFORCING STEEL MAY BE OMITTED FROM EITHER THE TONGUE OR GROOVE ENDS OF 12 INCH THRU 33 INCH DIAMETER PLAIN ROUND PIPE ONLY OF B WALL SINGLE CAGE. BELL ENDS WITH O-RING GASKETS SHALL HAVE REINFORCEMENT IN THEM.

THE SPACING CENTER TO CENTER OF ADJACENT RINGS OF CIRCUMFERENTIAL REINFORCEMENT IN A CAGE SHALL NOT EXCEED 4 INCHES FOR PIPE UP TO AND INCLUDING PIPE HAVING A 4 INCH WALL THICKNESS NOR EXCEED THE WALL THICKNESS FOR LARGER PIPE, AND SHALL IN NO CASE EXCEED 6 INCHES. THE CONTINUITY OF THE CIRCUMFERENTIAL REINFORCING STEEL SHALL NOT BE DESTROYED DURING THE MANUFACTURE OF THE PIPE.

GENERAL NOTES:

THE STRENGTH TEST REQUIREMENTS IN POUNDS-FORCE PER LINEAL FOOT OF PIPE UNDER THE THREE-EDGE-BEARING METHOD SHALL BE COMPUTED BY MULTIPLYING THE INTERNAL DIAMETER OF THE PIPE IN FEET BY THE D-LOADS (EXPRESSED IN POUNDS-FORCE PER LINEAL FOOT OF DIAMETER) TO PRODUCE THE 0.01 INCH CRACK AND THE ULTIMATE LOAD SPECIFIED ON SHEETS 1 AND 5 OF THIS STANDARD PLATE.

PIPES 60 INCHES IN DIAMETER OR GREATER AND ALL CENTER LINE CULVERTS SHALL HAVE TIED JOINTS.

NOT MORE THAN TWO LIFT HOLES WILL BE PERMITTED IN EACH SECTION OF PIPE. TAPERED PLUGS SHALL BE FURNISHED FOR CLOSING LIFT HOLES.

GASKET LUBRICATION SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS.

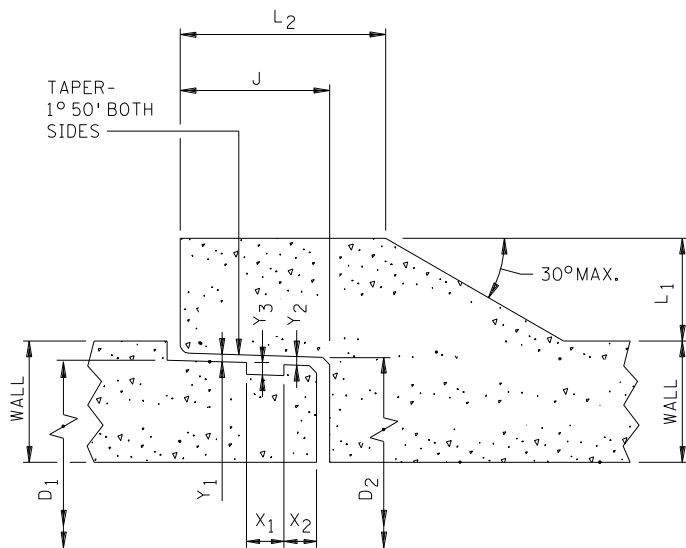
LAYING LENGTH:

THE NOMINAL LAYING OF ALL PIPE SHALL NOT BE LESS THAN 6 FEET EXCEPT THAT NOT MORE THAN TWO 4 FOOT LENGTHS OF PIPE WILL BE PERMITTED IN A LINE OF PIPE TO MAKE THE REQUIRED TOTAL LENGTH. FOR ALL DIAMETERS OF PIPE ONE SECTION OF ANY ODD LENGTH GREATER THAN 4 FEET WILL BE PERMITTED IN EACH LINE OR REACH OF PIPE TO MAKE THE REQUIRED TOTAL LENGTH. PIPE SECTIONS SHORTER THAN THE NOMINAL LAYING LENGTH SHALL BE INSTALLED NEAR THE MIDDLE OF THE LINE OR AS DIRECTED BY THE ENGINEER.

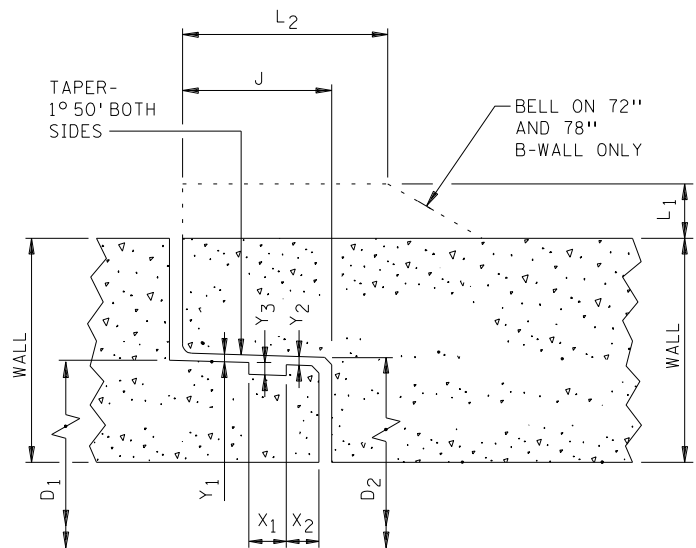
BASIS FOR DESIGN: AASHTO M170

APPROVED <u>Aug. 31, 1989</u>  Director Materials, Research and Standards	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION REINFORCED CONCRETE PIPE GENERAL NOTES	SPECIFICATION REFERENCE 2501 2502 2503	STANDARD PLATE NO. 3000L 5 OF 5
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DIAM. D IN.	APPROX. DIA. GASKET MATERIAL INCHES NOT STRETCHED	GASKET VOLUME IN CU. IN.	LENGTH OF JOINT J INCHES	D ₁ INCHES	D ₂ INCHES	(MIN.) L ₂ INCHES	B-WALL L ₁ INCHES	C-WALL L ₁ INCHES	X ₁ INCHES	X ₂ INCHES	Y ₁ INCHES	Y ₂ INCHES	Y ₃ INCHES
12	21/32	13.5	3-5/8	15.223	15.331	5	2	0	1	7/8	0.062	0.090	0.313
15	21/32	16.5	3-5/8	18.723	18.831	4-3/4	2-3/16	0	1	7/8	0.062	0.090	0.313
18	21/32	19.5	3-5/8	22.098	22.206	5	2-3/8	0	1	7/8	0.062	0.090	0.313
21	21/32	22.5	3-7/8	25.600	25.724	5-1/4	2-9/16	0	1	7/8	0.062	0.090	0.313
24	21/32	25.5	3-7/8	28.975	29.099	5-1/2	2-3/4	2	1	7/8	0.062	0.090	0.313
27	21/32	29.0	4	32.476	32.608	5-1/2	2-3/4	2	1	7/8	0.062	0.090	0.313
30	21/32	32.0	4	35.976	36.108	5-1/2	2-3/4	2	1	7/8	0.062	0.090	0.313
33	21/32	35.0	4-1/8	39.476	39.616	5-3/4	2-7/8	2-1/8	1	7/8	0.062	0.090	0.313
36	21/32	38.0	4-1/8	42.976	43.116	6	3-1/8	2-3/8	1	7/8	0.062	0.090	0.313
42	3/4	59.0	4-5/8	50.021	50.183	6-3/4	3-3/4	3	1-3/16	1	0.067	0.129	0.376
48	3/4	67.0	4-3/4	57.023	57.193	7-1/4	4-1/8	3-3/8	1-3/16	1	0.067	0.129	0.376
54	3/4	74.0	5	63.007	63.192	7-1/2	3-5/8	2-7/8	1-3/16	1	0.067	0.129	0.376
60	3/4	81.0	5	69.007	69.192	7-1/2	3-1/8	2-3/8	1-3/16	1	0.067	0.129	0.376
66	3/4	88.0	5	75.007	75.192	7-1/2	2-3/4	2	1-3/16	1	0.067	0.129	0.376
72	13/16	106.0	5-1/4	79.250	79.400	8 *	3/4	0	1-3/16	1-1/4	0.093	0.190	0.376
78	13/16	116.0	5-1/4	86.250	86.400	8 *	3/4	0	1-3/16	1-1/4	0.093	0.190	0.376
84	13/16	123.0	5-1/4	91.500	91.650	0	0	0	1-3/16	1-1/4	0.093	0.190	0.376
90	13/16	131.0	5-1/4	97.750	97.900	0	0	0	1-3/16	1-1/4	0.093	0.190	0.376
96	13/16	140.0	5-1/4	104.250	104.400	0	0	0	1-3/16	1-1/4	0.093	0.190	0.376
102	13/16	149.0	5-1/4	110.750	110.900	0	0	0	1-3/16	1-1/4	0.093	0.190	0.376
108	13/16	157.0	6-3/8	117.250	117.400	0	0	0	1-3/16	1-1/4	0.130	0.190	0.376



66" PIPE AND SMALLER ①



72" PIPE AND LARGER

NOTES:

SEE STANDARD PLATE 3000 FOR PIPE DESIGN.

THE ENGINEER MAY APPROVE A CHANGE IN THE SIZE OF THE NOTCH AND GASKET.
A WRITTEN REQUEST FOR APPROVAL OF SUCH CHANGE WILL BE REQUIRED

TOLERANCES IN DIMENSIONS:

JOINT DIMENSIONS ARE NOMINAL AND SUBJECT TO REASONABLE MANUFACTURING TOLERANCES.
THE TONGUE AND GROOVE SHALL BE SUCH THAT WHEN THE PIPE IS JOINTED WITH THE GASKET
IN PLACE A PROPER FIT IS OBTAINED. FINAL ACCEPTANCE OF THE PIPE WILL BE AT THE JOB
SITE AFTER EFFECTIVE JOINTING HAS BEEN OBTAINED.

DIMENSIONS SHOWN ARE DESIGN DIMENSIONS, INSPECTORS SHALL MEASURE TO THE
NEAREST 1/8 OF AN INCH.

GASKET VOLUMES: ± 4 PERCENT FOR PIPE 72" AND LARGER, ± 10 PERCENT
FOR UNDER 72".

① SEE SHEET 2 FOR OPTIONAL BELL REINFORCEMENT, CLEARANCES AND NOTES.

APPROVED AUGUST 8, 1994

Gerald J. Rofen
STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

GASKET JOINT FOR R.C. PIPE

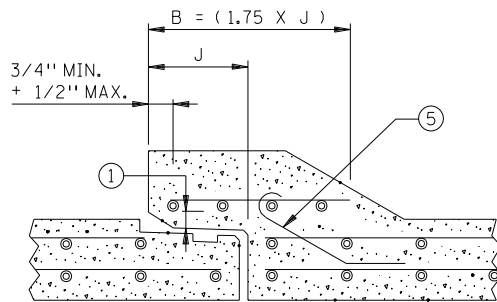
SPECIFICATION
REFERENCE

2501
2502
2503

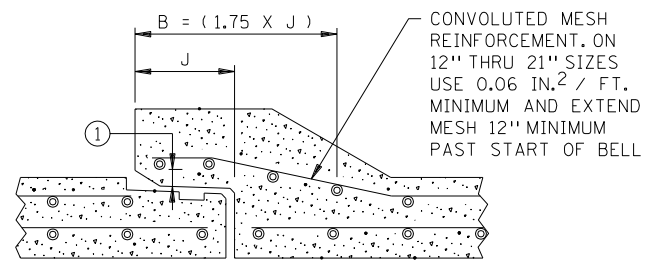
STANDARD
PLATE
NO.

3006G

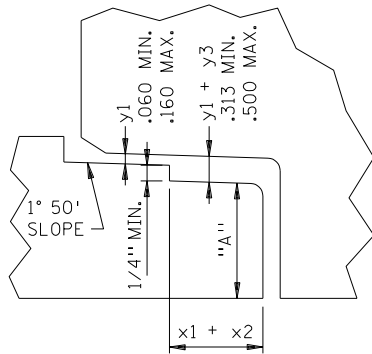
1 OF 2



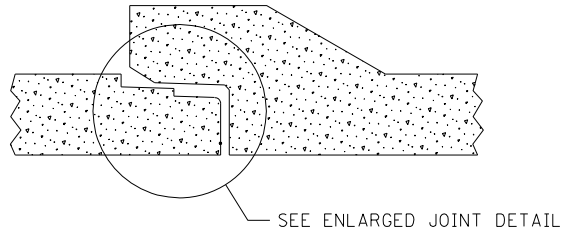
CYLINDRICAL CAGE DETAIL



CONVOLUTED CAGE DETAIL



ENLARGED JOINT DETAIL



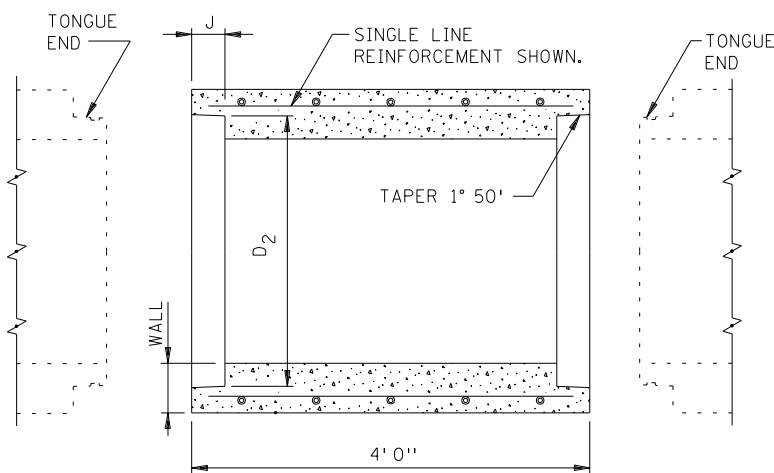
OPTIONAL TONGUE DETAIL
(REINFORCEMENT NOT SHOWN)

BASIS FOR DESIGN:
AASHTO M170

INT. DIA. PIPE	JOINT LENGTH	SPIGOT THICKNESS
	x1 + x2	"A"
12"	1.75	1.15
15"		1.50
18"		1.70
21"		1.95
24"		2.15
27"		2.40
30"		2.65
33"		2.90
36"		3.15
48"	1.75	3.15

OPTIONAL BELL STEEL REINFORCEMENT
(66" PIPE AND SMALLER PIPE)

INTERNAL DIAMETER	12"	15"	18"	21"	24"	27"	30"
WALL	4"	4-3/8"	4-7/8"	5-1/4"	5-3/4"	6"	6-1/4"
STEEL INSIDE (SQ. IN./ LIN. FT.)	.08	.08	.10	.12	.12	.14	.18
STEEL OUTSIDE (SQ. IN./ LIN. FT.)				.08	.08	.08	.11



OPTIONAL TRANSITION PIPE
(CONNECT TONGUE END TO TONGUE END)

NOTES:

- REINFORCING IN BELL SHALL BE LOCATED BETWEEN 3/4" TO 1-1/4" MESH FROM INNER FACE OF BELL.
- THE BELL CAGE SHALL BE AT LEAST AS WIDE AS DIMENSION B.
- FOR DOUBLE CAGE PIPE, REINFORCEMENT SHALL BE AT LEAST EQUAL IN AREA TO THAT OF THE OUTSIDE CAGE OR LINE FOR BELLS OR THE INSIDE CAGE OR LINE FOR SPIGOTS. FOR SINGLE CAGE PIPE, REINFORCEMENT SHALL BE AT LEAST EQUAL IN AREA TO THAT OF THE CAGE FOR EITHER THE BELL OR SPIGOT. BELL CAGES SHALL NOT HAVE FEWER LONGITUDINALS THAN THE MAIN CAGE.
- SEE SHEET 1 FOR ALL DIMENSIONS OTHER THAN BELL REINFORCEMENT.
- USE A MINIMUM OF THREE NO.3 HOOK TIES EQUALLY SPACED: MAXIMUM SPACING SHALL BE 24".

APPROVED AUGUST 8, 1994

L. J. R. R. R.

STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

GASKET JOINT FOR R.C. PIPE (OPTIONS)

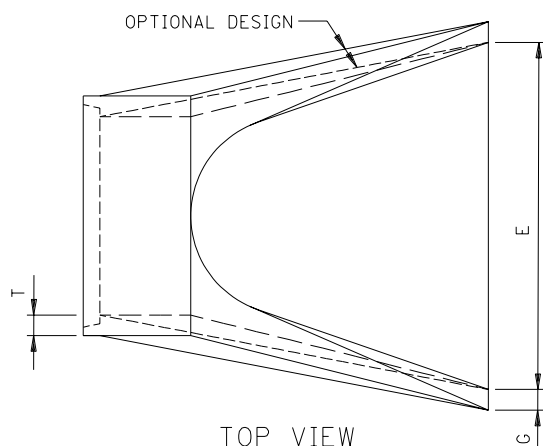
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2501 2502 2503

REVISED
10-17-97

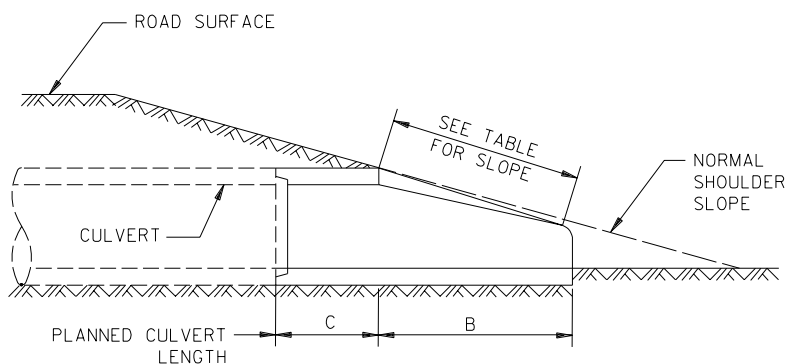
STANDARD
PLATE
NO.

3006G

2 OF 2



TOP VIEW

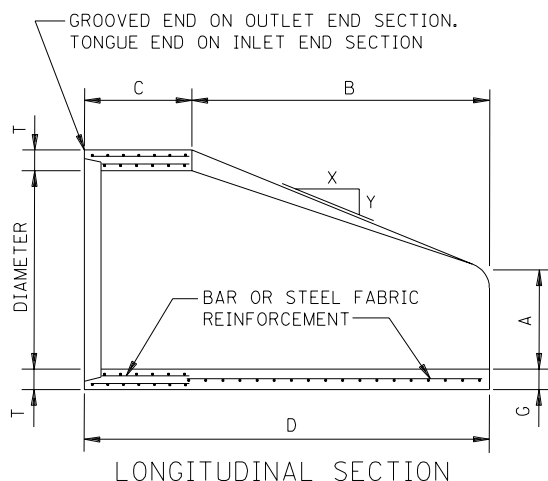


SLOPE DETAIL

NOTE: REINFORCEMENT AND DESIGN OF END SECTION "C" SHALL CONFORM TO STANDARD REINFORCED CONCRETE PIPE CLASS II, "B" WALL.

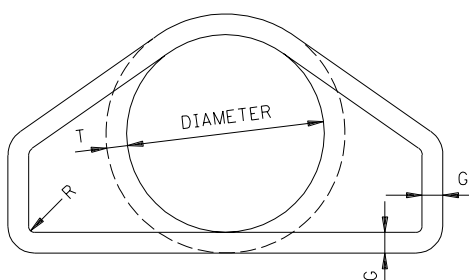
ROUNDED EDGE PERMITTED ON SLOPED END "B".

HANDLING HOLES SHALL BE PROVIDED AS NECESSARY FOR HANDLING OF APRONS.



LONGITUDINAL SECTION

SLOPE = Y TO X



END VIEW

SEE STD PLATE 3000 FOR ADDITIONAL REQUIREMENTS

DIAM.	WEIGHT PER SECTION (LBS.)	APPROX. SLOPE Y TO X	T	A	B	C	D	E	G	R	(S)
12"	530	1 TO 2.4	2"	4"	24"	48-7/8"	72-7/8"	24"	2"	1-1/2"	0.07
15"	740	1 TO 2.4	2-1/4"	6"	27"	46"	73"	30"	2-1/4"	1-1/2"	0.07
18"	990	1 TO 2.3	2-1/2"	9"	27"	46"	73"	36"	2-1/2"	1-1/2"	0.07
21"	1280	1 TO 2.4	2-3/4"	9"	36"	37-1/2"	73-1/2"	42"	2-3/4"	1-1/2"	0.07
24"	1520	1 TO 2.5	3"	9-1/2"	43-1/2"	30"	73-1/2"	48"	3"	1-1/2"	0.07
27"	1930	1 TO 2.5	3-1/4"	10-1/2"	49-1/2"	24"	73-1/2"	54"	3-1/4"	1-1/2"	0.13
30"	2190	1 TO 2.5	3-1/2"	12"	54"	19-3/4"	73-3/4"	60"	3-1/2"	1-1/2"	0.14
36"	4100	1 TO 2.5	4"	15"	63"	34-3/4"	97-3/4"	72"	4"	1-1/2"	0.12
42"	5380	1 TO 2.5	4-1/2"	21"	63"	35"	98"	78"	4-1/2"	1-1/2"	0.15
48"	6550	1 TO 2.5	5"	24"	72"	26"	98"	84"	5"	1-1/2"	0.18
54"	8240	1 TO 2.0	5-1/2"	27"	65"	33-1/4"	98-1/4"	90"	5-1/2"	1-1/2"	0.22
60"	8730	1 TO 1.9	6"	35"	60"	39"	99"	96"	5"	1-1/2"	0.25
66"	10710	1 TO 1.7	6-1/2"	30"	72"	27"	99"	102"	5-1/2"	1-1/2"	0.31
72"	12520	1 TO 1.8	7"	36"	78"	21"	99"	108"	6"	1-1/2"	0.35
78"	14770	1 TO 1.8	7-1/2"	36"	90"	21"	111"	114"	6-1/2"	1-1/2"	0.40
84"	18160	1 TO 1.6	8"	36"	90-1/2"	21"	111-1/2"	120"	6-1/2"	1-1/2"	0.46
90"	20900	1 TO 1.5	8-1/2"	41"	87-1/2"	24"	111-1/2"	132"	6-1/2"	6"	0.51

(S) CONTINUOUS BASIC REINFORCEMENT IN SQ. IN. PER LINEAL FT. FOR SLOPED END "B" (LARGER OF INNER OR OUTER CAGE ON STD. PLATE 3000). FOR WALL THICKNESSES LESS THAN 4", LOCATE REINFORCEMENT AT THE CENTER OF WALL. FOR WALL THICKNESSES 4" AND GREATER, LOCATE REINFORCEMENT WITH A MIN. OF 2" OF COVER MEASURED FROM THE OUTSIDE OF THE WALL.

NOTE: UNLESS SPECIFIED OTHERWISE IN THE PLANS, WHEN AN APRON IS REQUIRED FOR A RUN OF GASKET PIPE (STD. PLATE 3006), THE PRODUCER MAY FURNISH EITHER:

1. AN APRON WITH A STD. PLATE 3006 JOINT, OR
2. AN APRON WITH A STD. PLATE 3000 JOINT AND THE END OF THE STD. PLATE 3006 PIPE CONNECTING TO THE APRON PROVIDED WITH A STD. PLATE 3000 JOINT. THIS JOINT IS TO BE SEALED WITH A PREFORMED MASTIC SEALER.

APPROVED May 8, 1985

R. H. Sullivan
Assistant Division Director
Technical Services

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

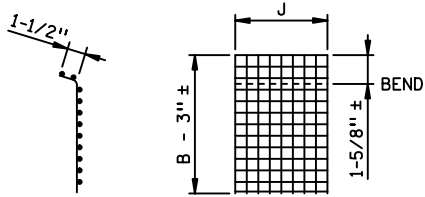
CONCRETE APRON FOR
REINFORCED CONCRETE PIPE

SPECIFICATION
REFERENCE
2501, 2503

REVISED
10-16-2000 A.K.J.

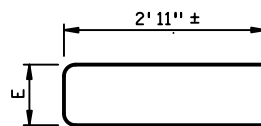
STANDARD
PLATE
NO.

3100G

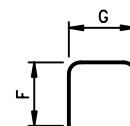


SIDE
FRONT
RODENT SHIELD ①

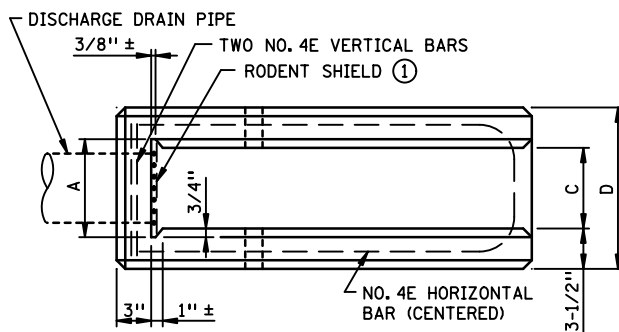
DIMENSIONS ARE APPROXIMATE TO ALLOW FOR BEND AND A SNUG FIT IN SLOT IN HEADWALL.



**NO. 4E
HORIZONTAL BAR**



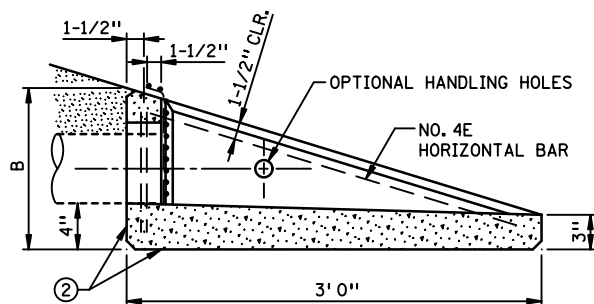
**NO. 4E
VERTICAL BAR
(2 REQUIRED)**



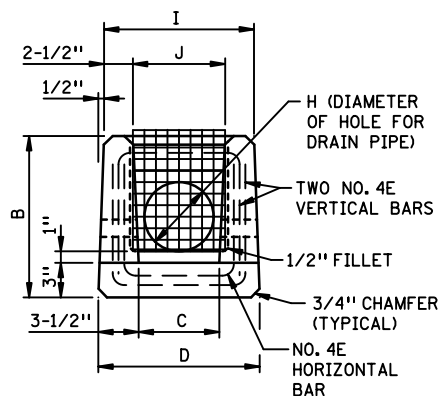
PLAN

DIMENSIONS	4" DIA. PIPE	6" DIA. PIPE	8" DIA. PIPE
A	6-1/2"	8-1/2"	10-1/2"
B	1' 0"	1' 2"	1' 4"
C	5"	7"	9"
D	1' 0"	1' 2"	1' 4"
E	8-1/2"	10-1/2"	1' 0-1/2"
F	9"	11"	1' 1"
G	9-1/2"	11-1/2"	1' 1-1/2"
H Δ	5"	7"	9-1/2"
I	11"	1' 1"	1' 3"
J	6"	8"	10"
APPROX. WT.	210 LBS.	250 LBS.	300 LBS.

Δ EXACT DIMENSION DEPENDENT ON COUPLING METHOD.



SECTION



END VIEW

NOTES:

ALL CONCRETE MATERIALS SHALL BE MN/DOT MIX DESIGNATION 3W46 AND/OR OTHER MIX AS APPROVED BY THE STATE MATERIALS ENGINEER. HEADWALLS SHALL NOT BE SHIPPED UNTIL CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 5000 PSI. THE EPOXY BARS SHALL BE SECURELY RETAINED SO THEY ARE NOT DISPLACED DURING CONCRETE PLACEMENT. TIE WIRE SHALL BE EPOXY COATED. WELDING WILL NOT BE PERMITTED. THE FABRICATOR SHALL PROVIDE A QUALITY CONTROL PROGRAM APPROVED BY THE MATERIALS ENGINEER.

- ① THE RODENT SHIELD SHALL BE FABRICATED FROM CARBON STEEL FLATTENED EXPANDED METAL, STYLE 1/2" NO. 4F. IT SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION. ACTUAL SCREEN DIMENSIONS SHALL BE SUCH AS WILL SNUGLY FIT THE PROVIDED SLOT (TAPERED IF NECESSARY), WITH THE SCREEN LIP FITTING FLUSH WITH THE CASTING TOP AND THE BOTTOM FITTING TIGHT TO THE FLOW LINE.
- ② THE MANUFACTURER'S NAME AND DATE OF PRODUCTION (MONTH AND YEAR) SHALL BE CLEARLY CAST (NOT INK STAMPED) INTO EITHER THE BOTTOM OF EACH HEADWALL OR NEAR THE BOTTOM OF THE LARGE END . IF A MANUFACTURER HAS MORE THAN ONE PLANT, THEY SHALL BE APPROPRIATELY CODED.

APPROVED AUGUST 20, 2001

[Signature]
STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

PRECAST CONCRETE HEADWALL FOR SUBSURFACE DRAINS

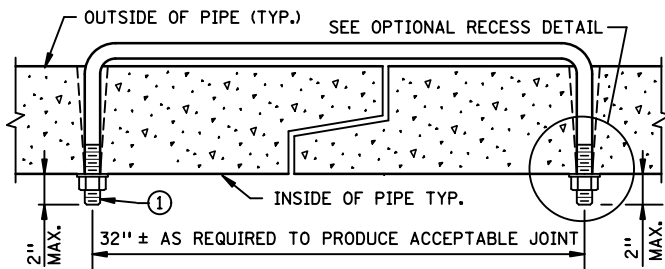
SPECIFICATION
REFERENCE

2502

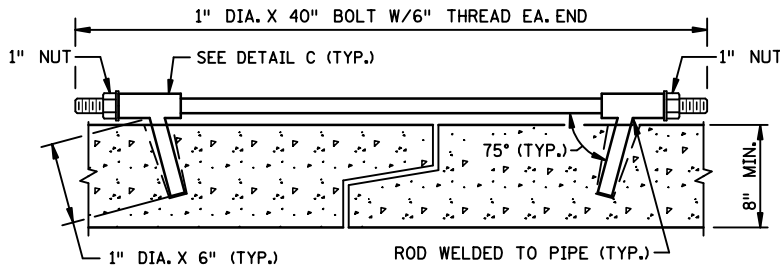
REVISED
3-22-2013 M.J.E.

STANDARD
PLATE
NO.

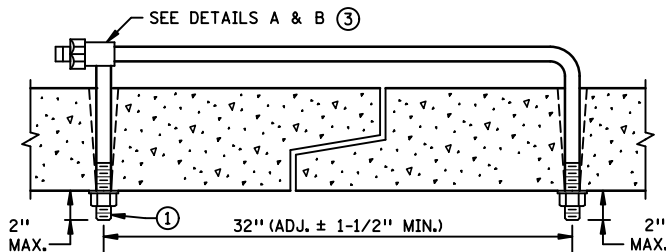
3131C



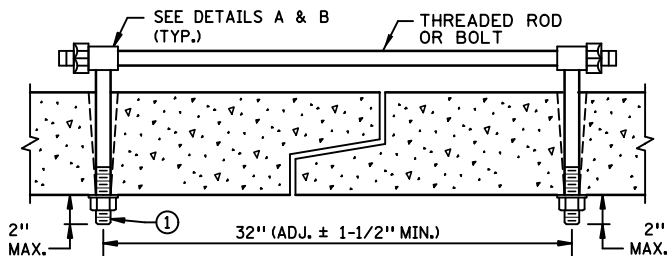
U BOLT TIE ③



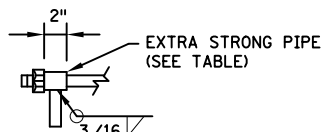
HIDEAWAY TIE ROD ④



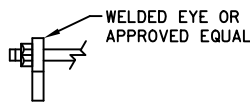
SINGLE CONNECTION TIE ③



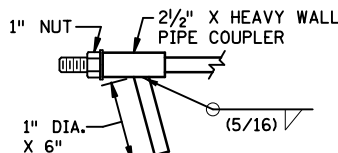
DOUBLE CONNECTION TIE



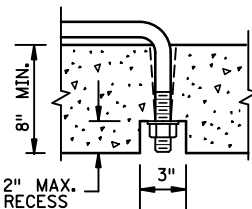
DETAIL A



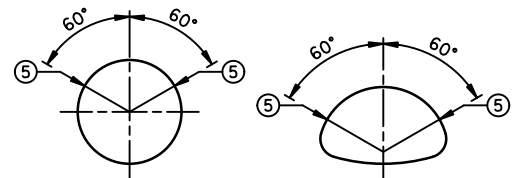
DETAIL B



DETAIL C

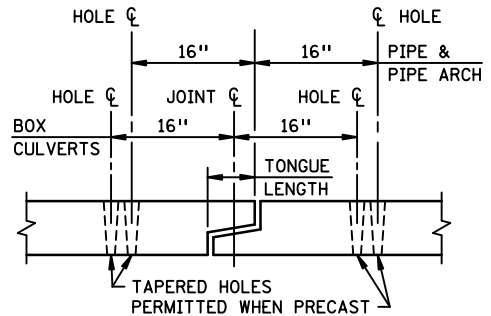


OPTIONAL RECESS DETAIL ②



ROUND PIPE

PIPE-ARCH



PLACEMENT OF HOLES ⑥

TIE ROD DIAMETER		
PIPE SIZE (INCHES)	ROD THREAD DIA.	EXTRA STRONG PIPE INSIDE DIA (SEE DETAIL A)
12 - 27	5/8"	3/4"
30 - 66	3/4"	1"
72 - 144	1"	1-1/4"
ALL PRECAST BOX CULVERTS	1"	1-1/4"

PIPE SIZE LISTED IS INSIDE DIA. OF ROUND PIPE OR EQUIVALENT DIA. OF PIPE ARCH.

NOTES:

STEEL SHALL CONFORM TO SPEC. 3306 OR EQUAL.

FOR CONC. CULVERTS, PIPE TIES SHALL BE REQUIRED FOR ALL JOINTS UNLESS OTHERWISE SPECIFIED IN THE PLANS OR IN THE SPECIAL PROVISIONS.

FOR CONCRETE SEWERS, TIE THE THREE END SECTIONS (INCLUDING APRON) OF A FREE END (NO MANHOLE).

NUTS AND WASHERS ARE NOT REQUIRED ON INSIDE OF PIPES 27" OR LESS IN DIAMETER.

ON BELL PIPE LARGER THAN 24", TIES MAY BE INSERTED FROM THE INSIDE.

TIE RODS SHALL BE GALVANIZED AS PER SPEC. 3392 OR POWER WASHED AND DIPPED IN AN APPROVED ZINC-RICH EPOXY PRIME PAINT AFTER FABRICATION. SEE THE MnDOT APPROVED PRODUCT LIST FOR APPROVED PAINT COATINGS.

TIES TO BE USED ONLY TO HOLD PIPE SECTIONS TOGETHER, NOT FOR PULLING SECTIONS TIGHT.

FOR BOX CULVERT TIE LOCATIONS SEE MnDOT BRIDGE OFFICE PRECAST CONCRETE BOX CULVERT STANDARDS.

- ① TIE ROD THREADS SHALL PROJECT TO THE INSIDE OF PIPE OR CULVERT EXCEPT AS NOTED IN PLANS.
- ② TIE ROD THREADS SHALL BE RECESSED WHEN PIPE OR CULVERT IS USED AS CATTLE PASS OR PEDESTRIAN TRAIL.
- ③ TIE ROD THREADS MAY PROJECT TO OUTSIDE OF BOX CULVERT PIPE IN MULTIPLE PIPELINE INSTALLATIONS. FACE CONNECTION DOWN STREAM.
- ④ HIDEAWAY TIE ROD SHALL ONLY BE USED FOR PEDESTRIAN CULVERT APPLICATIONS OR AS SPECIFIED IN PLAN OR SPECIAL PROVISION.
- ⑤ TIE LOCATION
- ⑥ HOLES SHALL BE CAST OR DRILLED 16" FROM CENTERLINE OF JOINTS FOR BOX CULVERTS, AS SHOWN, UNLESS FORMS ARE SET UP FOR 16" SPACING FROM OUTSIDE OF JOINT.

APPROVED SEPT. 14, 2012

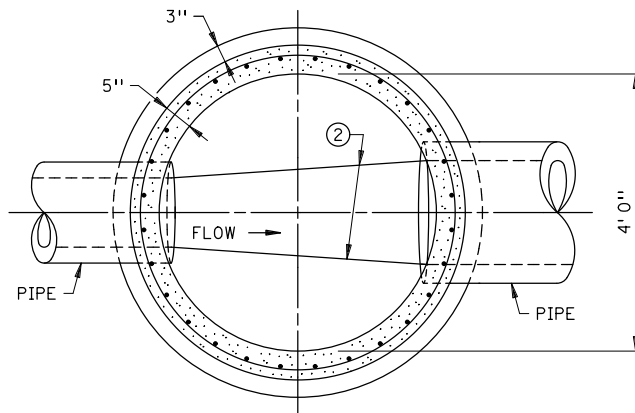
Michael J. Henn
STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

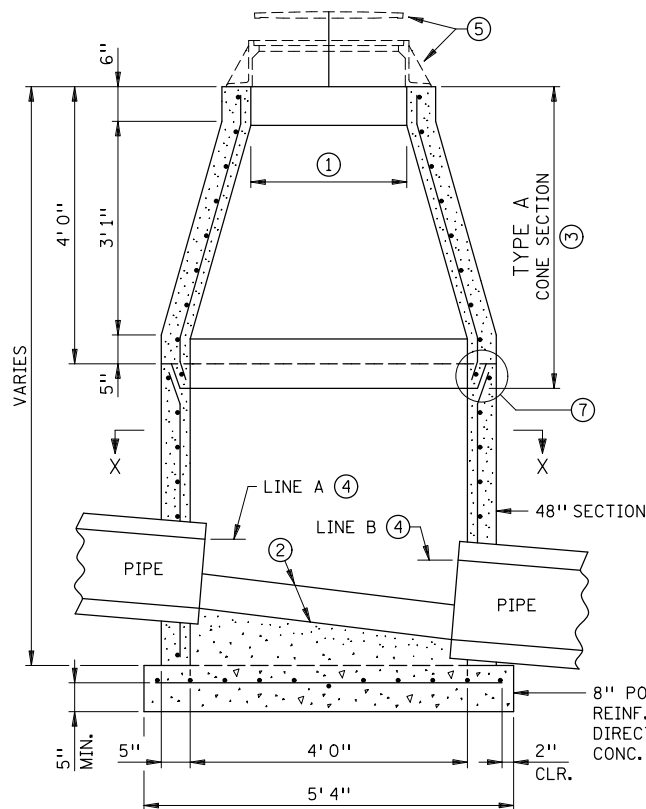
CONCRETE PIPE OR
PRECAST BOX CULVERT TIES

SPECIFICATION
REFERENCE
2501
2503

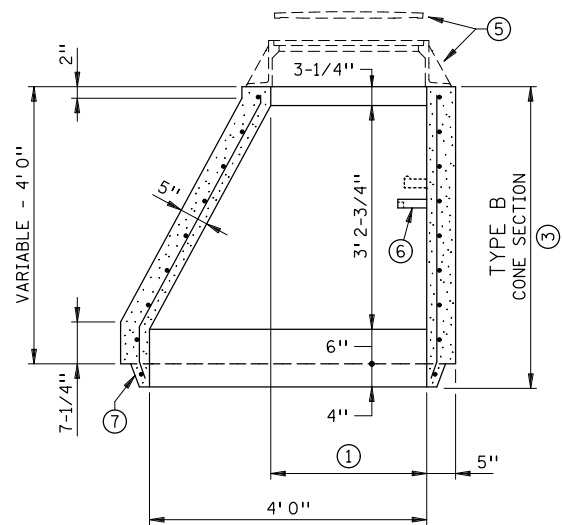
STANDARD
PLATE
NO.
3145G



SECTION X-X



SECTIONAL VIEW
TYPE A CONE



SECTIONAL VIEW
TYPE B CONE
SEE TYPE A CONE FOR ADDITIONAL INFORMATION

NOTES:

REINFORCING: SINGLE LINE STEEL WIRE FABRIC HAVING AN AREA OF NOT LESS THAN 0.12 SQ. IN. PER FOOT OF HEIGHT.

- ① 2' 3" NOMINAL OPENING.
- ② PROVIDE MORTAR FILLETS TO FIT THE BOTTOM PORTION OF PIPE TO DIRECT FLOW TO OUTLET.
- ③ TYPE A CONE SECTION SHALL BE USED UNLESS OTHERWISE INDICATED IN THE PLANS. FOR SHORT CONE SECTION USE TYPE C. SEE STANDARD PLATE 4010.

- ④ THE ELEV. OF LINE A SHALL BE EQUAL TO OR ABOVE LINE B.
- ⑤ REFER TO PLAN FOR CASTINGS REQUIRED. USE ADJUSTING RINGS WHERE NECESSARY, SEE STANDARD PLATES INDEX. CASTING AND PRECAST CONC. ADJUSTING RINGS SHALL BE SET ON FULL MORTAR BEDS. NO PIPE OR STRUCTURE ALLOWED ABOVE TOP OF CONE.
- ⑥ REFER TO PLANS FOR ANY STEP REQUIREMENTS.
- ⑦ SEE STANDARD PLATES INDEX FOR OTHER APPROVED JOINTS.

DESIGN F

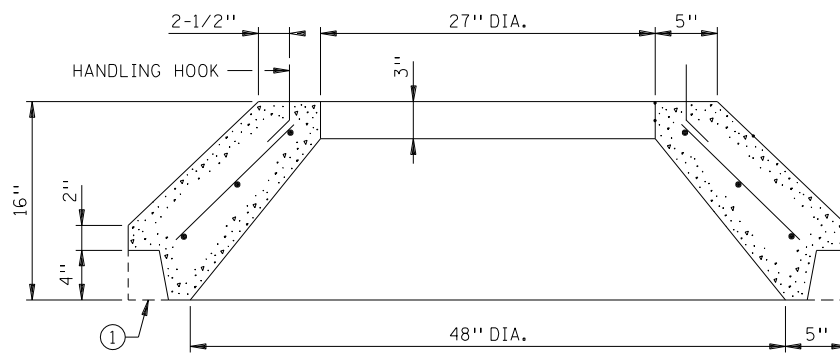
APPROVED APRIL 16, 2014

Christopher Ry
STATE DESIGN ENGINEER

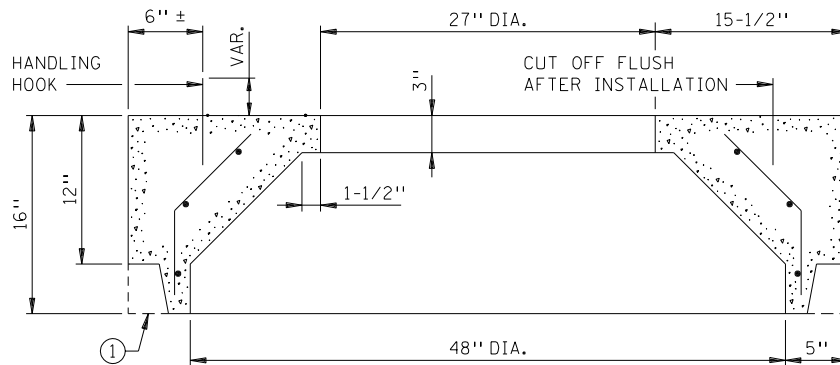
STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION
MANHOLE OR CATCH BASIN
TYPE A & B CONE SECTIONS
PRECAST

SPECIFICATION
REFERENCE
2506

STANDARD
PLATE
NO.
4005M

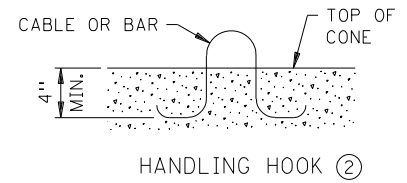


TYPE C
CONE SECTION



TYPE C
ALTERNATE

SHORT CONES



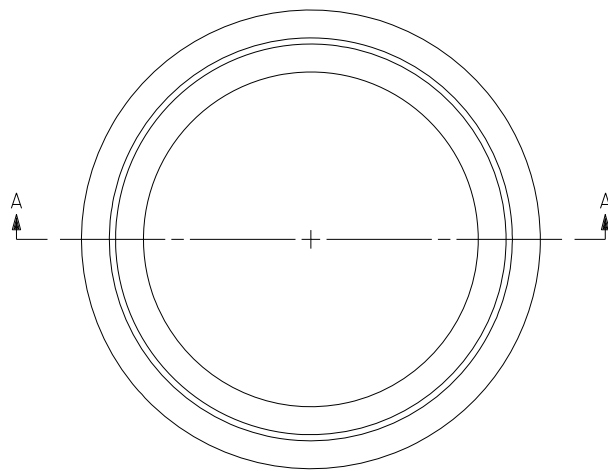
HANDLING HOOK ②

NOTES:

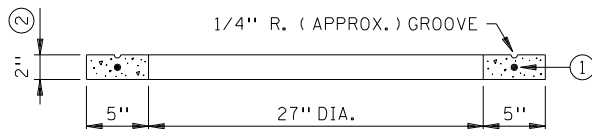
APPROXIMATE WEIGHTS:
CONE SECTION = 1350 LBS.
ALTERNATE SECTION = 1900 LBS.

