
Appendix A

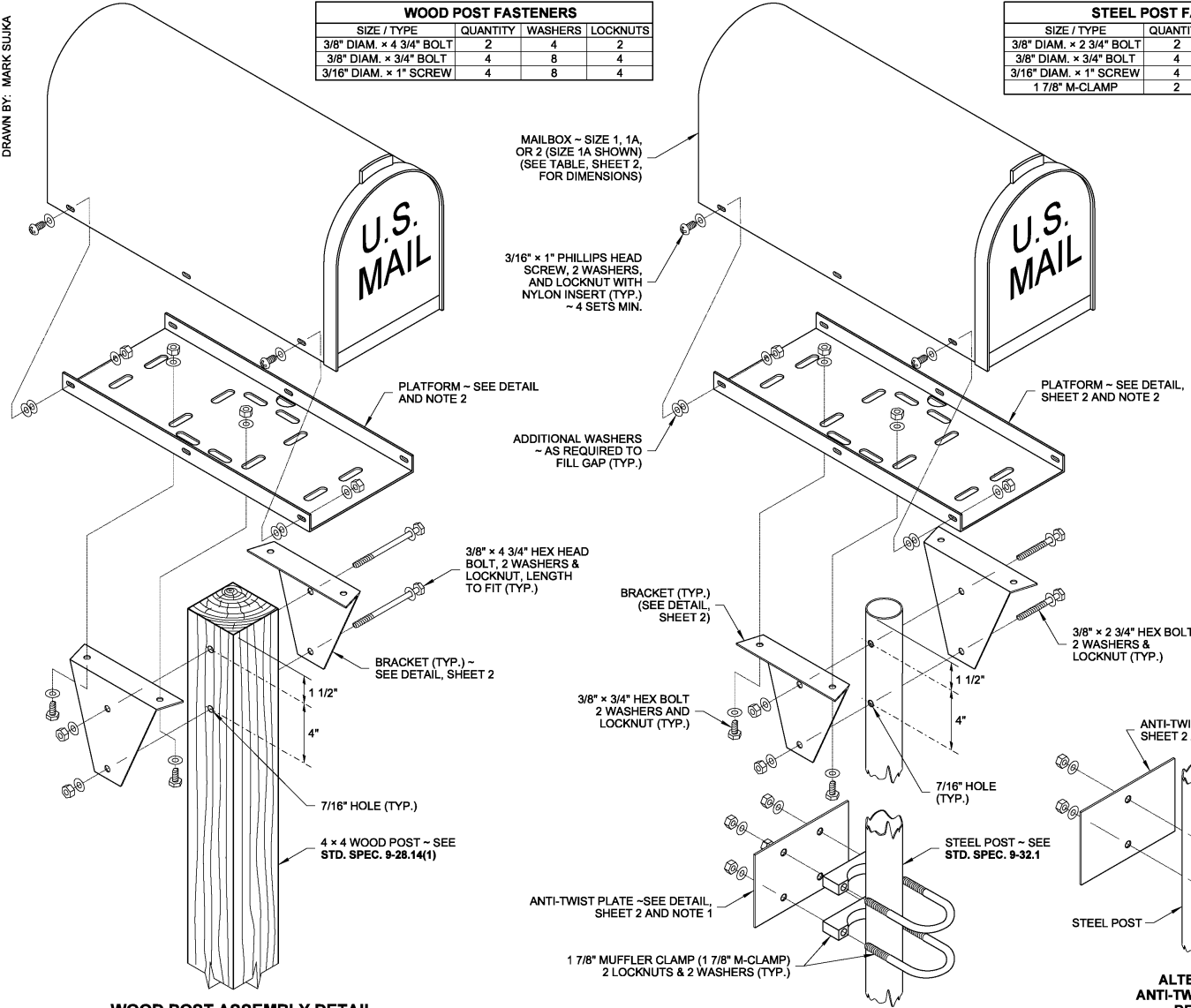
Standard Plans

401.0008 - STANDARD DETAILS FOR SPECS

JURISDICTION	DETAIL NUMBER	STANDARD DETAIL NAME
WSDOT	H-70.10-01	Single Mailbox Support Type 1
WSDOT	B-30.90-02	Catch Basin Adjustment Section
PIERCE COUNTY	1002	Concrete Manhole Collar
LAKEWOOD	MI-03	Valve Casing Adjustment & Restoration
WSDOT	B-30.30-03	Rectangular Vaned Grate
WSDOT	B-30.20-04	Rectangular Solid Metal Cover
WSDOT	B-30.10-03	Rectangular Frame (Reversible)
WSDOT	B-5.20-02	Catch Basin Type 1
WSDOT	B-10.20-02	Catch Basin Type 2
WSDOT	B-5.40-02	Catch Basin Type 1L
WSDOT	B-25.60-02	Concrete Inlet
WSDOT	I-40.20-00	Storm Drain Inlet Protection
LAKEWOOD	RW-03	Collector Arterial Street
LAKEWOOD	RW-04	Local Access Street
PIERCE COUNTY	PC. A7.1	Utility Patch (sheet 1 of 2)
PIERCE COUNTY	PC. A7.2	Utility Patch (sheet 2 of 2 notes)
WSDOT	M-20.10-02	Longitudinal Marking Patterns
LAKEWOOD	FR-01	Residential Driveway
LAKEWOOD	FR-04	Curbs
CONTECH	STD. PLAN	Contech - Stormwater Management Stormfilter
CONTECH	STD. PLAN	Contech - 4 - Cartridge Catchbasin Stormfilter
HYDRO INT.	STD. PLAN	Hydro International - 4 ft Diam. Downstream Defender
HYDRO INT.	STD. PLAN	Hydro International - 6 ft Diam. Downstream Defender

WOOD POST FASTENERS			
SIZE / TYPE	QUANTITY	WASHERS	LOCKNUTS
3/8" DIAM. x 4 3/4" BOLT	2	4	2
3/8" DIAM. x 3/4" BOLT	4	8	4
3/16" DIAM. x 1" SCREW	4	8	4

STEEL POST FASTENERS			
SIZE / TYPE	QUANTITY	WASHERS	LOCKNUTS
3/8" DIAM. x 2 3/4" BOLT	2	4	2
3/8" DIAM. x 3/4" BOLT	4	8	4
3/16" DIAM. x 1" SCREW	4	8	4
1 7/8" M-CLAMP	2	4	4



NOTES

1. A socket and wedge anchoring system that meets the NCHRP 350 crash test criteria may be substituted in lieu of the anti-twist plate designs shown. Anti-twist plates are not required for wood post installations.
2. The platform design shown on this plan features slots that accommodate several types of mailbox supports; only those slots necessary for assembling the type being installed are required. An adjustable platform may be used in lieu of this design, but it must fit the bracket design shown on this plan. Brackets are required for all single-post installations. Field drilling may be necessary.
3. Center the mailbox on the platform to ensure space for the mailbox door to open and to allow space for installing the fasteners (see ALIGNMENT DETAIL, Sheet 2). Spacing of mailbox mounting holes varies among manufacturers. Attachment of the mailbox to the platform may require drilling additional holes through the mailbox to fit the platform.
4. Attach a newspaper box to a steel post with two 1 7/8" Muffler Clamps spaced 4" apart. Field drill 7/16" holes in the newspaper box to fit. Use 2 1/2" x 1/4" lag bolts to attach newspaper boxes to wood posts. Newspaper boxes must not extend beyond the front of the mailbox when the mailbox door is closed.
5. A Type 2 Support (Standard Plan H-70.20) is required when 2 or more mailboxes are to be installed on one support.