REINFORCING:
SINGLE LINE STEEL WIRE FABRIC HAVING
AN AREA OF NOT LESS THAN 0.12 SQ. IN.
PER FOOT OF HEIGHT.

- ① ALTERNATE DESIGN WHEN TONGUE AND GROOVE JOINT NOT APPLICABLE.
- ② OTHER SECURED METHODS FOR HANDLING ARE PERMITTED.



TOP VIEW



SECTION A-A

CONCRETE ADJUSTING RING

NOTES:

ON CONSTRUCTION OF NEW DRAINAGE
STRUCTURES, THE NUMBER OF ADJUSTING
RINGS USED PER MANHOLE OR CATCH BASIN
SHALL BE LIMITED TO PROVIDE A MAXIMUM
THICKNESS OF 6" INCLUDING MORTAR
THICKNESS (6" RING IS NOT ALLOWED ON
NEW CONSTRUCTION).

CONCRETE RINGS MUST BE ENCASED IN MORTAR,
SEE STANDARD PLATE 4026.

- ① REINFORCING:
A SINGLE HOOP OF 8 GAGE STEEL WIRE.
- ② VARIABLE THICKNESS, 2" MIN. TO 6" MAX.

APPROVED MARCH 14, 1996

Donald J. Robinson

STATE DESIGN ENGINEER

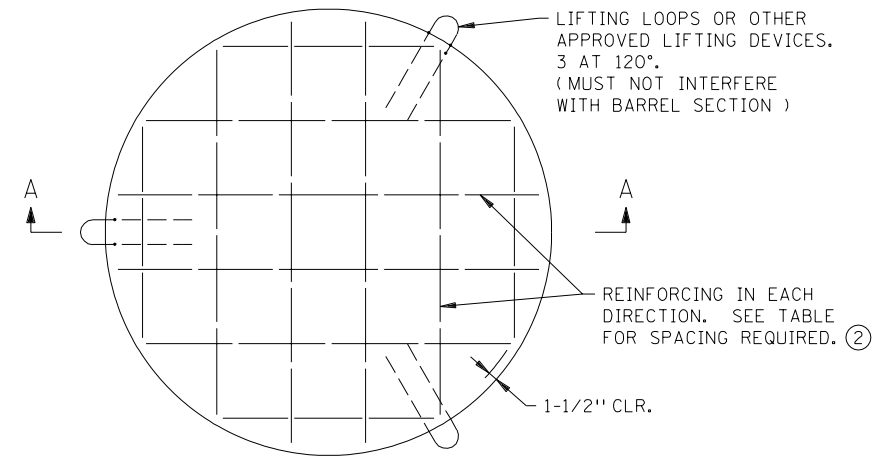
STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION
CONCRETE SHORT CONE
AND ADJUSTING RING
(SECTIONAL CONCRETE)

SPECIFICATION
REFERENCE
2506

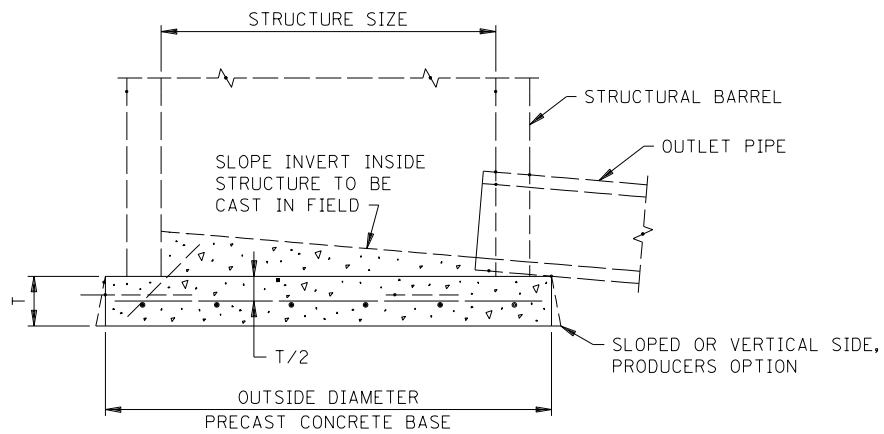
REVISED
7-20-98

STANDARD
PLATE
NO.

4010H



TOP VIEW



SECTION A-A

STRUCTURE SIZE (INCHES)	PRECAST CONCRETE BASE				
	OUTSIDE DIAMETER (INCHES)	T (INCHES)	MINIMUM REINF. ②		APPROX. WEIGHT (POUNDS)
			BAR NUMBER	SPACING (INCHES)	
30	44	6	13	12	790
48	64	6	13	12	1,680
54	72	8	13	12	2,830
60	78	8	13	12	3,320
66	85	8	13	12	3,940
72	92	8	13	12	4,620
78	100	8	13	12	5,460
84	106	8	13	8	6,130
90	114	8	13	8	7,090
96	120	8	13	8	7,850
102	127	8	13	8	8,800
108	132	9	13	8	10,690
120	146	12	13	8	17,440
132	160	12	13	8	20,940
144	174	12	13	6	24,770

①

NOTES:

ALL REBARS ARE IN METRIC DESIGNATIONS

① ALTERNATE T = 10" WITH NO. 13 BAR SPACED AT 10".

② EQUIVALENT WIRE MESH MAY BE USED.

APPROVED OCTOBER 17, 1994

Donald J. Robinson

STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

PRECAST CONCRETE BASE

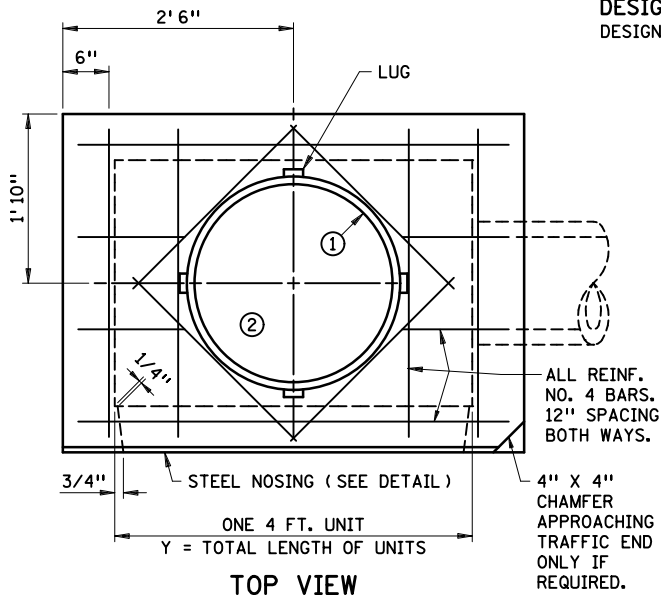
SPECIFICATION
REFERENCE

2506

REVISED
2-10-2000 A.K.J.

STANDARD
PLATE
NO.

4011E



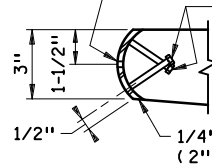
DESIGNATION:
DESIGN 4021 Y

TOTAL LENGTH OF UNITS
STANDARD PLATE REFERENCE

EXAMPLE:
DESIGN 4021 8

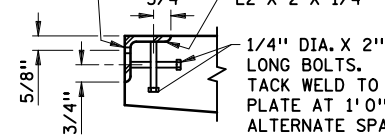
TWO 4 FT. UNITS
CONSTRUCT PER
STANDARD PLATE 4021

1/4" DIA. AIR HOLE AT
2' 0" SPACES



OPTION 1

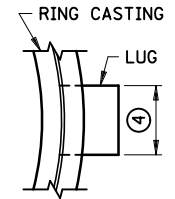
1/4" DIA. AIR HOLE AT 2' 0" SPACES



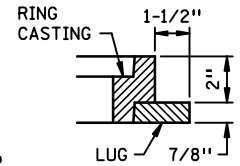
OPTION 2

STEEL NOSING

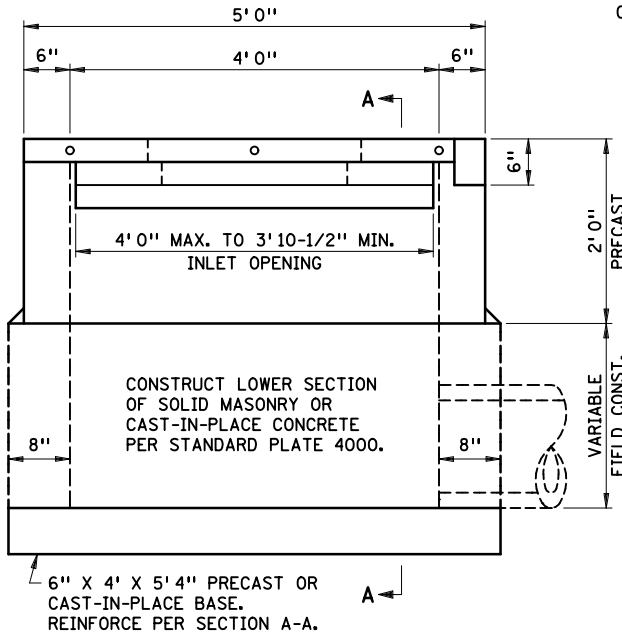
GALVANIZE AFTER FABRICATION PER SPEC. 3394



PLAN VIEW

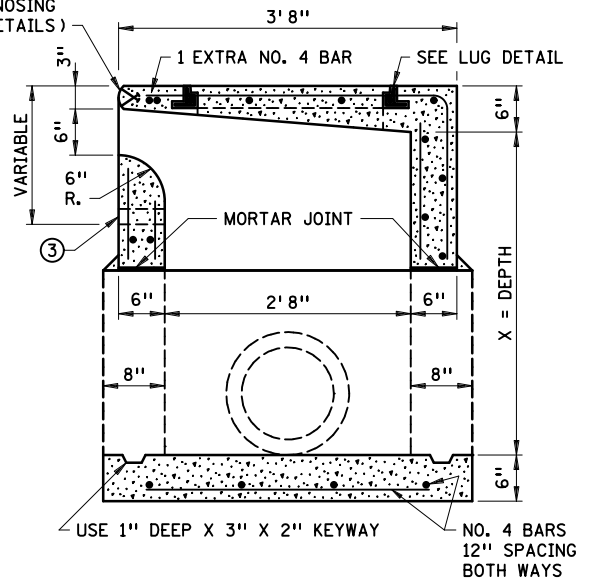


SECTION
LUG
DETAIL



FRONT VIEW

STEEL NOSING
(SEE DETAILS)



SECTION A-A

CONSTRUCTION NOTES:

FOR INLETS LONGER THAN 4 FT., USE MULTIPLE UNITS. TOP AND SIDE JOINTS BETWEEN ADJACENT UNITS SHALL BE SEALED WITH OAKUM AND 1/2 IN. HOT POURED SEALER, SPEC. 3723.

ONLY ONE MANHOLE REQUIRED PER INSTALLATION, LOCATED AT CENTER OF UNIT OVER OUTLET.

PLACE PIPE OPENING AS REQUIRED.

SLOPE FLOOR 5/8 IN. PER FT. TO OUTLET.

WHEN MULTIPLE UNITS ARE INSTALLED, THE BASE AND LOWER WALL SHALL BE CONSTRUCTED AS ONE STRUCTURE.

- ① RING CASTING NO. 790-2, MODIFIED BY THE ADDITION OF LUGS AT QUARTER POINTS OR APPROVED EQUAL. SEE LUG DETAIL.
- ② COVER CASTING NO. 715 or 716 (SEE PLAN).
- ③ 3 IN. MAX. DIA. TEMPORARY INLETS ARE PERMITTED AT THE ELEVATION OF THE SUBGRADE TO PROVIDE DRAINAGE PRIOR TO SURFACING. NO MORE THAN 3 INLETS WILL BE PERMITTED PER 4 FT. (Y) LENGTH WITH A MIN. SPACING OF 1 FT. BETWEEN INLETS. THE TEMPORARY INLETS SHALL BE GROUTED SHUT AFTER COMPLETION OF SURFACING.
- ④ 3" TO 8" LUG PERMISSIBLE.

APPROVED JULY 6, 2001

STATE DESIGN ENGINEER

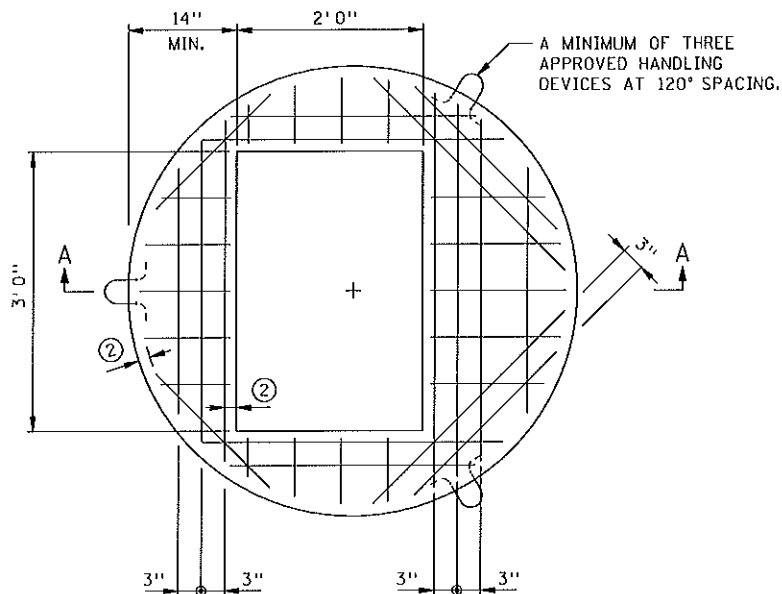
STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

PRECAST CURB OPENING CATCH BASIN

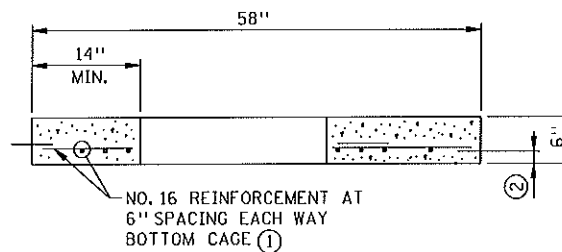
SPECIFICATION
REFERENCE
2506
3622

REVISED
3-22-2013 M.J.E.

STANDARD
PLATE
NO.
4021F



PLAN



SECTION A-A

NOTES:

ALL REBARS ARE IN METRIC DESIGNATIONS

AASHTO HS 25 LOADING.

MAXIMUM FILL HEIGHT 8 FEET.

THE NO. 4022 SHALL BE PERMANENTLY MARKED ON THE TOP OF THE COVER.

EQUIVALENT STEEL AREAS IN WIRE MESH MAY BE USED.

REINFORCEMENT PER SPEC. 3301, GRADE 60.

TO BE USED WITH 4 FT. DIA. STRUCTURES ONLY.

① TOP CAGE NOT REQUIRED.

② 1-1/2" MINIMUM REINFORCEMENT CLEARANCE.

APPROVED MARCH 2, 1998

Delbert W. Linder

STATE DESIGN ENGINEER

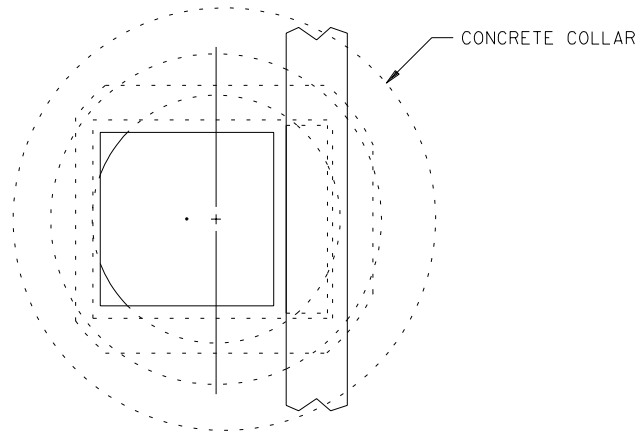
STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION
MANHOLE OR CATCH BASIN COVER
3 FT. X 2 FT. OPENING
FOR USE WITH OR WITHOUT TRAFFIC LOADS

SPECIFICATION
REFERENCE
2506

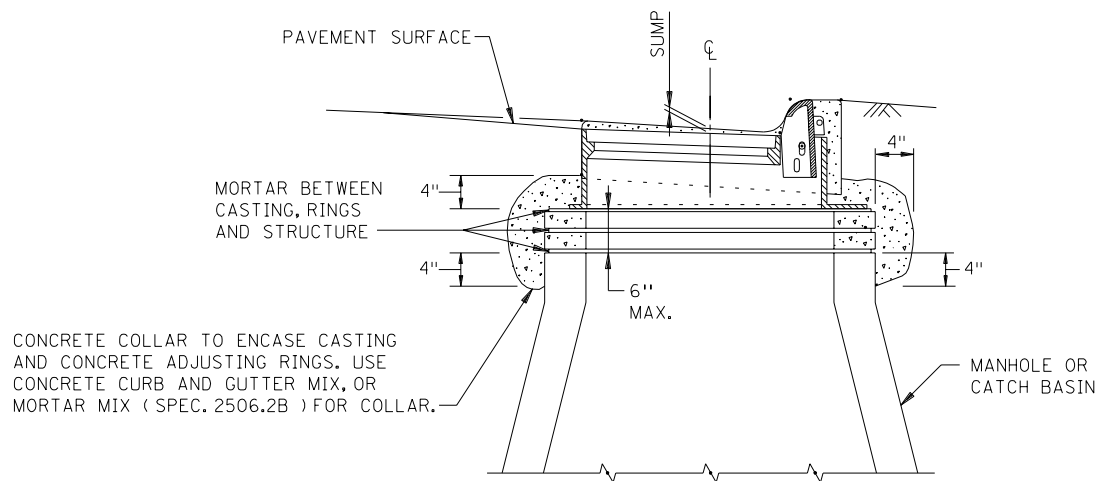
REVISED
4-19-2001 A.K.J.

STANDARD
PLATE
NO.

4022A



PLAN



SECTION

APPROVED JULY 1, 1998

Delbert W. Jones
STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

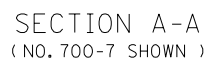
CONCRETE ENCASED
CONCRETE ADJUSTING RINGS

SPECIFICATION
REFERENCE

2506

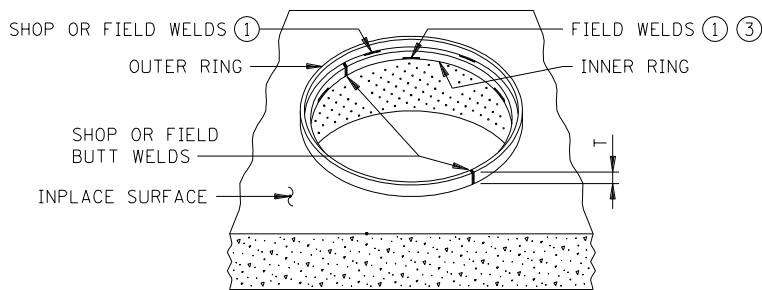
STANDARD
PLATE
NO.

4026A

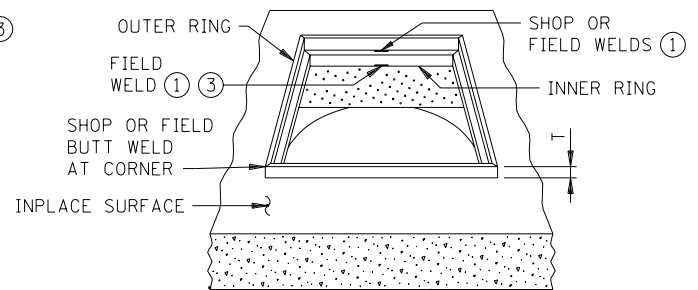


4" CASTING NO. 700-4 (98 LBS.)
7" CASTING NO. 700-7 (118 LBS.)
8" CASTING NO. 700-8
9" CASTING NO. 700-9
10" CASTING NO. 700-10

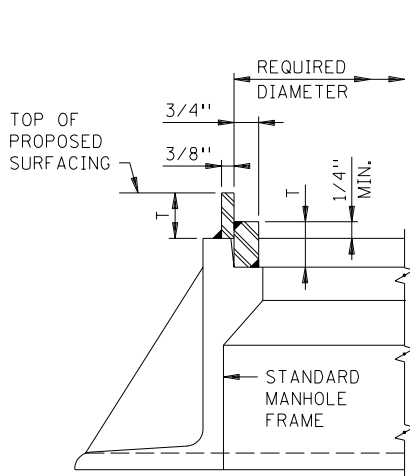
4101D



ROUND CASTING

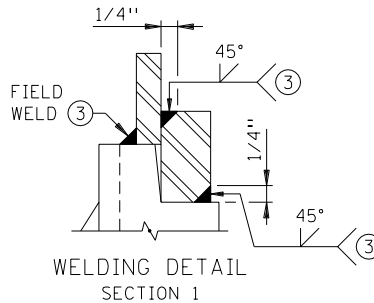


SQUARE OR RECTANGULAR CASTING

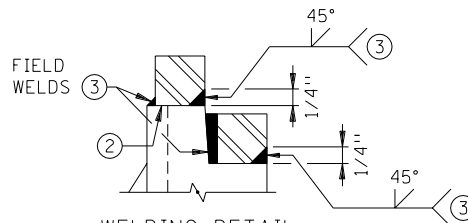


SECTION 1

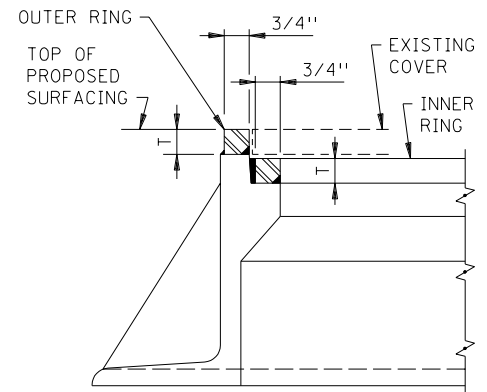
USE WHEN THE COVER IS THINNER THAN THE DEPTH OF THE OVERLAY.



WELDING DETAIL SECTION 1



WELDING DETAIL SECTION 2



SECTION 2

USE WHEN THE COVER IS THICKER THAN THE DEPTH OF THE OVERLAY.

NOTES:

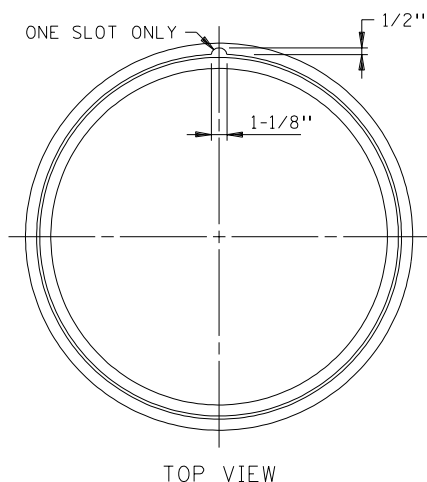
DIMENSION T IS EQUAL TO AN ADJUSTMENT THICKNESS WITH A 3/4" MIN. AND INCREASE IN 1/4" INCREMENTS.

WELDING BETWEEN STEEL AND CAST IRON SHALL BE DONE PER SPEC. 2471.3 USING NI-55 WELDING RODS AND AS APPROVED BY THE ENGINEER.

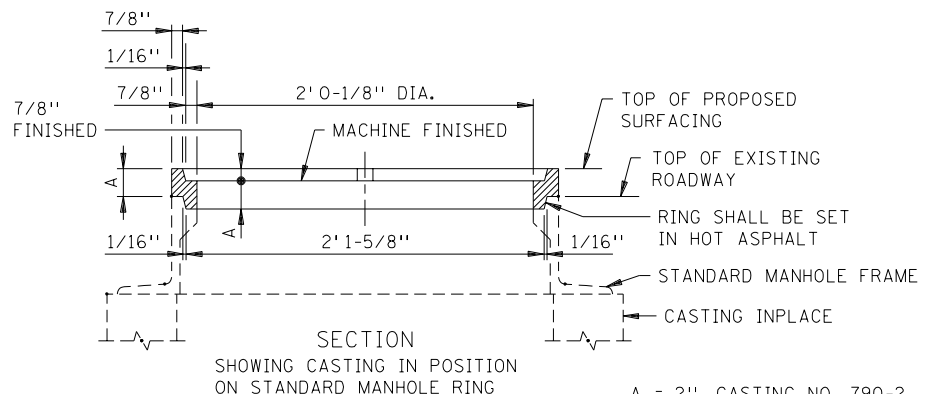
SURFACES OF ADJUSTING RINGS AND MANHOLE CASTINGS SHALL BE CLEANED BY WIRE BRUSHING AND SOLVENT WASH TO ELIMINATE RUST, DIRT OIL, GREASE, ETC., PRIOR TO WELDING OR APPLICATION EPOXY AND AS APPROVED BY THE ENGINEER.
RING STEEL SHALL CONFORM TO SPEC. 3306. FIELD COAT WITH PRIMER CONFORMING TO SPEC. 3506 AFTER WELDING.

- ① IN LIEU OF WELDING TO CASTINGS, A SPECIALLY FORMULATED EPOXY MAY BE USED AROUND THE TOTAL MATING SURFACE AS APPROVED BY THE MATERIALS ENGINEERING SECTION, WITH APPROVAL OF THE ENGINEER.
- ② WHEN THE OUTER RING IS WIDER THAN THE TOP EDGE OF THE CASTING, EPOXY IS RECOMMENDED TO JOIN THE SURFACES.
- ③ MAKE 2" LONG WELDS AT 1'0" SPACES AROUND CIRCUMFERENCE OR PERIMETER.

STEEL ADJUSTING RING



TOP VIEW



SECTION
SHOWING CASTING IN POSITION
ON STANDARD MANHOLE RING

NOTE: THE AUXILIARY CASTING SHALL BE USED WITH THE FOLLOWING RING CASTINGS, NO. 700-7 TO 700-10 & 770.

A = 2", CASTING NO. 790-2
A = 3", CASTING NO. 790-3
A = 4", CASTING NO. 790-4
A = 5", CASTING NO. 790-5
A = 6", CASTING NO. 790-6

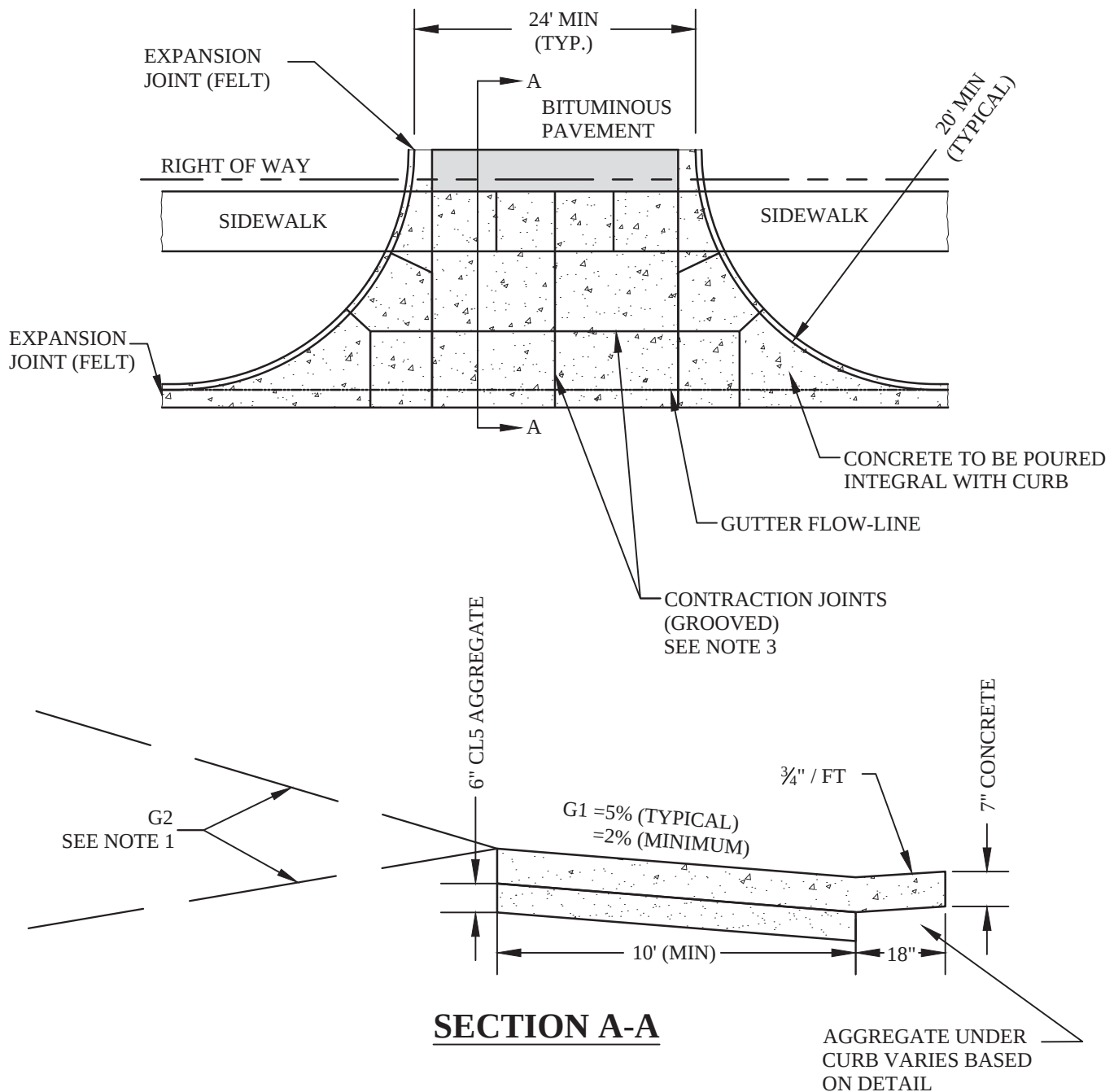
CAST IRON ADJUSTING RING

APPROVED March 6, 1991
B. M. Hill
DIRECTOR
OFFICE OF TECHNICAL SUPPORT

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION
ADJUSTING RINGS
FOR CATCH BASINS AND MANHOLES

SPECIFICATION
REFERENCE
2506

STANDARD
PLATE
NO.
4108F



NOTES

1. WHERE THE ALGEBRAIC DIFFERENCE OF GRADES IN THE DRIVEWAY BETWEEN G1 AND G2 EXCEED 8%, A 10 FOOT VERTICAL CURVE WILL BE REQUIRED AND APPROVED BY THE ENGINEER.
2. WHERE FULL DRIVEWAY REPLACEMENT IS NOT REQUIRED, MATCH EXISTING DRIVEWAY RADIUS FOR CURB, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
3. FOR EXISTING APRONS, TERMINATE NEW CONTRACTION JOINTS AT EXISTING JOINTS.



CITY OF BURNSVILLE - ENGINEERING DEPT. TYPICAL COMMERCIAL CONCRETE DRIVEWAY APRON

Plate No.

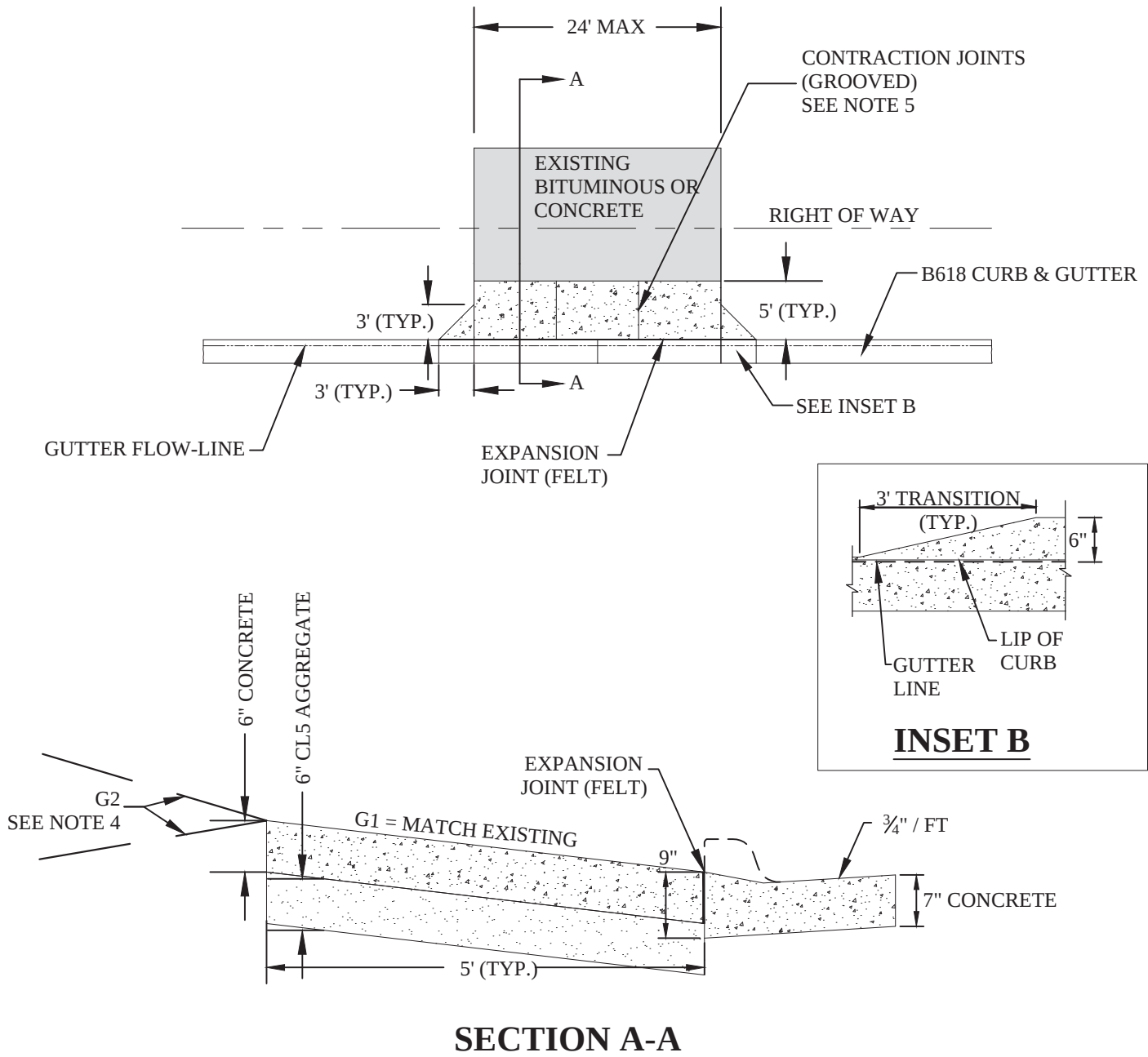
STR-1

Revision Date

1/2018

File Location:

S:\Details\english\Street\STR-1-Comm Dwy.dwg



NOTES

1. CONCRETE APRONS REQUIRED WHERE EXISTING APRON OR DRIVEWAY IS CONCRETE, AND AS DIRECTED BY THE ENGINEER.
2. APRON WIDTH TO BE VERIFIED BY THE ENGINEER AT THE TIME OF CURB INSTALLATION.
3. MAXIMUM DRIVEWAY OPENING ALLOWED IS 24' AT THE CURB CUT.
4. WHERE THE ALGEBRAIC DIFFERENCE OF GRADES IN THE DRIVEWAY BETWEEN G1 AND G2 EXCEED 15%, A VERTICAL CURVE WILL BE REQUIRED AND APPROVED BY THE ENGINEER.
5. WHEN MATCHING EXISTING CONCRETE PAVEMENT, ALIGN CONTRACTION JOINTS WITH EXISTING JOINTS TO GREATEST EXTENT POSSIBLE.



CITY OF BURNSVILLE - ENGINEERING DEPT.
TYPICAL RESIDENTIAL
CONCRETE DRIVEWAY APRON

Plate No.

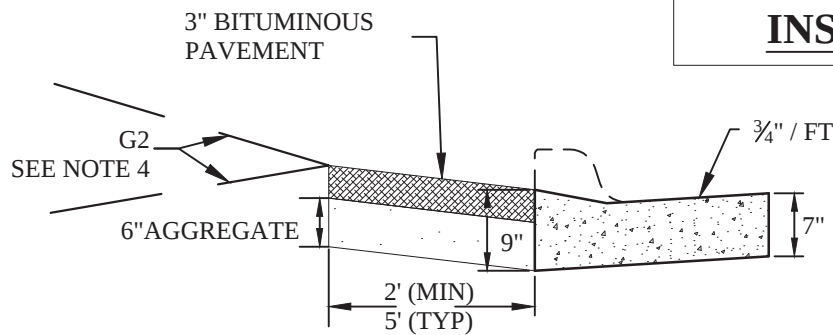
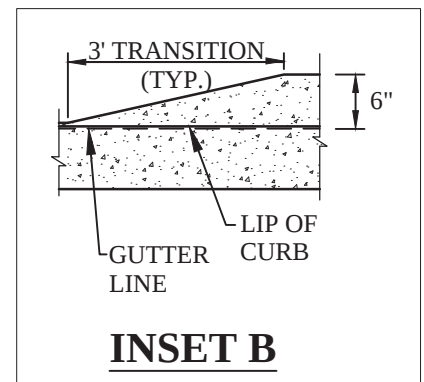
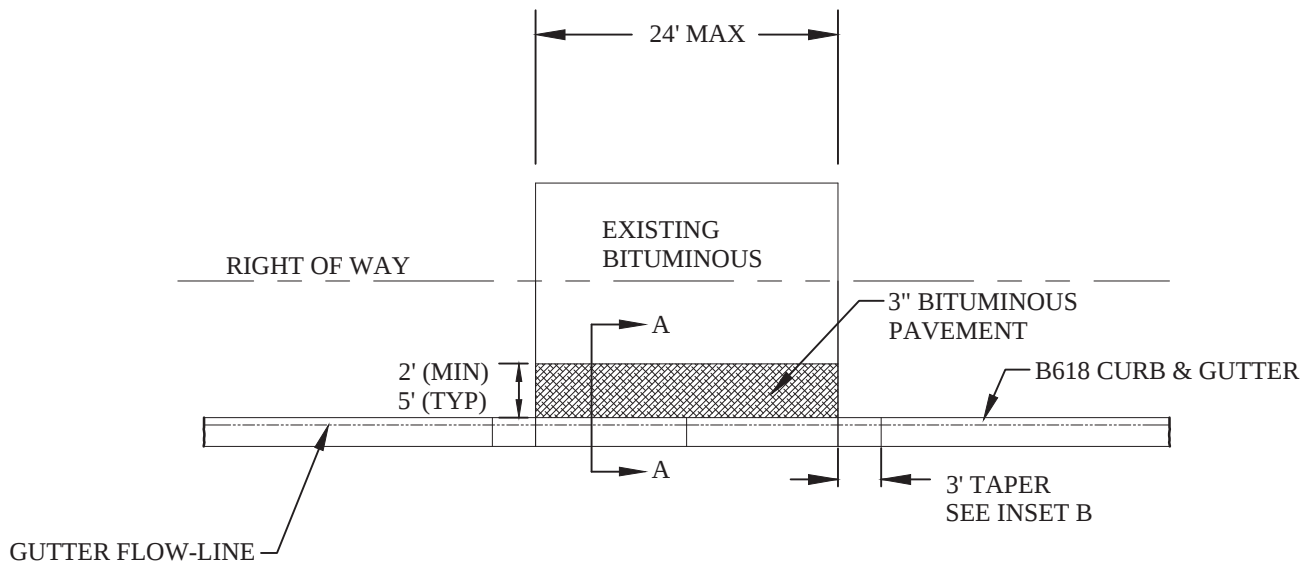
STR-2

Revision Date

1/2018

File Location:

S:\Details\english\Street\STR02-Res Dwy Apron.dwg



SECTION A-A

NOTES

1. INSTALL BITUMINOUS APRON/PATCH WHERE EXISTING DRIVEWAY PAVEMENT IS BITUMINOUS.
2. APRON WIDTH TO BE VERIFIED BY THE ENGINEER AT THE TIME OF CURB INSTALLATION.
3. MAXIMUM DRIVEWAY OPENING ALLOWED IS 24' AT THE CURB CUT.
4. WHERE THE ALGEBRAIC DIFFERENCE OF GRADES IN THE DRIVEWAY BETWEEN G1 AND G2 EXCEED 15%, A VERTICAL CURVE WILL BE REQUIRED AND APPROVED BY THE ENGINEER.



CITY OF BURNSVILLE - ENGINEERING DEPT.
TYPICAL RESIDENTIAL
BITUMINOUS DRIVEWAY

Plate No.

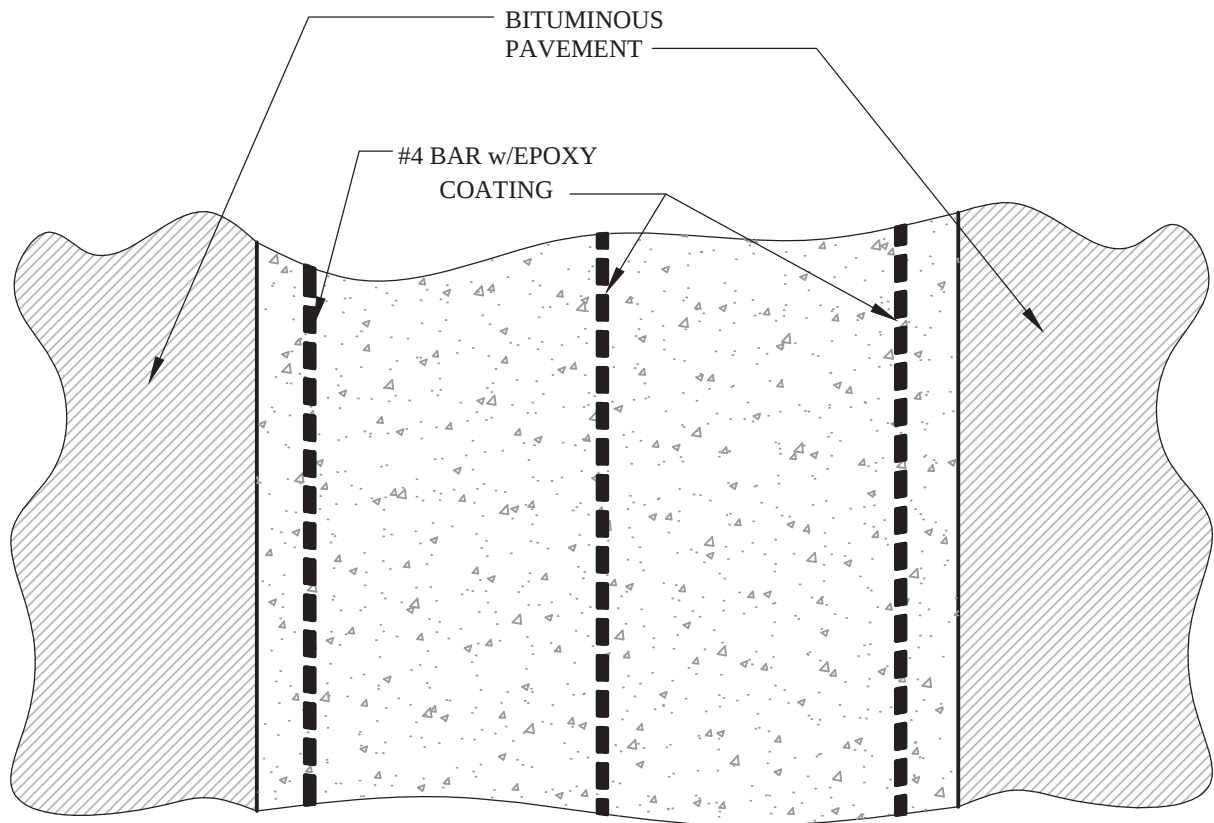
STR-3

Revision Date

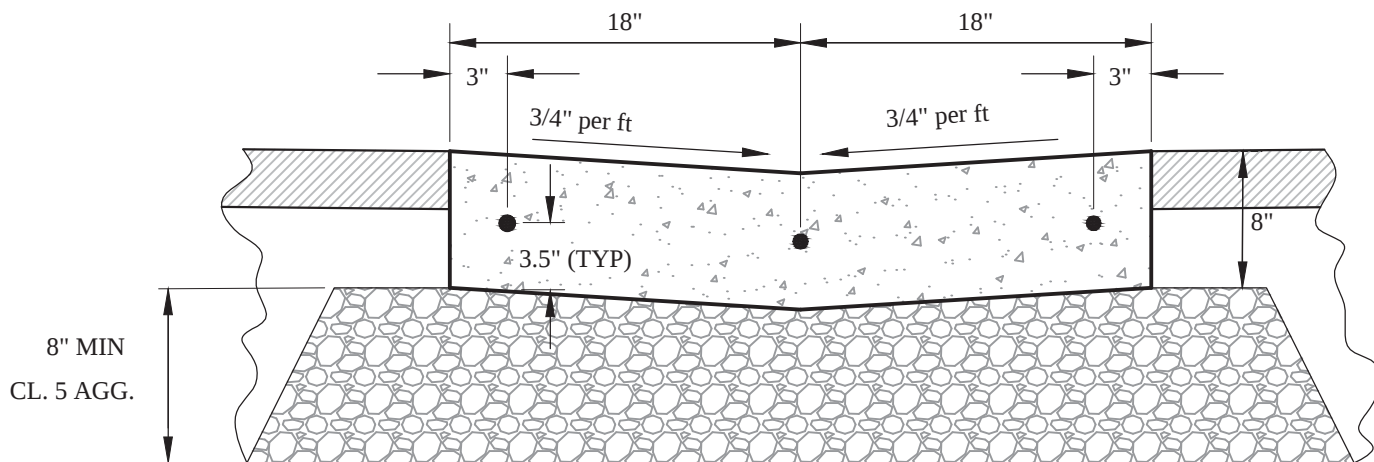
1/2018

File Location:

S:\Details\english\Street\STR03-Res Bit Dwy.dwg



PLAN



SECTION



CITY OF BURNSVILLE - ENGINEERING DEPT.

8" CONCRETE VALLEY GUTTER

Plate No.

STR - 4

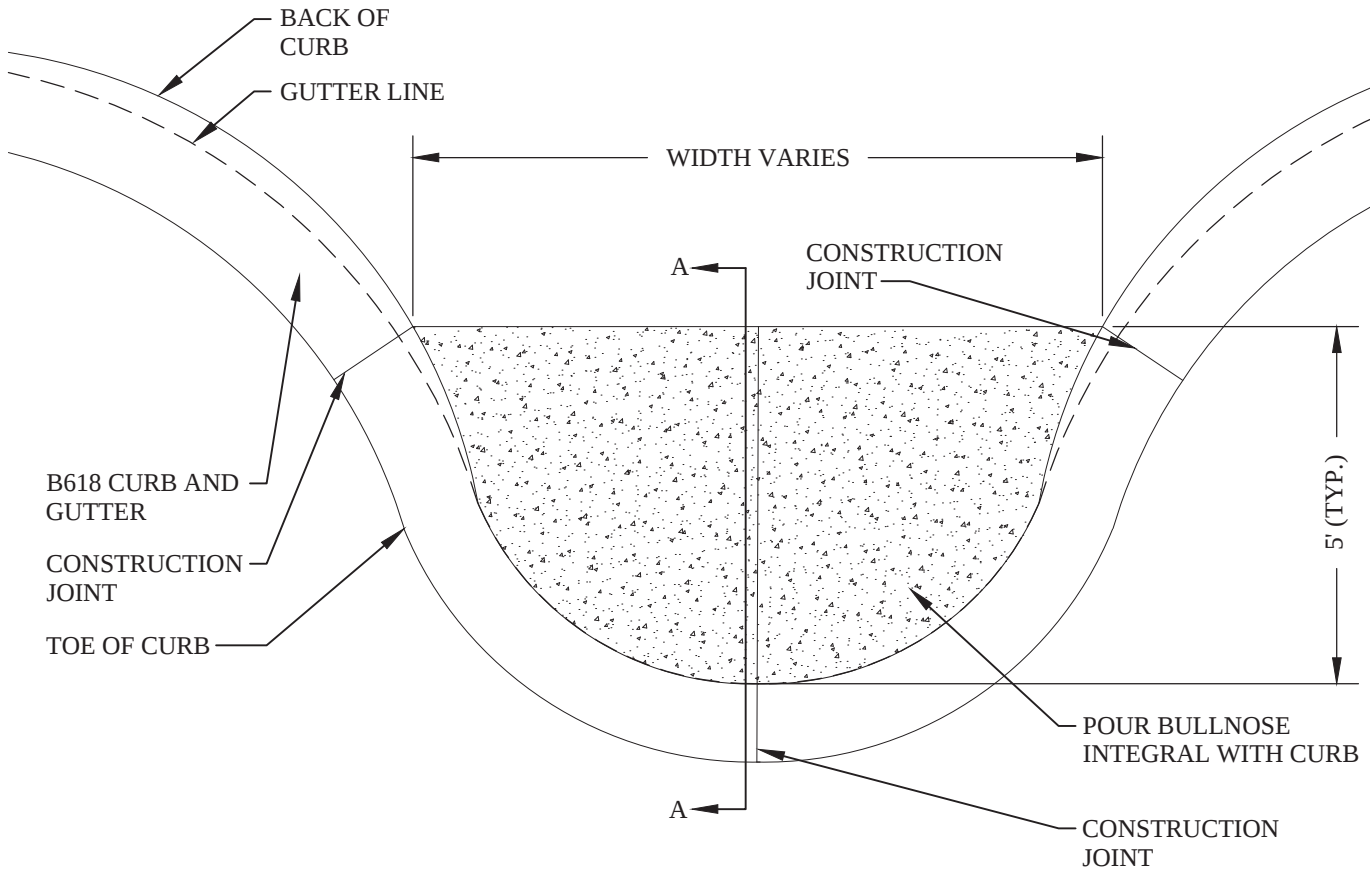
Revision Date

11/2013

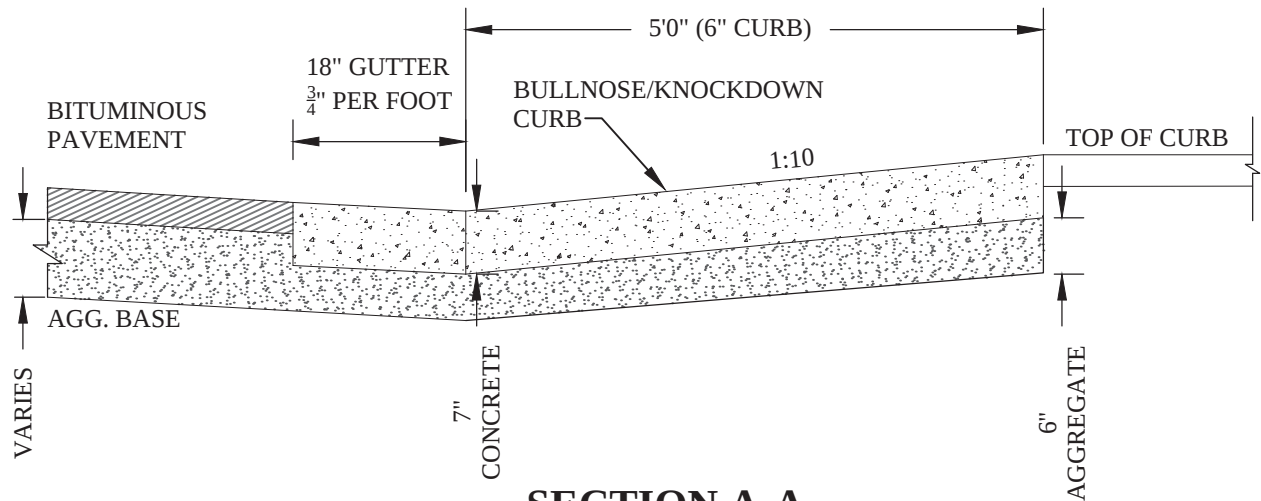
File Location:

S:\Details\english\Street\STR04-Valley Gutter.dwg

MEDIAN OR TEAR-DROP ISLAND



PLAN



SECTION A-A



CITY OF BURNSVILLE - ENGINEERING DEPT. BULLNOSE KNOCKDOWN CURB

Plate No.

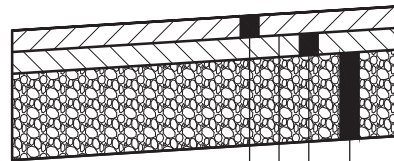
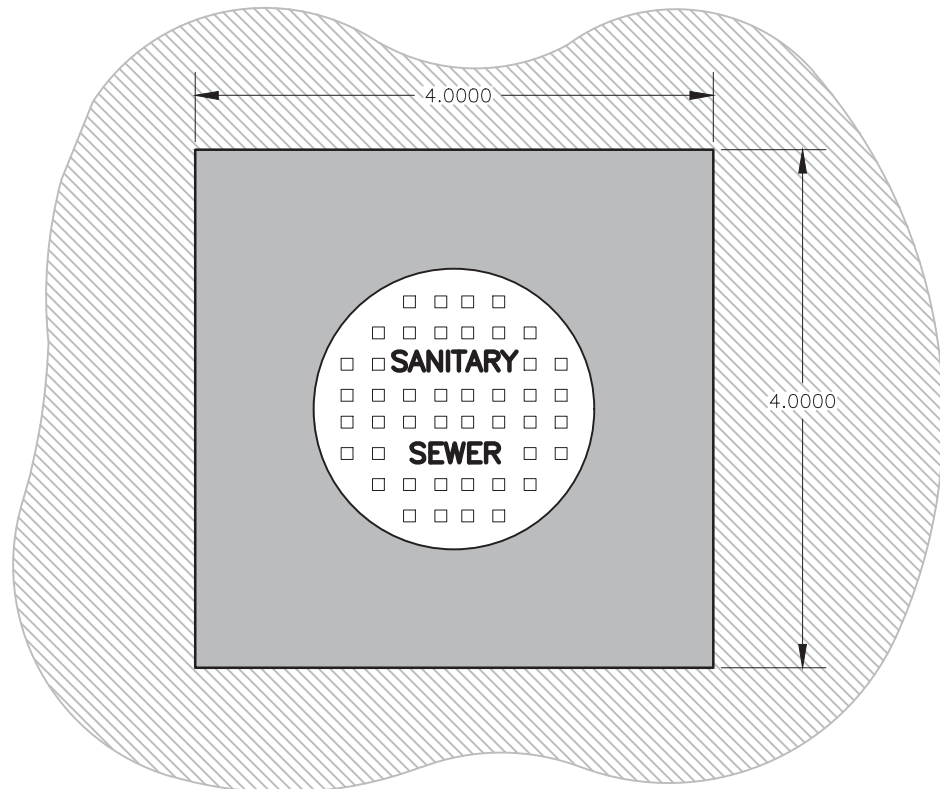
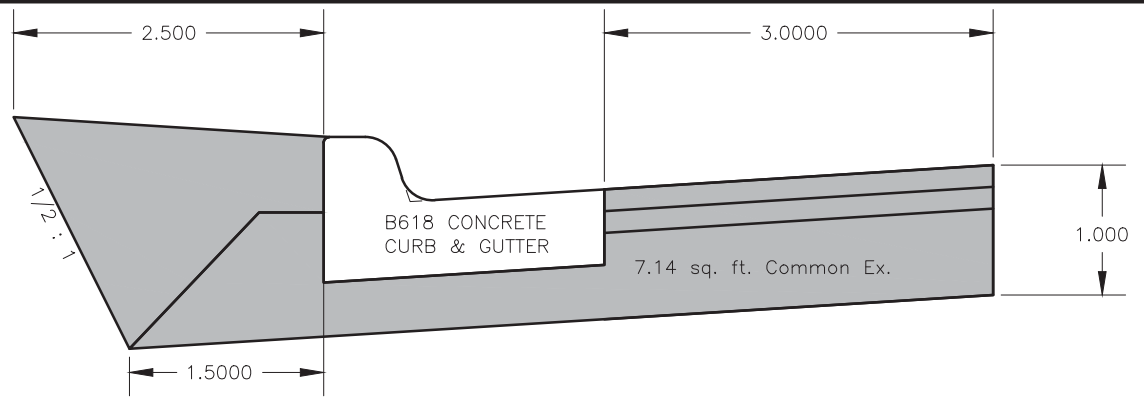
STR - 5

Revision Date

1/2018

File Location:

S:\Details\english\Street\STR05-Bullnose.dwg



2" WEARING COURSE MIXTURE SPWEA240B,
MnDOT SPEC. 2360

BITUMINOUS TACK COAT,
MnDOT SPEC. 2357

2" WEARING COURSE MIXTURE SPWEA240B,
MnDOT SPEC. 2360

8" CLASS 5 AGGREGATE BASE



CITY OF BURNSVILLE -ENGINEERING DEPT.

SPOT REPAIR PATCHING

Plate No.

STR - 6

Revision Date

3/2017

File Location:

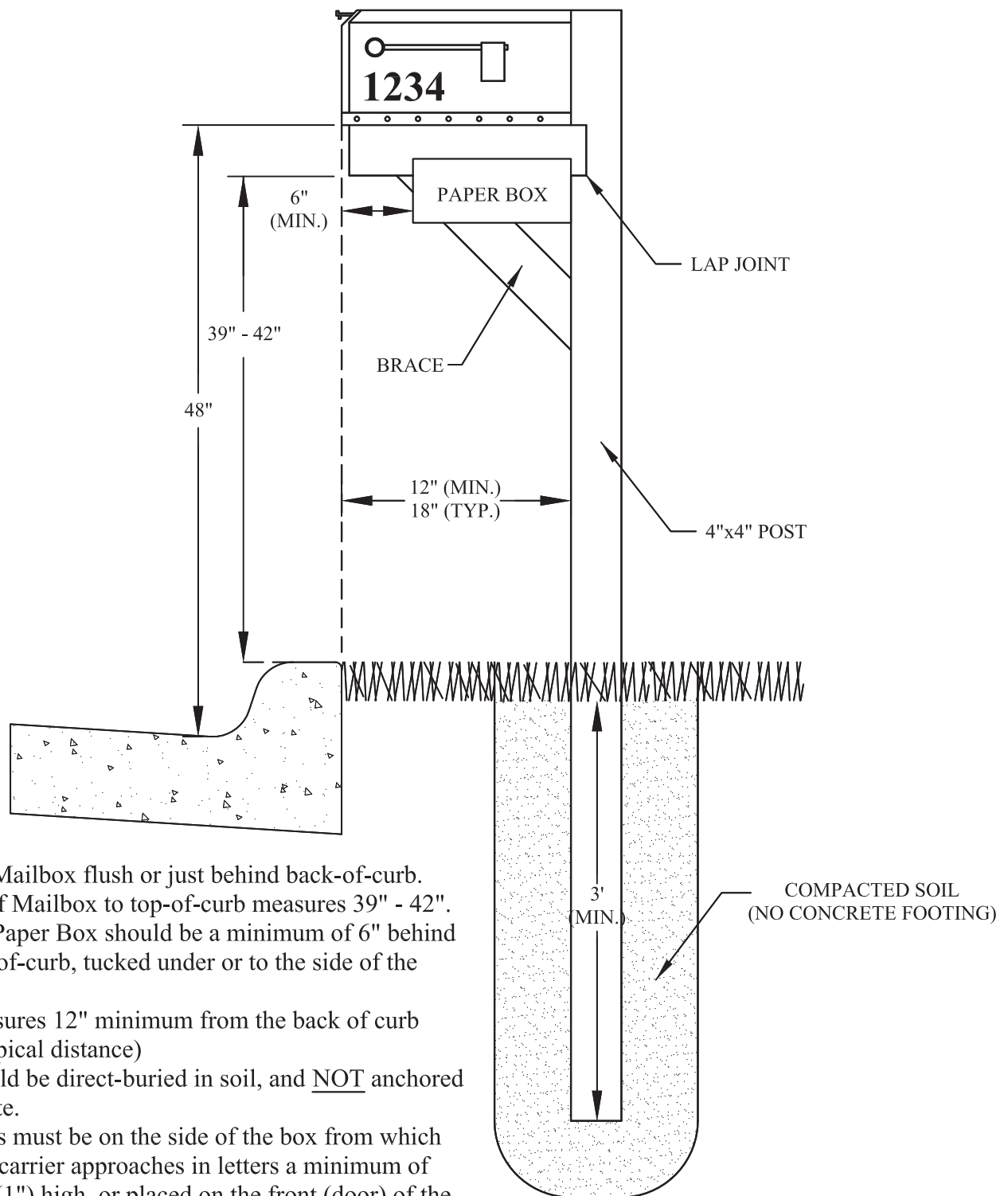
S:\Details\english\Street\STR6-SpotRepairPatching.dwg

1. THE CONTRACTOR WILL SUBMIT PLANS SIGNED BY A REGISTERED ENGINEER FOR PROPOSED RETAINING WALLS FOR APPROVAL BY THE ENGINEER.
2. ALL MODULAR BLOCK RETAINING WALLS WILL BE PAID FOR BY THE SQUARE FOOT AREA OF INSTALLED ABOVE AND BELOW GRADE.
3. SEE PLANS AND DIVISION 2, PART A, SECTION 2411 FOR BLOCK COLOR AND TEXTURE REQUIREMENTS.
4. NO DISTURBANCE WILL BE ALLOWED BEYOND THE EXCAVATION LINE SHOWN ON THE DETAIL, OR THE CONSTRUCTION LIMITS SHOWN ON THE PLANS.



MODULAR BLOCK RETAINING WALL

S:\Details\english\Street\STR08-Retaining Wall.dwg

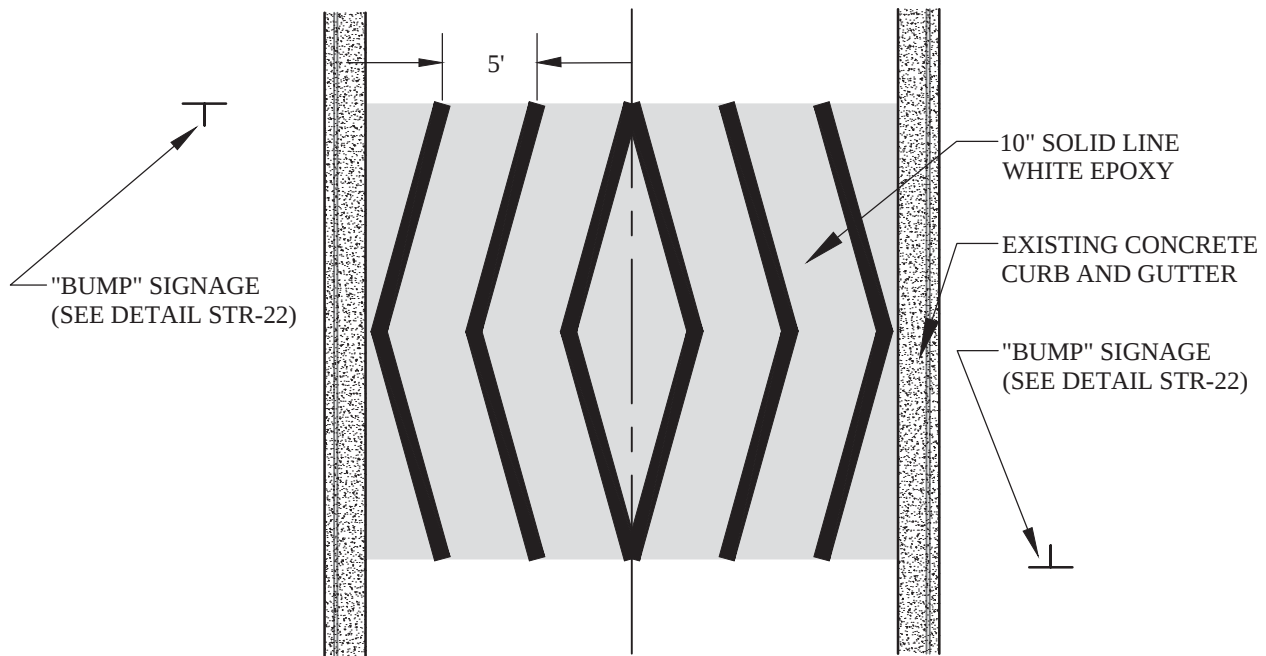
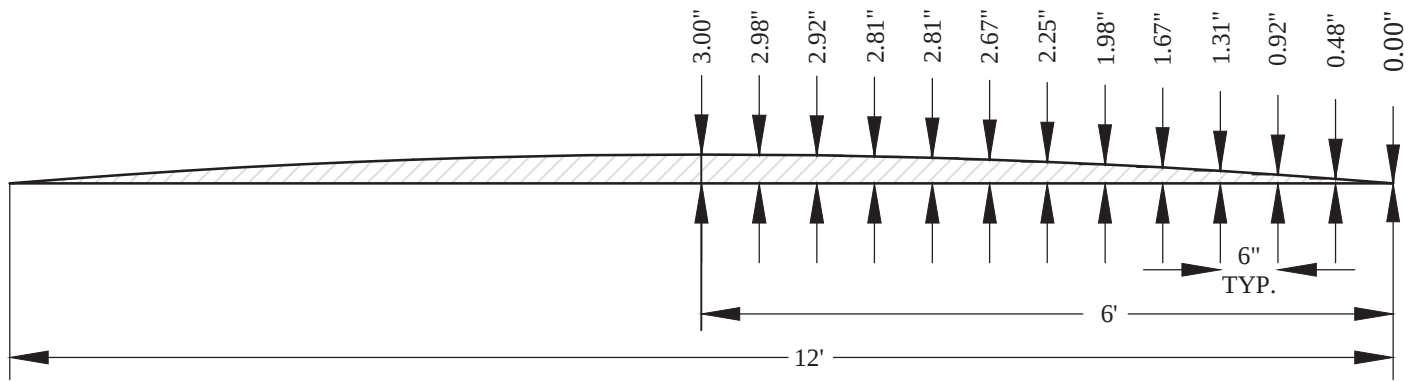


1. Front of Mailbox flush or just behind back-of-curb.
2. Bottom of Mailbox to top-of-curb measures 39" - 42".
3. Front of Paper Box should be a minimum of 6" behind the back-of-curb, tucked under or to the side of the mailbox.
4. Post measures 12" minimum from the back of curb (18" is typical distance)
5. Post should be direct-buried in soil, and NOT anchored in concrete.
6. Addresses must be on the side of the box from which the letter carrier approaches in letters a minimum of one inch (1") high, or placed on the front (door) of the mailbox.



CITY OF BURNSVILLE - ENGINEERING DEPT.
**MAILBOX
 INSTALLATION**

Plate No.	STR - 11
Revision Date	1/2015
File Location: S:\Details\english\Street\STR11-Mailbox.dwg	



NOTES:

1. REFER TO DIVISION 2, PART A, SECTION 2563 FOR MORE INFORMATION.



CITY OF BURNSVILLE - ENGINEERING DEPT.

SPEED HUMP

Plate No.

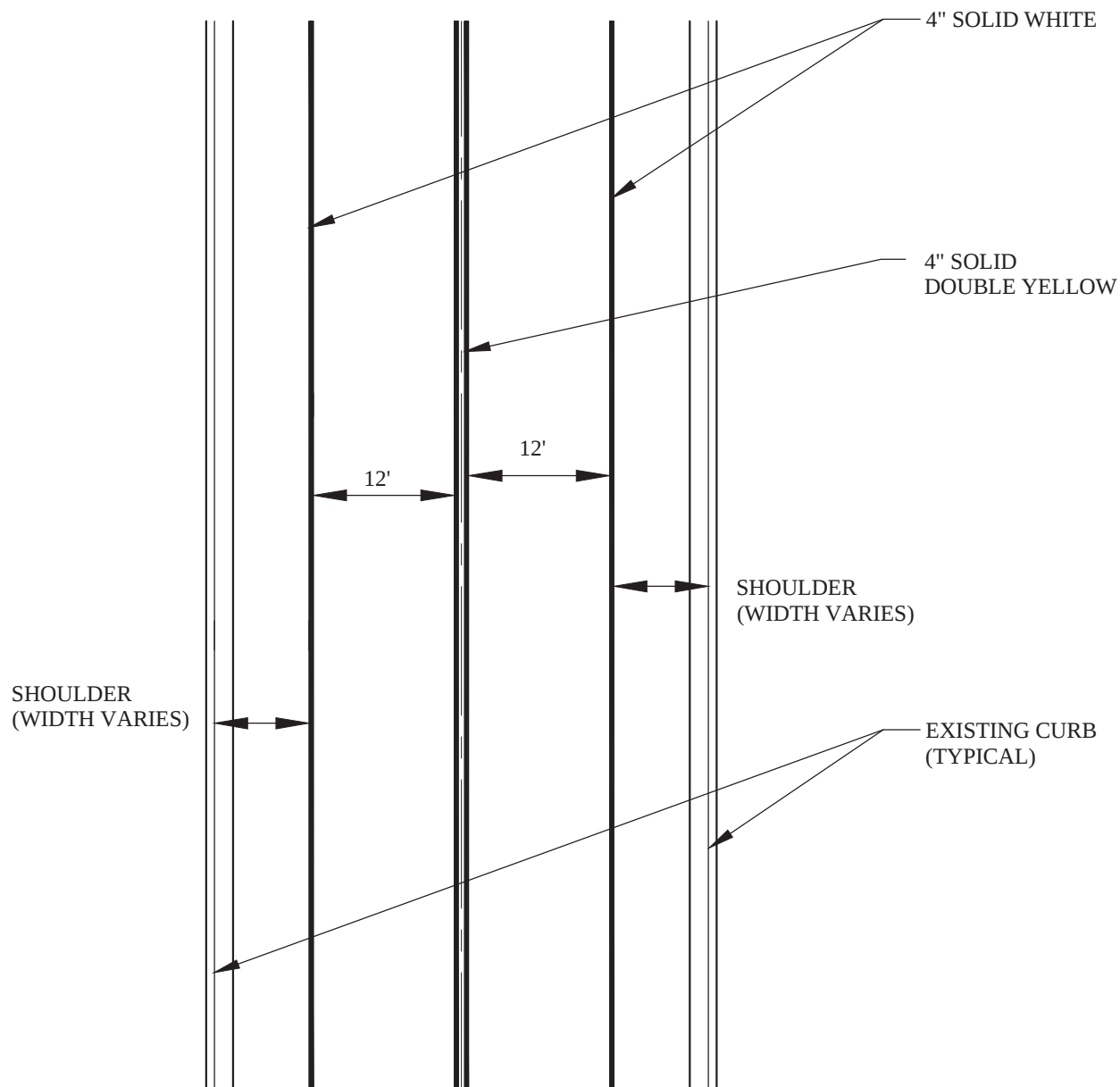
STR - 12

Revision Date

11/2013

File Location:

S:\Details\english\Street\STR12-Speed Hump.dwg



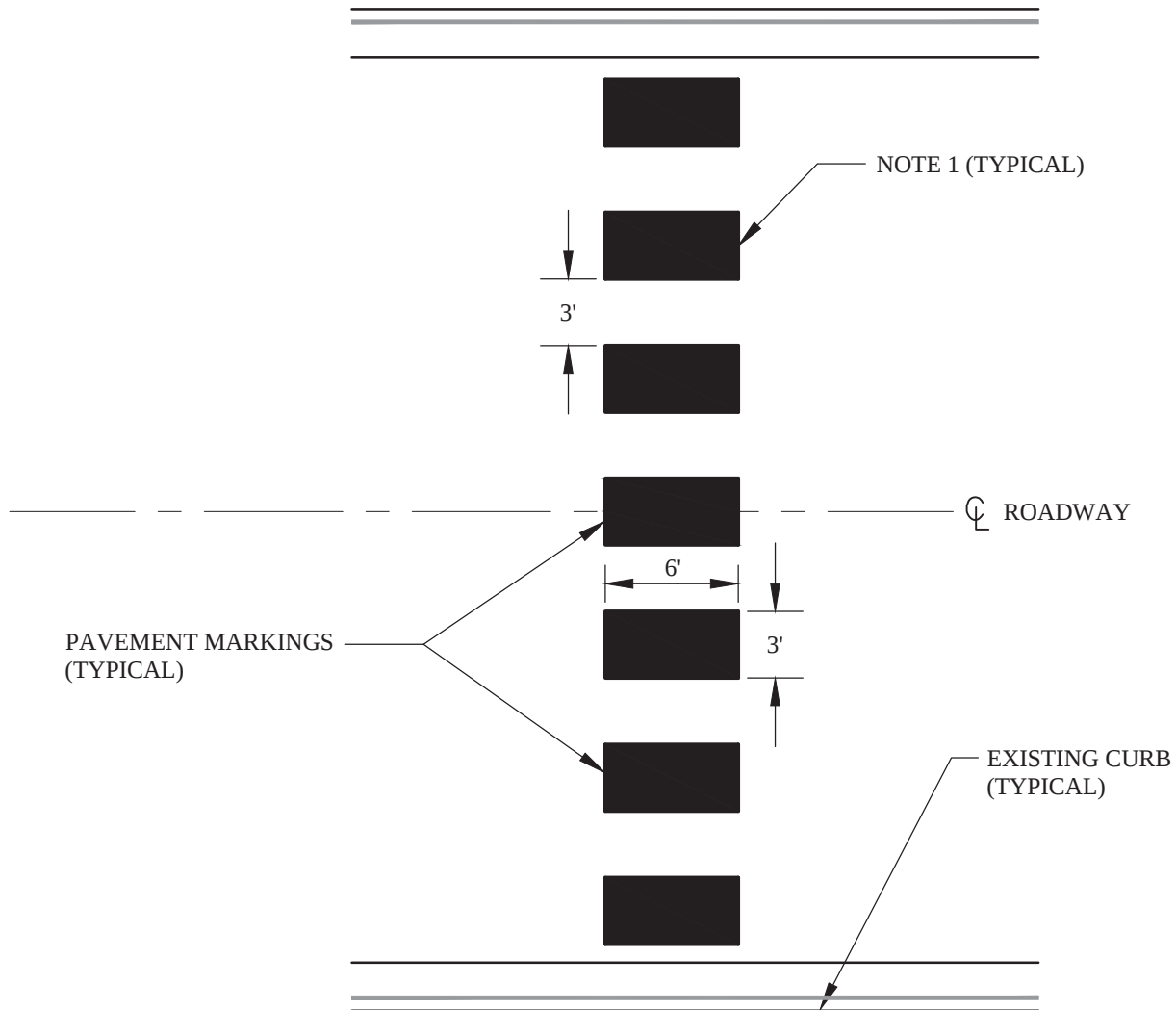
CITY OF BURNSVILLE - ENGINEERING DEPT.

TYPICAL PAVEMENT MARKING

Plate No.	STR - 16
Revision Date	11/2013
File Location: S:\Details\english\Street\STR16-Pavement MarkinG.dwg	

NOTES:

1. WHITE TRAFFIC PAINT/EPOXY IN AREAS AS SHOWN.
2. CONTRACTOR TO PROVIDE LATOUT FOR APPROVAL.



CITY OF BURNSVILLE - ENGINEERING DEPT.

**PEDESTRIAN CROSSWALK
MARKING**

Plate No.

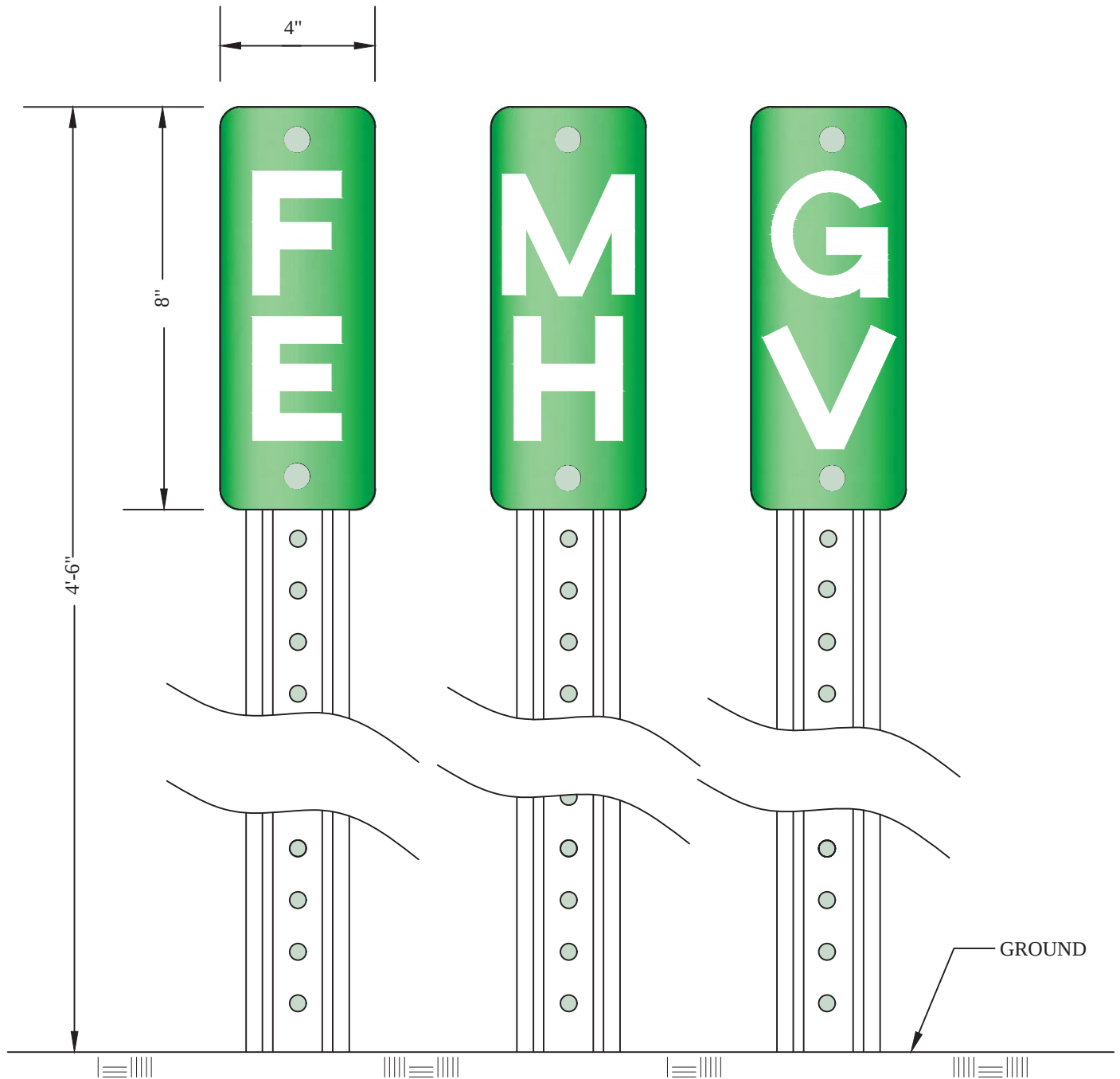
STR - 17

Revision Date

11/2013

File Location:

S:\Details\english\Street\STR17-Crosswalk.dwg



NOTES

1. STRUCTURE MARKER SIGNS WILL BE USED ON ALL STRUCTURES OUTSIDE OF THE STREET RIGHT-OF-WAY
2. DO NOT USE ON HYDRANT LEAD VALVES
3. STRUCTURE MARKERS ARE INCIDENTAL TO THE STRUCTURE BEING INSTALLED
4. 0.063" THICK ALUMINUM SIGN WITH WHITE LETTERS ON GREEN HIGH-INTENSITY REFLECTORIZED BACKGROUND
5. U-CHANNEL POST, MINIMUM 2.5 LB/FT, 7' LONG, GALVANIZED
6. SEE DIVISION 2, PART A & MnDOT 2564 FOR FURTHER INFORMATION
7. RIB BACKED POST



CITY OF BURNSVILLE - ENGINEERING DEPT. UTILITY STRUCTURE MARKERS (OUT OF ROW)

Plate No.

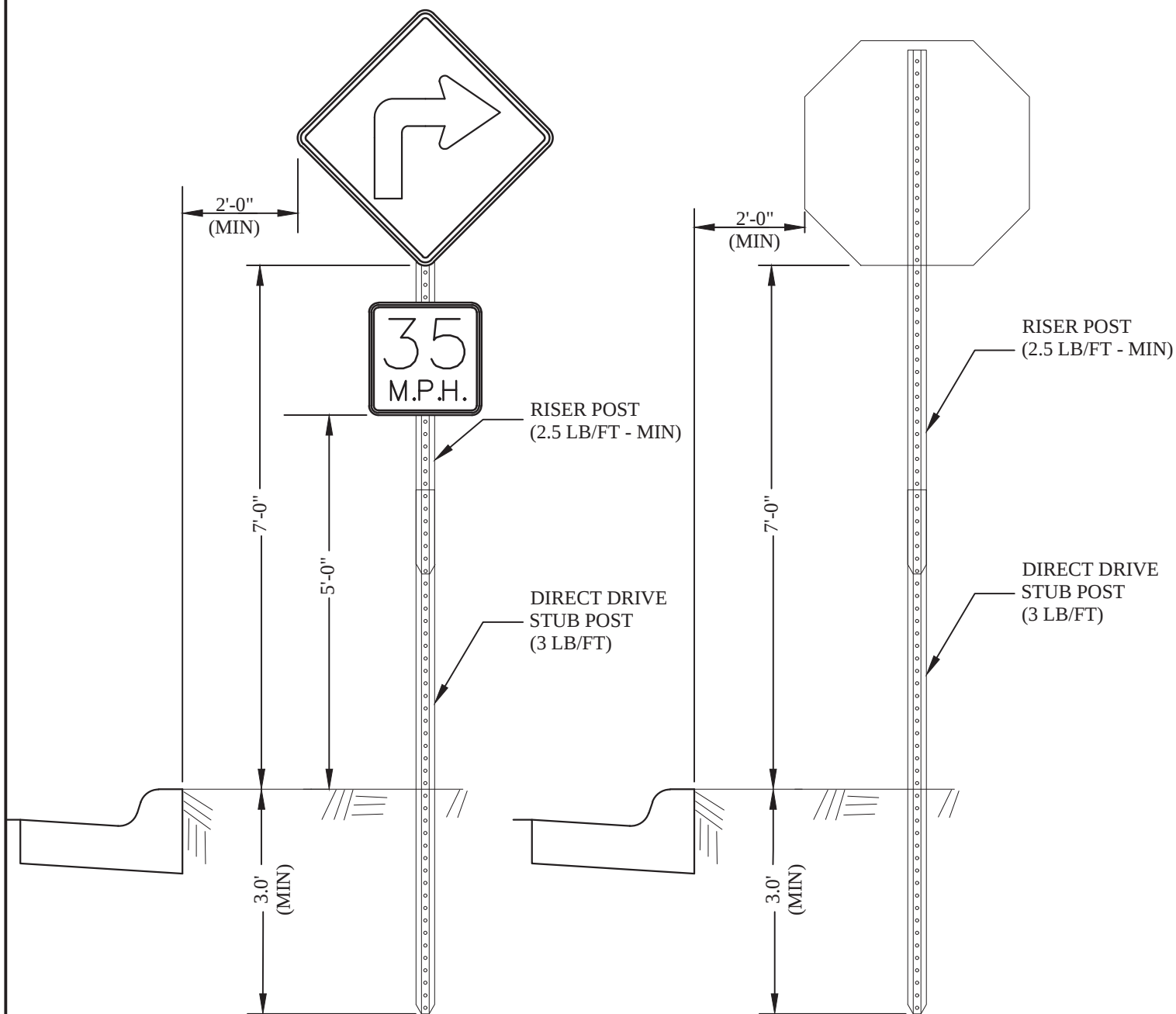
STR-21

Revision Date

1/2018

File Location:

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TWO SIGNS ON POST

ONE SIGN ON POST

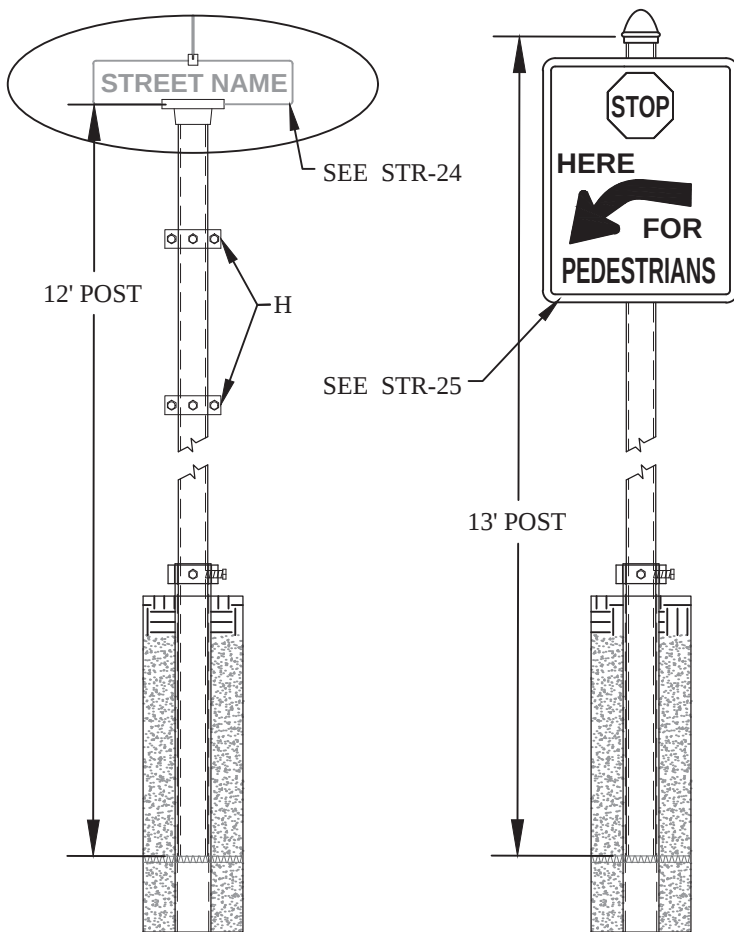
NOTES

1. REFER TO SIGN PLAN SHEETS FOR SIGN SIZE AND INSTALLATION LOCATIONS
2. TYPICAL CHANNEL POST LENGTHS ARE 7' (84") FOR BOTH STUB AND RISER POSTS
3. SEE DIVISION 2, PART A & MnDOT 2564 FOR FURTHER INFORMATION
4. RIB BACKED POST



CITY OF BURNSVILLE - ENGINEERING DEPT. TYPE C SIGN INSTALLATION

Plate No.	STR-22
Revision Date	1/2018
File Location: S:\Details\english\Street\STR22-Warning Sign Install.dwg	