MAILBOX SUPPORT TYPE 1 STANDARD PLAN H-70.10-01

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION

Pasco Bakotich III

STATE DESIGN ENGINEER



Washington State Department of Transportation

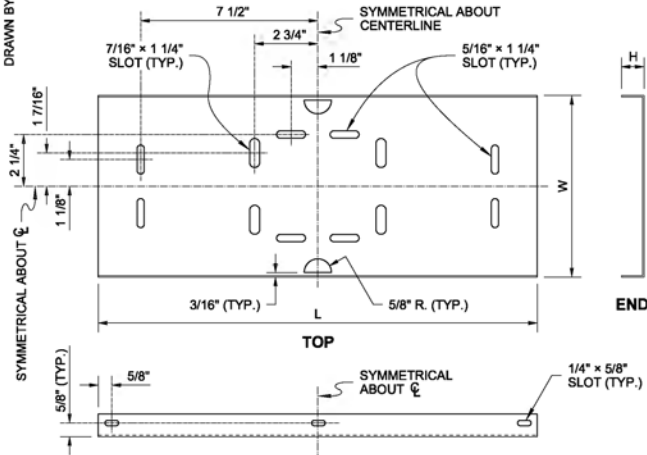
NOTE: THIS PLAN IS AN ILLUSTRATION OF A STANDARD DESIGN. IT IS NOT A CONTRACT DOCUMENT. THE ORIGINAL, SIGNED BY THE ENGINEER, SHALL BE SUBMITTED TO THE STATE OF WASHINGTON FOR REVIEW AND APPROVAL. A COPY MAY BE OBTAINED UPON REQUEST.

02-07-12

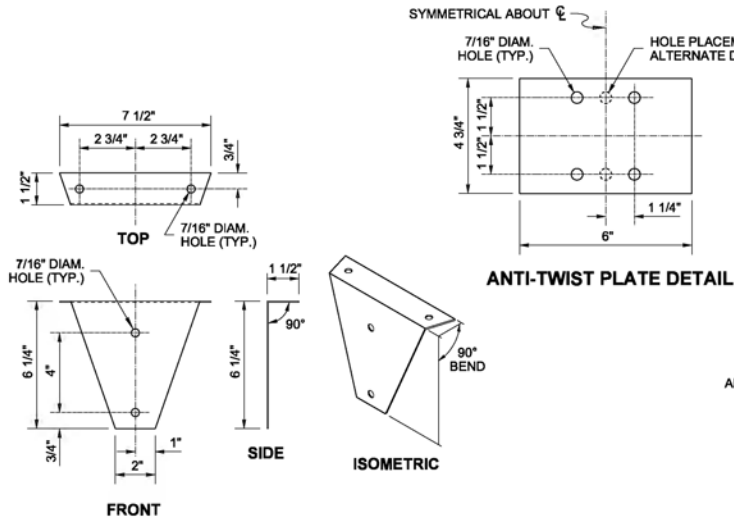
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DRAWN BY: MARK SUJKA

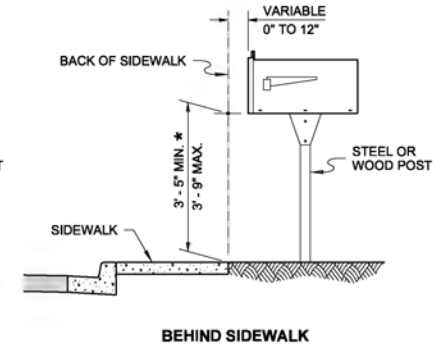
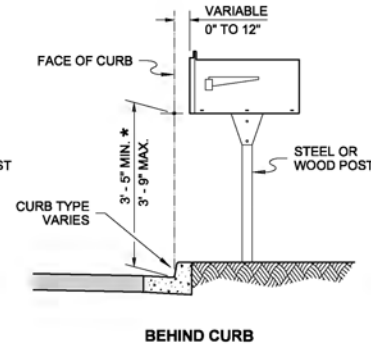
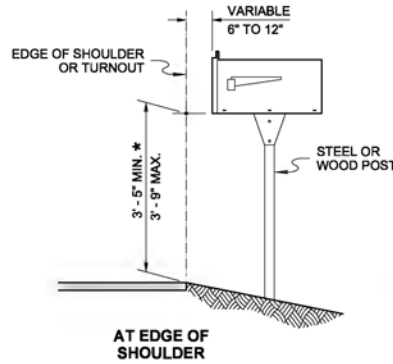
MAILBOX & PLATFORM DIMENSIONS							
SIZE	MAILBOX DIMENSIONS			PLATFORM DIMENSIONS			
	L	W	H	L	W	H	
1	19"	6 1/2"	8 1/2"	17"	6"	1"	
1A	21"	8"	10 1/2"	19"	7 1/2"	1"	
2	24"	11 1/2"	13 1/2"	21"	11"	1"	



PLATFORM DETAIL

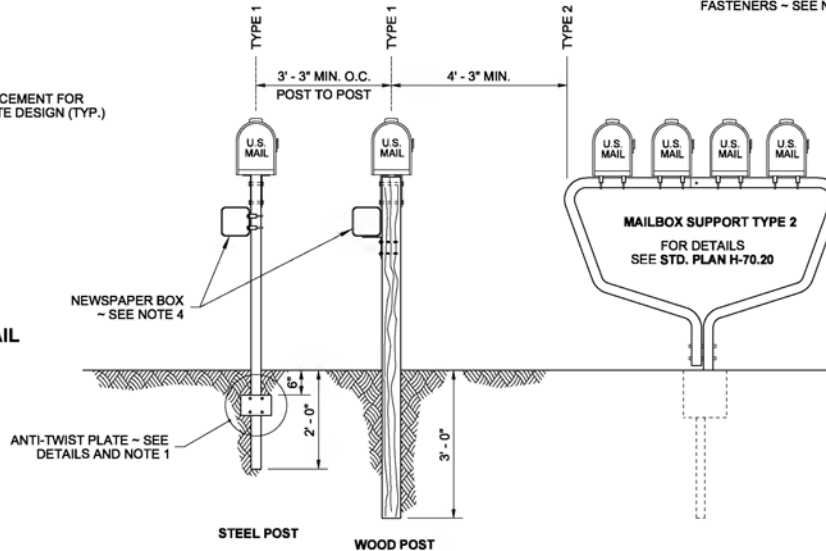
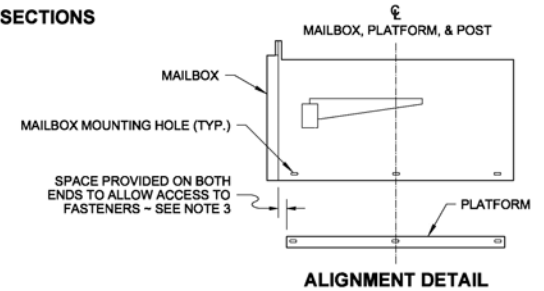


BRACKET DETAIL



* UNLESS OTHERWISE SHOWN IN THE PLANS

MAILBOX PLACEMENT SECTIONS



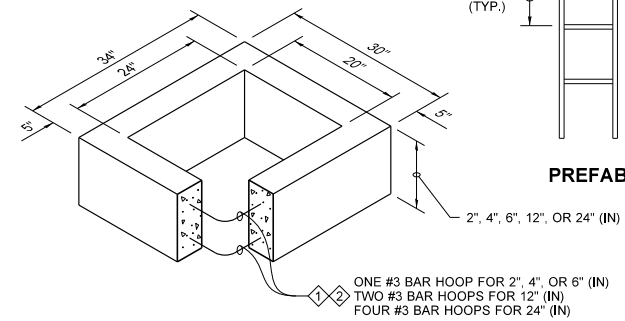
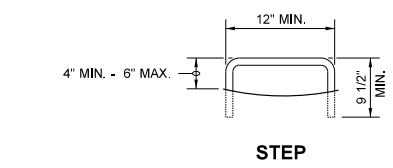
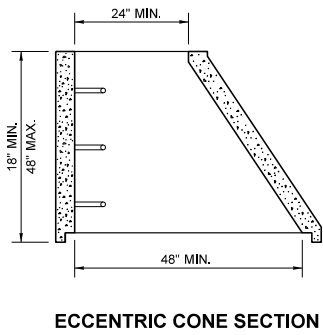
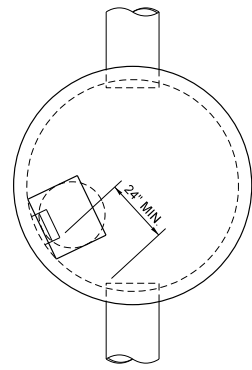
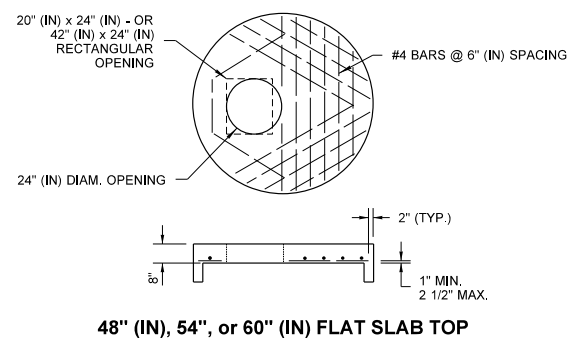
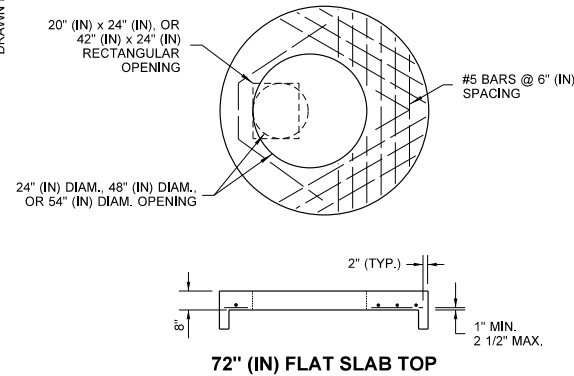
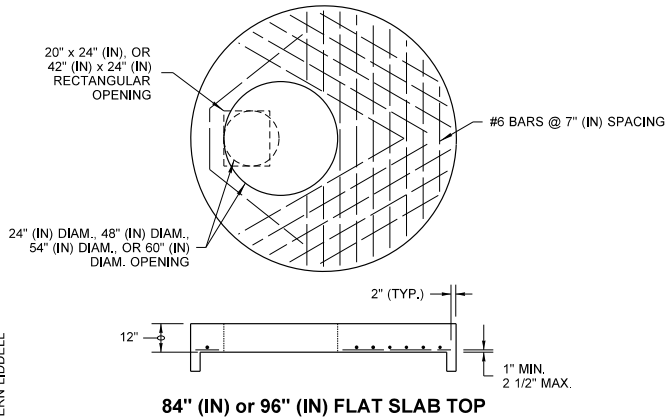
POST PLACEMENT DETAIL



NOTE: THIS PLAN IS AN ELECTRICAL ENGINEERING DOCUMENT. THE ORIGINAL, SIGNED BY THE ENGINEER, MUST BE SUBMITTED WITH THE PERMIT APPLICATION. A COPY MAY BE OBTAINED UPON REQUEST.

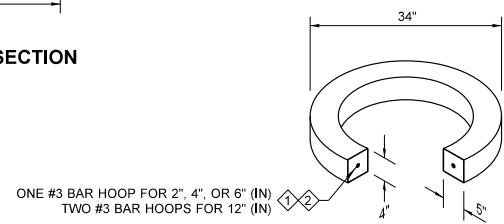
MAILBOX SUPPORT
TYPE 1
STANDARD PLAN H-70.10-01
SHEET 2 OF 2 SHEETS

DRAWN BY: FERN LIDDELL



RECTANGULAR ADJUSTMENT SECTION

- ① As an acceptable alternative to rebar, wire mesh having a minimum area of 0.12 square inches per foot may be used for adjustment sections.
- ② As an acceptable alternative to conventional steel reinforcement, manufacturers shall use Synthetic Structural Fibers meeting the requirements of **Standard Specification Section 9-05.50(10)**.



CIRCULAR ADJUSTMENT SECTION
For rectangular and circular adjustment sections, approved alternate material compositions are acceptable in lieu of precast concrete designs

NOTE

- 1. Ladder rungs for manholes and catch basins shall meet the requirements of **AASHTO M 199**.