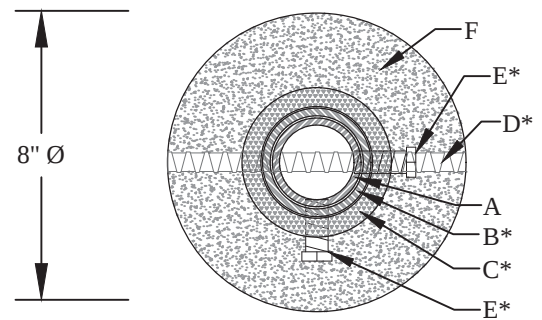


ELEVATION VIEW

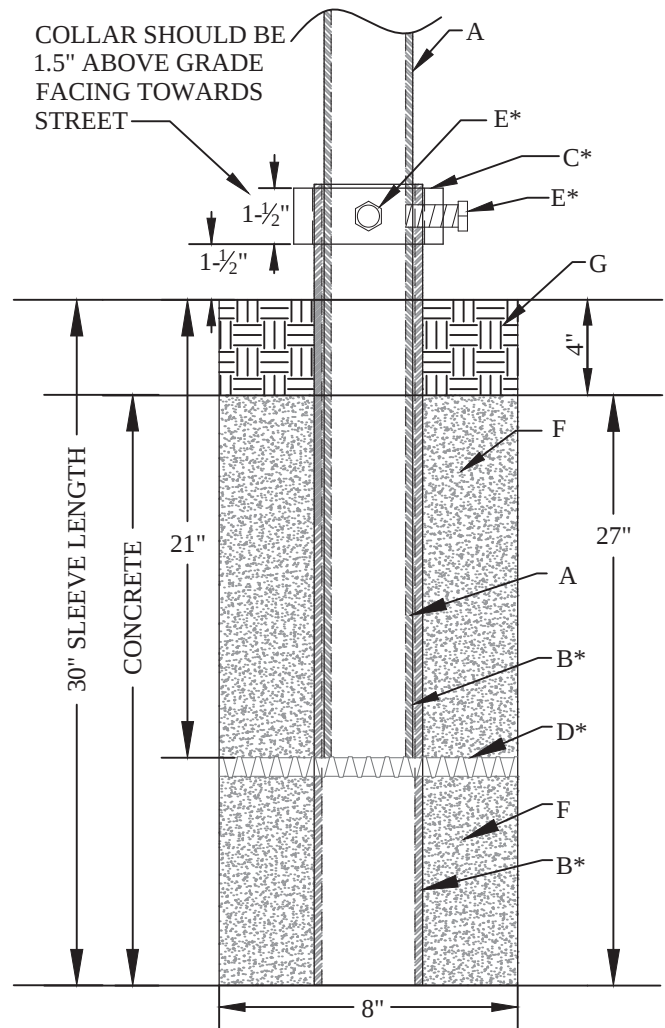
NOTES

- A. GALVANIZED STEEL POST 2" O.D. x 12' LENGTH. RESTS ON REBAR IN SLEEVE
- B. 2 $\frac{3}{8}$ " ALUMINUM PIPE SLEEVE 2.5" I.D. x 2.9" O.D. x 30" LENGTH W/TWO HOLES $\frac{3}{4}$ " $\varnothing$ @ 90°; HOLES $\frac{3}{4}$ " FROM TOP OF PIPE, W/TWO HOLES $\frac{3}{4}$ " $\varnothing$, HOLES 6" FROM BOTTOM FOR REBAR
- C. CAST STEEL RETAINING RING 3" I.D. x 4" O.D. x 1.5" DEPTH THREADED FOR $\frac{5}{8}$ " $\varnothing$ MACHINE SCREW. RING WILL BE TURNED SO THAT THE SCREWS FACE THE STREET
- D. STEEL RE-BAR #4 $\varnothing$ x 8" LENGTH
- E. MACHINE SCREW PLATED $\frac{5}{8}$ " x 1 $\frac{1}{2}$ " ZINC BOLT. APPLY ANTI-SEIZE COMPOUND TO BOLT THREADS.
- F. CONCRETE FOOTING 8" $\varnothing$ x 26" DEPTH.
- G. BLACK DIRT & SEED 4" TO MEET FINAL GRADE
- H. LYLE SIGNS, INC. BR-95 SIGN MOUNTING BRACKET OR APPROVED EQUAL (USED IF A TRAFFIC SIGN IS REQUIRED) SEE DETAIL STR-22 FOR MOUNTING HEIGHT

* ITEMS B, C, D, & E WILL BE EARL F. ANDERSON TUBULAR POST BREAKAWAY SYSTEM OR APPROVED EQUAL
SEE DIVISION 2, PART A, SECTION 2564



PLAN VIEW



INSET VIEW OF SLEEVE & FOOTING



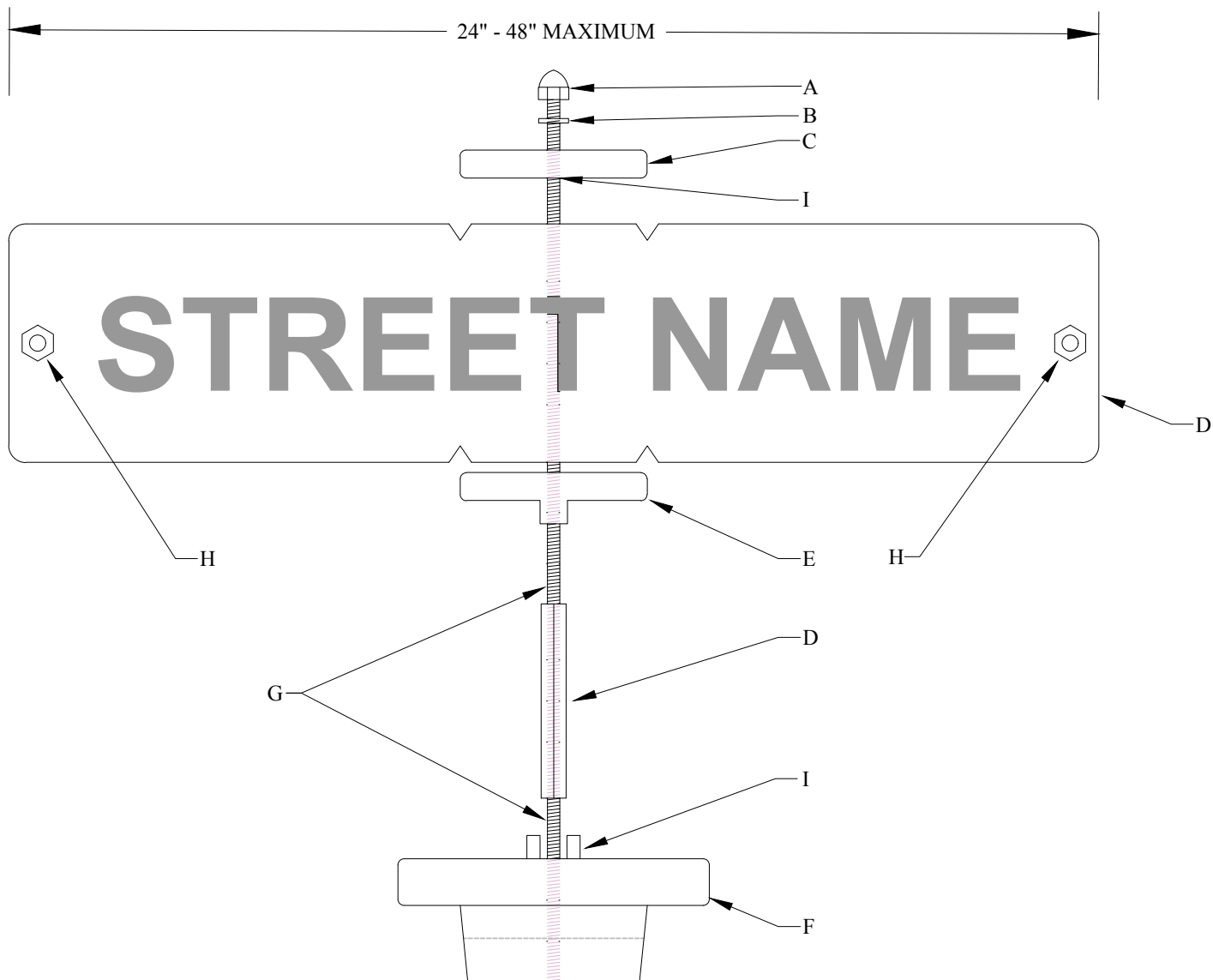
CITY OF BURNSVILLE - ENGINEERING DEPT.
**ROUND SIGN POST
INSTALLATION**

Plate No. STR-23

Revision Date 1/2018

File Location:

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NOTES

- A. $\frac{1}{2}$ " ZINC HIGH DOME ACORN NUT - ITEM #461 B&F FASTENER SUPPLY (OR EQUAL)
- B. $\frac{1}{2}$ " x $1\frac{3}{8}$ " ZINC WASHER
- C. FLAT-STYLE 4-WAY SIGN SEPARATOR (COMPATIBLE WITH ITEM F)
- D. 2-PANEL 9" STREET SIGN NOTCH & PUNCH E450 COMPLIANT WITH 4-WAY SEPARATOR BRACKET
- E. LOCKING-STYLE 4-WAY SIGN SEPARATOR (COMPATIBLE WITH ITEM F)
- F. 4-WAY ($2\frac{3}{8}$ " DIAMETER) ROUND CAP-STYLE #556 BY TRAFFIC SAFETY COMPANY
- G. $\frac{1}{2}$ " ZINC THREADED ROD, LENGTH AS FOLLOWS:
 - 2-9" SIGNS = 21" ROD
 - 3-9" SIGNS = 30" ROD
- H. $\frac{1}{4}$ "-20-1/2" HEX HEAD BRASS BOLT WITH $\frac{1}{4}$ "-20 HEX HEAD BRASS NY-LOCK NUT
- I. ALL THREADED CONNECTION SHALL BE ANTISIEZED (EXCEPT FOR BRASS NUTS AND/OR BOLTS)

2" O.D. ROUND SIGN
POST



CITY OF BURNSVILLE - ENGINEERING DEPT.
**STREET SIGN PLATE
ASSEMBLY DETAIL**

Plate No.

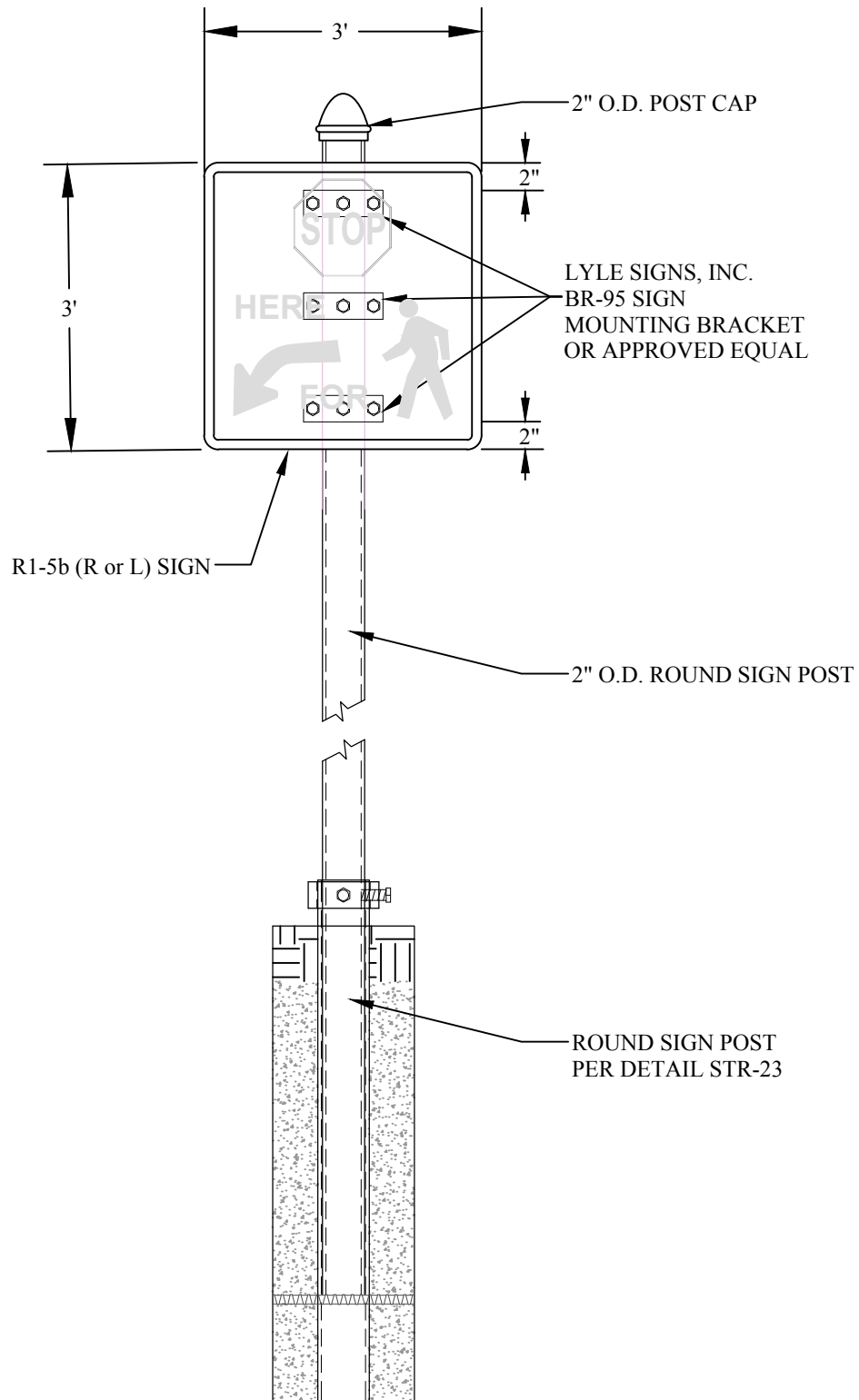
STR-24

Revision Date

3/2019

File Location:

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ELEVATION VIEW



CITY OF BURNSVILLE - ENGINEERING DEPT.

**STOP HERE FOR
PEDESTRIAN SIGN**

Plate No.

STR-25

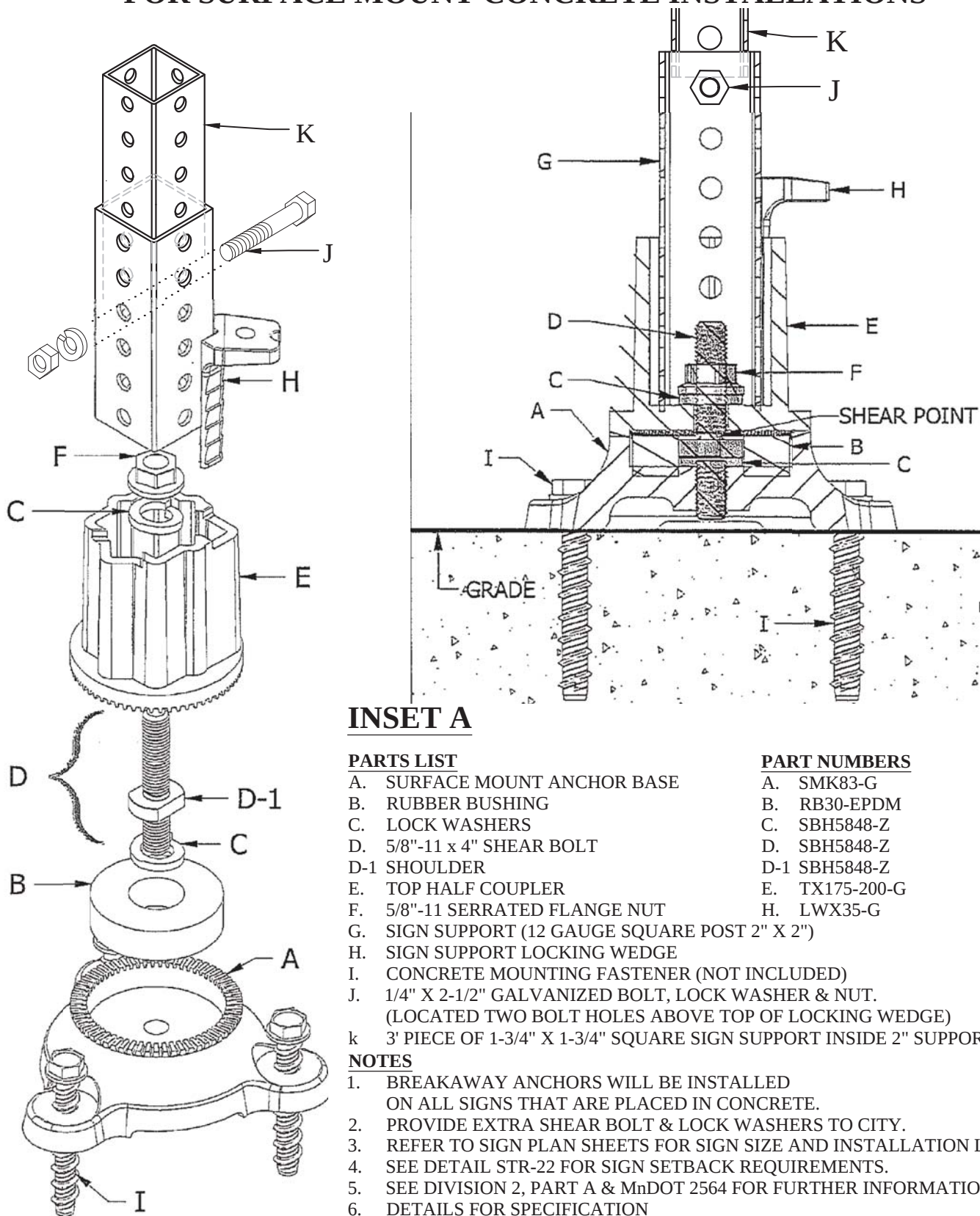
Revision Date

1/2021

File Location:

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KLEEN BREAK MODEL 425 FOR SURFACE MOUNT CONCRETE INSTALLATIONS



INSET A

PARTS LIST

- | | |
|---|---|
| <p>A. SURFACE MOUNT ANCHOR BASE</p> <p>B. RUBBER BUSHING</p> <p>C. LOCK WASHERS</p> <p>D. 5/8"-11 x 4" SHEAR BOLT</p> <p>D-1 SHOULDER</p> <p>E. TOP HALF COUPLER</p> <p>F. 5/8"-11 SERRATED FLANGE NUT</p> <p>G. SIGN SUPPORT (12 GAUGE SQUARE POST 2" X 2")</p> <p>H. SIGN SUPPORT LOCKING WEDGE</p> <p>I. CONCRETE MOUNTING FASTENER (NOT INCLUDED)</p> <p>J. 1/4" X 2-1/2" GALVANIZED BOLT, LOCK WASHER & NUT.
(LOCATED TWO BOLT HOLES ABOVE TOP OF LOCKING WEDGE)</p> <p>k 3' PIECE OF 1-3/4" X 1-3/4" SQUARE SIGN SUPPORT INSIDE 2" SUPPORT.</p> | <p>PART NUMBERS</p> <p>A. SMK83-G</p> <p>B. RB30-EPDM</p> <p>C. SBH5848-Z</p> <p>D. SBH5848-Z</p> <p>D-1 SBH5848-Z</p> <p>E. TX175-200-G</p> <p>H. LWX35-G</p> |
|---|---|

NOTES

1. BREAKAWAY ANCHORS WILL BE INSTALLED ON ALL SIGNS THAT ARE PLACED IN CONCRETE.
2. PROVIDE EXTRA SHEAR BOLT & LOCK WASHERS TO CITY.
3. REFER TO SIGN PLAN SHEETS FOR SIGN SIZE AND INSTALLATION LOCATIONS.
4. SEE DETAIL STR-22 FOR SIGN SETBACK REQUIREMENTS.
5. SEE DIVISION 2, PART A & MnDOT 2564 FOR FURTHER INFORMATION.
6. DETAILS FOR SPECIFICATION

http://www.x-sqrd.com/PROD-INFO/KLEEN_BREAK_CI.pdf



CITY OF BURNSVILLE - ENGINEERING DEPT.
**SQUARE TUBULAR SIGN
POST BREAKAWAY**

Plate No.

STR-26

Revision Date

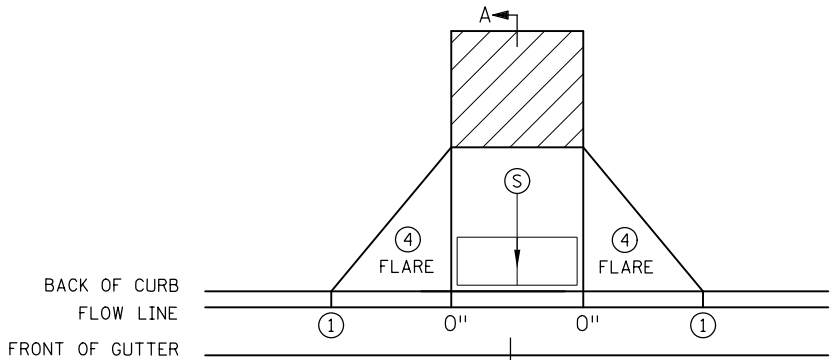
1/2018

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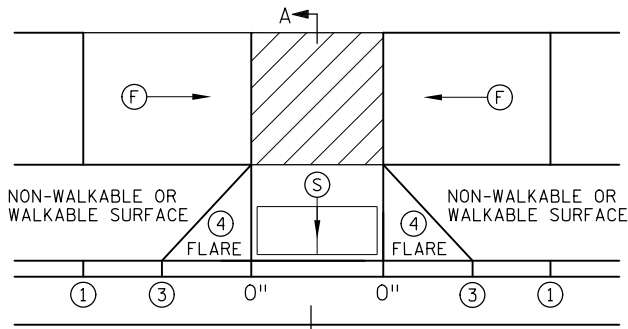
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PLOTTED/REVISED: 4-APR-2018

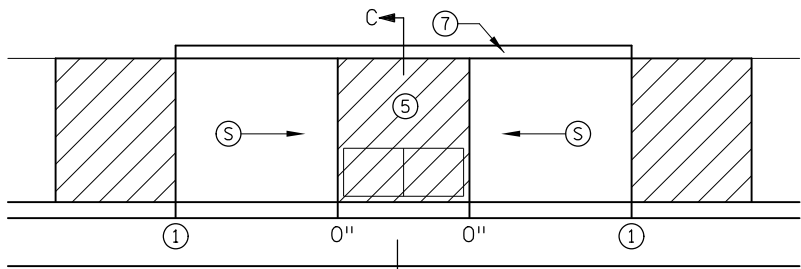
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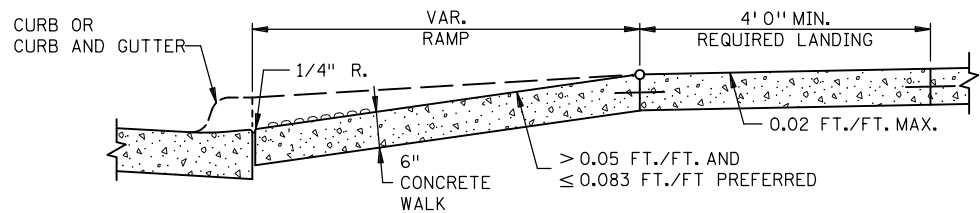
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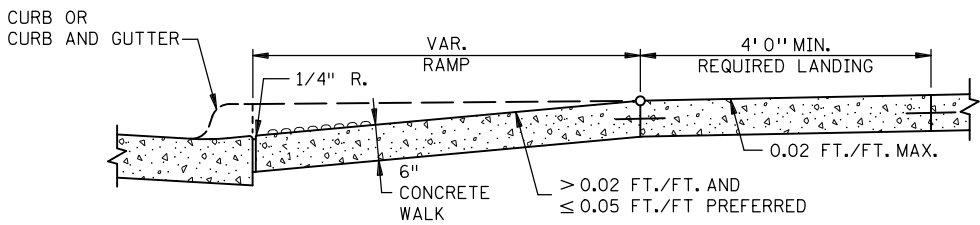
TIERED PERPENDICULAR



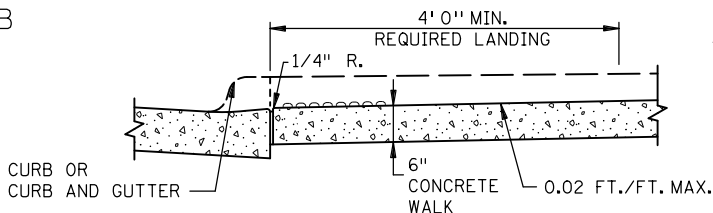
PARALLEL



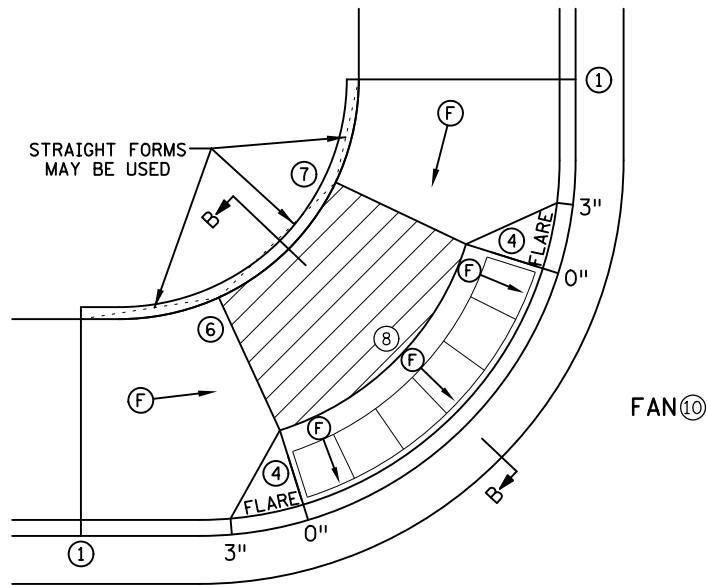
SECTION A-A
PERPENDICULAR/TIERED/DIAGONAL



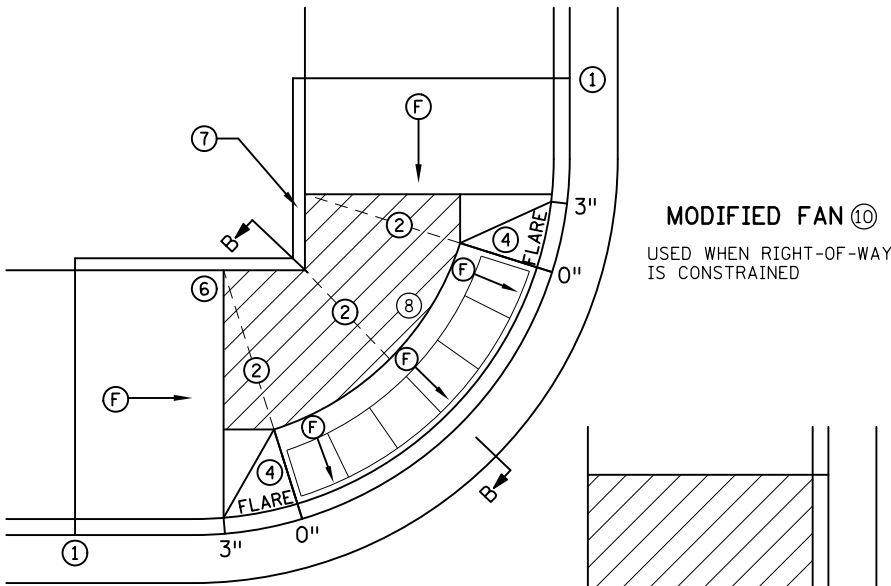
SECTION B-B
FAN



SECTION C-C
PARALLEL/DEPRESSED CORNER

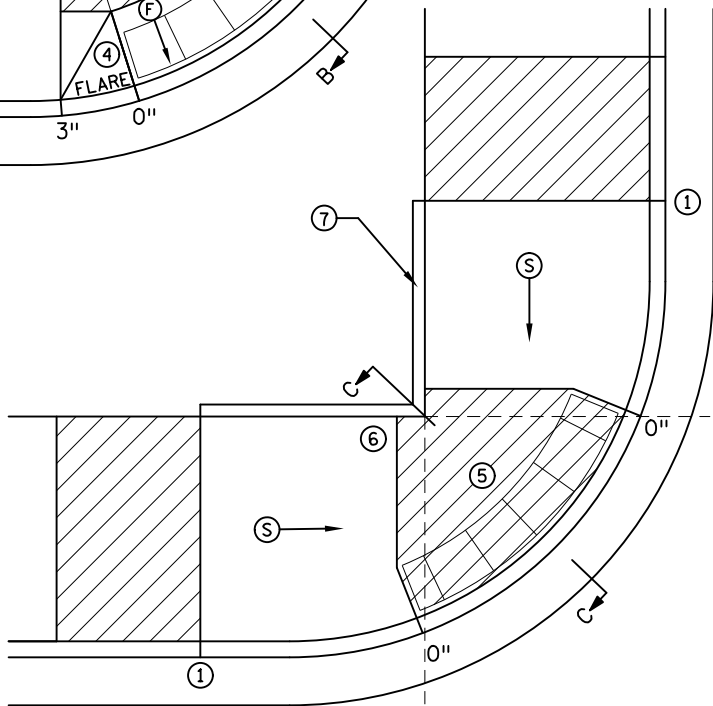


FAN

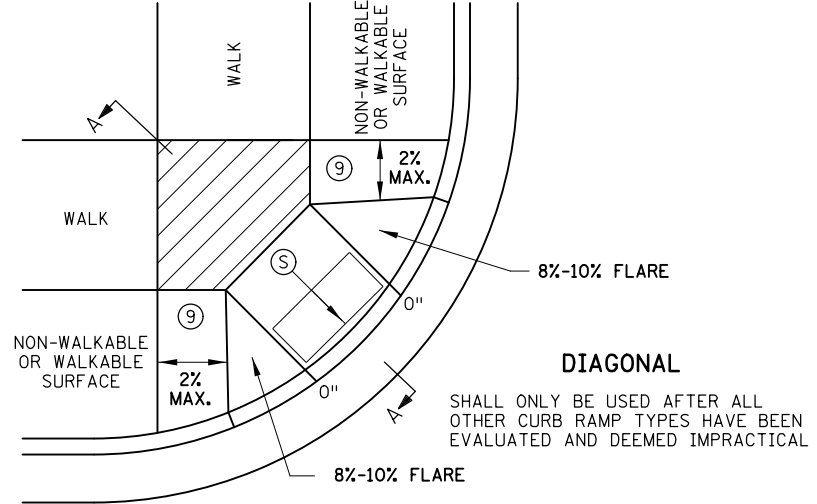


MODIFIED FAN

USED WHEN RIGHT-OF-WAY IS CONSTRAINED



DEPRESSED CORNER



DIAGONAL

SHALL ONLY BE USED AFTER ALL OTHER CURB RAMP TYPES HAVE BEEN EVALUATED AND DEEMED IMPRACTICAL

NOTES:

- LANDINGS SHALL BE LOCATED ANYWHERE THE PEDESTRIAN ACCESS ROUTE (PAR) CHANGES DIRECTION, AT THE TOP OF RAMPS THAT HAVE RUNNING SLOPES GREATER THAN 5.0%, AND IF THE APPROACHING WALK IS INVERSE GRADE GREATER THAN 2%.
- INITIAL CURB RAMP LANDINGS SHALL BE CONSTRUCTED WITHIN 15' FROM THE BACK OF CURB, WITH 6' FROM THE BACK OF CURB BEING THE PREFERRED DISTANCE, ONLY APPLICABLE WHEN THE INITIAL RAMP RUNNING SLOPE IS OVER 5.0%.
- SECONDARY CURB RAMP LANDINGS ARE REQUIRED FOR EVERY 30' OF VERTICAL RISE WHEN THE LONGITUDINAL RUNNING SLOPE IS GREATER THAN 5.0%.
- CONTRACTION JOINTS SHALL BE CONSTRUCTED ALONG ALL GRADE BREAKS WITHIN THE PAR. 1/4" DEEP VISUAL JOINTS SHALL BE USED AT THE TOPS OF CONCRETE FLARES ADJACENT TO WALKABLE SURFACES.
- ALL GRADE BREAKS WITHIN THE PAR SHALL BE PERPENDICULAR TO THE PATH OF TRAVEL. THUS BOTH SIDES OF A SLOPED WALKING SURFACE MUST BE EQUAL LENGTH. (EXCEPT AS STATED IN 6 BELOW.)
- TO ENSURE INITIAL RAMPS AND INITIAL LANDINGS ARE PROPERLY CONSTRUCTED, LANDINGS SHALL BE CAST SEPARATELY. FOLLOW SIDEWALK REINFORCEMENT DETAILS ON SHEET 6 AND THE ADA SPECIAL PROVISIONS - PROSECUTION OF WORK (ADA).

TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.

WHEN THE BOULEVARD IS 4' WIDE OR LESS, THE TOP OF CURB TAPER SHALL MATCH THE RAMP SLOPES TO REDUCE NEGATIVE BOULEVARD SLOPES FROM THE TOP BACK OF CURB TO THE PAR.

ALL RAMP TYPES SHOULD HAVE A MINIMUM 3' LONG RAMP LENGTH.

4' MINIMUM WIDTH OF DETECTABLE WARNING IS REQUIRED FOR ALL RAMPS. DETECTABLE WARNINGS SHALL CONTINUOUSLY EXTEND FOR A MIN. OF 24" IN THE PATH OF TRAVEL. DETECTABLE WARNING TO COVER ENTIRE WIDTH OF SHARED-USE PATHS AND THE ENTIRE PAR WIDTH OF THE WALK. DETECTABLE WARNING SHOULD BE 6" LESS THAN THE PAR/TRAIL WIDTH. ARC LENGTH OF RADIAL DETECTABLE WARNINGS SHOULD NOT BE GREATER THAN 20 FEET.

RECTANGULAR DETECTABLE WARNINGS SHALL BE SETBACK 3" FROM THE BACK OF CURB. RADIAL DETECTABLE WARNINGS SHALL BE SETBACK 3" MINIMUM TO 6" MAXIMUM FROM THE BACK OF CURB.

- 1 MATCH FULL HEIGHT CURB.
- 2 4' MINIMUM DEPTH LANDING REQUIRED ACROSS TOP OF RAMP.
- 3 3" HIGH CURB WHEN USING A 3' LONG RAMP, 4" HIGH CURB WHEN USING A 4' LONG RAMP.
- 4 SEE SHEET 4 OF 6, TYPICAL SIDE TREATMENT OPTIONS, FOR DETAILS ON FLARES AND RETURNED CURBS, WHEN INITIAL LANDING IS AT FULL CURB HEIGHT.
- 5 DETECTABLE WARNINGS MAY BE PART OF THE 4' X 4' MIN. LANDING AREA IF IT IS NOT FEASIBLE TO CONSTRUCT THE LANDING OUTSIDE OF THE DETECTABLE WARNING AREA.
- 6 THE GRADE BREAK SHALL BE PERPENDICULAR TO THE BACK OF WALK. THIS WILL ENSURE THAT THE GRADE BREAK IS PERPENDICULAR TO THE DIRECTION OF TRAVEL. (TYPICAL FOR ALL)
- 7 WHEN ADJACENT TO GRASS, GRADING SHALL ALWAYS BE USED WHEN FEASIBLE. V CURB, IF USED, SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS. WHEN ADJACENT TO PARKING LOTS, CONCRETE OR BITUMINOUS TAPERS SHOULD BE USED OVER V CURB TO REDUCE TRIPPING HAZARDS AND FACILITATE SNOW & ICE REMOVAL.
- 8 A 7' MIN TOP RADIUS GRADE BREAK REQUIRED TO BE CONSTRUCTIBLE.
- 9 PAVE FULL WALK WIDTH.
- 10 "S" SLOPES ON FANS SHALL ONLY BE USED WHEN ALL OTHER FEASIBLE OPTIONS HAVE BEEN EVALUATED AND DEEMED IMPRACTICAL.

LEGEND

- THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT. IF SITE CONDITIONS WARRANT, LONGITUDINAL SLOPES UP TO 8.3% OR FLATTER ARE ALLOWED.
- S INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND THE CROSS SLOPE SHALL NOT EXCEED 2.0%.
- F INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%.
- LANDING AREA - 4' X 4' MIN. (5' X 5' MIN. PREFERRED) DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS. LANDING SHALL BE FULL WIDTH OF INCOMING PAR.
- X" CURB HEIGHT

REVISION:
APPROVED: JANUARY 23, 2017
OPERATIONS ENGINEER

MINNESOTA
DEPARTMENT
OF
TRANSPORTATION

STANDARD PLAN 5-297.250

1 OF 6

STATE DESIGN ENGINEER

APPROVED: 1-23-2017
REVISED:

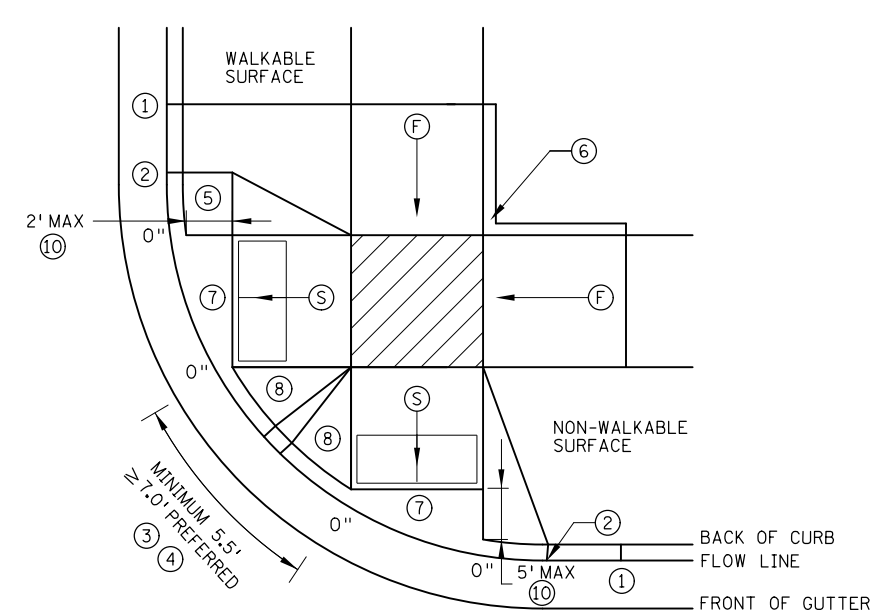
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PEDESTRIAN CURB RAMP DETAILS

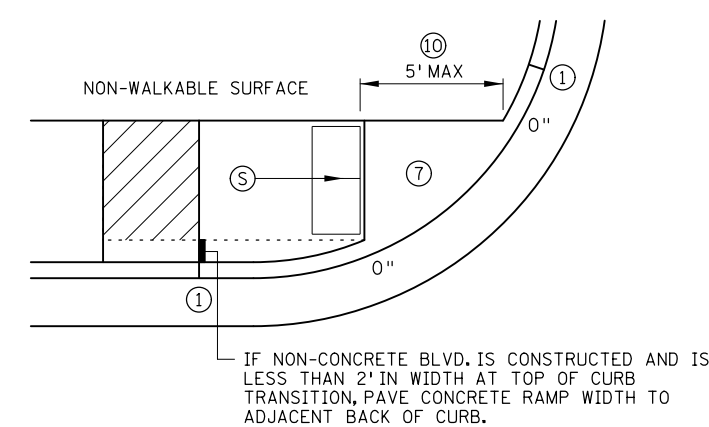
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PLOTTED/REVISED: 4-APR-2018

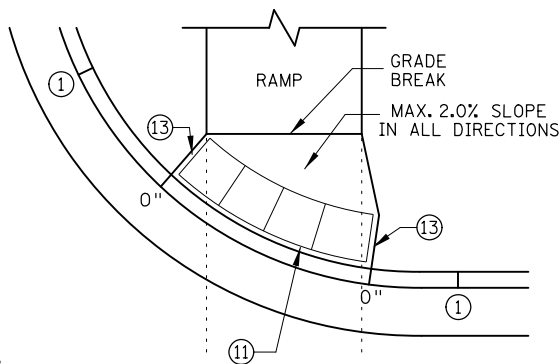
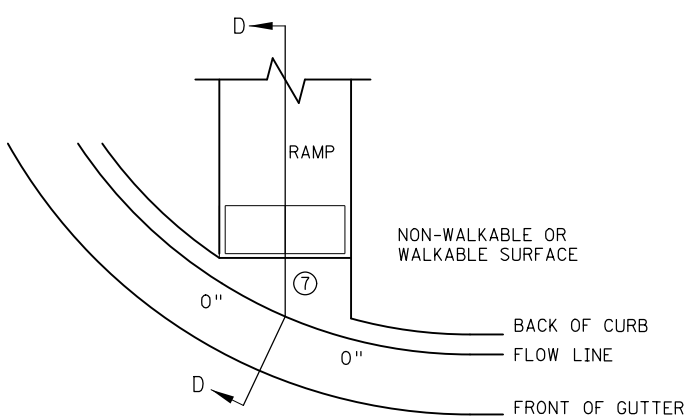
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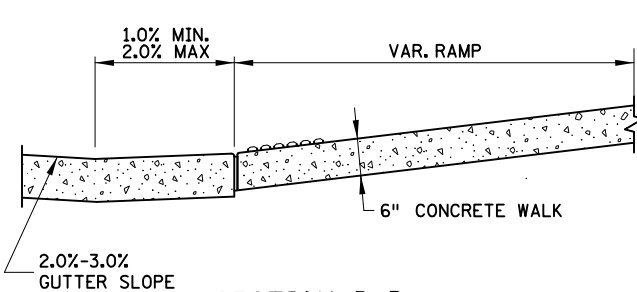
COMBINED DIRECTIONAL ⑨



STANDARD ONE-WAY DIRECTIONAL ⑨

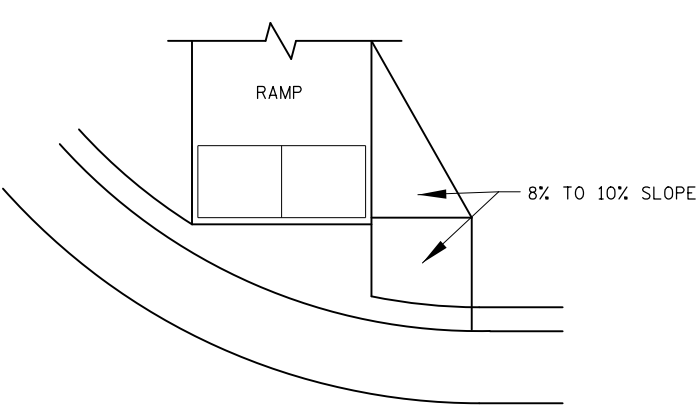


ONE-WAY DIRECTIONAL WITH DETECTABLE WARNING AT BACK OF CURB



SECTION D-D

DIRECTIONAL RAMP WALKABLE FLARE



NOTES:

- LANDINGS SHALL BE LOCATED ANYWHERE THE PEDESTRIAN ACCESS ROUTE (PAR) CHANGES DIRECTION, AT THE TOP OF RAMPS THAT HAVE RUNNING SLOPES GREATER THAN 5.0%, AND IF THE APPROACHING WALK IS INVERSE GRADE.
- INITIAL CURB RAMP LANDINGS SHALL BE CONSTRUCTED WITHIN 15' FROM THE BACK OF CURB, WITH 6' FROM THE BACK OF CURB BEING THE PREFERRED DISTANCE, ONLY APPLICABLE WHEN THE INITIAL RAMP RUNNING SLOPE IS OVER 5.0%.
- SECONDARY CURB RAMP LANDINGS ARE REQUIRED FOR EVERY 30" OF VERTICAL RISE WHEN THE LONGITUDINAL SLOPE IS GREATER THAN 5.0%.
- CONTRACTION JOINTS SHALL BE CONSTRUCTED ALONG ALL GRADE BREAKS WITHIN THE PAR. 1/4" DEEP VISUAL JOINTS SHALL BE USED AT THE TOP GRADE BREAK OF CONCRETE FLARES ADJACENT TO WALKABLE SURFACES.
- ALL GRADE BREAKS WITHIN THE PAR SHALL BE PERPENDICULAR TO THE PATH OF TRAVEL. THUS BOTH SIDES OF A SLOPED WALKING SURFACE MUST BE EQUAL LENGTH.
- TO ENSURE INITIAL RAMPS AND INITIAL LANDINGS ARE PROPERLY CONSTRUCTED, LANDINGS SHALL BE CAST SEPARATELY, FOLLOW SIDEWALK REINFORCEMENT DETAILS ON SHEET 6 AND THE ADA SPECIAL PROVISION (PROSECUTION OF WORK).
- TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.
- WHEN THE BOULEVARD IS 4' WIDE OR LESS, THE TOP OF CURB TAPER SHALL MATCH THE RAMP SLOPES TO REDUCE NEGATIVE BOULEVARD SLOPES FROM THE TOP BACK OF CURB TO THE PAR.
- ALL RAMP TYPES SHOULD HAVE A MINIMUM 3' LONG RAMP LENGTH.
- 4' MINIMUM WIDTH OF DETECTABLE WARNING IS REQUIRED FOR ALL RAMPS. DETECTABLE WARNINGS SHALL CONTINUOUSLY EXTEND FOR A MIN. OF 24" IN THE PATH OF TRAVEL. DETECTABLE WARNING TO COVER ENTIRE WIDTH OF SHARED-USE PATH AND THE ENTIRE PAR WIDTH OF THE WALK. DETECTABLE WARNING SHOULD BE 6" LESS THAN THE PAR/PATH WIDTH. ARC LENGTH OF RADIAL DETECTABLE WARNINGS SHOULD NOT BE GREATER THAN 20 FEET.
- RADIAL DETECTABLE WARNINGS SHALL BE SETBACK 3" MINIMUM TO 6" MAXIMUM FROM THE BACK OF CURB. SEE NOTES ⑩ & ⑪ FOR INFORMATION REGARDING RECTANGULAR DETECTABLE WARNING PLACEMENT.
- ① MATCH FULL CURB HEIGHT.
- ② 3" HIGH CURB WHEN USING A 3' LONG RAMP
4" HIGH CURB WHEN USING A 4' LONG RAMP.
- ③ 3" MINIMUM CURB HEIGHT (5.5' MIN. DISTANCE REQUIRED BETWEEN DOMES)
4" PREFERRED (7' MIN. DISTANCE REQUIRED BETWEEN DOMES).
- ④ THE "BUMP" IN BETWEEN THE RAMPS SHOULD NOT BE IN THE PATH OF TRAVEL FOR COMBINED DIRECTIONAL RAMPS. IF THIS OCCURS MODIFY THE RAMP LOCATION OR SWITCH RAMP TO A FAN/DEPRESSED CORNER.
- ⑤ WHEN USING CONCRETE PAVED FLARES ON THE OUTSIDE OF DIRECTIONAL RAMPS, AND ADJACENT TO A WALKABLE SURFACE, DIRECTIONAL RAMP FLARES SHOULD BE USED. SEE THE DETAIL ON THIS SHEET.
- ⑥ GRADING SHALL ALWAYS BE USED WHEN FEASIBLE. V CURB, IF USED, SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS. WHEN ADJACENT TO PARKING LOTS, CONCRETE OR BITUMINOUS TAPERS SHOULD BE USED OVER V CURB TO REDUCE TRIPPING HAZARDS AND FACILITATE SNOW & ICE REMOVAL.
- ⑦ MAX. 2.0% SLOPE IN ALL DIRECTIONS IN FRONT OF GRADE BREAK AND DRAIN TO FLOW LINE. SHALL BE CONSTRUCTED INTEGRAL WITH CURB AND GUTTER.
- ⑧ 8% TO 10% WALKABLE FLARE.
- ⑨ PLACE DOMES AT THE BACK OF CURB WHEN ALLOWABLE SETBACK CRITERIA IS EXCEEDED.
- ⑩ FRONT EDGE OF DETECTABLE WARNING SHALL BE SET BACK 2' MAXIMUM WHEN ADJACENT TO WALKABLE SURFACE, AND 5' MAXIMUM WHEN ADJACENT TO NON-WALKABLE SURFACE WITH ONE CORNER SET 3" FROM BACK OF CURB. A WALKABLE SURFACE IS DEFINED AS A PAVED SURFACE ADJACENT TO A CURB RAMP WITHOUT RAISED OBSTACLES THAT COULD MISTAKENLY BE TRAVERSED BY A USER WHO IS VISUALLY IMPAIRED.
- ⑪ RECTANGULAR DETECTABLE WARNINGS MAY BE SETBACK UP TO 9" FROM THE BACK OF CURB WITH CORNERS SET 3" FROM BACK OF CURB. IF 9" SETBACK IS EXCEEDED USE RADIAL DETECTABLE WARNINGS.
- ⑫ FOR DIRECTIONAL RAMPS WITH THE DETECTABLE WARNINGS PLACED AT THE BACK OF CURB, THE DETECTABLE WARNINGS SHALL COVER THE ENTIRE WIDTH OF THE WALK/PATH. THIS ENSURES A DETECTABLE EDGE AND HELPS ELIMINATE THE CURB TAPER OBSTRUCTING THE PATH OF PEDESTRIAN TRAVEL.
- ⑬ THE CONCRETE WALK SHALL BE FORMED AND CONSTRUCTED PERPENDICULAR TO THE BACK OF CURB. MAINTAIN 3" BETWEEN EDGE OF DOMES AND EDGE OF CONCRETE.
- ⑭ TO BE USED FOR ALL DIRECTIONAL RAMPS, EXCEPT WHERE DOMES ARE PLACED ALONG THE BACK OF CURB.