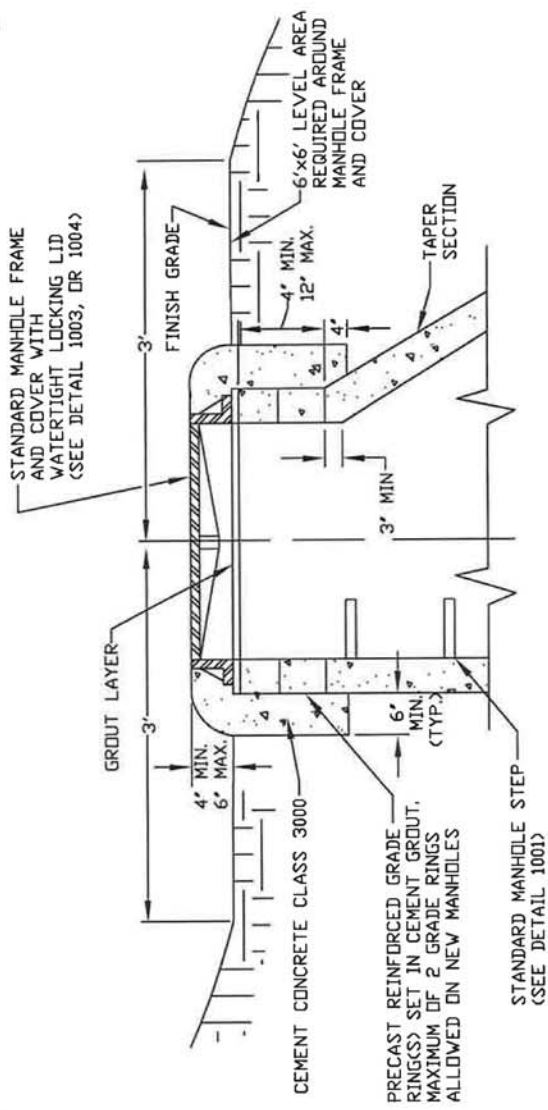
Heilman, Julie
Jan 25 2017 3:01 PM

MISCELLANEOUS DETAILS FOR DRAINAGE STRUCTURES STANDARD PLAN B-30.90-02

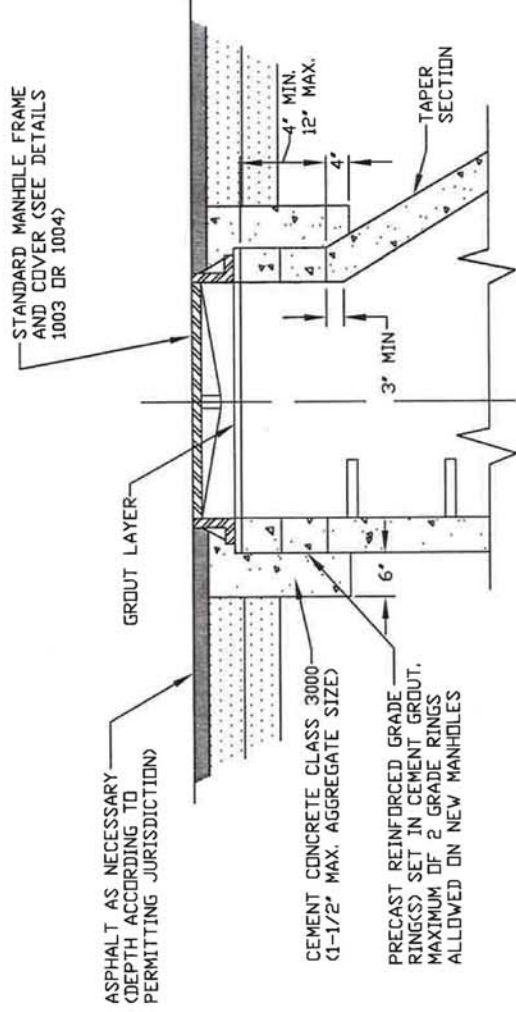
SHEET 1 OF 1 SHEET

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STATE DESIGN ENGINEER
Washington State Department of Transportation



NON-PAVED AREA



PAVED AREA



PIERCE COUNTY PUBLIC WORKS & UTILITIES DEPARTMENT
SEWER UTILITY DIVISION
9850 64TH STREET WEST
UNIVERSITY PLACE, WASHINGTON 98467-1078
(253) 798-4050

STANDARD DETAILS

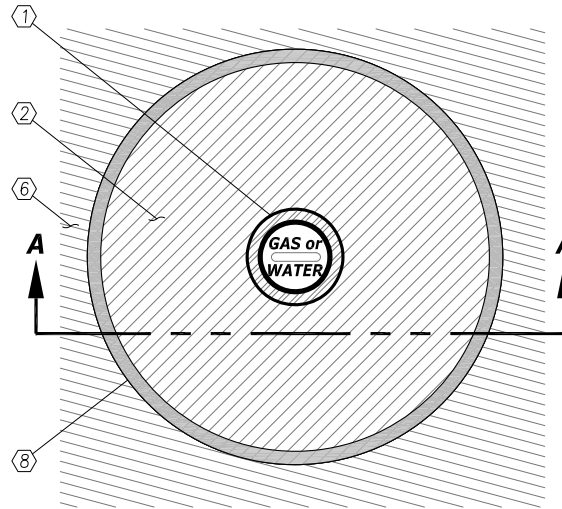
CONCRETE MANHOLE COLLAR

DATE
12/26/2012
SCALE
NTS

STANDARD DETAIL NO.

1002

PAGE 1 OF 1



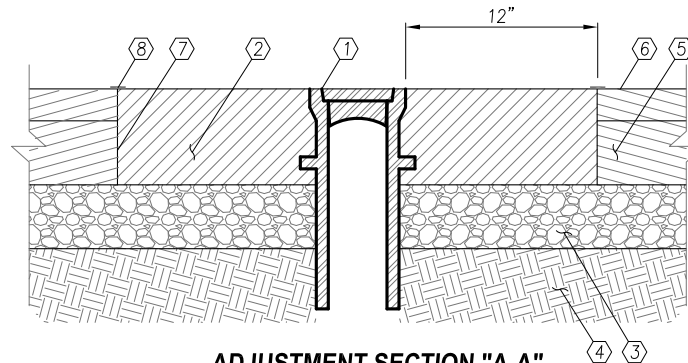
RESTORATION PLAN

CONSTRUCTION NOTES:

- ① NEW OR EXISTING FRAME AND GRATE OR SOLID LID
- ② 6" HMA (2) 3" LIFTS
- ③ 4" CSTC
- ④ COMPACTED SUBGRADE
- ⑤ EXISTING HMA
- ⑥ NEW 2" HMA OVERLAY OR HMA PATCH
- ⑦ TACK COAT
- ⑧ JOINT SEAL

GENERAL NOTES:

- 1. MATERIALS AND CONSTRUCTION REQUIREMENTS SHALL BE PER LATEST EDITION OF WSDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION UNLESS OTHERWISE NOTED.
- 2. NEW CASTING MAY BE PROVIDED BY UTILITY.



ADJUSTMENT SECTION "A-A"

APPROVED FOR PUBLICATION

Paul A. Bucich
Paul A. Bucich, P.E.
PUBLIC WORKS DIRECTOR/CITY ENGINEER

01/10/20
DATE



Public Works Department

DATE	REVISION DESCRIPTION	BY	APPROVED
11/05/19	ORIGINAL DRAWING	AD/CD	PAB

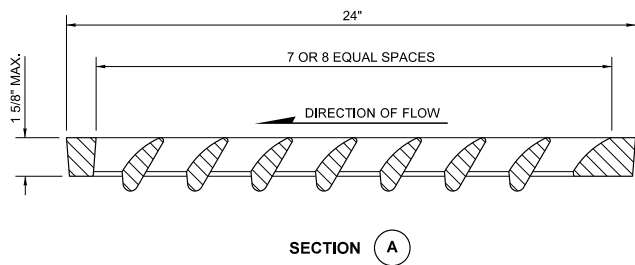
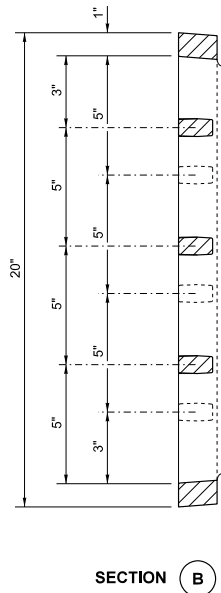
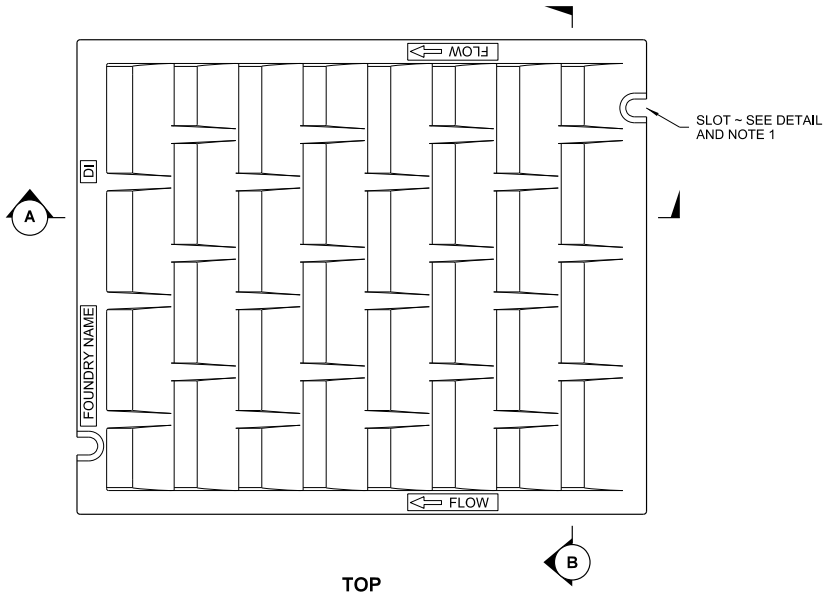
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NOT TO SCALE