LEGEND	
THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT. IF SITE CONDITIONS WARRANT, LONGITUDINAL SLOPES UP TO 8.3% OR FLATTER ARE ALLOWED.	
⑤	INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND THE CROSS SLOPE SHALL NOT EXCEED 2.0%.
⑥	INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%.
⑦	LANDING AREA - 4' X 4' MIN. (5' X 5' MIN. PREFERRED) DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS. LANDING SHALL BE FULL WIDTH OF INCOMING PAR.
X"	CURB HEIGHT

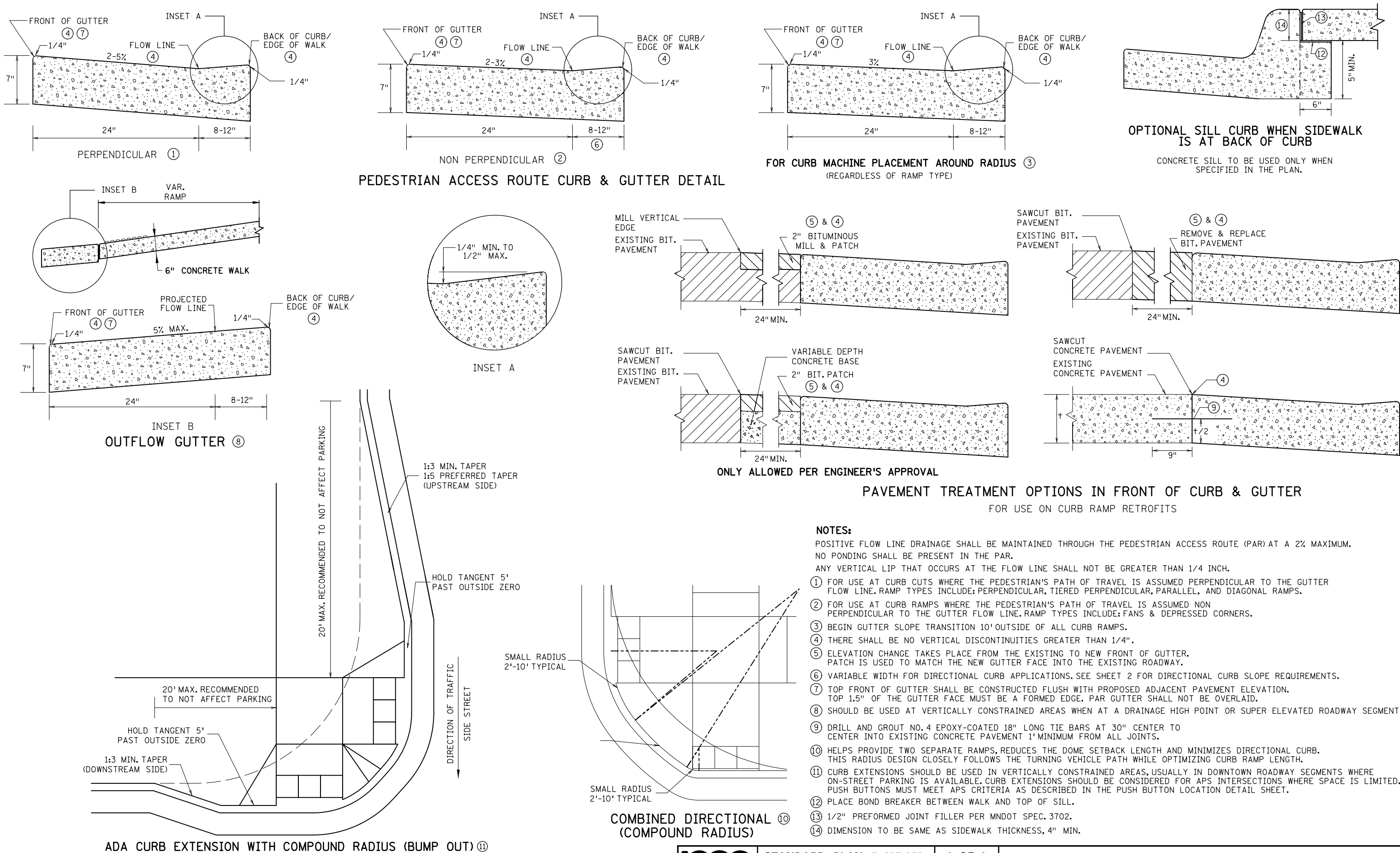
REVISION:
APPROVED: JANUARY 23, 2017
OPERATIONS ENGINEER

CURB FOR DIRECTIONAL RAMPS ⑭

	STANDARD PLAN 5-297.250	2 OF 6	PEDESTRIAN CURB RAMP DETAILS		
	APPROVED: 1-23-2017 REVISOR:		STATE PROJ. NO.	(T.H.)	SHEET NO. OF SHEETS

PLOTTED/REVISED: 4-APR-2018

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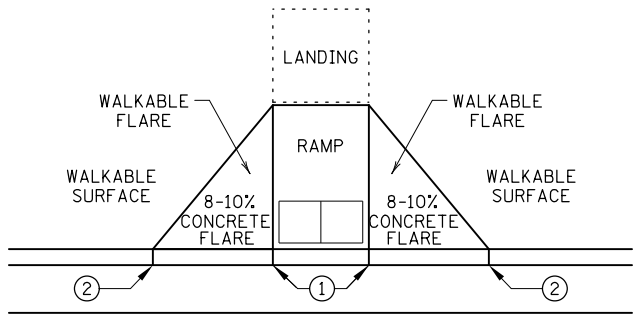


REVISION:
APPROVED: JANUARY 23, 2017
OPERATIONS ENGINEER

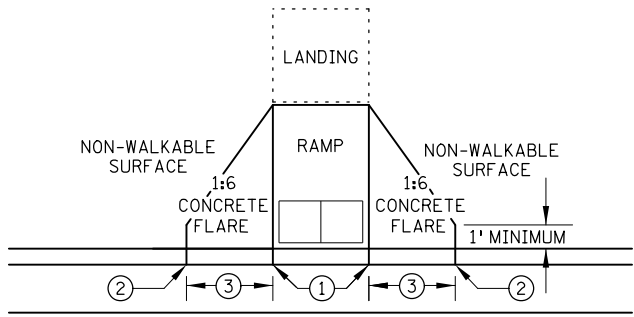
	STANDARD PLAN 5-297.250	3 OF 6	PEDESTRIAN CURB RAMP DETAILS		
	APPROVED: 1-23-2017 REVISOR:		STATE PROJ. NO.	(T.H.)	SHEET NO. OF SHEETS

PLOTTED/REVISED: 4-APR-2018

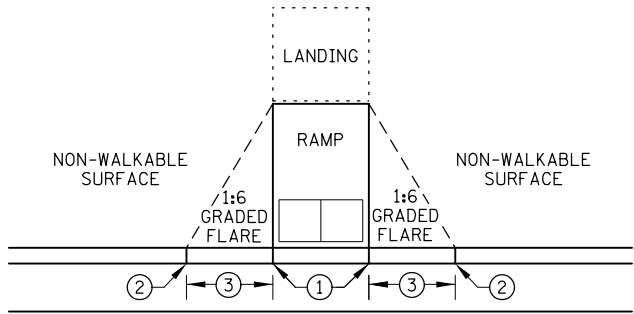
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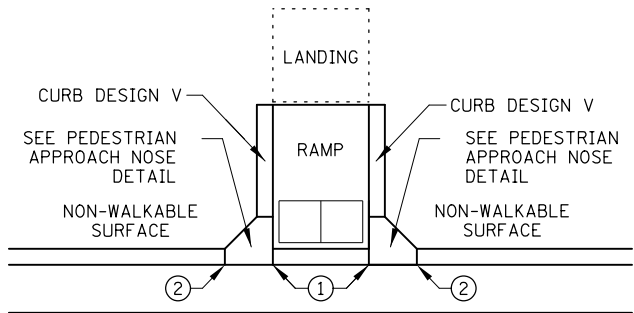
PAVED FLARES
ADJACENT TO WALKABLE SURFACE



PAVED FLARES
ADJACENT TO NON-WALKABLE SURFACE

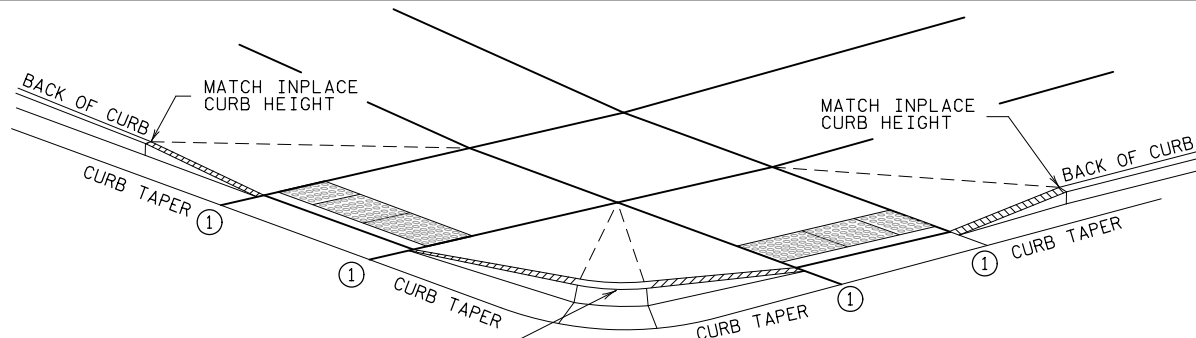


GRADED FLARES



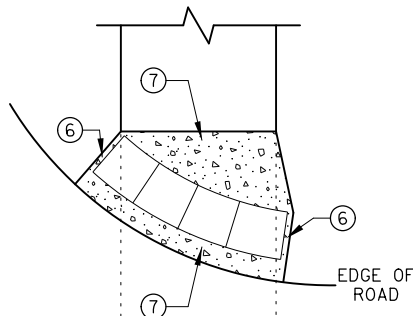
RETURNED CURB ⑤

TYPICAL SIDE TREATMENT OPTIONS ④ ⑪

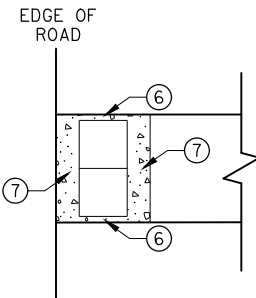


3" MINIMUM CURB HEIGHT, 4" PREFERRED
(MEASURED AT FRONT FACE OF CURB)
FOR A MIN. 6" LENGTH (MEASURED ALONG FLOW LINE)

DETECTABLE EDGE WITH ⑧
CURB AND GUTTER

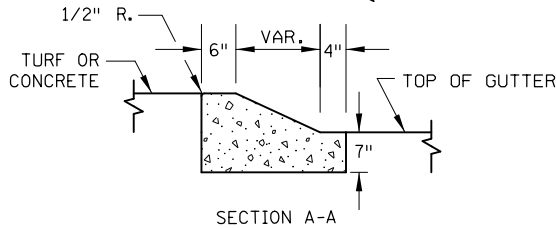
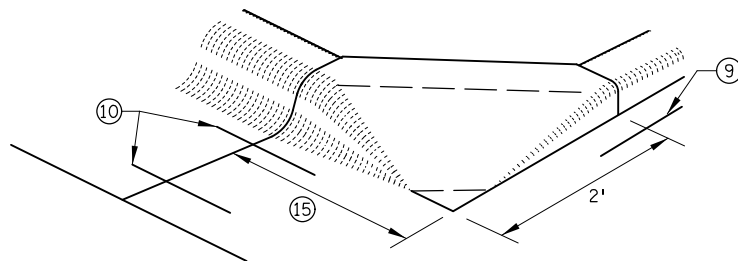


RADIAL DETECTABLE WARNING

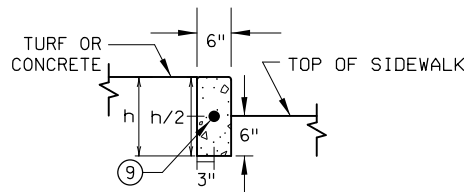


RECTANGULAR DETECTABLE WARNING

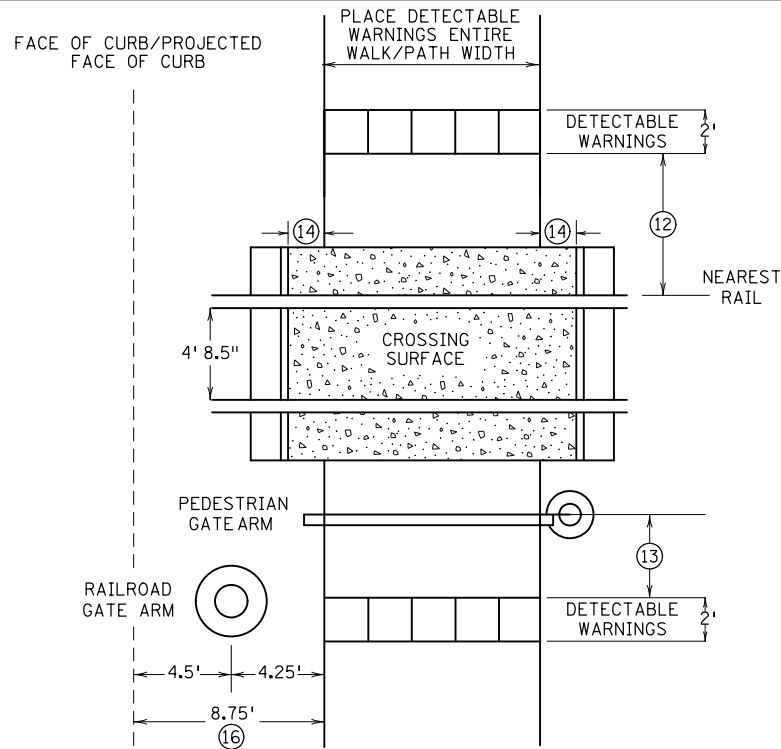
DETECTABLE EDGE WITHOUT CURB AND GUTTER



SECTION A-A



SECTION B-B



RAILROAD CROSSING
PLAN VIEW

NOTES:

- SEE STANDARD PLATE 7038 AND THIS SHEET FOR ADDITIONAL DETAILS ON DETECTABLE WARNING.
- A WALKABLE SURFACE IS DEFINED AS A PAVED SURFACE ADJACENT TO A CURB RAMP WITHOUT RAISED OBSTACLES THAT COULD MISTAKENLY BE TRAVERSED BY A USER WHO IS VISUALLY IMPAIRED.
- CONCRETE FLARE LENGTHS ADJACENT TO NON-WALKABLE SURFACES SHOULD BE LESS THAN 8' LONG MEASURED ALONG THE RAMP FROM THE BACK OF CURB.
- ① 0" CURB HEIGHT.
- ② FULL CURB HEIGHT.
- ③ 2' FOR 4" HIGH CURB AND 3' FOR 6" HIGH CURB.
- ④ SIDE TREATMENTS ARE APPLICABLE TO ALL RAMP TYPES AND SHOULD BE IMPLEMENTED AS NEEDED AS FIELD CONDITIONS DICTATE. THE ENGINEER SHALL DETERMINE THE RAMP SIDE TREATMENTS BASED ON MAINTENANCE OF BOTH ROADWAY AND SIDEWALK, ADJACENT PROPERTY CONSIDERATIONS, AND MITIGATING CONSTRUCTION IMPACTS.
- ⑤ TYPICALLY USED FOR MEDIANS AND ISLANDS.
- ⑥ WHEN NO CONCRETE FLARES ARE PROPOSED, THE CONCRETE WALK SHALL BE FORMED AND CONSTRUCTED PERPENDICULAR TO THE EDGE OF ROADWAY. MAINTAIN 3" MAX. BETWEEN EDGE OF DOMES AND EDGE OF CONCRETE.
- ⑦ IF NO CURB AND GUTTER IS PLACED IN RURAL SECTIONS, DETECTABLE WARNINGS SHALL BE PLACED 1' FROM THE EDGE OF BITUMINOUS ROADWAY AND/OR BITUMINOUS SHARED-USE PATH TO PROVIDE VISUAL CONTRAST.
- ⑧ ALL CONSTRUCTED CURBS MUST HAVE A CONTINUOUS DETECTABLE EDGE FOR THE VISUALLY IMPAIRED. THIS DETECTABLE EDGE REQUIRES DETECTABLE WARNINGS WHEREVER THERE IS ZERO-INCH HIGH CURB. CURB TAPERS ARE CONSIDERED A DETECTABLE EDGE WHEN THE TAPER STARTS WITHIN 3" OF THE EDGE OF THE DETECTABLE WARNINGS AND UNIFORMLY RISES TO A 3-INCH MINIMUM CURB HEIGHT. ANY CURB NOT PART OF A CURB TAPER AND LESS THAN 3 INCHES IN HEIGHT IS NOT CONSIDERED A DETECTABLE EDGE AND THEREFORE IS NOT COMPLIANT WITH ACCESSIBILITY STANDARDS.
- ⑨ DRILL AND GROUT 1 - NO. 4 12" LONG REINFORCEMENT BAR (EPOXY COATED) WITH 3" MIN. COVER. REINFORCEMENT BARS ARE NOT NEEDED IF THE APPROACH NOSE IS POURED INTEGRAL WITH THE V CURB.
- ⑩ DRILL AND GROUT 2 - NO. 4 12" LONG REINFORCEMENT BARS (EPOXY COATED) WITH 3" MIN. COVER. REINFORCEMENT BARS ARE NOT NEEDED IF THE APPROACH NOSE IS POURED INTEGRAL WITH THE CURB AND GUTTER.
- ⑪ SIDE TREATMENT EXAMPLES SHOWN ARE WHEN THE INITIAL LANDING IS APPROXIMATELY LEVEL WITH THE FULL HEIGHT CURB (I.E. 6" LONG RAMP FOR 6" HIGH CURB). WHEN THE INITIAL LANDING IS MORE THAN 1" BELOW FULL HEIGHT CURB REFER TO SHEETS 1 & 2 TO MODIFY THE CURB HEIGHT TAPERS AND MAINTAIN POSITIVE BOULEVARD DRAINAGE.
- ⑫ NEAREST EDGE OF DETECTABLE WARNING SURFACES SHALL BE PLACED 12' MINIMUM TO 15' MAXIMUM FROM THE NEAREST RAIL. FOR SKEWED RAILWAYS IN NO INSTANCE SHALL THE DETECTABLE WARNING BE CLOSER THAN 12' MEASURED PERPENDICULAR TO THE NEAREST RAIL.
- ⑬ WHEN PEDESTRIAN GATES ARE PROVIDED, DETECTABLE WARNING SURFACES SHALL BE PLACED ON THE SIDE OF THE GATES OPPOSITE THE RAIL, 2' FROM THE APPROACHING SIDE OF THE GATE ARM. THIS CRITERIA GOVERNS OVER NOTE ⑫.
- ⑭ CROSSING SURFACE SHALL EXTEND 2' MINIMUM PAST THE OUTSIDE EDGE OF WALK OR SHARED-USE PATH.
- ⑮ 3' FOR MEDIANS AND SPLITTER ISLANDS. NOSE CAN BE REDUCED TO 2' ON FREE RIGHT ISLANDS.
- ⑯ SIDEWALK TO BE PLACED 8.75' MIN. FROM THE FACE OF CURB/PROJECTED FACE OF CURB. THIS ENSURES MIN. CLEARANCE BETWEEN THE SIDEWALK AND GATE ARM COUNTERWEIGHT SUPPORTS.

REVISION:
APPROVED: JANUARY 23, 2017

OPERATIONS ENGINEER

PEDESTRIAN APPROACH
NOSE DETAIL
(FOR RETURNED CURB
SIDE TREATMENT)

MINNESOTA
DEPARTMENT
OF
TRANSPORTATION

STANDARD PLAN 5-297.250

4 OF 6

APPROVED: 1-23-2017
REVISED:

STATE PROJ. NO.

PEDESTRIAN CURB RAMP DETAILS

(T.H.) SHEET NO. OF SHEETS



4" MIN. LANDING

6" WIDE V-CURB

1:2

4" PEDESTAL POLE
(LINE UP CENTER OF POLE WITH THE BACK OF V-CURB)

30" X 30" SQUARE PEDESTAL FOUNDATION
(MUST BE FLUSH WITH THE SURROUNDING WALK)

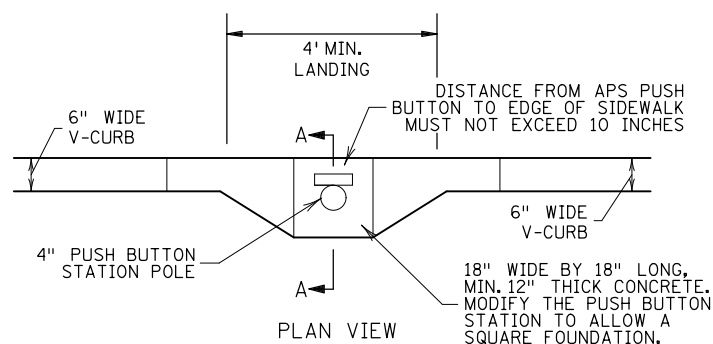
BUTTON

DISTANCE FROM APS PUSH BUTTON TO EDGE OF SIDEWALK MUST NOT EXCEED 10 INCHES

6" WIDE V-CURB

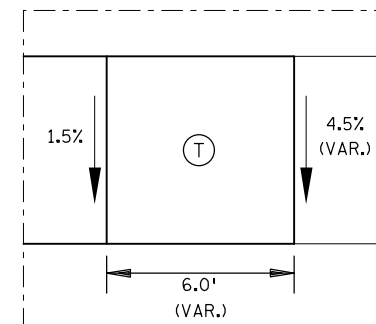
1:2

PLAN VIEW



3' DOME SETBACK, 4' LONG RAMP AND
PUSH BUTTON 9' FROM THE BACK OF CURB

PRIMARILY USED FOR APS APPLICATIONS
 WHERE THE PAR DOES NOT CONTINUE PAST
 THE PUSH BUTTON (DEAD-END SIDEWALK)



TRANSITION PANEL ④ ⑤

A WALKABLE FLARE IS AN 8-10% CONCRETE FLARE THAT IS REQUIRED WHEN THE FLARE IS ADJACENT TO A WALKABLE SURFACE, OR WHEN THE PEDESTRIAN PATH OF TRAVEL OF A PUSH BUTTON TRAVERSES THE FLARE.

ALL V CURB CONTRACTION JOINTS SHALL MATCH CONCRETE WALK JOINTS.

WHERE RIGHT-OF-WAY ALLOWS, USE OF V CURB SHOULD BE MINIMIZED. GRADING ADJACENT TURF OR SLOPING ADJACENT PAVEMENT IS PREFERRED.

V CURB SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS.

V CURB NEXT TO BUILDING SHALL BE A 4" WIDTH AND SHALL MATCH PREVIOUS TOP OF SIDEWALK ELEVATIONS.

- ① END TAPERS AT TRANSITION SECTION SHALL MATCH INPLACE SIDEWALK GRADES.
- ② ALL V CURB SHALL MATCH BOTTOM OF ADJACENT WALK.
- ③ EDGE BETWEEN NEW V CURB AND INPLACE STRUCTURE SHALL BE SEALED AND BOND BREAKER SHALL BE USED BETWEEN EXISTING STRUCTURE AND PLACED V-CURB.
- ④ THE MAX. RATE OF CROSS SLOPE TRANSITIONING IS 1' LINEAR FOOT OF SIDEWALK PER HALF PERCENT CROSS SLOPE. WHEN PAR WIDTH IS GREATER THAN 6' OR THE RUNNING SLOPE IS GREATER THAN 5%, DOUBLE THE CALCULATED TRANSITION LENGTH.
- ⑤ TRANSITION PANELS ARE TO ONLY BE USED AFTER THE RAMP, OR IF NEEDED, LANDING ARE AT THE FULL CURB HEIGHT (TYPICAL SECTION).
- ⑥ EXISTING CROSS SLOPE GREATER THAN 2.0%.

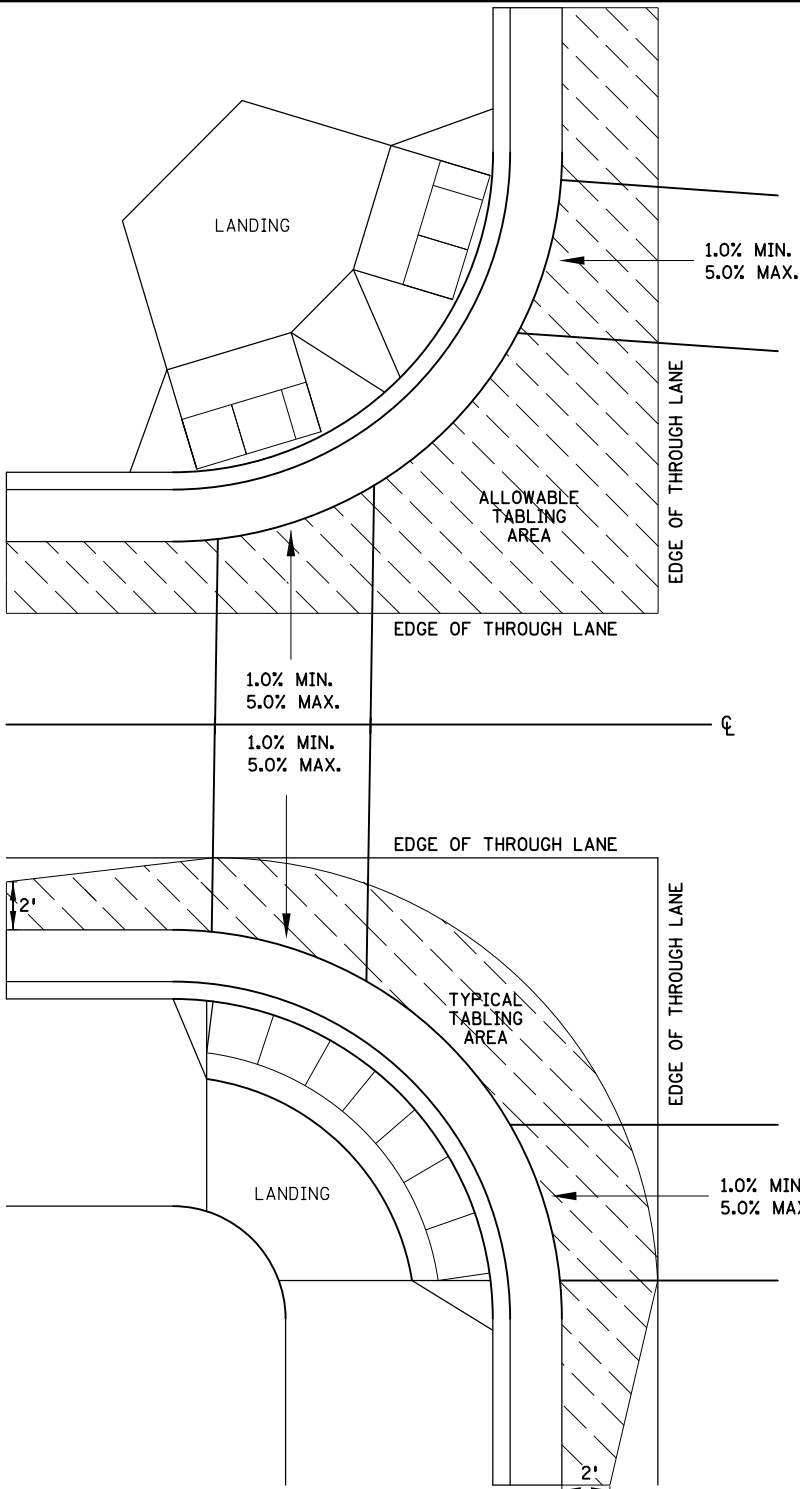
LEGEND

THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT. IF SITE CONDITIONS WARRANT, LONGITUDINAL SLOPES UP TO 8.3% OR FLATTER ARE ALLOWED.

- 
 INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND THE CROSS SLOPE SHALL NOT EXCEED 2.0%.
- 
 LANDING AREA - 4' X 4' MIN. (5' X 5' MIN. PREFERRED) DIMENSIONS AND MAX. 2.0% SLOPE IN ALL DIRECTIONS. LANDING SHALL BE FULL WIDTH OF INCOMING PARS.
- 
 TRANSITION PANEL(S) - TO BE USED FOR TRANSITIONING THE CROSS-SLOPE OF A RAMP TO THE EXISTING WALK CROSS-SLOPE. RATE OF TRANSITION SHOULD BE 0.5% PER 1 LINEAR FOOT OF WALK. SEE THIS SHEET FOR ADDITIONAL INFORMATION.

PLOTTED/REVISED: 4-APR-2018

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CURB LINE AND ROAD CROSSING ADJUSTMENTS

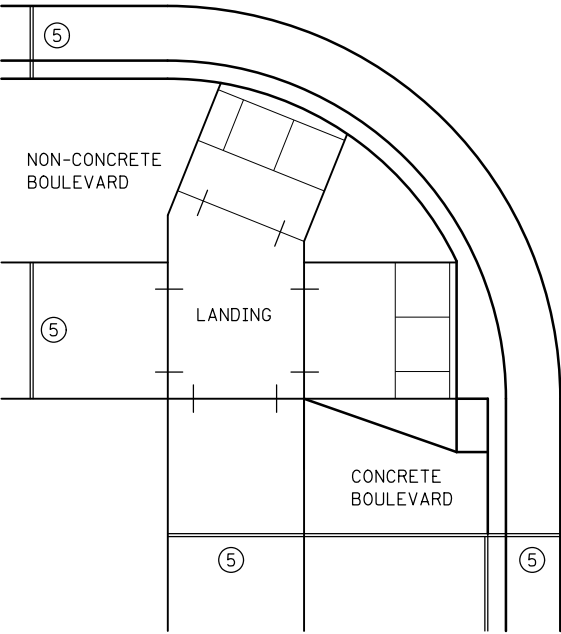
"TABLING" OF CROSSWALKS MEANS MAINTAINING LESS THAN 2% CROSS SLOPE WITHIN A CROSSWALK, IS REQUIRED WHEN A ROADWAY IS IN A STOP OR YIELD CONDITION AND THE PROJECT SCOPE ALLOWS.

RECONSTRUCTION PROJECTS: ON FULL PAVEMENT REPLACEMENT PROJECTS "TABLING" OF ENTIRE CROSSWALK SHALL OCCUR WHEN FEASIBLE.

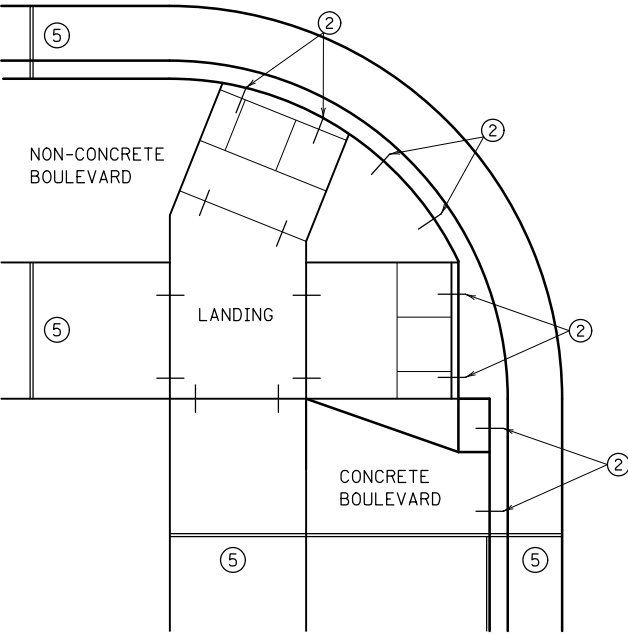
MILL & OVERLAY PROJECTS: "TABLING" OF FLOW LINES, IN FRONT OF THE PEDESTRIAN RAMP, IS REQUIRED WHEN THE EXISTING FLOW LINE IS GREATER THAN 2%. WARPING OF THE BITUMINOUS PAVEMENT CAN NOT EXTEND INTO THE THROUGH LANE. TABLE THE FLOW LINE TO 2% OR AS MUCH AS POSSIBLE WHILE ADHERING TO THE FOLLOWING CRITERIA:
1) 1.0% MIN. CROSS-SLOPE OF THE ROAD
2) 5.0% MAX. CROSS-SLOPE OF THE ROAD
3) "TABLE" FLOW LINE UP TO 4% CHANGE FROM EXISTING SLOPE IN FRONT OF PEDESTRIAN RAMP
4) UP TO 2% CHANGE IN FLOW LINE FROM EXISTING SLOPE BEYOND THE PEDESTRIAN CURB RAMP

STAND-ALONE ADA RETROFITS: FOLLOW MILL & OVERLAY CRITERIA ABOVE HOWEVER ALL PAVEMENT WARPING IS DONE WITH BITUMINOUS PATCHING ON BITUMINOUS ROADWAYS AND FULL-DEPTH APRON REPLACEMENT ON CONCRETE ROADWAYS.

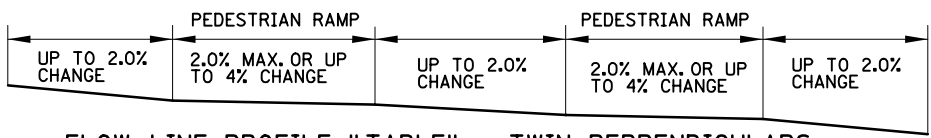
RAISING OF CURB LINES SHOULD OCCUR IN VERTICALLY CONSTRAINED AREAS. RAISE THE CURB LINES ENOUGH TO ALLOW COMPLIANT RAMPS OR AS MUCH AS POSSIBLE WHILE ADHERING TO THE FOLLOWING CRITERIA:
1) 1.0% MIN. AND 5.0% MAXIMUM CROSS-SLOPE OF THE ROAD
2) 1.0% MIN. FLOW LINE (ON EITHER SIDE OF PEDESTRIAN RAMP) TO MAINTAIN POSITIVE DRAINAGE
3) 5.0% RECOMMENDED MAX. FLOW LINE
4) LONGITUDINAL THROUGH LANE ROADWAY TAPERS SHOULD BE 1" VERTICAL PER 15' HORIZONTAL



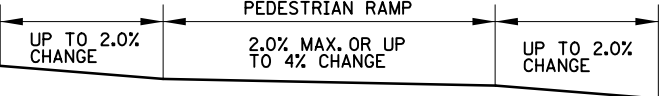
EXPANSION MATERIAL PLACEMENT FOR CONCRETE AND BITUMINOUS ROADWAYS



OPTIONAL CURB LINE REINFORCEMENT PLACEMENT ON BITUMINOUS ROADWAYS



FLOW LINE PROFILE "TABLE" - TWIN PERPENDICULARS



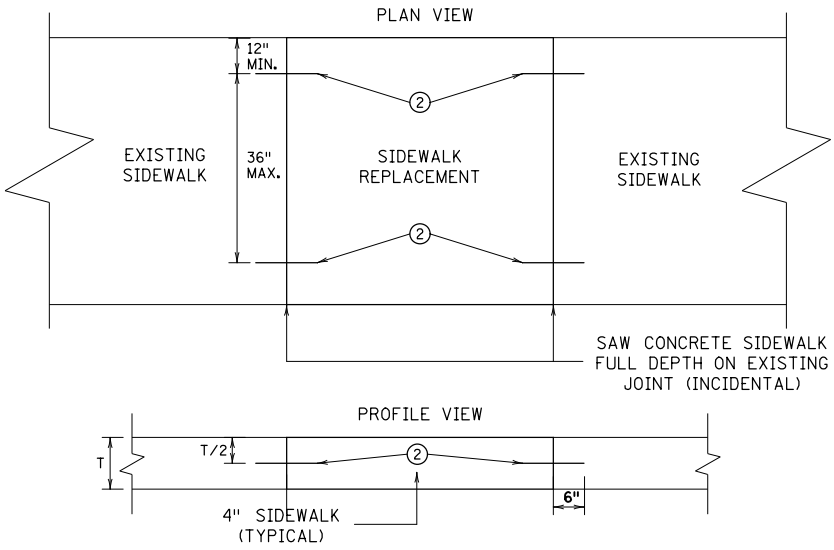
FLOW LINE PROFILE "TABLE" - FAN



FLOW LINE PROFILE RAISE - TWIN PERPENDICULARS

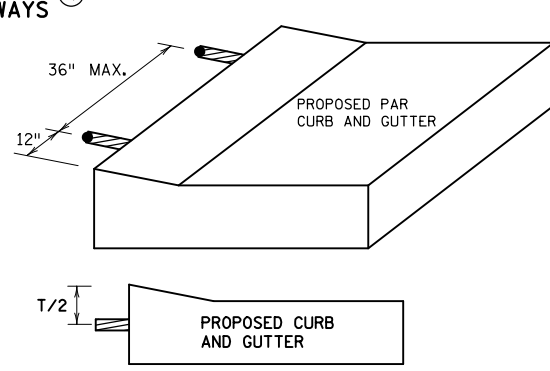


FLOW LINE PROFILE RAISE - FAN

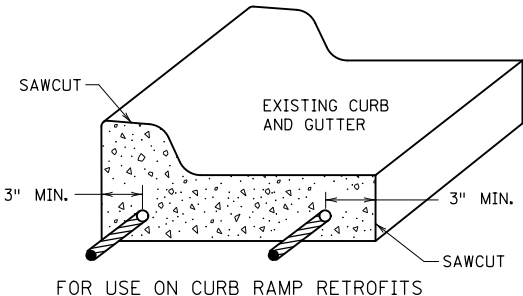


OPTIONAL SIDEWALK REINFORCEMENT

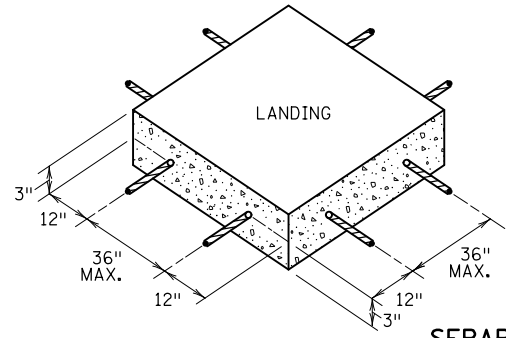
SIDEWALK REINFORCEMENT TO BE USED ONLY WHEN SPECIFIED IN THE PLAN.



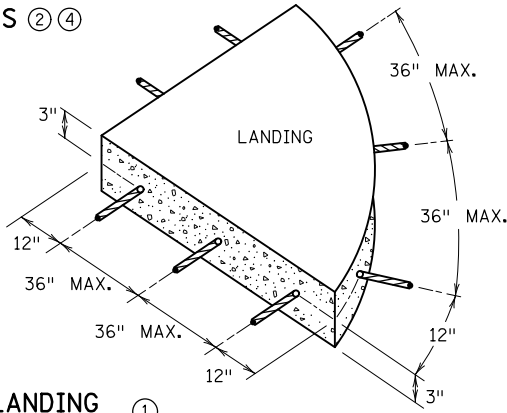
OPTIONAL CURB LINE REINFORCEMENT DETAILS



CURB AND GUTTER REINFORCEMENT



SEPARATE LANDING POUR REINFORCEMENT



NOTES:

- 1) TO ENSURE RAMPS AND LANDINGS ARE PROPERLY CONSTRUCTED, ALL INITIAL LANDINGS AT A TOP OF A RAMPED SURFACE (RUNNING SLOPE GREATER THAN 2%) SHALL BE FORMED AND PLACED SEPARATELY IN AN INDEPENDENT CONCRETE POUR. FOLLOW SIDEWALK REINFORCEMENT DETAILS ON THIS SHEET FOR ALL SEPARATELY POURED INITIAL LANDINGS.
- 2) DRILL AND GROUT NO. 4 12" LONG REINFORCEMENT BARS AT 36" MAXIMUM CENTER TO CENTER (EPOXY COATED). BARS TO BE ADJUSTED TO MATCH RAMP GRADE.
- 3) DRILL AND GROUT 2 - NO. 4 X 12" LONG REINFORCEMENT BARS (EPOXY COATED). REINFORCEMENT REQUIRED FOR ALL CONSTRUCTION JOINTS WITHIN RADIUS.
- 4) THIS OPTIONAL CURB LINE REINFORCEMENT DETAIL SHOULD ONLY BE USED ON BITUMINOUS ROADWAYS WHEN SPECIFIED IN THE PLAN.
- 5) 1/2 IN. PREFORMED JOINT FILLER MATERIAL PER MNDOT SPEC. 3702.