**Valve Casing
Adjustment and Restoration**

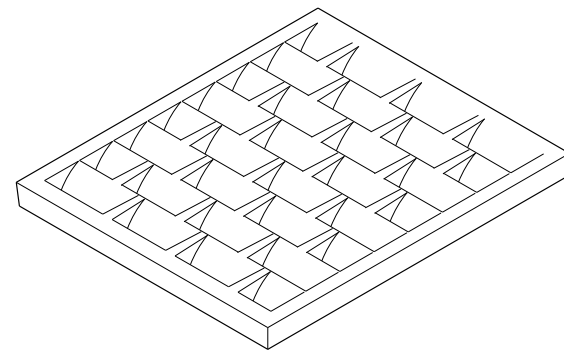
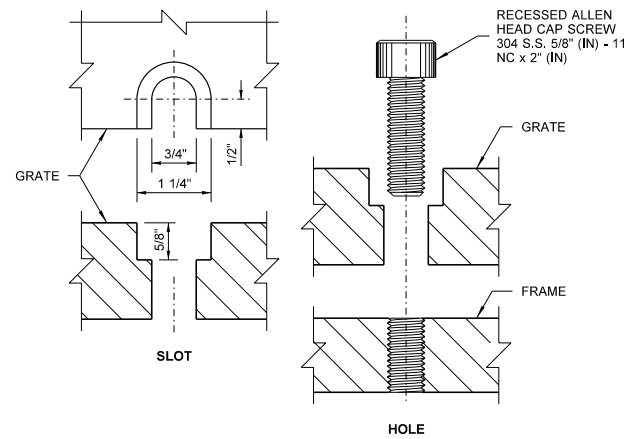
MI-03

DRAWN BY: FERN LIDDELL



NOTES

1. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC x 2" (in) allen head cap screw by being tapped, or other approved mechanism. Location of bolt-down holes varies by manufacturer.
2. Refer to **Standard Specification Section 9-05.15** and **9-05.15(2)** for additional requirements.
3. For frame details, see **Standard Plan B-30.10**.



ISOMETRIC



Heilman, Julie
Feb 20 2018 12:54 PM

**RECTANGULAR
VANED GRATE**

STANDARD PLAN B-30.30-03

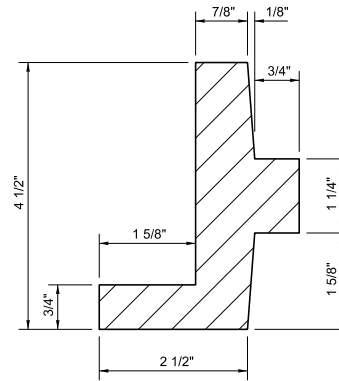
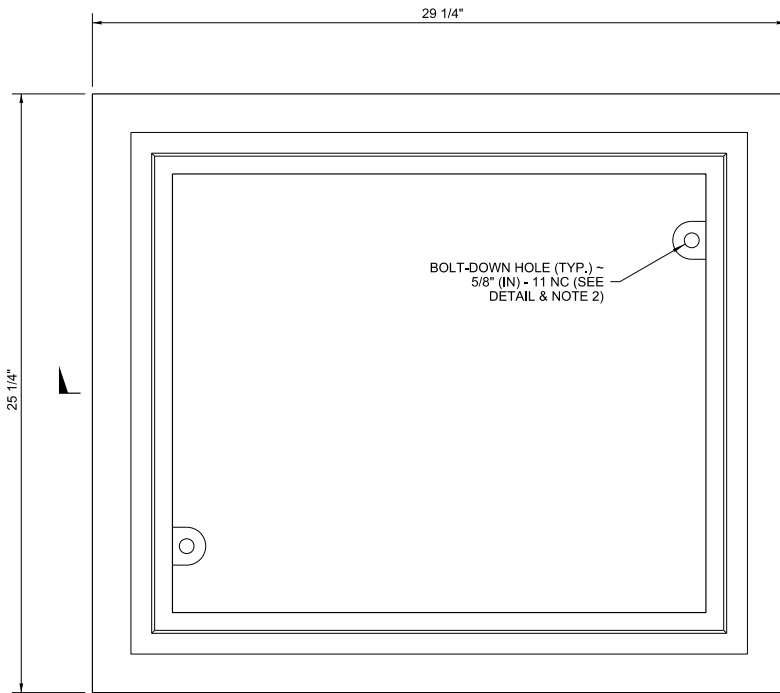
SHEET 1 OF 1 SHEET

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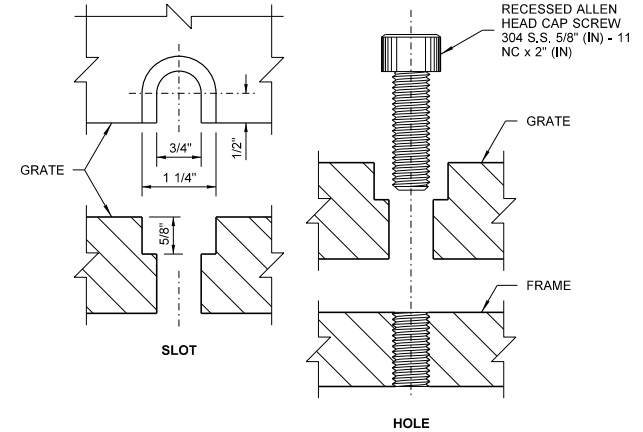
Capriotti, Jeff
Feb 27 2018 7:58 AM

STATE DESIGN ENGINEER

Washington State Department of Transportation

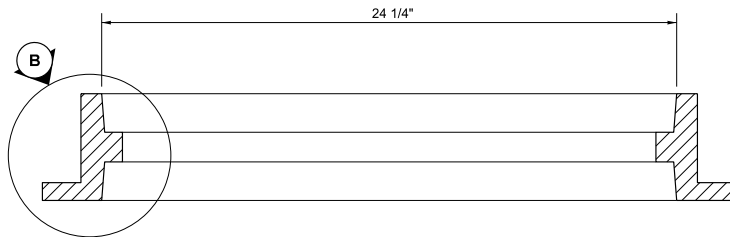


DETAIL B

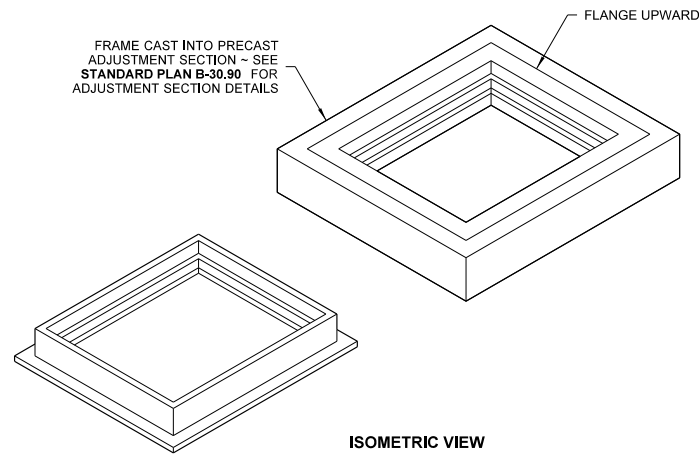


BOLT-DOWN DETAILS
SEE NOTE 2

TOP



SECTION A



ISOMETRIC VIEW
SHOWING THE VARIATIONS

NOTES

1. This frame is designed to accommodate 20" (in) x 24" (in) grates or covers as shown on **Standard Plans B-30.20, B-30.30, B-30.40, and B-30.50.**
2. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC x 2" (in) allen head cap screw by being tapped, or other approved mechanism. Location of bolt-down holes varies by manufacturer.
3. Refer to **Standard Specification Section 9-05.15 and 9-05.15(2)** for additional requirements.