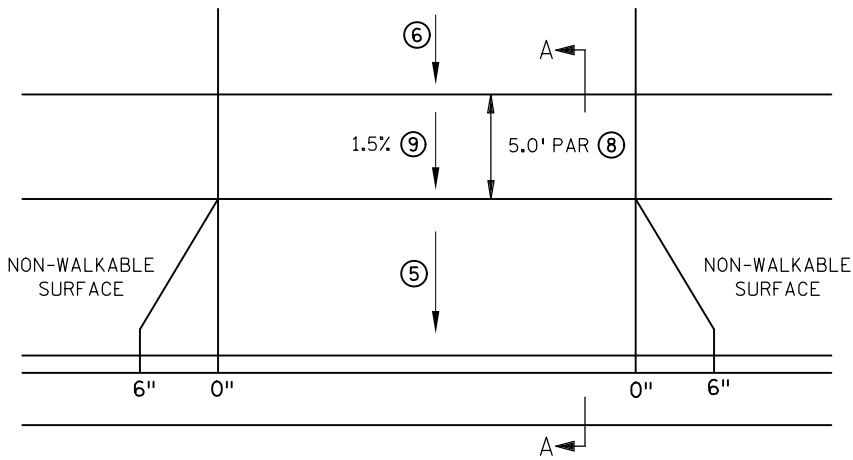


STANDARD PLAN 5-297.250 6 OF 6
APPROVED: 1-23-2017
REVISED:
STATE PROJ. NO. (T.H.) SHEET NO. OF SHEETS

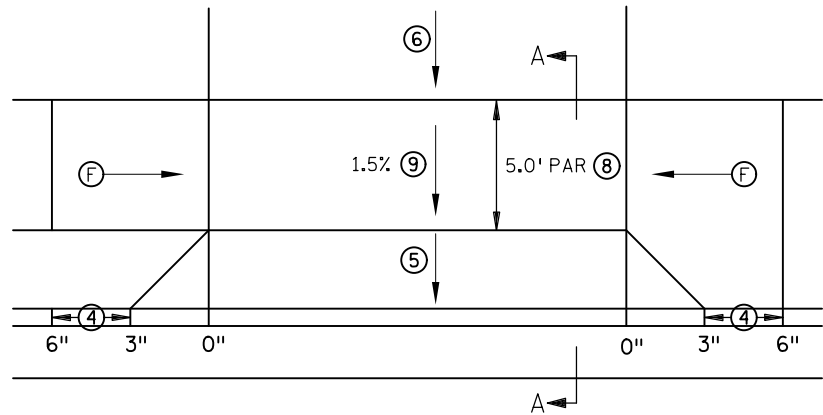
PEDESTRIAN CURB RAMP DETAILS

PLOTTED/REVISED: 4-APR-2018

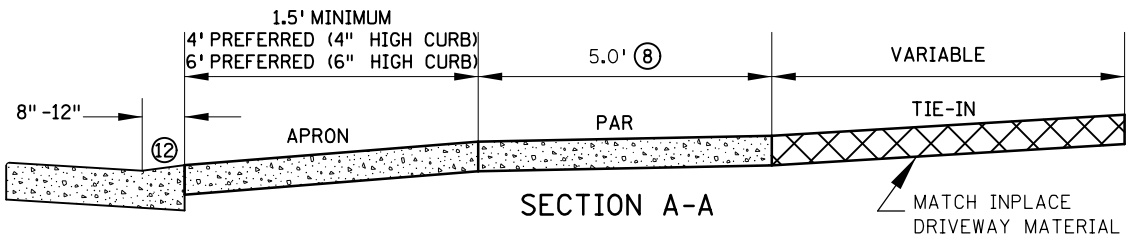
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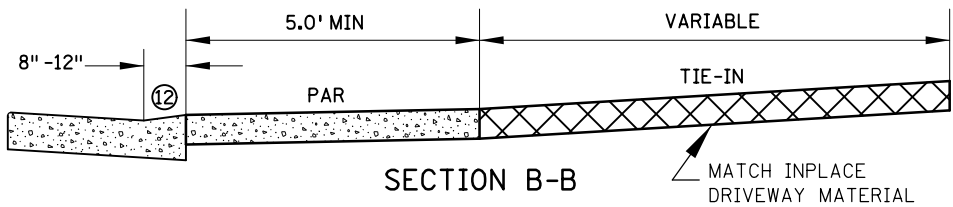
PERPENDICULAR DRIVEWAY ①



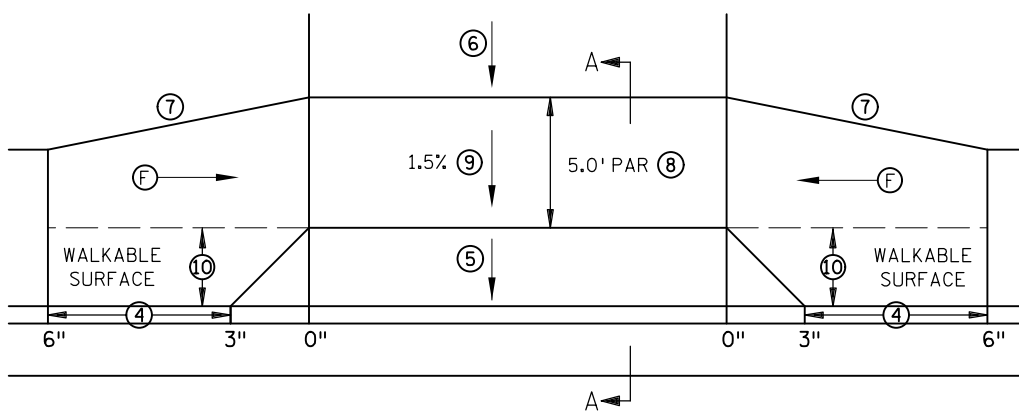
TIERED PERPENDICULAR DRIVEWAY ②



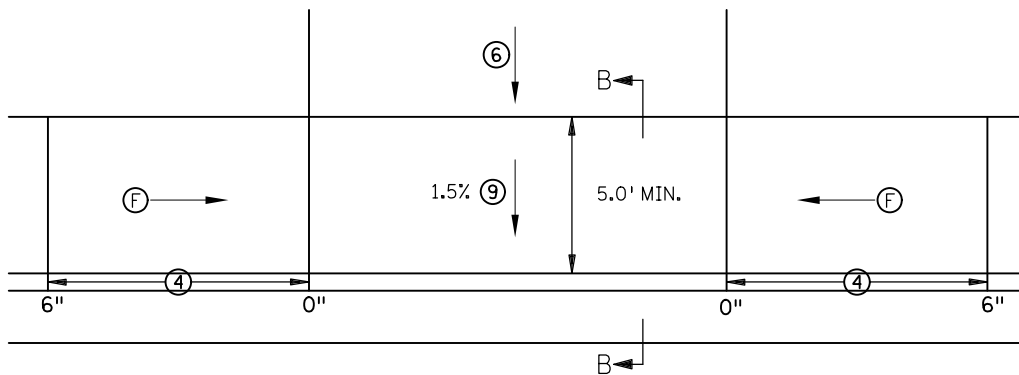
SECTION A-A



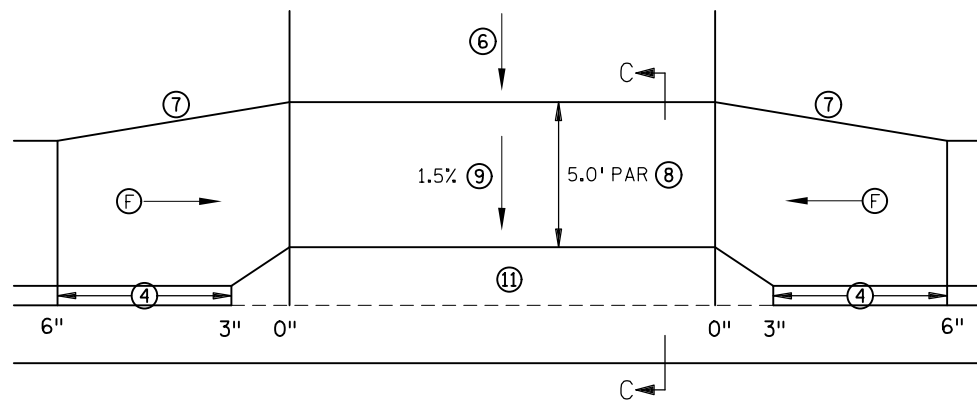
SECTION B-B



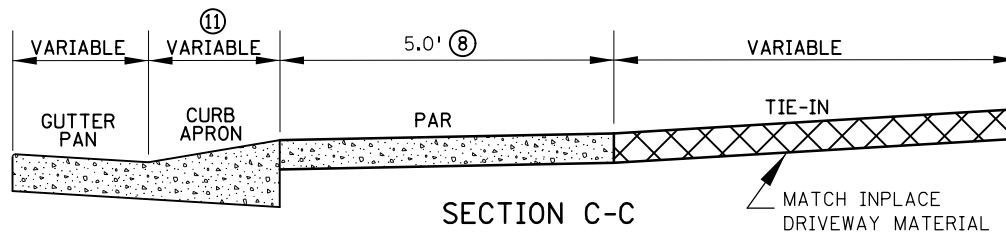
TIERED PERPENDICULAR OFFSET DRIVEWAY



PARALLEL DRIVEWAY ③



VALLEY GUTTER DRIVEWAY



SECTION C-C

NOTES:

- IN NO CASE SHALL SIDEWALK PROFILES EXCEED 5.0%, EXCEPT SIDEWALK PROFILES CAN MATCH ROADWAY GRADE IF ROADWAY GRADE IS GREATER THAN 5.0%. RAMPS FOR DRIVEWAYS ARE REQUIRED TO FOLLOW THE ABOVE SIDEWALK CRITERIA.
- CONTRACTION JOINTS SHALL BE CONSTRUCTED ALONG ALL GRADE BREAKS WITHIN THE PEDESTRIAN ACCESS ROUTE (PAR). 1/4" DEEP VISUAL JOINTS SHALL BE USED AT THE TOPS OF CONCRETE FLARES ADJACENT TO WALKABLE SURFACES.
- DRIVEWAY TYPES FROM MOST PREFERRED TO LEAST PREFERRED ARE AS FOLLOWS: PERPENDICULAR, TIERED PERPENDICULAR, TIERED PERPENDICULAR OFFSET & PARALLEL.
- ① TO BE USED WHEN THE DRIVEWAY PAR IS LEVEL WITH OR ABOVE THE TOP OF CURB, RESULTING IN A CONTINUOUS PAR PROFILE.
 - ② TO BE USED WHEN THE DRIVEWAY PAR IS BELOW THE ROADWAY CURB HEIGHT. THIS DRIVEWAY TYPE CAN BE USED FOR BOTH PAVED (AS SHOWN) AND GRASS BOULEVARDS.
 - ③ SHOULD BE USED FOR NEGATIVE SLOPED DRIVEWAYS. DW CURB TYPE 2 CURB SHOULD BE USED TO RAISE PAR ABOVE GUTTER AND REDUCE "ROLLER COASTER" EFFECT. 4" HIGH ROADWAY CURB SHOULD BE USED TO REDUCE "ROLLER COASTER" EFFECT ESPECIALLY WHEN MULTIPLE DRIVEWAYS ARE PRESENT.
 - ④ TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.
 - ⑤ 8% MAX. PREFERRED, 10% MAX. FOR COMMERCIAL AND 12% MAX. FOR RESIDENTIAL. SEE GENERAL NOTES ON SHEET 2 FOR MORE INFORMATION.
 - ⑥ 8% MAX. PREFERRED, SEE SHEET 2 FOR MORE INFORMATION.
 - ⑦ 1:3 MIN. 1:5 PREFERRED FOR DRIVEWAY RETROFIT PROJECTS. 1:10 PREFERRED FOR SIDEWALK REPLACEMENT PROJECTS.
 - ⑧ 5.0' MIN. PAR WIDTH IS THE STANDARD THROUGH DRIVEWAYS. IF FEASIBLE WIDEN DRIVEWAY PAR WIDTH TO MATCH APPROACHING SIDEWALK PAR WIDTHS. IN VERTICALLY CONSTRAINED AREAS PAR WIDTHS CAN INCREMENTALLY BE REDUCED TO 4.5' OR 4' MIN AFTER ALL OTHER OPTIONS HAVE BEEN APPLIED.
 - ⑨ THE PEDESTRIAN ACCESS ROUTE, MAY NOT EXCEED 0.02 FT./FT. AS CONSTRUCTED.
 - ⑩ SIDEWALK OFFSET TO BE LESS THAN OR EQUAL TO HALF THE APPROACHING SIDEWALK WIDTH.
 - ⑪ VALLEY GUTTER APRON TO BE POURED INTEGRAL WITH THE CURB AND GUTTER. SEE SHEET 2 FOR MORE INFORMATION.
 - ⑫ SEE SHEET 2 FOR CURB TYPE INFORMATION.

LEGEND

- (F) INDICATES DRIVEWAY RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
- X" CURB HEIGHT (INCHES)

REVISION:
APPROVED: JANUARY 23, 2017



STANDARD PLAN 5-297.254

1 OF 4

APPROVED: 1-23-2017
REVISED:
STATE DESIGN ENGINEER

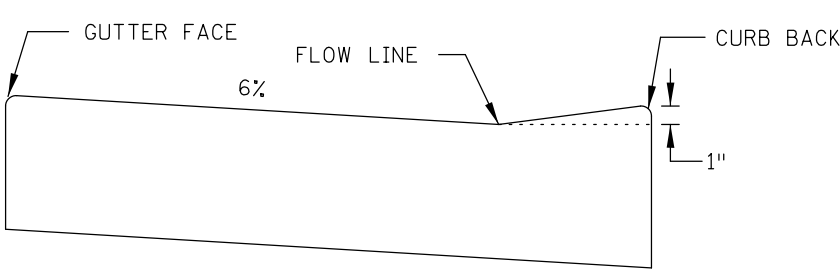
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DRIVEWAY AND SIDEWALK DETAILS

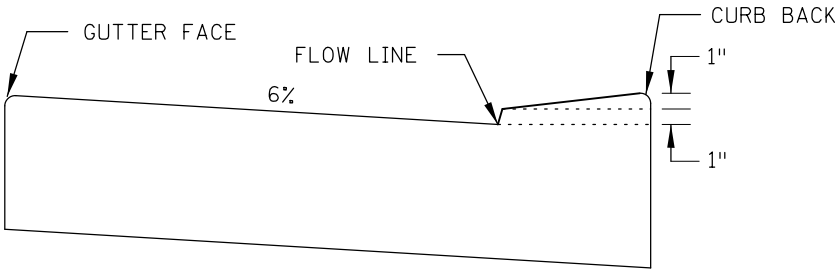
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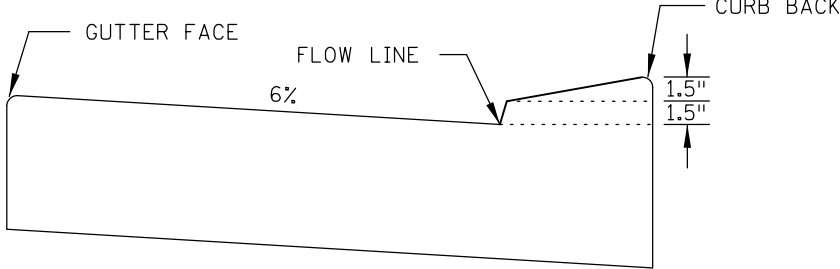
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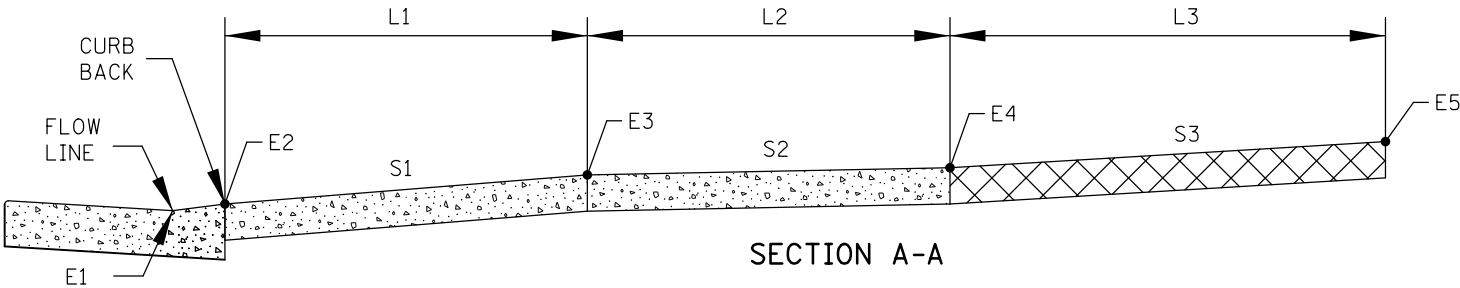
DW CURB STANDARD
STANDARD CURB AT DRIVEWAY



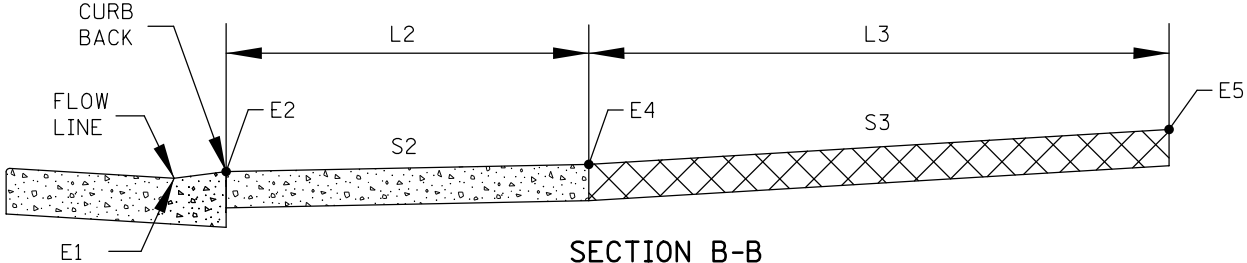
DW CURB TYPE 2
VERTICALLY CONSTRAINED



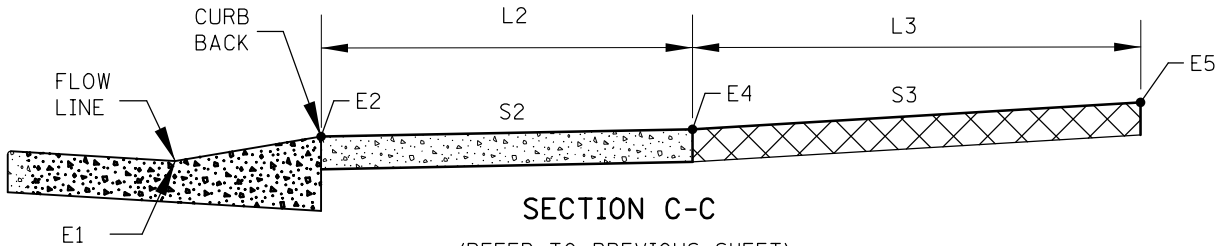
DW CURB TYPE 3
VERTICALLY CONSTRAINED



SECTION A-A
(REFER TO PREVIOUS SHEET)

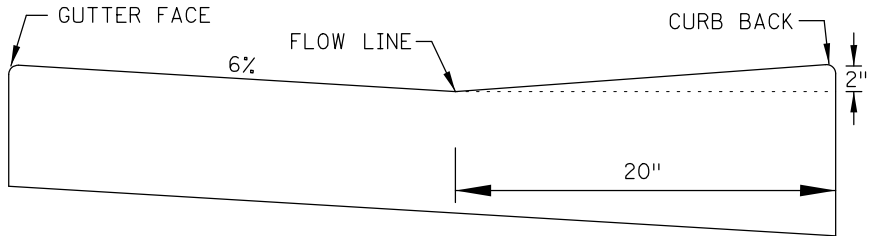


SECTION B-B
(REFER TO PREVIOUS SHEET)

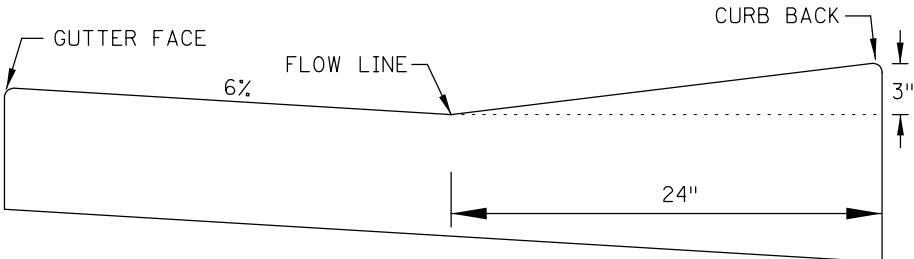


SECTION C-C
(REFER TO PREVIOUS SHEET)

DRIVEWAY TABULATION ①																
STATION	SIDE	DRIVEWAY TYPE	CURB TYPE ③	E1	E2	L1	S1	E3	L2	S2 ②	E4	L3	S3	EXISTING	E5	COMMENTS
						FT	%		FT	%		FT	%	%		



VG 220



VG 324

VALLEY GUTTER CURB

OTHER CURB HEIGHTS & CURB APRON LENGTHS CAN BE USED

- NOTES:
- DW CURB STANDARD SHALL BE USED WHEN THE DRIVEWAY ACTS AS A PEDESTRIAN RAMP. THE MAX. APRON SLOPE MUST ADHERE TO ADA CRITERIA AS WELL. DW CURB STANDARD SHOULD BE USED IF THERE IS ON STREET PARKING.
- WHERE ROADWAY DRAINAGE IS A CONCERN (NEGATIVE SLOPED APRON) DW CURB TYPE 2 CAN BE USED TO HELP KEEP THE WATER ON PUBLIC RIGHT OF WAY.
- S1 8% MAX PREFERRED, 10% MAX. COMMERCIAL AND 12% MAX. RESIDENTIAL. IF EXISTING GRADES ARE STEEPER DO NOT MAKE GRADES APPRECIABLY WORSE BY USING BEST PRACTICES SUCH AS DRIVEWAY CURB HEIGHTS, EXTENDING L3 AND/ OR STEEPEN S3.
- DW CURB TYPE 3 SHALL ONLY BE USED IN EXTREME TIE-IN CASES.
- S3 8% MAX PREFERRED, IF THIS SLOPE IS EXCEEDED OR IS CONTINUED FOR MORE THAN 5' ANALYZE THE NEED FOR VERTICAL CURVE(S). SEE ROAD DESIGN MANUAL, CHAPTER 5, FOR GEOMETRIC DESIGNS OF DRIVEWAYS.
- ① EXAMPLE SHOWN TO BE INCLUDED IN PLAN FOR EACH DRIVEWAY.
- ② SHOULD BE DESIGNED AT 1.5%.
- ③ DW CURB STANDARD SHALL BE THE STARTING POINT FOR ALL PERPENDICULAR AND TIERED DRIVEWAYS. DW CURB TYPES 2 AND 3 SHALL ONLY BE USED AFTER UTILIZING BEST PRACTICES SUCH AS MAXIMIZING S1, S3, AND L3.

REVISION:

APPROVED: JANUARY 23, 2017


OPERATIONS ENGINEER



STANDARD PLAN 5-297.2542 OF 4

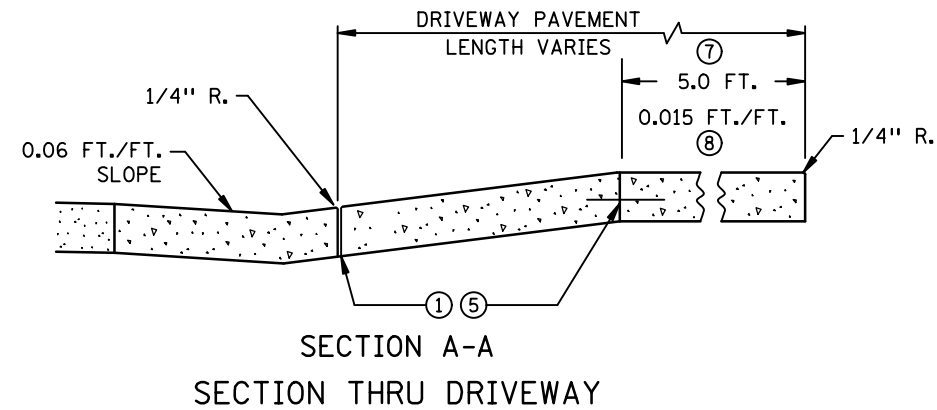
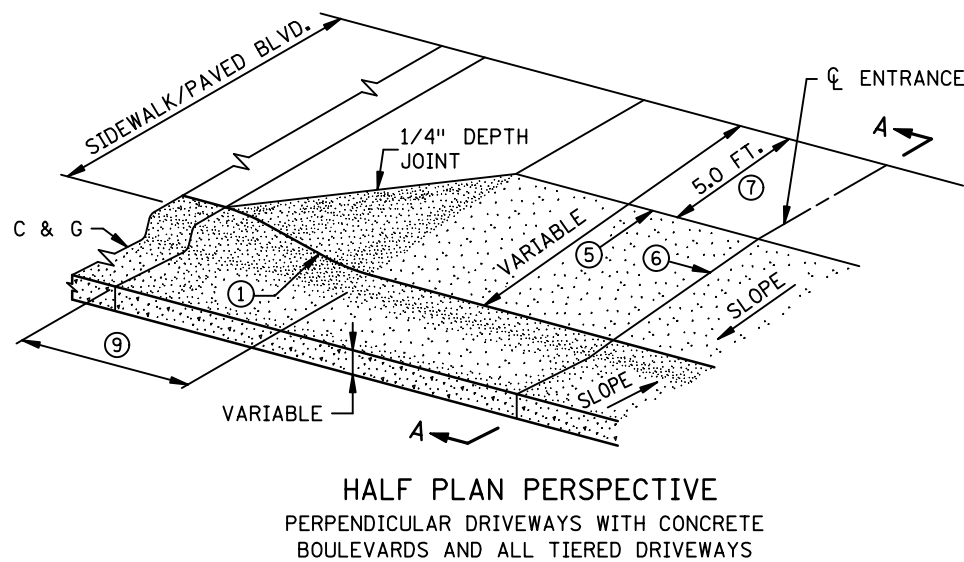
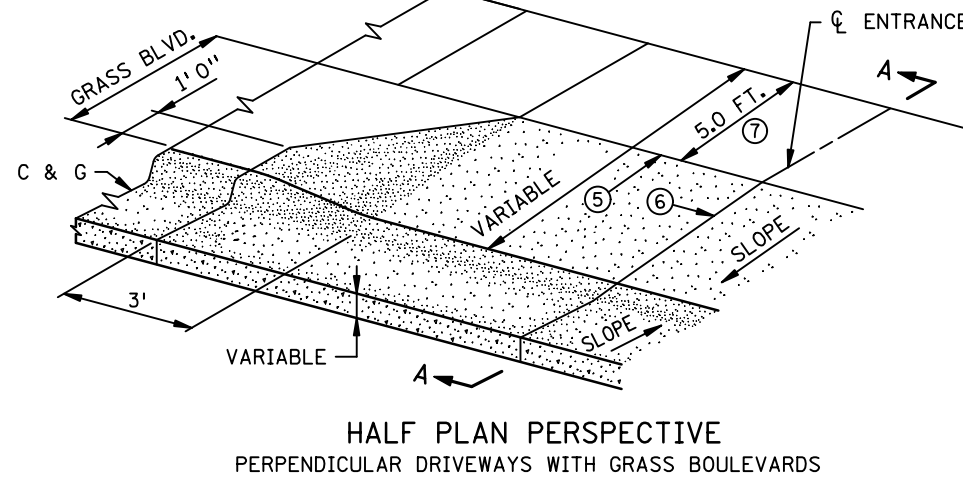
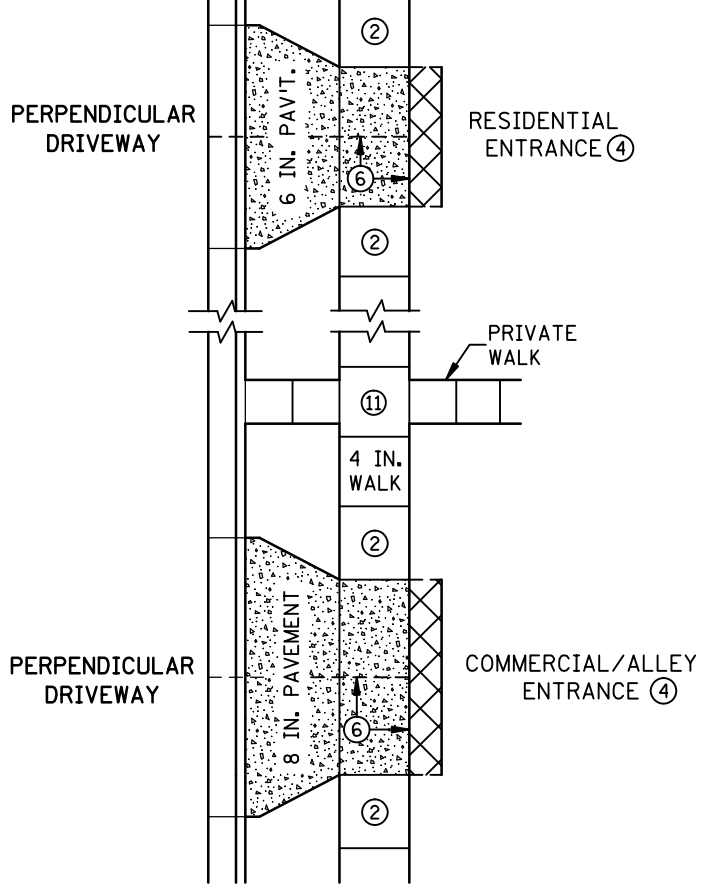
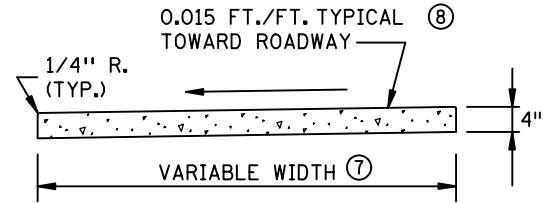
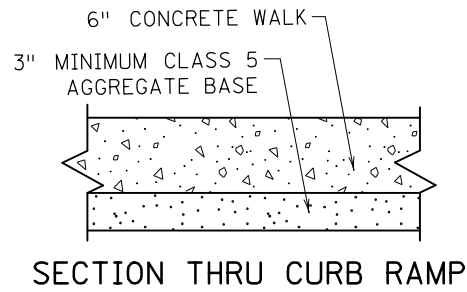
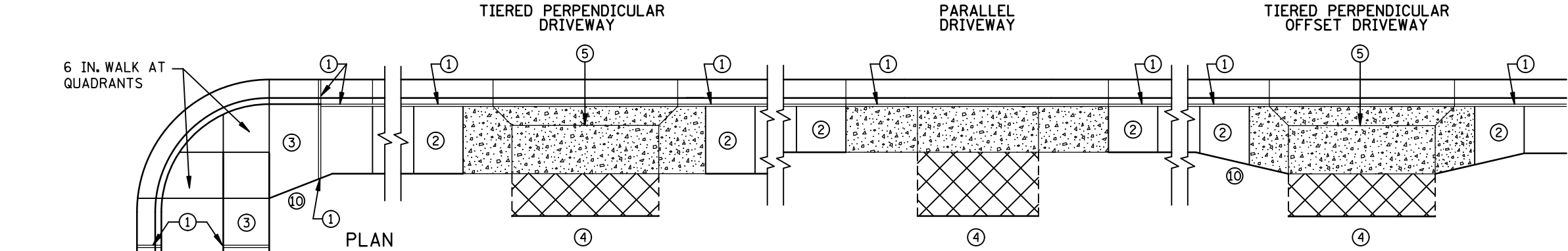


APPROVED: 1-23-2017
REVISED:

STATE PROJ. NO. (T.H.) SHEET NO. OF SHEETS

PLOTTED/REVISED: 4-APR-2018

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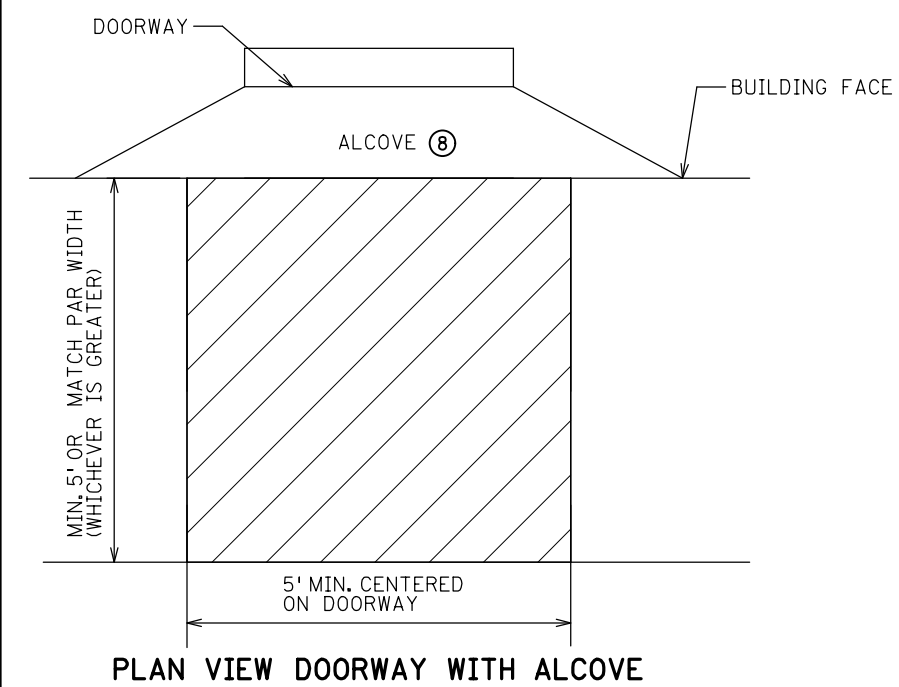
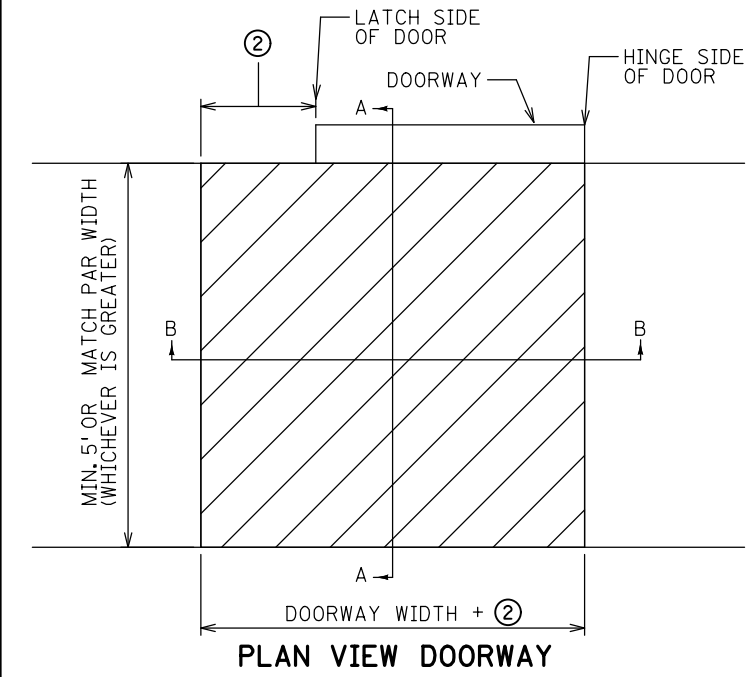
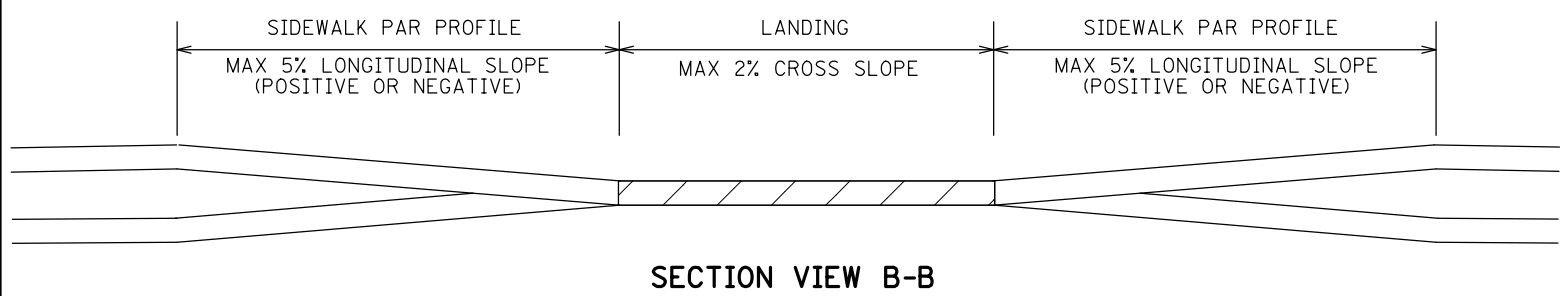


- NOTES:**
- TO MINIMIZE SIDEWALK "ROLLER COASTER" EFFECT IT IS DESIRABLE TO KEEP THE PAR ELEVATION CONTINUOUS OR AT LEAST IN THE UPPER HALF OF CURB HEIGHT. 4" HIGH CURB SHOULD BE USED INSTEAD OF 6" HIGH CURB TO HELP THIS PROBLEM WHEN APPLICABLE.
- 4" HIGH ADJACENT CURB IS PREFERRED WHEN BOULEVARDS 4' OR LESS ARE PRESENT MEASURED FROM THE BACK OF CURB. WHEN THE DRIVEWAY IS SLOPING DOWN FROM THE ROADWAY (NEGATIVE) 4" HIGH ADJACENT CURB SHOULD ALSO BE USED.
- SEE ROAD DESIGN MANUAL, CHAPTER 5, FOR GEOMETRIC DESIGN OF DRIVEWAYS.
- ① 1/2 IN. PREFORMED JOINT FILLER MATERIAL PER MnDOT SPEC. 3702, EXCEPT AT GRASS BOULEVARDS.
 - ② TRANSITION DRIVEWAY THICKNESS TO WALK THICKNESS.
 - ③ TRANSITION CURB RAMP THICKNESS TO WALK THICKNESS.
 - ④ MATCH INPLACE DRIVEWAY WIDTH, MATERIAL TYPE AND THICKNESS.
 - ⑤ TIE ONLY IF ADJACENT SECTIONS ARE NOT POURED MONOLITHICALLY. SEE SECTION A-A.
 - ⑥ FORM CONTRACTION JOINT AS NEEDED TO PRODUCE APPROXIMATELY SQUARE PANELS (MAXIMUM WIDTH 15 FT. BETWEEN JOINTS).
 - ⑦ 5.0' MIN. PAR WIDTH IS THE STANDARD THROUGH DRIVEWAYS. IF FEASIBLE WIDEN DRIVEWAY PAR WIDTH TO MATCH APPROACHING SIDEWALK PAR WIDTHS. IN VERTICALLY CONSTRAINED AREAS PAR WIDTHS CAN INCREMENTALLY BE REDUCED TO 4.5' OR 4' MIN AFTER ALL OTHER OPTIONS HAVE BEEN APPLIED.
 - ⑧ THE PEDESTRIAN ACCESS ROUTE CROSS-SLOPE, SHALL NOT EXCEED 0.02 FT./FT. AS CONSTRUCTED.
 - ⑨ 8% TO 10% FLARES SHALL BE USED WHEN ADJACENT TO WALKABLE SURFACES AND FOR ALL TIERED DRIVEWAYS WITH GRASS BOULEVARDS.
 - ⑩ 1:10 MIN. SIDEWALK OFFSET TAPER REQUIRED FOR SIDEWALK REPLACEMENT PROJECTS. 1:3 MIN. AND 1:5 MIN. PREFERRED SIDEWALK OFFSET TAPER FOR DRIVEWAY REPLACEMENT.
 - ⑪ LANDING REQUIRED, SEE NEXT SHEET FOR MORE INFORMATION.

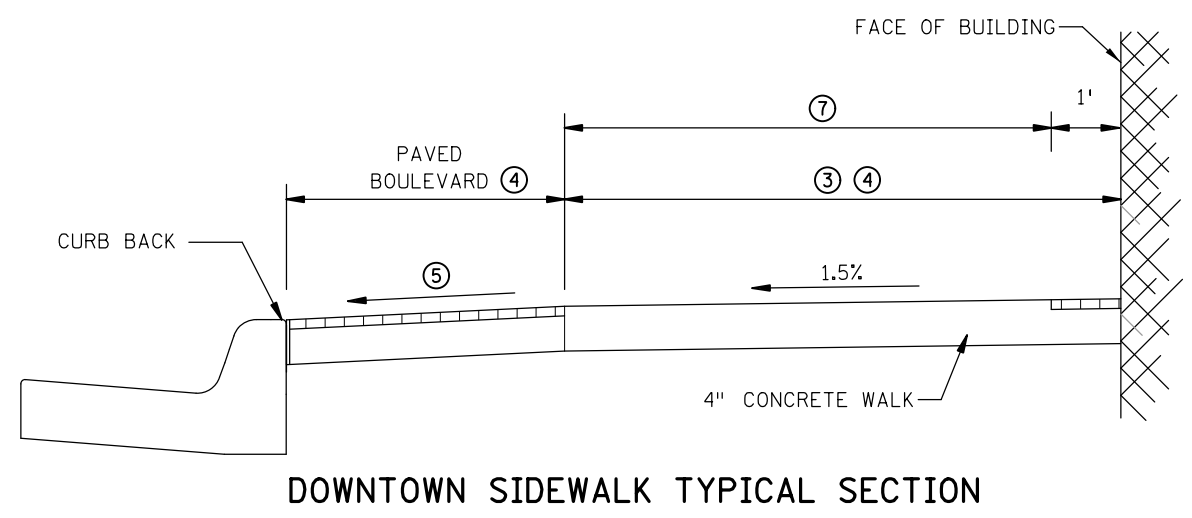
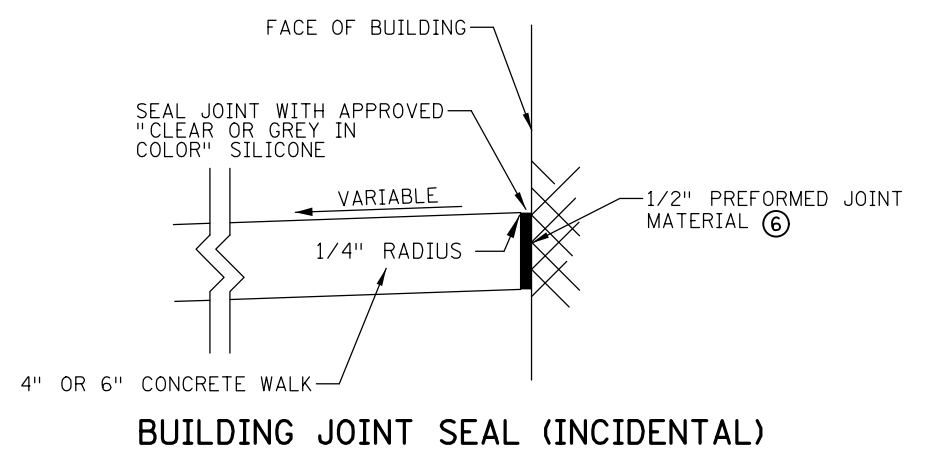
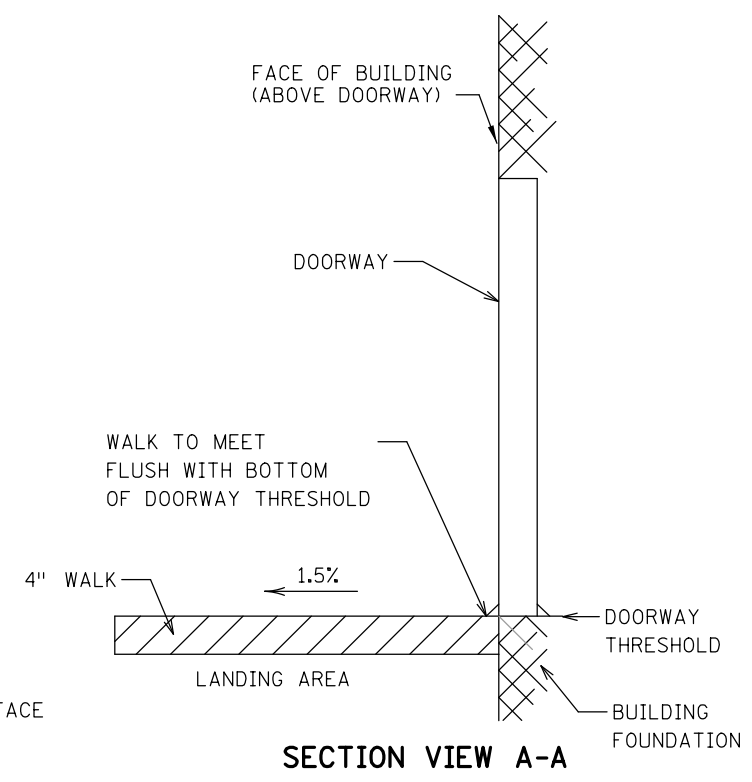
REVISION:
APPROVED: JANUARY 23, 2017

OPERATIONS ENGINEER

PLOTTED/REVISED: 4-APR-2018
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SIDEWALK LANDING REQUIREMENTS ①



- NOTES:
- FIELD ADJUST SIDEWALK PROFILES TO MEET ALL DOORWAY THRESHOLDS.
- SIDEWALK MUST MAINTAIN POSITIVE DRAINAGE AWAY FROM THE BUILDING TO THE ROADWAY.
- SEE SPECIAL PROVISIONS FOR SILICONE SPECIFICATIONS.
- ① LANDING CRITERIA IS REQUIRED FOR ALL DOORS, PRIVATE WALKS AND STEPS.
- ② 18" MIN. WHEN DOOR SWINGS OUTWARD FROM BUILDING.
12" MIN. WHEN DOOR SWINGS INWARD FROM BUILDING.
- ③ 6' MIN. PAR REQUIRED WHEN ADJACENT TO BUILDINGS.
- ④ 2/3 PAR TO 1/3 BOULEVARD SHOULD BE USED WHEN FEASIBLE.
- ⑤ 1%-5% FOR THE MAJORITY OF THE BLOCK, WITH EXCEPTIONS UP TO 8% IN CONSTRAINED AREAS.
10% MAX. FOR SHORT SECTIONS ALLOWED TO ACCOUNT FOR FIELD TOLERANCES.
- ⑥ FURNISH AND INSTALL BACKER ROD OF APPROPRIATE DIAMETER.
- ⑦ TO MINIMIZE VIBRATION AND ROLLING RESISTANCE, AREA SHOULD BE FREE OF PAVERS, STAMPED
CONCRETE, AND/OR EXCESSIVE JOINTING.
- ⑧ 2% MAX. PER BUILDING CODE. IF GREATER THAN 2%, FLATTEN AS FEASIBLE.