Julie Heilman
Heilman, Julie
Feb 20 2018 12:52 PM
Carpenter, Jeff

**RECTANGULAR FRAME
(REVERSIBLE)**

STANDARD PLAN B-30.10-03

SHEET 1 OF 1 SHEET

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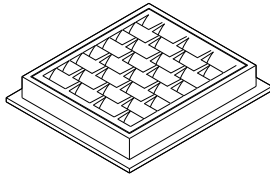
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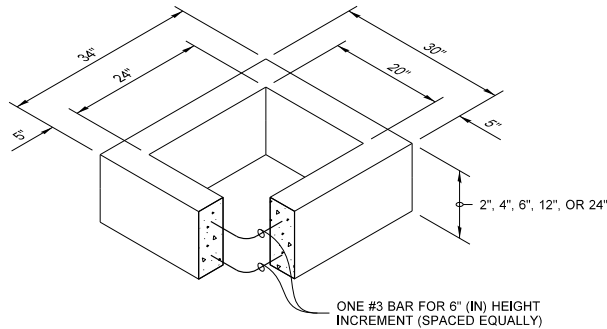


Washington State Department of Transportation

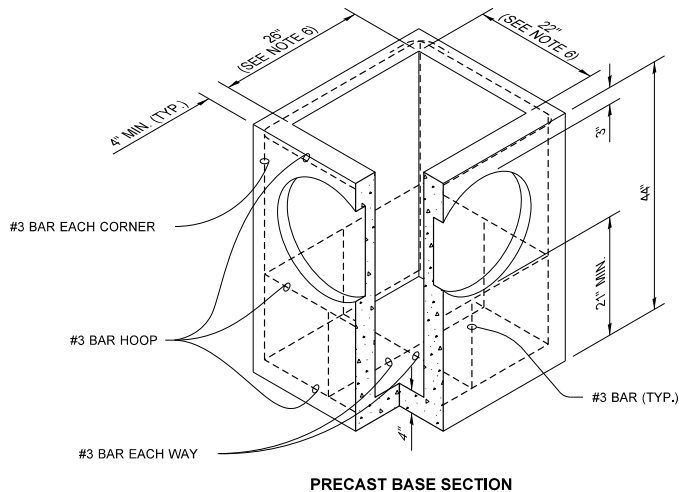
DRAWN BY: LISA CYFORD



FRAME AND VANED GRATE



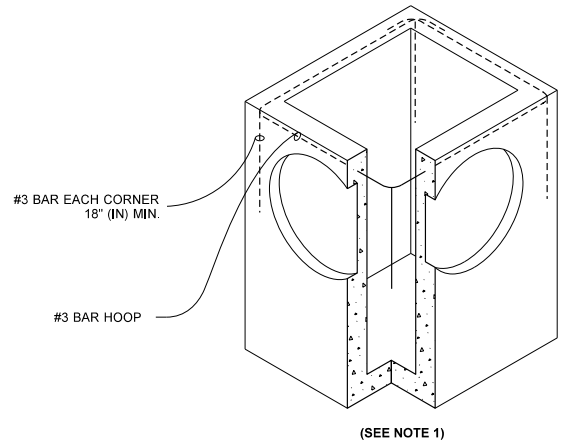
RECTANGULAR ADJUSTMENT SECTION



PRECAST BASE SECTION

PIPE ALLOWANCES	
PIPE MATERIAL	MAXIMUM INSIDE DIAMETER (INCHES)
REINFORCED OR PLAIN CONCRETE	12"
ALL METAL PIPE	15"
CPSSP ★ (STD. SPEC. SECT. 9-05.20)	12"
SOLID WALL PVC (STD. SPEC. SECT. 9-05.12(1))	15"
PROFILE WALL PVC (STD. SPEC. SECT. 9-05.12(2))	15"

★ CORRUGATED POLYETHYLENE STORM SEWER PIPE



ALTERNATIVE PRECAST BASE SECTION

NOTES

1. As acceptable alternatives to the rebar shown in the **PRECAST BASE SECTION**, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the **ALTERNATIVE PRECAST BASE SECTION**. Wire mesh shall not be placed in the knockouts.
2. The knockout diameter shall not be greater than 20" (in). Knockouts shall have a wall thickness of 2" (in) minimum to 2.5" (in) maximum. Provide a 1.5" (in) minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with **Standard Specification Section 9-04.3**.
3. The maximum depth from the finished grade to the lowest pipe invert shall be 5' (ft).
4. The frame and grate may be installed with the flange down, or integrally cast into the adjustment section with flange up.
5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1 : 24 or steeper.
6. The opening shall be measured at the top of the **Precast Base Section**.
7. All pickup holes shall be grouted full after the basin has been placed.



Julie Heilman
Heilman, Julie
Jan 25 2017 2:53 PM
cogin

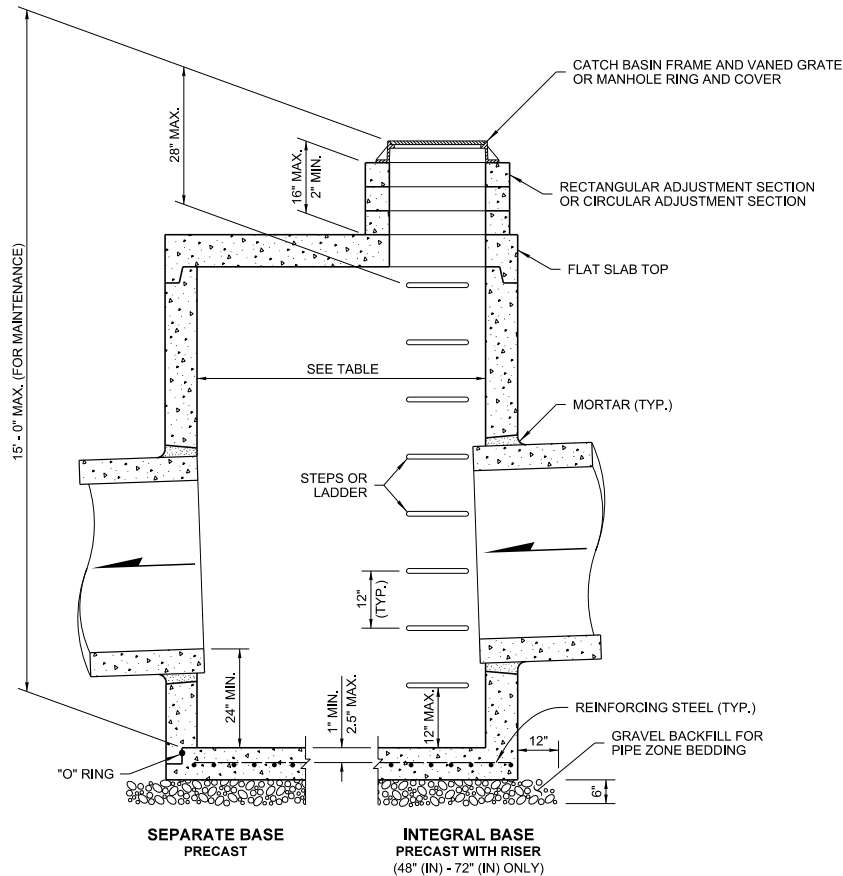
CATCH BASIN TYPE 1

STANDARD PLAN B-5.20-02

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jan 26 2017 6:48 AM
cogin





NOTES

1. No steps are required when height is 4' or less.
2. The bottom of the precast catch basin may be sloped to facilitate cleaning.
3. The rectangular frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.
4. Knockouts shall have a wall thickness of 2" (in) minimum to 2.5" (in) maximum. Provide a 1.5" (in) minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with **Standard Specification Section 9-04.3**.

CATCH BASIN DIMENSIONS

CATCH BASIN DIAMETER	MIN. WALL THICKNESS	MIN. BASE THICKNESS	MAXIMUM KNOCKOUT SIZE	MINIMUM DISTANCE BETWEEN KNOCKOUTS
48"	4"	6"	36"	8"
54"	4.5"	8"	42"	8"
60"	5"	8"	48"	8"
72"	6"	8"	60"	12"
84"	8"	12"	72"	12"
96"	8"	12"	84"	12"
120"	10"	12"	96"	12"
144"	12"	12"	108"	12"

PIPE ALLOWANCES

CATCH BASIN DIAMETER	PIPE MATERIAL WITH MAXIMUM INSIDE DIAMETER				
	CONCRETE	ALL METAL	CPSSP PP ①	SOLID WALL PVC ②	PROFILE WALL PVC ③
48"	24"	30"	24"	30"	30"
54"	30"	36"	30"	36"	36"
60"	36"	42"	36"	42"	42"
72"	42"	54"	42"	48"	48"
84"	54"	60"	54"	48"	48"
96"	60"	72"	60"	48"	48"
120"	66"	84"	60"	48"	48"
144"	78"	96"	60"	48"	48"

- ① Corrugated Polyethylene Storm Sewer Pipe (See **Standard Specification Section 9-05.20**)
- ② (See **Standard Specification Section 9-05.12(1)**)
- ③ (See **Standard Specification Section 9-05.12(2)**)
- ④ Polypropylene Pipe (See **Standard Specification Section 9-05.24**)



Heilman, Julie
Feb 20 2018 12:49 PM
CATCH BASIN TYPE 2

STANDARD PLAN B-10.20-02

SHEET 1 OF 1 SHEET

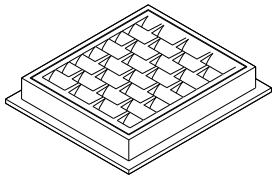
APPROVED FOR PUBLICATION

Carpete, Jeff
Mar 2 2018 10:01 AM

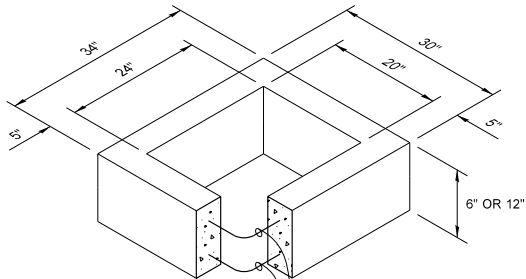
STATE DESIGN ENGINEER



Washington State Department of Transportation

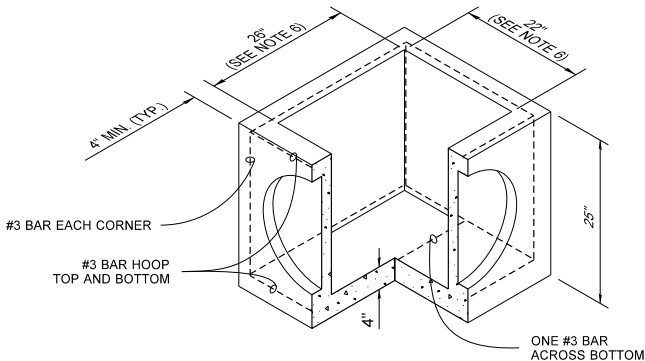


FRAME AND VANED GRATE



ONE #3 BAR HOOP FOR 6" (IN) HEIGHT
TWO #3 BAR HOOPS FOR 12" (IN) HEIGHT

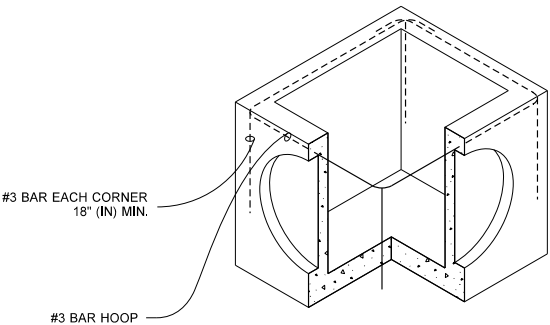
RECTANGULAR ADJUSTMENT SECTION



PRECAST BASE SECTION

PIPE ALLOWANCES	
PIPE MATERIAL	MAXIMUM INSIDE DIAMETER (INCHES)
REINFORCED OR PLAIN CONCRETE	12"
ALL METAL PIPE	15"
CPSSP ★ (STD. SPEC. SECT. 9-05.20)	12"
POLYPROPYLENE (STD. SPEC. SECT. 9-05.24)	12"
SOLID WALL PVC (STD. SPEC. SECT. 9-05.12(1))	15"
PROFILE WALL PVC (STD. SPEC. SECT. 9-05.12(2))	15"

★ CORRUGATED POLYETHYLENE
STORM SEWER PIPE



SEE NOTE 1

ALTERNATIVE PRECAST BASE SECTION

NOTES

1. As acceptable alternatives to the rebar shown in the **PRECAST BASE SECTION**, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the **ALTERNATIVE PRECAST BASE SECTION**. Wire mesh shall not be placed in the knockouts.
2. The knockout diameter shall not be greater than 18" (in) . Knockouts shall have a wall thickness of 2" (in) minimum to 2.5" (in) maximum. Provide a 1.5" (in) minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with **Standard Specification Section 9-04.3**.
3. The maximum depth from the finished grade to the lowest pipe invert shall be 5' (ft).
4. The frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.
5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1 : 24 or steeper.
6. The opening shall be measured at the top of the precast base section.
7. All pickup holes shall be grouted full after the inlet has been placed.