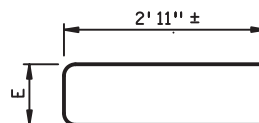
LEGEND	
	LANDING - ALL SLOPES TO BE LESS THAN 2%
	OPTIONAL AESTHETIC TREATMENT

REVISION:
APPROVED: JANUARY 23, 2017
 OPERATIONS ENGINEER

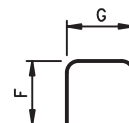
	STANDARD PLAN 5-297.254	4 OF 4	DRIVEWAY AND SIDEWALK DETAILS	
	 STATE DESIGN ENGINEER	APPROVED: 1-23-2017 REVISED:		

SIDE FRONT
RODENT SHIELD ①

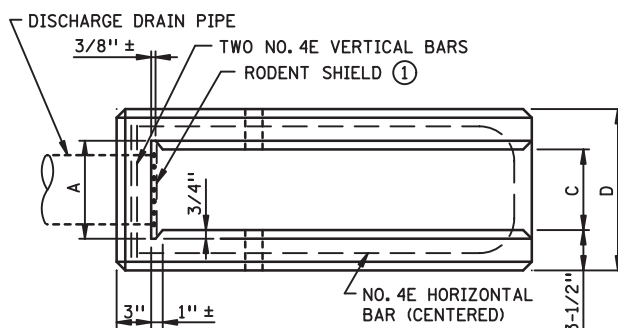
DIMENSIONS ARE APPROXIMATE TO ALLOW FOR BEND AND A SNUG FIT IN SLOT IN HEADWALL.



NO. 4E
HORIZONTAL BAR



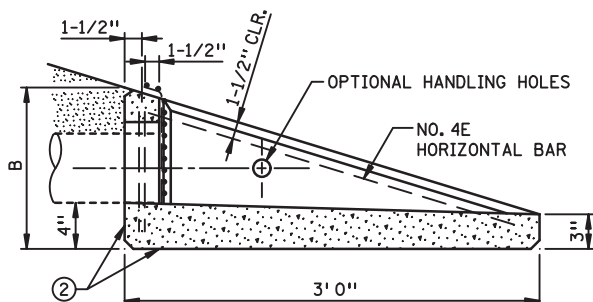
NO. 4E
VERTICAL BAR
(2 REQUIRED)



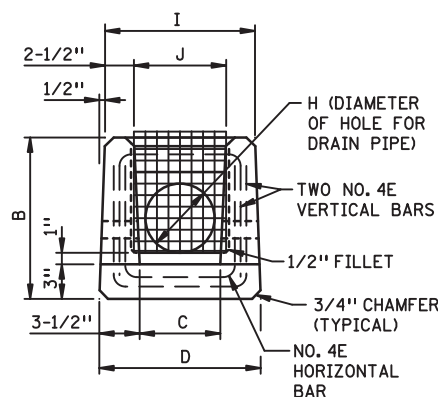
PLAN

DIMENSIONS	4" DIA. PIPE	6" DIA. PIPE	8" DIA. PIPE
A	6-1/2"	8-1/2"	10-1/2"
B	1' 0"	1' 2"	1' 4"
C	5"	7"	9"
D	1' 0"	1' 2"	1' 4"
E	8-1/2"	10-1/2"	1' 0-1/2"
F	9"	11"	1' 1"
G	9-1/2"	11-1/2"	1' 1-1/2"
H Δ	5"	7"	9-1/2"
I	11"	1' 1"	1' 3"
J	6"	8"	10"
APPROX. WT.	210 LBS.	250 LBS.	300 LBS.

Δ EXACT DIMENSION DEPENDENT ON COUPLING METHOD.



SECTION



END VIEW

NOTES:

ALL CONCRETE MATERIALS SHALL BE MN/DOT MIX DESIGNATION 3W46 AND/OR OTHER MIX AS APPROVED BY THE STATE MATERIALS ENGINEER. HEADWALLS SHALL NOT BE SHIPPED UNTIL CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 5000 PSI. THE EPOXY BARS SHALL BE SECURELY RETAINED SO THEY ARE NOT DISPLACED DURING CONCRETE PLACEMENT. TIE WIRE SHALL BE EPOXY COATED. WELDING WILL NOT BE PERMITTED. THE FABRICATOR SHALL PROVIDE A QUALITY CONTROL PROGRAM APPROVED BY THE MATERIALS ENGINEER.

- ① THE RODENT SHIELD SHALL BE FABRICATED FROM CARBON STEEL FLATTENED EXPANDED METAL, STYLE 1/2" NO. 4F. IT SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION. ACTUAL SCREEN DIMENSIONS SHALL BE SUCH AS WILL SNUGLY FIT THE PROVIDED SLOT (TAPERED IF NECESSARY), WITH THE SCREEN LIP FITTING FLUSH WITH THE CASTING TOP AND THE BOTTOM FITTING TIGHT TO THE FLOW LINE.
- ② THE MANUFACTURER'S NAME AND DATE OF PRODUCTION (MONTH AND YEAR) SHALL BE CLEARLY CAST (NOT INK STAMPED) INTO EITHER THE BOTTOM OF EACH HEADWALL OR NEAR THE BOTTOM OF THE LARGE END. IF A MANUFACTURER HAS MORE THAN ONE PLANT, THEY SHALL BE APPROPRIATELY CODED.

APPROVED AUGUST 20, 2001

STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

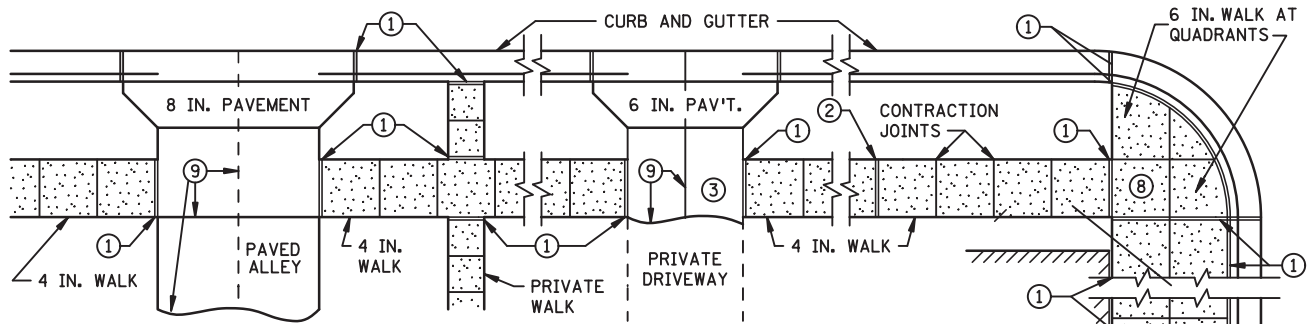
PRECAST CONCRETE HEADWALL FOR SUBSURFACE DRAINS

**SPECIFICATION
REFERENCE**
2502

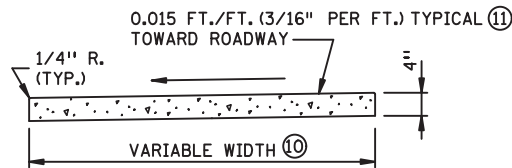
REVISED
3-22-2013 M.J.E.

STANDARD
PLATE
NO.

3131C



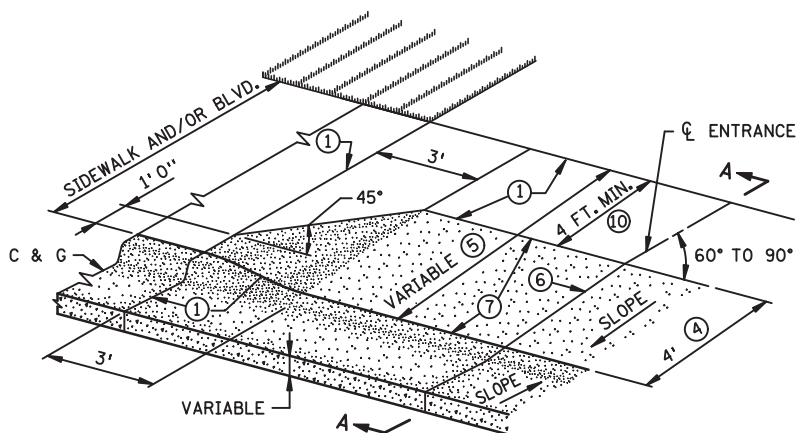
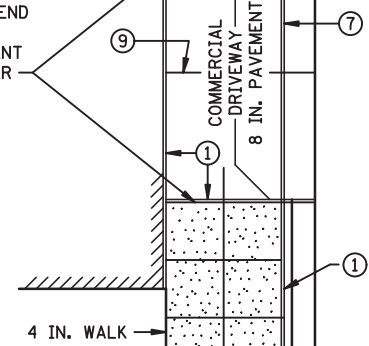
PLAN



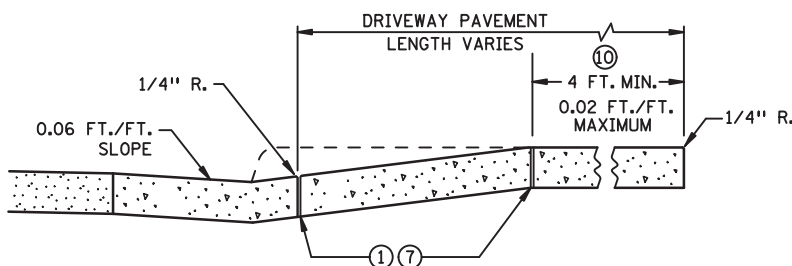
SECTION THRU WALK

CONCRETE WALK

PROVIDE INTERMEDIATE JOINT AT SQUARED END IN SIDEWALK, WHEN SIDEWALK IS ADJACENT TO CURB AND GUTTER



HALF PLAN PERSPECTIVE



SECTION A-A
CURB RETURN

NOTES:

SEE ROAD DESIGN MANUAL, CHAPTER 5, FOR GEOMETRIC DESIGN OF ENTRANCES.

WHERE THE MAX. ALLOWABLE ENTRANCE GRADIENT WOULD BE EXCEEDED, DUE TO THE POSITION OF EXISTING WALK, THE WALK SHALL BE REMOVED AND REPLACED, OR THE PAVEMENT WARPED TO PROVIDE THE REQUIRED ENTRANCE SLOPE.

SEE PLANS FOR PLACEMENT OF WALK AND DIMENSIONS FOR CONSTRUCTION OF DRIVEWAYS.

NO DEDUCTION SHALL BE MADE IN CURB & GUTTER FOR ENTRANCE.

- ① 1/2 IN. EXPANSION JOINT. 1/2 IN. PREFORMED JOINT FILLER MATERIAL, AASHTO M 213 (REQUIRED WHEN 2 CONCRETE AREAS ARE POURED SEPARATELY).
- ② 1/2 IN. EXPANSION JOINTS AT 60 FT. (APPROX.) MAXIMUM INTERVALS.
- ③ MATCH INPLACE DRIVEWAY THICKNESS (6 IN. MIN.).
- ④ WITHOUT SIDEWALK, PAVE ONLY TO THE END OF CURB RETURN WHEN ENTRANCE IS UNSURFACED OR CONSTRUCTION IS NOT NEEDED BEYOND THIS POINT.
- ⑤ WITH SIDEWALK, PAVE TO THE BACK OF SIDEWALK. PAID FOR AS CONCRETE DRIVEWAY PAVEMENT.
- ⑥ CONTRACTION JOINT (FORMED OR SAWED).
- ⑦ EXPANSION JOINT NOT REQUIRED IF ADJACENT SECTIONS ARE POURED MONOLITHICALLY. SEE SECTION A-A.
- ⑧ SEE PLANS FOR PLACEMENT OF PED. CURB RAMP.
- ⑨ FORM CONTRACTION JOINT AS NEEDED TO PRODUCE APPROXIMATELY SQUARE PANELS (MAXIMUM WIDTH 15 FT. BETWEEN JOINTS).
- ⑩ THE MINIMUM CONTINUOUS AND UNOBSTRUCTED CLEAR WIDTH OF A PEDESTRIAN ACCESS ROUTE SHALL BE 4.0 FT.
- ⑪ SEE PLANS FOR PROPOSED CROSS SLOPE OF THE PEDESTRIAN ACCESS ROUTE, WHICH MAY NOT EXCEED 0.02 FT./FT. AS CONSTRUCTED.

APPROVED JULY 25, 2011

[Signature]
STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

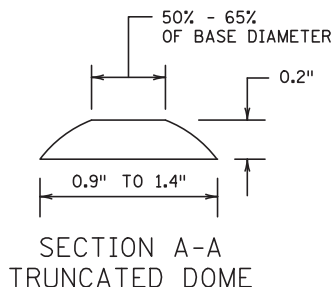
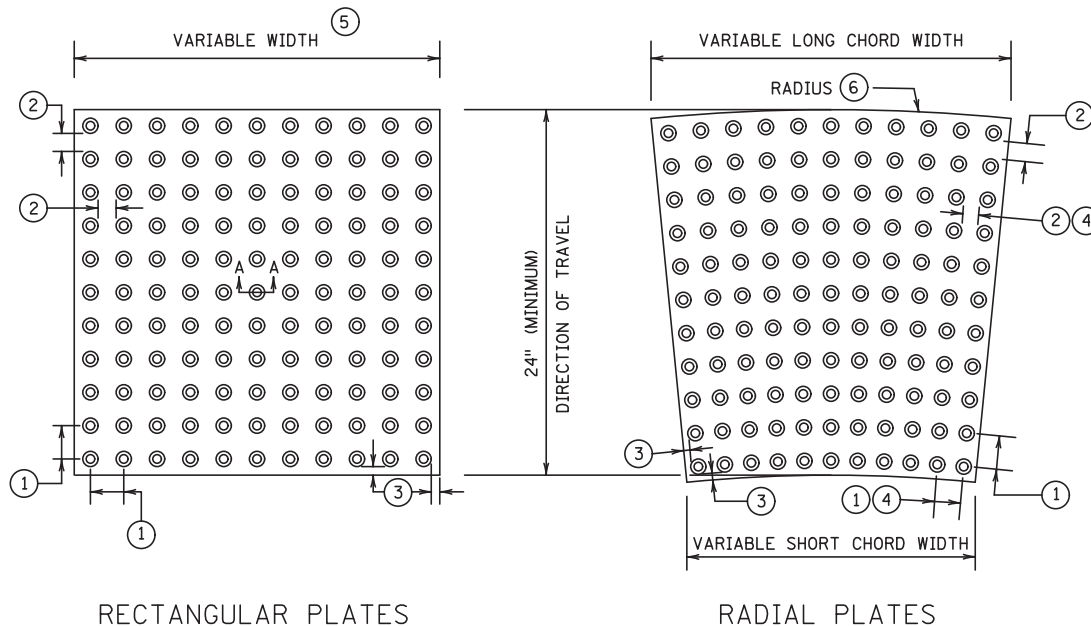
CONCRETE WALK & CURB RETURNS AT ENTRANCES

SPECIFICATION
REFERENCE

2301
2521
2531

STANDARD
PLATE
NO.

7035N



TYPICAL RADIAL TRUNCATED DOME PLATES			
RADIUS (FEET) ⑦	LONG CHORD WIDTH (INCHES)	SQ. FT. PER PLATE	PLATES REQUIRED FOR 90 DEGREE TURN
10	23-1/2	3.53	8
15	18-13/16	2.93	15
15	23-1/2	3.67	12
20	18-13/16	3.00	20
20	18-7/8	2.98	20
25	20-1/2	3.28	23
25	23-9/16	3.77	20
30	22-5/8	3.65	25
35	22	3.56	30

NOTES:

DETECTABLE WARNING SURFACES SHALL FOLLOW THE PUBLIC RIGHTS-OF-WAY ACCESSIBILITY GUIDELINES (PROWAG).

DETECTABLE WARNINGS CONSIST OF TRUNCATED DOMES ALIGNED IN A SQUARE OR RADIAL GRID PATTERN.

DETECTABLE WARNINGS ARE REQUIRED:

- WHERE RAMPS, LANDINGS, OR BLENDED TRANSITIONS PROVIDE A FLUSH PEDESTRIAN CONNECTION TO THE ROADWAY.
- WHERE PEDESTRIAN ACCESS ROUTES CROSS COMMERCIAL DRIVEWAYS THAT ARE PROVIDED WITH TRAFFIC CONTROL DEVICES OR OTHERWISE PERMITTED TO OPERATE LIKE A PUBLIC ROADWAY.
- AT PEDESTRIAN RAILWAY CROSSINGS.
- ON RAIL PLATFORMS WHERE BOARDING EDGES ARE NOT PROTECTED.

DETECTABLE WARNINGS SHALL EXTEND:

- A MINIMUM OF 24" IN THE DIRECTION OF TRAVEL.
- THE FULL WIDTH OF THE RAMP, LANDING, OR BLENDED TRANSITION, WITHIN 3" OF FULL WIDTH ON EITHER END.
- THE FULL LENGTH OF THE PUBLIC USE AREA OF A RAIL PLATFORM.

DETECTABLE WARNING SURFACES SHALL CONTRAST VISUALLY WITH ADJACENT GUTTER, ROADWAY, OR WALKWAY, EITHER A LIGHT-ON-DARK OR DARK-ON-LIGHT. CONTRAST MAY BE PROVIDED ON THE FULL RAMP SURFACE, EXCLUDING THE FLARED SIDES.

FOR MN/DOT PROJECTS, SEE MN/DOT'S APPROVED/QUALIFIED PRODUCT LISTS.

DETECTABLE WARNING SURFACE SHALL BE PAID FOR AS TRUNCATED DOMES BY THE SQUARE FOOT.

ALL TRUNCATED DOME SYSTEMS SHALL BE PLACED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER.

- ① CENTER TO CENTER DOME SPACING: 1.6" MINIMUM, 2.4" MAXIMUM.
- ② BASE TO BASE DOME SPACING: 0.65" MINIMUM.
- ③ DOME BASE TO PLATE EDGE SPACING: 0.35" MINIMUM, 0.75" MAXIMUM.
- ④ SPACING VARIES ON RADIAL PLATES.
- ⑤ TYPICAL WIDTHS AVAILABLE: 12", 18", 24", 30", 36". CHECK WITH MANUFACTURERS FOR AVAILABLE WIDTHS.
- ⑥ ON RADIAL PLATE, RADIUS DEFINED AT BACK OF CURB.
- ⑦ TYPICAL RADII. CHECK WITH MANUFACTURERS FOR AVAILABLE RADII.

APPROVED AUGUST 23, 2010

[Signature]
STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

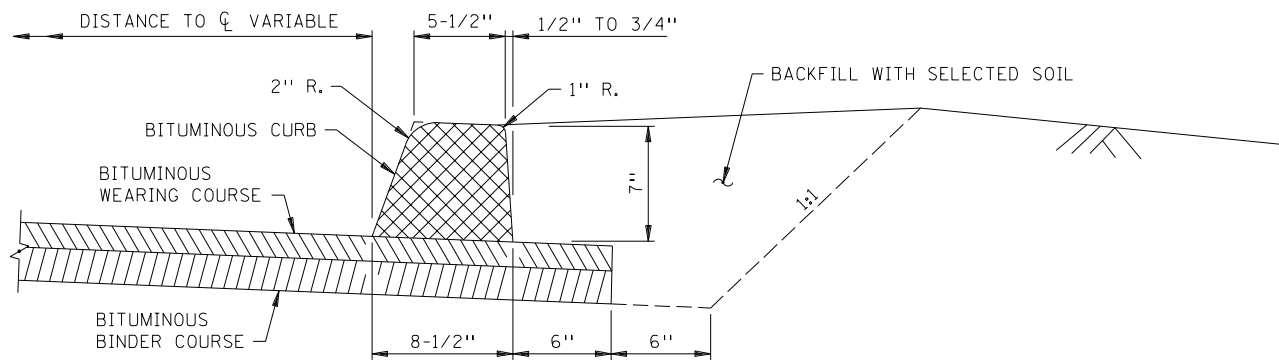
DETECTABLE WARNING SURFACE
TRUNCATED DOMES

SPECIFICATION
REFERENCE

2531

STANDARD
PLATE
NO.

7038A



CROSS SECTION

VOLUME OF CURB
0.338 CU. FT. PER LIN FT.

APPROVED Oct. 1, 1966

W. A. Ebern

ASSISTANT COMMISSIONER
ENGINEERING STANDARDS

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

BITUMINOUS CURB

SPECIFICATION
REFERENCE

2535

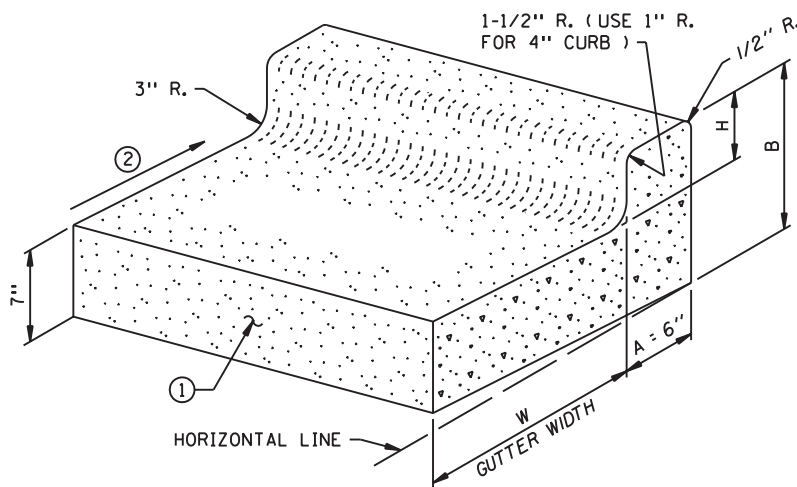
STANDARD
PLATE
NO.

7065C



REVERSE SLOPE GUTTER SECTION
(FORMS MAY BE TILTED)

DESIGN B



DESIGN V

NOTES:

- ① LONGITUDINAL JOINT WHEN ADJACENT TO RIGID PAVEMENT OR BASE.
SEE STANDARD PLANS MANUAL FOR JOINT INFORMATION.
- ② SLOPE 0.06 FT/FT NORMAL, UNLESS OTHERWISE SPECIFIED. IF A DIFFERENT GUTTER SLOPE IS PERMITTED, THE FORM MAY BE TILTED.

DESIGN B			W = 12''				W = 18''				W = 24''				W = 30''				W = 36''			
			DESIGN NO.	CONCRETE			DESIGN NO.	CONCRETE			DESIGN NO.	CONCRETE			DESIGN NO.	CONCRETE			DESIGN NO.	CONCRETE		
				CU.	YDS. PER LIN. FT.	FT. PER CU. YD.		CU.	YDS. PER LIN. FT.	FT. PER CU. YD.		CU.	YDS. PER LIN. FT.	FT. PER CU. YD.		CU.	YDS. PER LIN. FT.	FT. PER CU. YD.		CU.	YDS. PER LIN. FT.	FT. PER CU. YD.
DIMENSIONS																						
H	A	B																				
4	7-3/8''	11-1/2''	B412	0.0421	23.8	B418	0.0529	18.9	B424	0.0637	15.7	B430	0.0745	13.4	B436	0.0853	11.7					
6	8''	13-1/2''	B612	0.0474	21.1	B618	0.0582	17.2	B624	0.0690	14.5	B630	0.0798	12.5	B636	0.0906	11.0					
8	8-5/8''	15-1/2''	B812	0.0529	18.9	B818	0.0637	15.7	B824	0.0745	13.4	B830	0.0853	11.7	B836	0.0962	10.4					
9	9''	16-5/8''	B912	0.0559	17.9	B918	0.0667	15.0	B924	0.0775	12.9	B930	0.0883	11.3	B936	0.0991	10.1					
10	9-3/8''	17-5/8''	B1012	0.0589	17.0	B1018	0.0697	14.4	B1024	0.0805	12.4	B1030	0.0913	11.0	B1036	0.1021	9.8					

DESIGN V			W = 12''			W = 18''			W = 24''			W = 30''			W = 36''		
			DESIGN NO.	CONCRETE		DESIGN NO.	CONCRETE		DESIGN NO.	CONCRETE		DESIGN NO.	CONCRETE		DESIGN NO.	CONCRETE	
CU. YDS. PER LIN. FT.	LIN. FT. PER CU. YD.	CU. YDS. PER LIN. FT.		LIN. FT. PER CU. YD.	CU. YDS. PER LIN. FT.		LIN. FT. PER CU. YD.	CU. YDS. PER LIN. FT.		LIN. FT. PER CU. YD.							
											DIMENSIONS						
											H		A	B			
4	6''	11-3/8''	V412	0.0396	25.3	V418	0.0504	19.9	V424	0.0612	16.4	V430	0.0720	13.9	V436	0.0828	12.1
6	6''	13-3/8''	V612	0.0426	23.5	V618	0.0534	18.7	V624	0.0642	15.6	V630	0.0750	13.4	V636	0.0858	11.7
8	6''	15-3/8''	V812	0.0457	21.9	V818	0.0565	17.7	V824	0.0673	14.9	V830	0.0781	12.8	V836	0.0889	11.3
9	6''	16-3/8''	V912	0.0472	21.2	V918	0.0580	17.2	V924	0.0688	14.5	V930	0.0796	12.6	V936	0.0904	11.1
10	6''	17-3/8''	V1012	0.0487	20.5	V1018	0.0595	16.8	V1024	0.0703	14.2	V1030	0.0811	12.4	V1036	0.0919	10.9

APPROVED MARCH 11, 1994

R.H. Corbridge

ACTING STATE DESIGN ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

CONCRETE CURB AND GUTTER

SPECIFICATION

REFERENCE

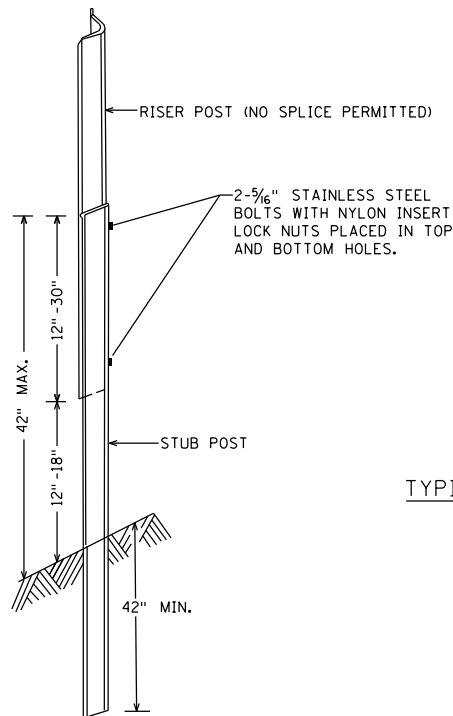
2531

REVISION DATE
2-28-05

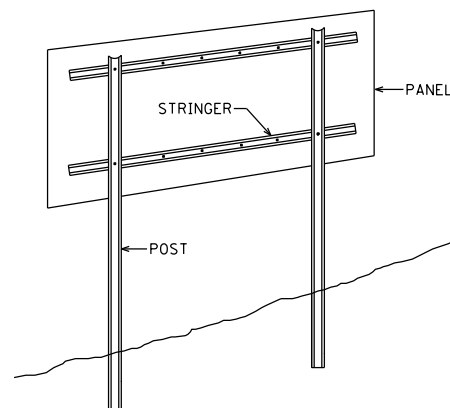
STANDARD
PLATE
NO.

7100H

TYPE C & D POST

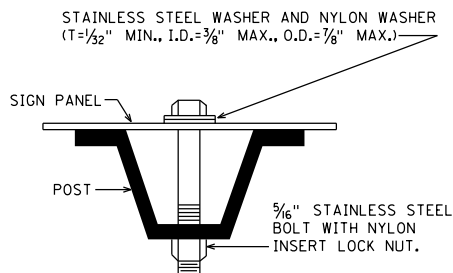


TYPICAL TYPE C INSTALLATION

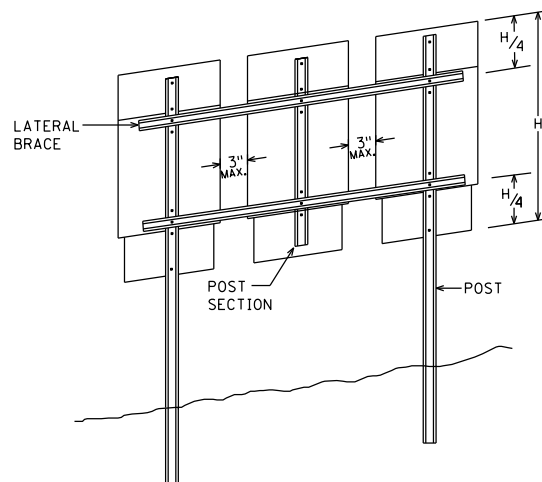


TYPICAL TYPE D INSTALLATION

U POST BREAKAWAY SPLICE



U POST MOUNTING
TYPE C SIGNS

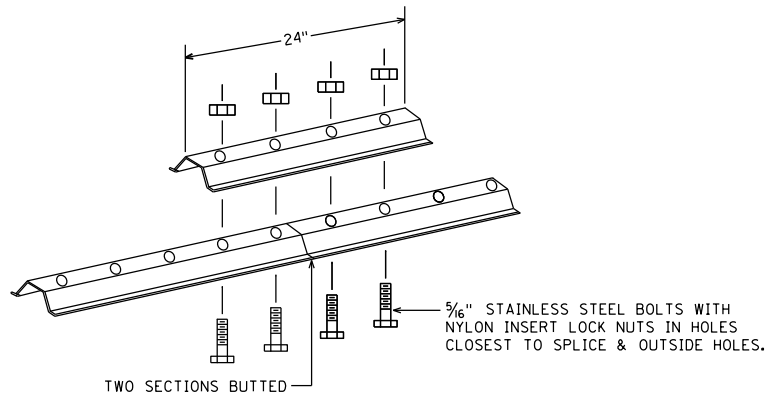


MODIFIED TYPE C INSTALLATION

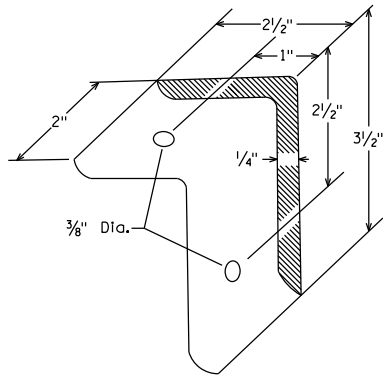
NOTES:

1. USE 3 LB/FT STUB POSTS. SHALL CONFORM TO MNDOT 3401.
2. USE 2.5 LB/FT RISER POSTS, STRINGERS, KNEE BRACES AND LATERAL BRACES. ALL SHALL CONFORM TO MNDOT 3401.
3. SEE SIGN DATA SHEETS FOR NUMBER OF POSTS, KNEE BRACES, POST LENGTHS AND SPACINGS. AS DETERMINED FROM TEM CHARTS 6.3 AND 6.4.
4. IF MORE THAN TWO POSTS ARE NEEDED, THE MINIMUM SPACING SHALL BE 45" BETWEEN POSTS.
5. TYPE D SIGN PANELS SHALL BE BOLTED TO STRINGERS AT 24" MAXIMUM INTERVALS IN ACCORDANCE WITH THE TYPE D STRINGER AND PANEL-JOINT DETAIL (SEE STANDARD SIGNS MANUAL).
6. MOUNTING (PUNCH CODE) FOR TYPE C SIGN PANELS SHALL BE AS INDICATED IN THE STANDARD SIGNS MANUAL UNLESS OTHERWISE SPECIFIED.
7. ALL RISER (VERTICAL) U POSTS SHALL BE SPLICED. DRIVEN STUB POSTS SHALL BE AT LEAST 7' LONG.
8. USE STAINLESS STEEL 5/16" BOLTS, WASHERS AND NYLON INSERT LOCK NUTS AS SHOWN FOR ALL GROUND MOUNTED AND OVERHEAD MOUNTED SIGNS.
9. STAINLESS STEEL WASHER WITH SAME DIMENSIONS SHALL BE PROVIDED BETWEEN ALL NYLON WASHERS AND BOLT HEADS.
10. BRACING STUBS SHALL BE NO MORE THAN 4" ABOVE GROUND AND EMBEDDED AT LEAST 42".
11. A-FRAME BRACKET SHALL BE STEEL CONFORMING TO MNDOT 3306 AND GALVANIZED IN ACCORDANCE WITH MNDOT 3394.
12. COLLARS SHALL BE USED TO SHIM OVERLAYS AND LEGEND COMPONENTS AWAY FROM PANEL WHERE INTERFERENCE WITH BOLT HEADS IS ENCOUNTERED. MNDOT 3352.2A6.
13. 2 POST TYPE C SIGNS SHALL BE REINFORCED WITH AT LEAST ONE LATERAL BRACE. INSTALLATIONS WHERE THE TOTAL PANEL HEIGHT IS 60" OR MORE SHALL HAVE TWO LATERAL BRACES LOCATED APPROXIMATELY AT THE QUARTER POINTS.
14. WHERE 2 SINGLE POST TYPE C SIGNS ARE INSTALLED SIDE BY SIDE, THEY SHALL BE REINFORCED Laterally BY AT LEAST 2 BRACES, BOLTED AT EACH POST AND LOCATED APPROXIMATELY AT THE QUARTER POINTS.
15. WHERE 3 OR MORE TYPE C SIGNS ARE INSTALLED SIDE BY SIDE, THEY SHALL BE REINFORCED Laterally BY AT LEAST 2 BRACES, BOLTED AT EACH POST AND POST SECTION AND LOCATED APPROXIMATELY AT THE QUARTER POINTS AS SHOWN IN MODIFIED TYPE C INSTALLATION.

TYPE C & D SIGN STRUCTURAL DETAILS

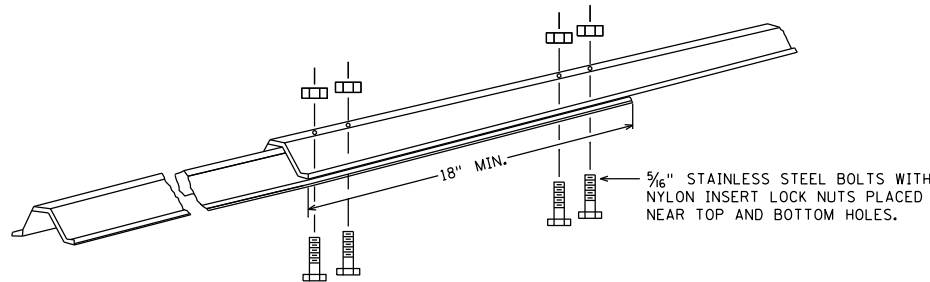


LATERAL BRACE OR STRINGER
SPLICE DETAIL (EXPLODED VIEW)



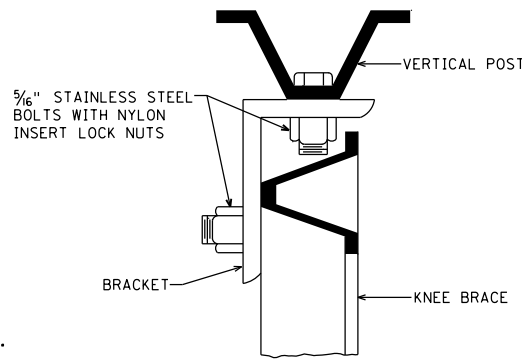
A-FRAME BRACKET

(STEEL MNDOT 3306 GALVANIZED PER MNDOT 3394)

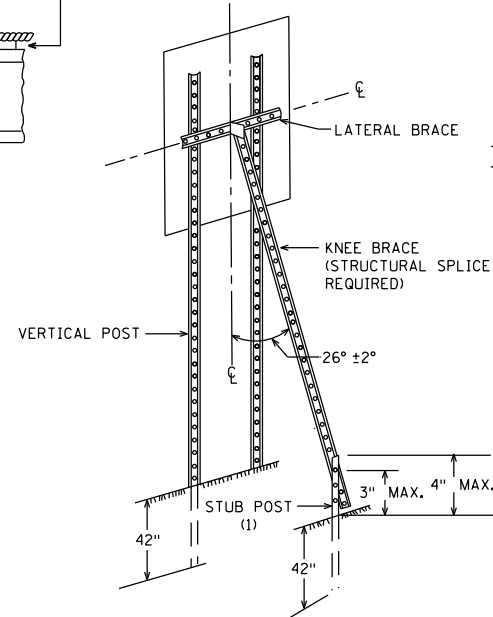


STRUCTURAL SPLICE

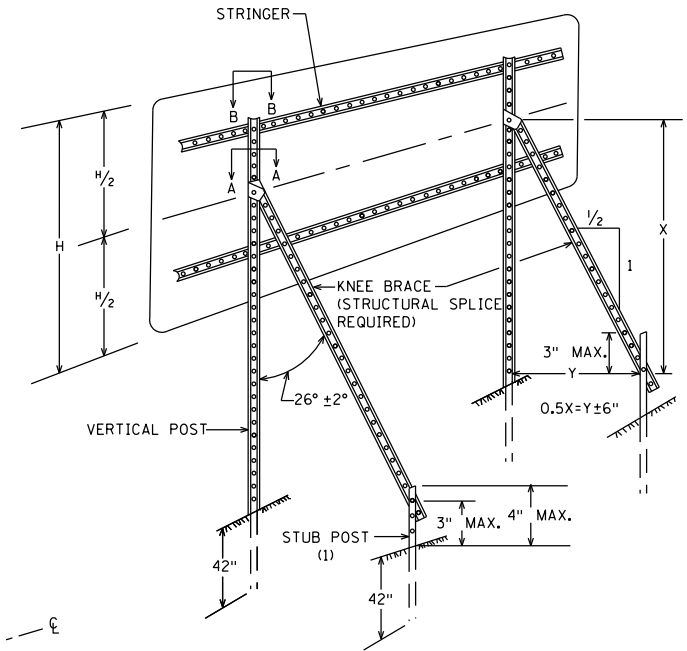
(USE WHEN IT IS NECESSARY TO FABRICATE THE CORRECT LENGTH OF POST FROM TWO PIECES)



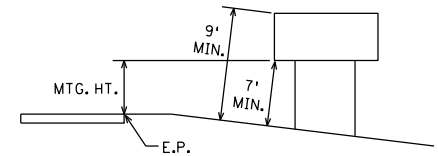
SECTION A-A



TYPICAL "A-FRAME" INSTALLATION
TYPE "C" SIGNS



TYPICAL "A-FRAME" INSTALLATION
TYPE "D" SIGNS

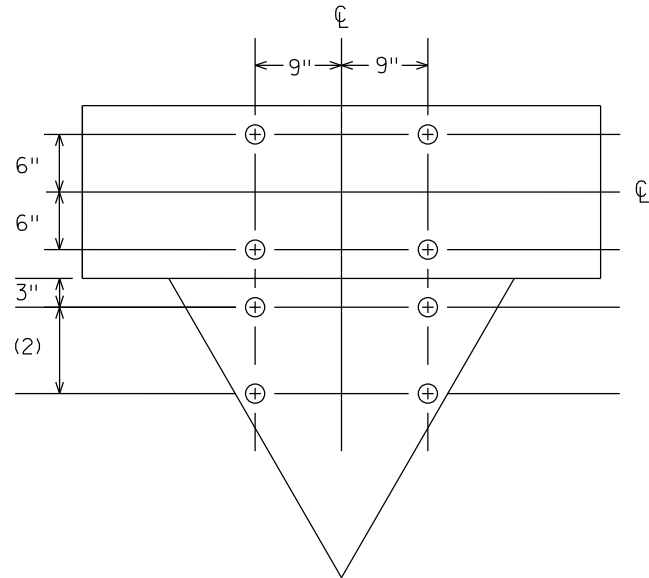
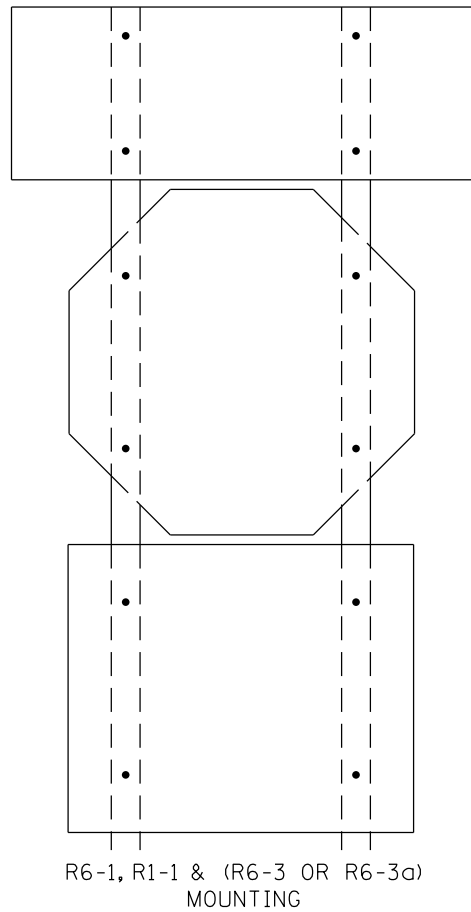


TYPICAL MOUNTING

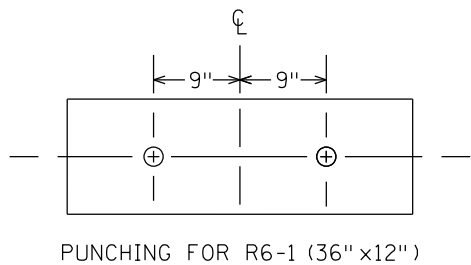
- (1) OFFSET STUB POST 1' TOWARD ROADWAY
RELATIVE TO VERTICAL POST. ATTACH STUB
POST AND KNEE BRACE BACK TO BACK.

TYPE C & D SIGN
STRUCTURAL DETAILS

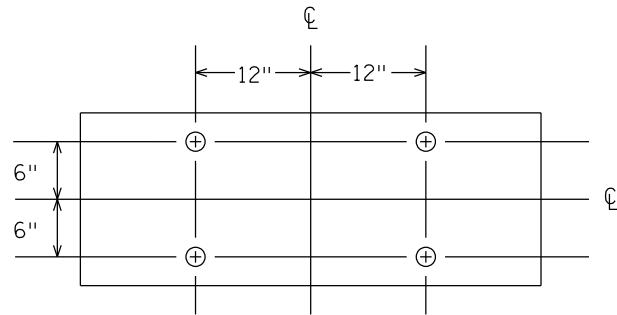
Sheet 2 of 3



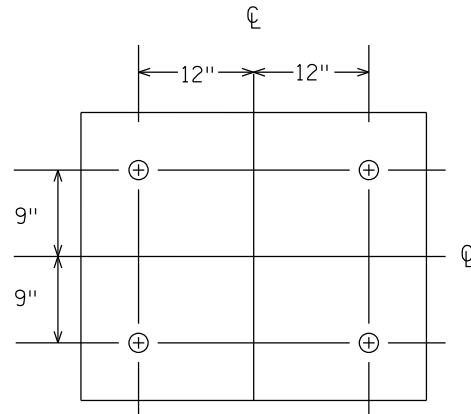
PUNCHING FOR R6-1 (54" x 18") AND
R1-2 (36" x 36" x 36" OR 48" x 48" x 48")
(2) 9" FOR 36" x 36" x 36"
18" FOR 48" x 48" x 48"



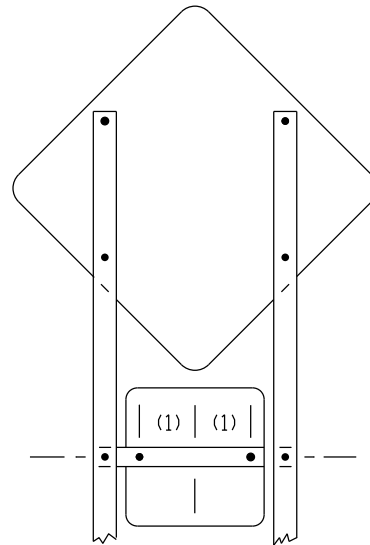
PUNCHING FOR R6-1 (36" x 12")



PUNCHING FOR R6-1 (54" x 18")

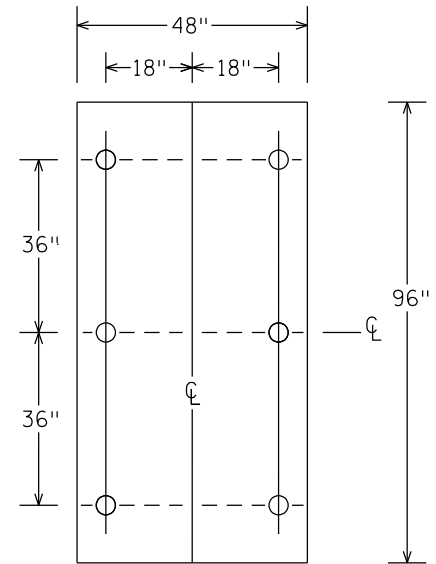


PUNCHING FOR R6-3 OR R6-3a (36" x 30")

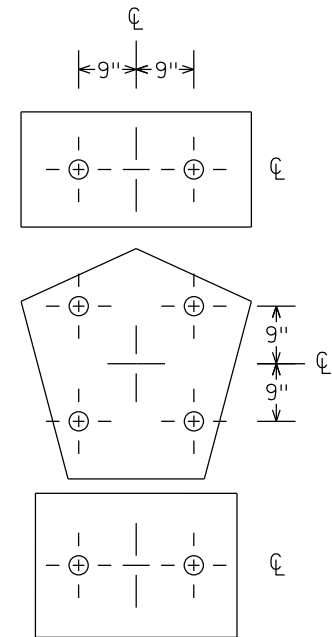


WARNING SIGN [30" x 30 OR 48" x 48"] AND
WARNING PLAQUE [18" x 18" OR 30" x 30"]
PUNCHING AND MOUNTING

- (1) 6" FOR WARNING PLAQUE (18" x 18")
12" FOR WARNING PLAQUE (30" x 30")



PUNCHING FOR R2-4b
SPEED LIMIT



(M3-1A, M3-2A, M3-3A OR M3-4A) [36" x 18"] AND
M1-6 [36" x 36"] AND
(M5-1A, M5-2A, M6-1A, M6-2A, M6-3A M6-4A, M6-5A OR M6-6A) [30" x 24"]
PUNCHING

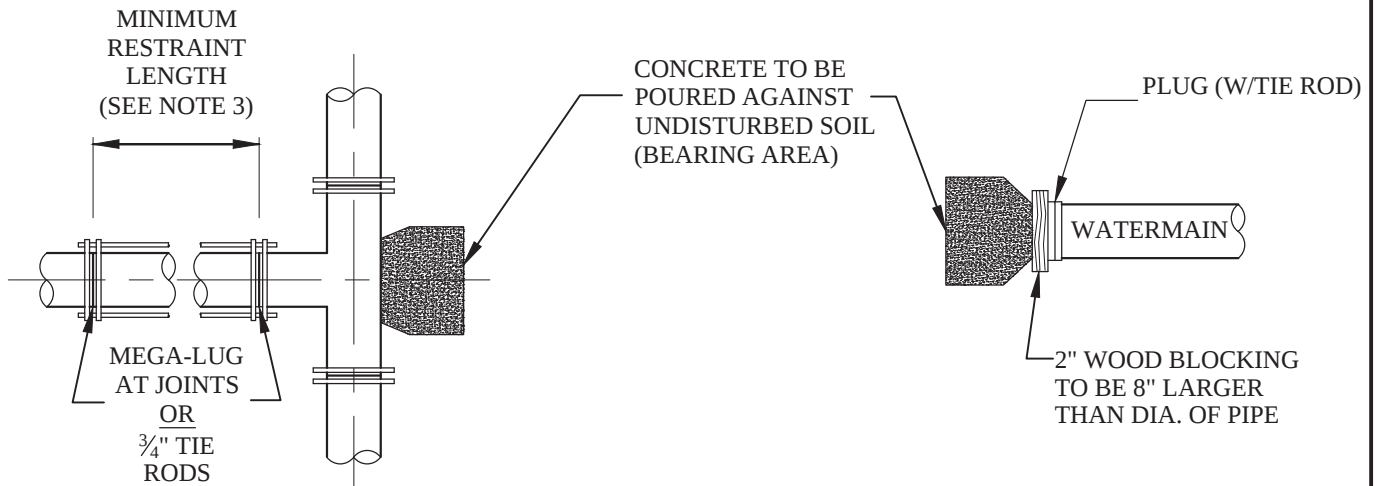
MINIMUM PIPE RESTRAINT LENGTHS (NO THRUST BLOCKING)

PIPE SIZE	PLUG	90° BEND OR TEE*	45° BEND**	22½° BEND**
6"	47'	17'	7'	4'
8"	62'	22'	9'	5'
10"	75'	26'	11'	5'
12"	88'	30'	13'	6'
16"	114'	39'	16'	8'
20"	139'	47'	20'	10'
24"	164'	55'	23'	11'
30"	199'	66'	28'	14'
36"	233'	77'	32'	16'
42"	265'	87'	36'	18'
48"	296'	96'	40'	20'

* RESTRAINING ALONG SINGLE LEG OF TEE.
 ** LENGTH IS BOTH DIRECTIONS FROM BEND.

MINIMUM BEARING AREAS (FOR THRUST BLOCKING)

PIPE SIZE	TEE or PLUG	90° BEND	45° BEND	22½° BEND
6"	2.9 SQ. FT.	3.1 SQ. FT.	1.6 SQ. FT.	0.8 SQ. FT.
8"	3.7 SQ. FT.	5.3 SQ. FT.	2.9 SQ. FT.	1.4 SQ. FT.
10"	5.7 SQ. FT.	8.1 SQ. FT.	4.4 SQ. FT.	2.2 SQ. FT.
12"	8.1 SQ. FT.	13.4 SQ. FT.	6.6 SQ. FT.	3.2 SQ. FT.
16"	15.1 SQ. FT.	21.4 SQ. FT.	11.6 SQ. FT.	5.9 SQ. FT.
20"	23.2 SQ. FT.	30.2 SQ. FT.	18.1 SQ. FT.	9.3 SQ. FT.
24"	33.6 SQ. FT.	48.5 SQ. FT.	26.1 SQ. FT.	13.3 SQ. FT.
OVER 24"	PIPE WILL BE RESTRAINED. SEE TABLE ABOVE			



NOTES:

1. PIPE RESTRAINING OR THRUST BLOCKING WILL BE USED FOR PLUGS, TEES, AND BENDS 22 ½° AND OVER.
2. PIPE RESTRAINING AS NOTED IN THE TABLE MAY BE USED IN LIEU OF THRUST BLOCKING AT THE CONTRACTOR'S DISCRETION.
3. IF NEXT JOINT BEYOND FITTING IS BEYOND RESTRAINT LENGTH, NO RESTRAINTS ARE NECESSARY.
4. PIPE RESTRAINING WILL BE ACCOMPLISHED THROUGH USE OF GALVANIZED TIE-RODS (¾" MINIMUM) OR MEGA-LUG FITTINGS, OR ENGINEER APPROVED EQUAL.
5. THRUST BLOCK WILL ONLY BE USED WHERE WORKING PRESSURES ARE 150 PSI OR LESS.
6. THRUST BLOCK BEARING AREA WILL BE PLACED AGAINST UNDISTURBED TRENCH AREA OR MATERIAL AS DIRECTED BY THE ENGINEER.
7. NO TIMBER WILL BE ALLOWED AS AN ALTERNATE TO CONCRETE FOR THRUST BLOCKING.
8. WRAP FITTINGS WITH POLYETHYLENE PRIOR TO PLACING CONCRETE FOR THRUST BLOCKING.



CITY OF BURNSVILLE - ENGINEERING DEPT.

WATERMAIN RESTRAINT & THRUST BLOCKING

Plate No.

WM-1

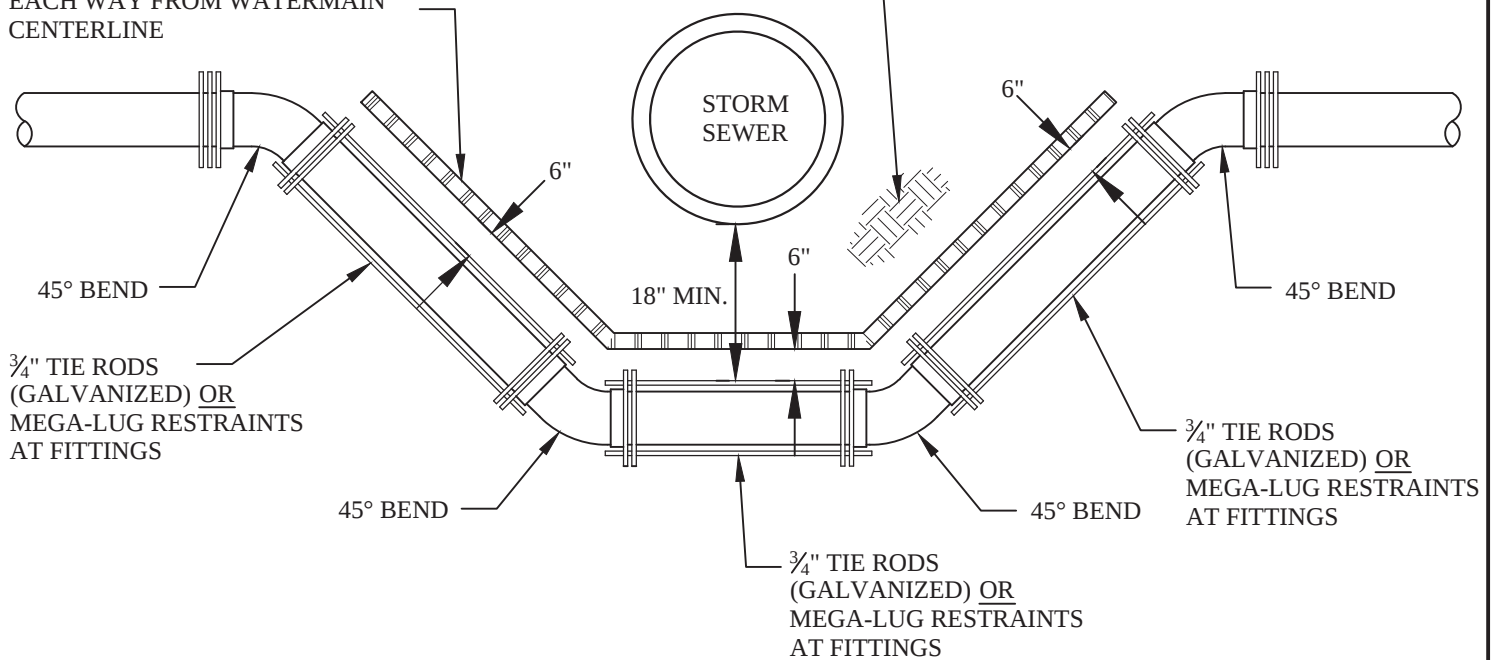
Revision Date

11/2013

File Location:

S:\Details\english\Watermain\WM01-Watermain Blocking.dwg

MIN. 4" THICK RIGID INSULATION
LAYER WITH JOINTS STAGGERED
AND EXTENDING A MINIMUM OF 48"
EACH WAY FROM WATERMAIN
CENTERLINE



NOTES

1. ALL JOINTS WILL BE MECHANICALLY RESTRAINED USING TIE RODS OR WITH MEGA-LUG JOINT RESTRAINTS.



CITY OF BURNSVILLE - ENGINEERING DEPT.
**LOWER AND INSULATE
WATERMAIN**

Plate No.

WM-2

Revision Date

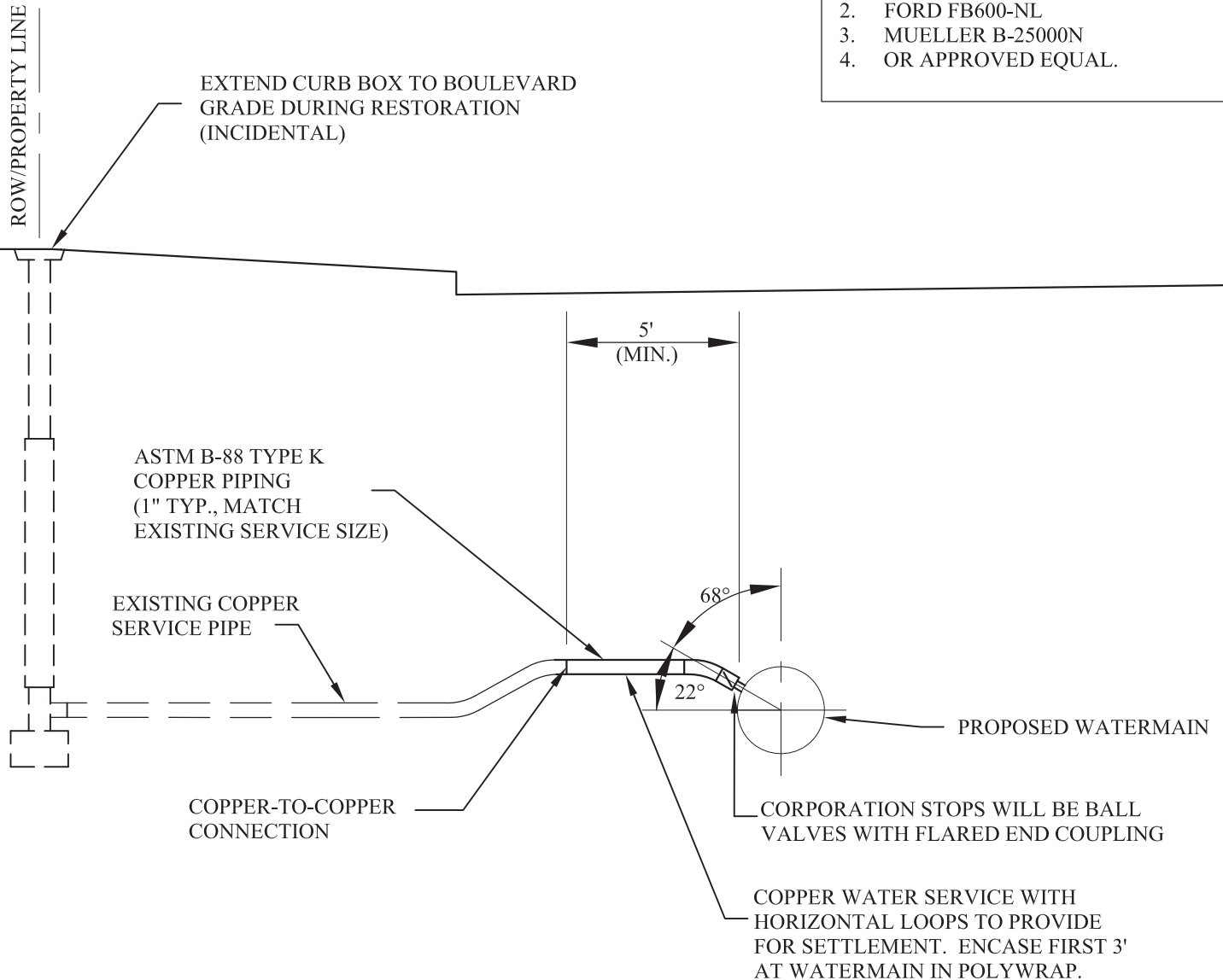
11/2013

File Location:

S:\Details\english\Watermain\WM02-LowerInsulate.dwg

ACCEPTABLE CORPORATION STOPS

1. A.Y. McDONALD 74701-B
2. FORD FB600-NL
3. MUELLER B-25000N
4. OR APPROVED EQUAL.



NOTES

1. MAINTAIN 18" VERTICAL AND 24" HORIZONTAL SEPARATION BETWEEN SEWER AND WATER SERVICE LINES.
2. CONNECTION TO EXISTING WATER SERVICE WILL BE MADE AT 5' (MIN.) FROM CORPORATION STOP.



CITY OF BURNSVILLE - ENGINEERING DEPT.
**EXISTING WATER
SERVICE CONNECTION**

Plate No.

WM-3

Revision Date

11/2013

File Location:

S:\Details\english\Watermain\WM03-Service Replace.dwg

ACCEPTABLE CURB BOXES

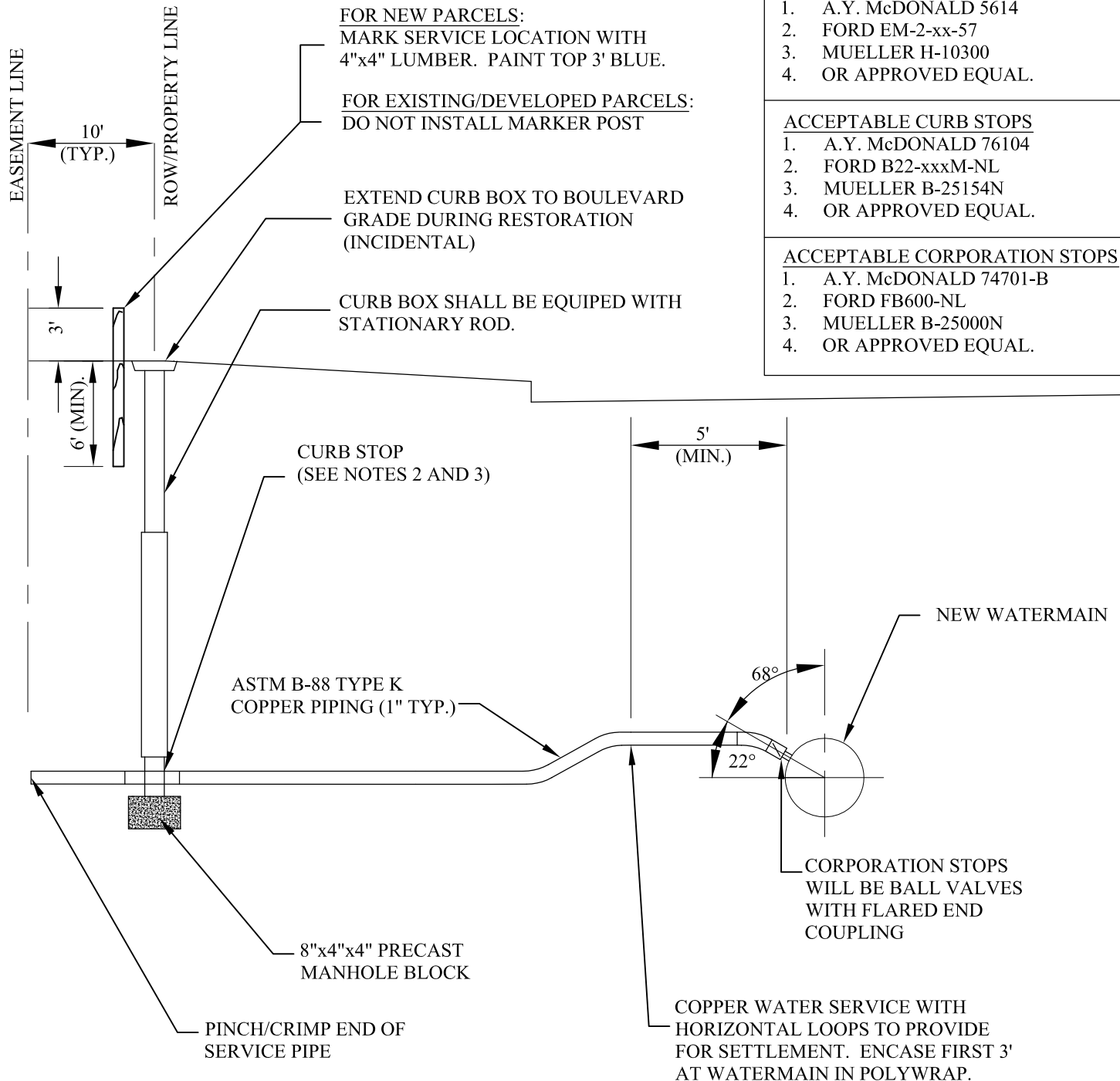
1. A.Y. McDONALD 5614
2. FORD EM-2-xx-57
3. MUELLER H-10300
4. OR APPROVED EQUAL.

ACCEPTABLE CURB STOPS

1. A.Y. McDONALD 76104
2. FORD B22-xxxM-NL
3. MUELLER B-25154N
4. OR APPROVED EQUAL.

ACCEPTABLE CORPORATION STOPS

1. A.Y. McDONALD 74701-B
2. FORD FB600-NL
3. MUELLER B-25000N
4. OR APPROVED EQUAL.



NOTES

1. MAINTAIN 18" VERTICAL AND 24" HORIZONTAL SEPARATION BETWEEN SEWER AND WATER SERVICE LINES.
2. CURB STOP WILL HAVE A SCREWED CONNECTION BETWEEN STOP AND BOX.
3. CURB STOP WILL USE FLARED END COUPLINGS ON BOTH ENDS.



CITY OF BURNSVILLE - ENGINEERING DEPT. NEW WATER SERVICE INSTALLATION

Plate No.

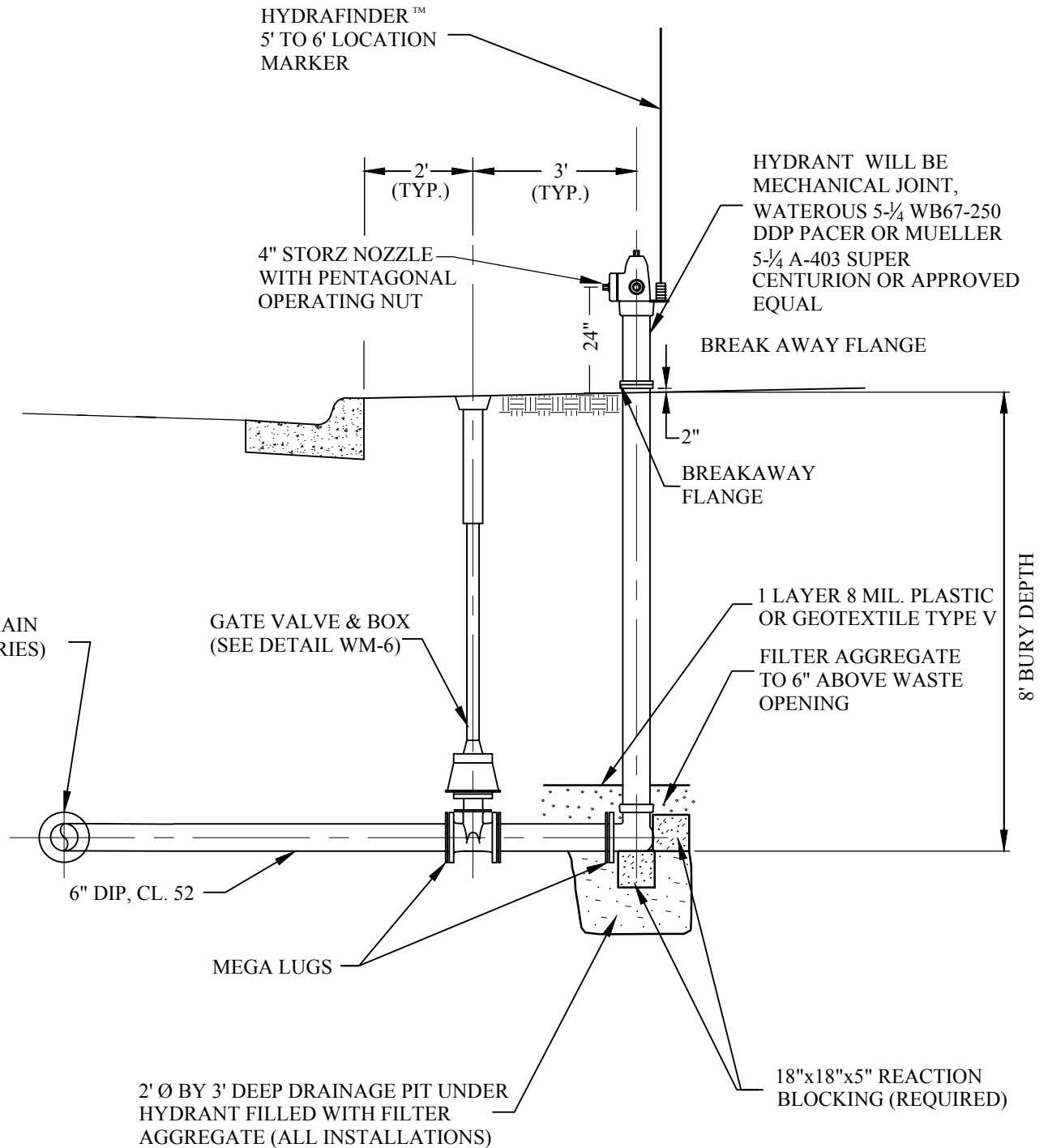
WM-4

Revision Date

11/2013

File Location:

S:\Details\english\Watermain\WM04-1InchS Service.dwg



CITY OF BURNSVILLE - ENGINEERING DEPT.

HYDRANT INSTALLATION

Plate No.

WM-5

Revision Date

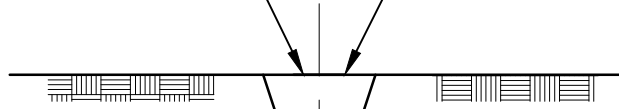
3/2019

File Location:

S:\Details\english\Watermain\WM05-HydInstall.dwg

VALVE BOX WILL BE SET $\frac{1}{2}$ " BELOW
PAVEMENT AND FLUSH (AT GRADE) IN
TURF AND SIDEWALK AREAS

COVER WILL BE
MARKED "WATER"

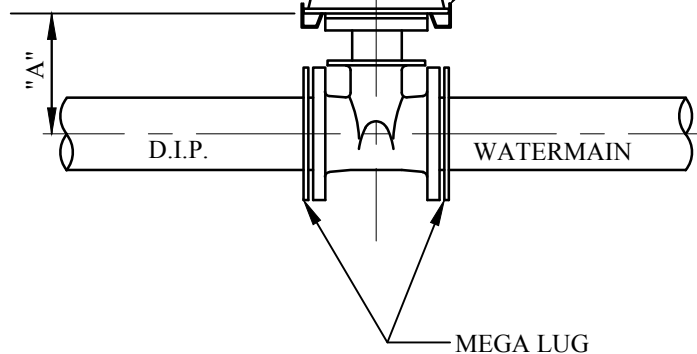


VALVE BOX WILL BE SET TO HAVE 6"
ADJUSTMENT UP AND DOWN FROM
FINISHED GRADE

VALVE BOX WILL BE
TYLER-UNION 6860-G SERIES
OR APPROVED EQUAL,
SCREW TYPE

GATE VALVE ADAPTOR AS
MANUFACTURED BY ADAPTOR
INC., OR APPROVED EQUAL
(SEE INSET A)

MEGA LUG



GATE VALVE ADAPTOR
 $\frac{1}{4}$ " STEEL WITH
PROTECTIVE
COATING

$\frac{1}{2}$ " RUBBER GASKET
INSTALLED BETWEEN
THE GATE VALVE AND
GATE VALVE ADAPTOR.

INSET A

VALVE SIZE	DIMENSION "A"
6"	10"
8"	14"



CITY OF BURNSVILLE - ENGINEERING DEPT.

VALVE BOX INSTALLATION

Plate No.

WM-6

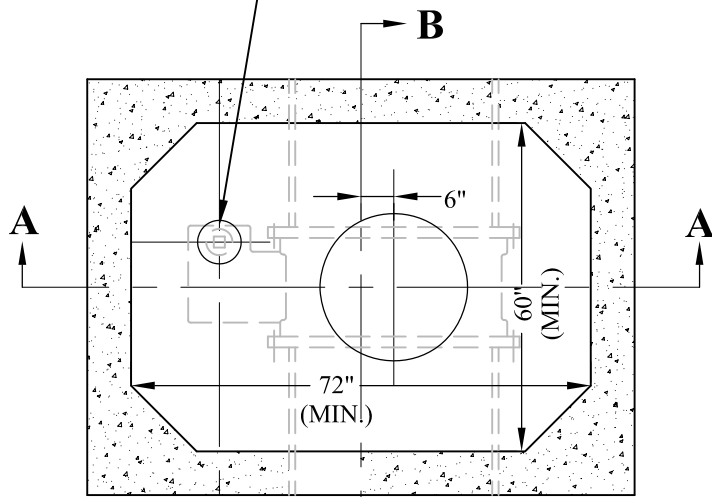
Revision Date

3/2019

File Location:

S:\Details\english\Watermain\WM06-Valve Box.dwg

GATE VALVE ACCESS HOLE TO
BE CORE DRILLED IN THE
FIELD AFTER VALVE
INSTALLATION (INCIDENTAL)



NOTES

1. EXTERNAL MANHOLE DIMENSIONS VARY BASED ON PRECAST REQUIREMENTS.
2. SEE PLANS FOR PIPE SIZE AND STRUCTURE ELEVATIONS.
3. ADJUSTING RING, MIN. 2, MAX 4. SEE MnDOT STD. PLATE 4026

NEENAH CASTING R-1642-B
WITH THE WORD "WATER"
STAMPED ON THE COVER,
OR APPROVED EQUAL.

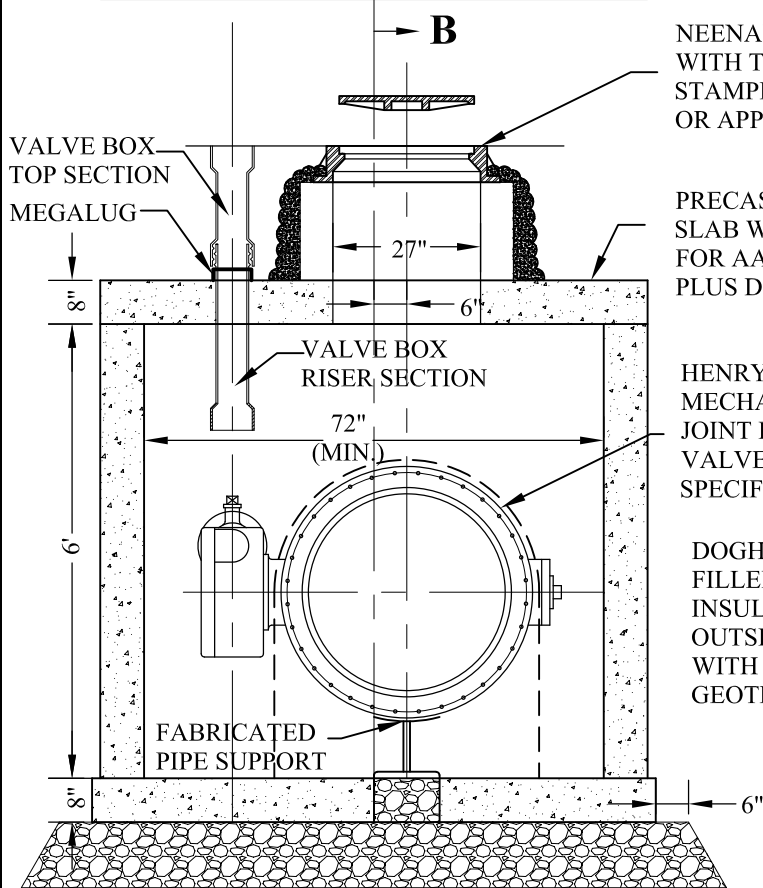
PRECAST CONCRETE TOP
SLAB WILL BE DESIGNED
FOR AASHTO HS-25 LOADING
PLUS DEAD LOAD

HENRY PRATT
MECHANICAL
JOINT BUTTERFLY
VALVE (AS
SPECIFIED)

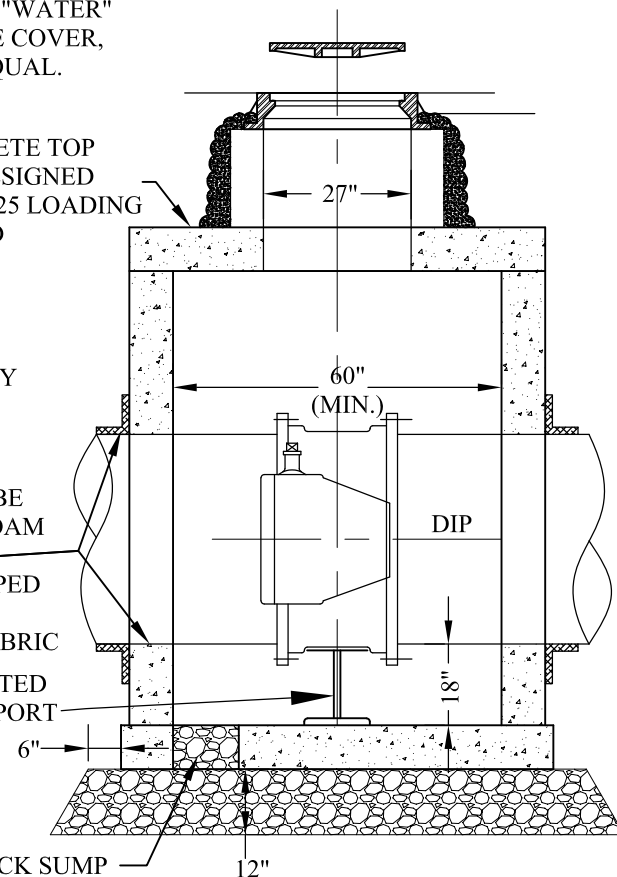
DOGHOUSE TO BE
FILLED WITH FOAM
INSULATION &
OUTSIDE WRAPPED
WITH TYPE V
GEOTEXTILE FABRIC

FABRICATED
PIPE SUPPORT

12" ROCK SUMP



SECTION A-A



SECTION B-B



CITY OF BURNSVILLE - ENGINEERING DEPT.
**PRECAST BUTTERFLY
VALVE MANHOLE**

Plate No.

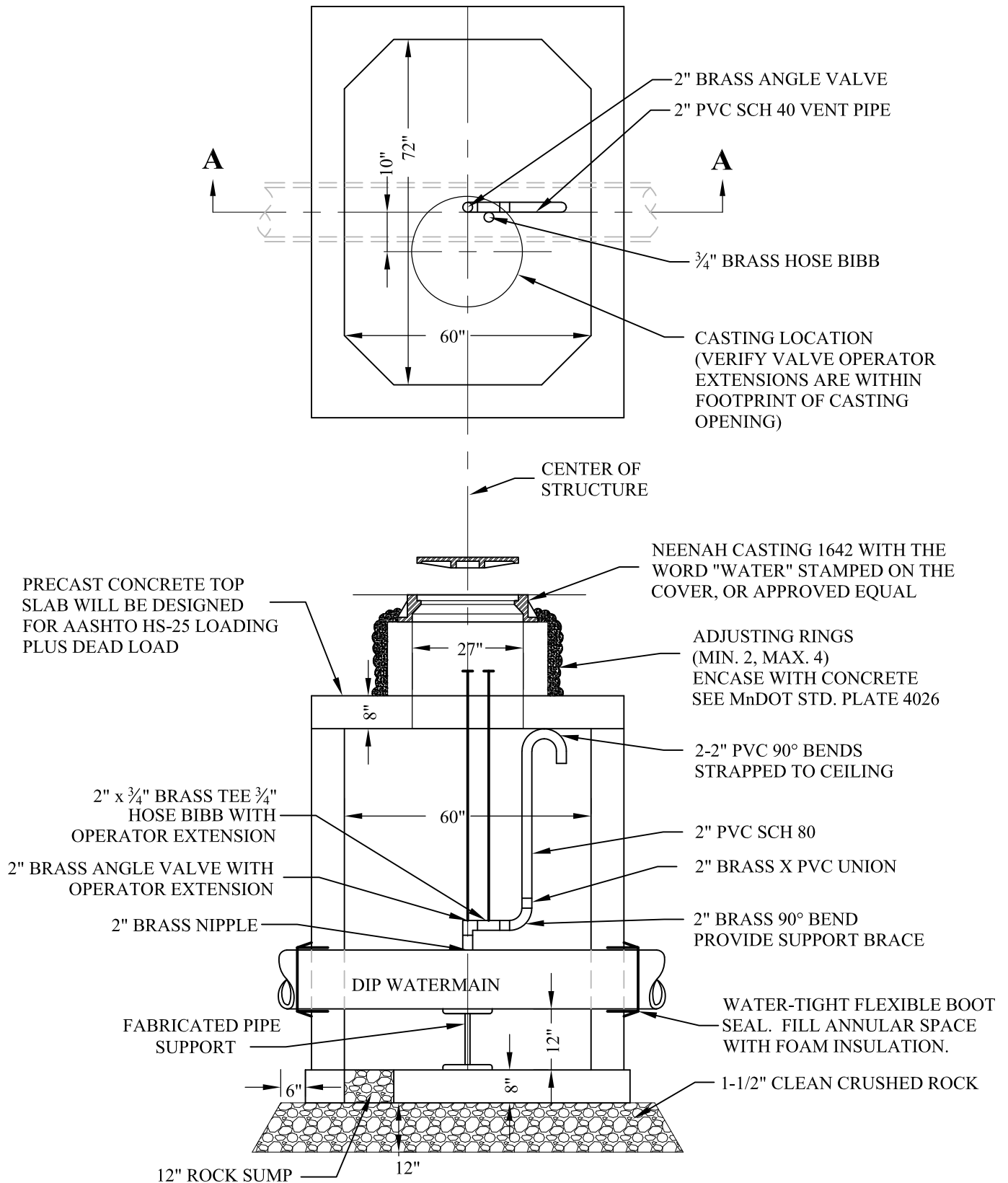
WM-7

Revision Date

02/2021

File Location:

S:\Details\english\Watermain\WM07-Butterfly_Valve_MH.dwg

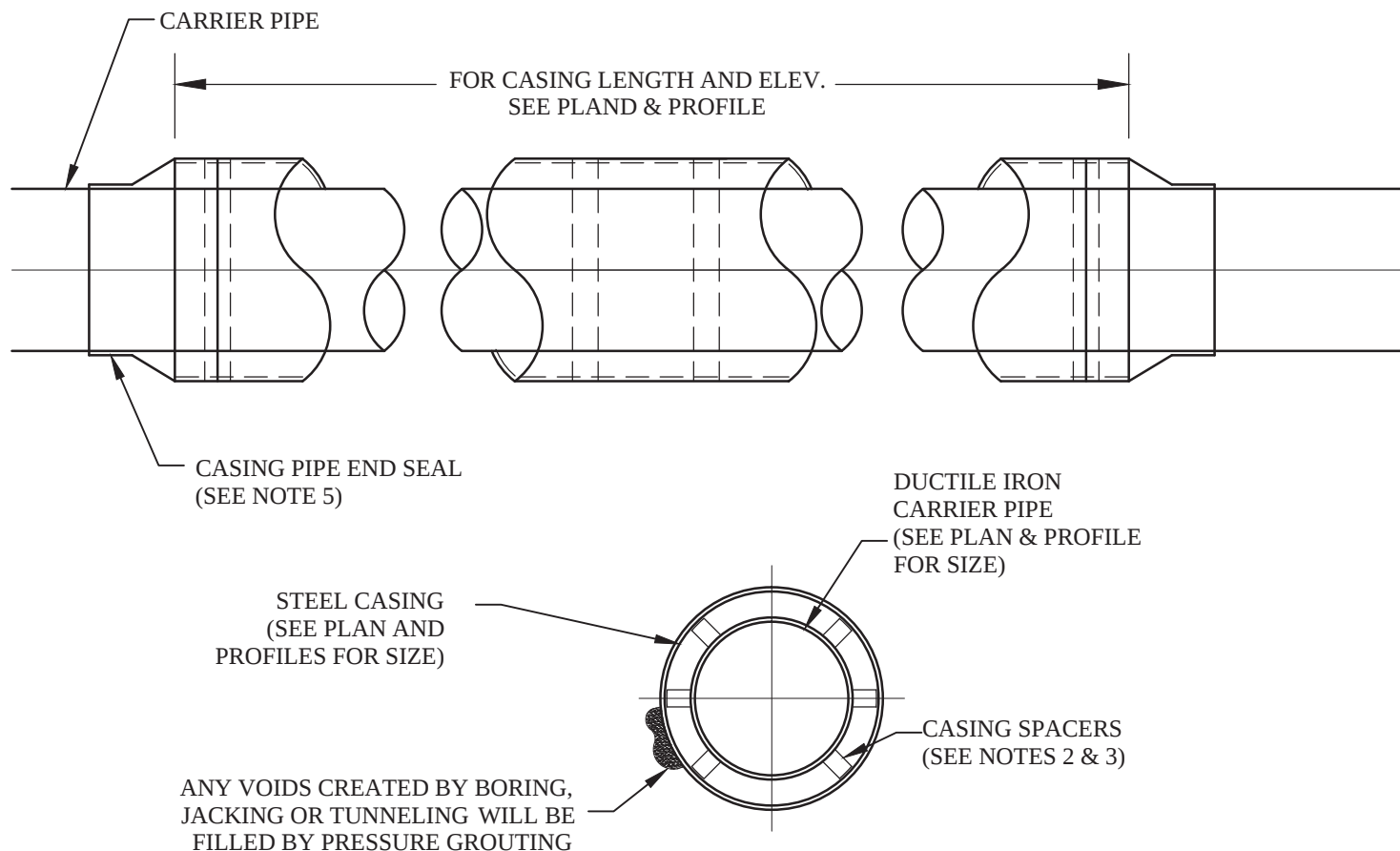


SECTION A-A



CITY OF BURNSVILLE - ENGINEERING DEPT. WATERMAIN AIR RELEASE MANHOLE (MANUAL)

Plate No.	WM-8
Revision Date	02/2021
File Location: S:\Details\english\Watermain\WM08_air_release.dwg	



WALL THICKNESS OF CASING PIPE				
DIAMETER	UP TO 12"	14" TO 24"	26" TO 34"	36" TO 72"
MINIMUM THICKNESS	1/4"	3/8"	1/2"	5/8"

CASING WILL BE SMOOTH STEEL PIPE

NOTES:

1. ALL JOINTS OF DUCTILE IRON CARRIER PIPE WITHIN CASING WILL BE FULLY RESTRAINED.
2. CASING SPACERS WILL BE HEAVY-DUTY PLASTIC OR STEEL. INSTALL SPACERS ON 10' CENTERS. INSTALL ADDITIONAL SPACERS AS NECESSARY FOR PLACEMENT WITHIN 2' OF THE ENDS OF THE CASING.
3. CASING SPACERS WILL BE CENTERED/RESTRAINED TYPE.
4. FILL ANNULAR SPACE BETWEEN CASING AND CARRIER PIPE WITH SAND.
5. CASING END SEALS WILL BE RUBBER AS MANUFACTURED BY ADVANCED PRODUCTS & SYSTEMS, INC., OR APPROVED EQUAL



CITY OF BURNSVILLE - ENGINEERING DEPT.
**WATERMAIN CASING
PIPE DETAIL**

Plate No. WM-9

Revision Date 11/2013

File Location:
S:\Details\english\Watermain\WM09-CasingPipe.dwg