Julie Heilman
Heilman, Julie
Feb 20 2018 12:51 PM
cogsw

CONCRETE INLET

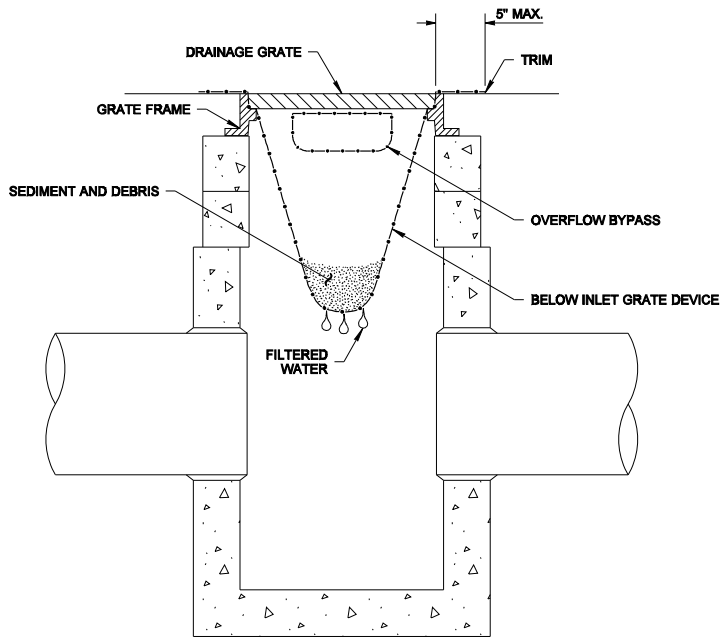
STANDARD PLAN B-25.60-02

SHEET 1 OF 1 SHEET

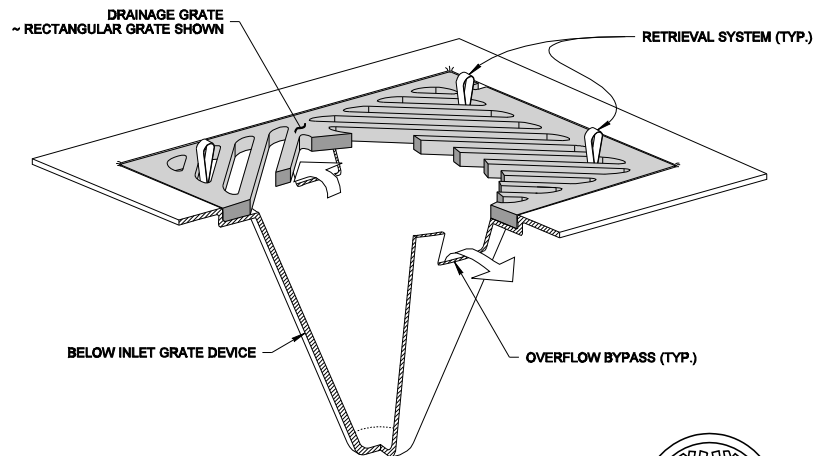
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Feb 27 2018 7:43 AM

STATE DESIGN ENGINEER
Washington State Department of Transportation



SECTION VIEW
NOT TO SCALE



ISOMETRIC VIEW

NOTES

1. Size the Below Inlet Grate Device (BIGD) for the storm water structure it will service.
2. The BIGD shall have a built-in high-flow relief system (overflow bypass).
3. The retrieval system must allow removal of the BIGD without spilling the collected material.
4. Perform maintenance in accordance with Standard Specification 8-01.3(15).



STATE OF
WASHINGTON
REGISTERED
LANDSCAPE ARCHITECT

MARK W. MAURER
CERTIFICATE NO. 000598

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT. IT IS NOT TO BE USED FOR CONSTRUCTION OR FOR ANY OTHER PURPOSE WITHOUT THE APPROVAL OF THE ENGINEER. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

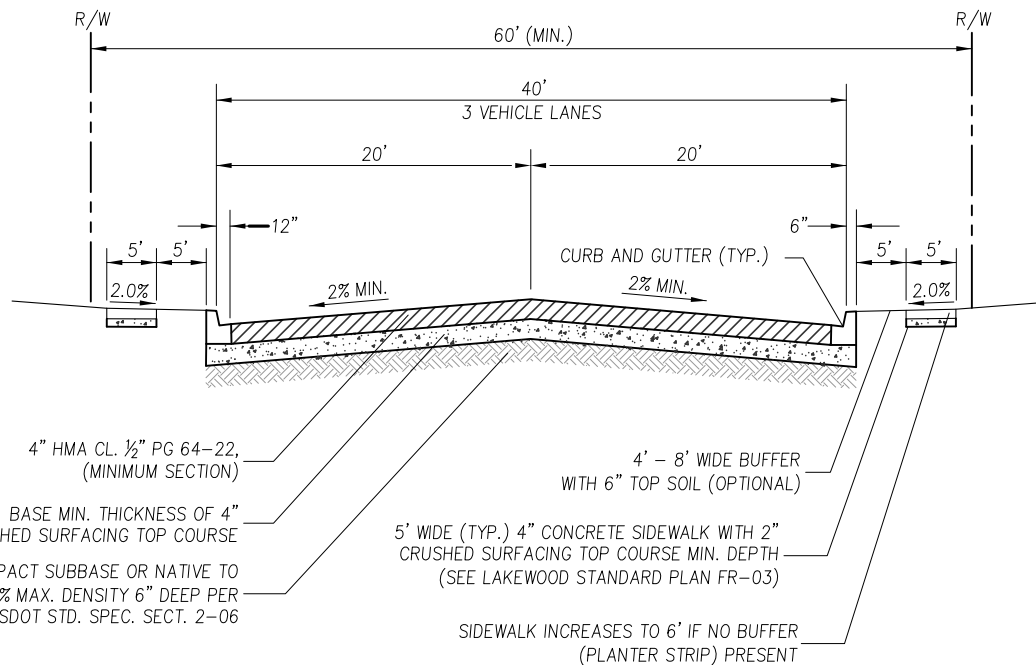
**STORM DRAIN
INLET PROTECTION
STANDARD PLAN I-40.20-00**

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Pasco Bakotich III 09-20-07

STATE DESIGN ENGINEER DATE
Washington State Department of Transportation



GENERAL NOTES:

1. EXTRA WIDTH MAY BE REQUIRED FOR BICYCLE FACILITIES.
2. THIS TYPICAL STREET CROSS SECTION DOES NOT PROVIDE FOR ON STREET PARKING.
3. PAVEMENT SECTIONS SHOWN ARE MINIMUM ALLOWED AND SHALL BE SUPPORTED BY ENGINEERED PAVEMENT DESIGN.
4. SEE PROJECT LANDSCAPE PLANS FOR PLANTERS STIP DETAILS.
5. 10' SIDEWALK WIDTH AT TRANSIT STOP LOCATIONS.

RIGHT-OF-WAY CALCULATION

TYPICAL SECTION

2 CURB LANES AT 14' = 28'
 1 TURN LANE AT 12'
 (SEE NOTE 2)

CURB-TO-CURB WIDTH = 40'

2 CURBS AT 0.5' = 1'
 2 PLANTER STRIPS AT 4.5' = 9'
 2 SIDEWALKS AT 5' = 10'

STANDARD RIGHT-OF-WAY WIDTH = 60'

APPROVED FOR PUBLICATION

Paul A. Bucich
 Paul A. Bucich, P.E.
 PUBLIC WORKS DIRECTOR/CITY ENGINEER
 01/10/20
 DATE



Public Works Department

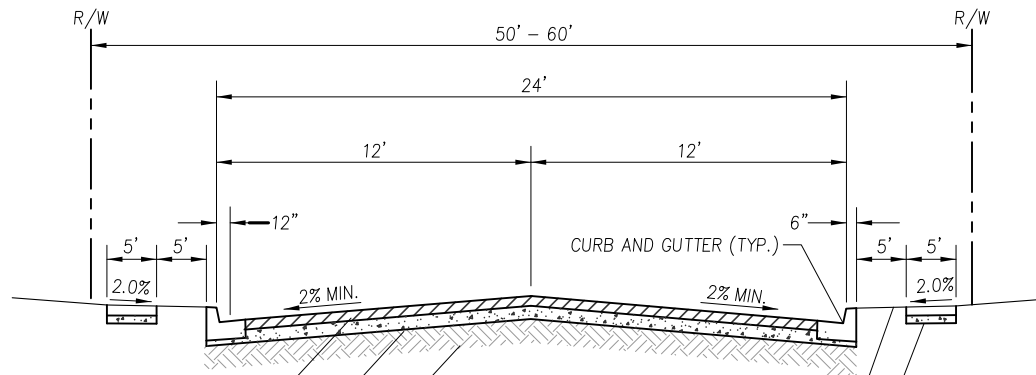
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11/05/19	ORIGINAL DRAWING	AD/CD	PAB

6000 Main Street SW 98499

NOT TO SCALE

**Collector
Arterial Street**

RW-03



3" HMA CL. 1/2" PG 64-22,
(MINIMUM SECTION)

BASE MIN. THICKNESS OF 4"
CRUSHED SURFACING TOP COURSE

COMPACT SUBBASE OR NATIVE TO
95% MAX. DENSITY 6" DEEP PER
WSDOT STD. SPEC. SECT. 2-06

4' - 6' WIDE BUFFER WITH 6"
TOPSOIL (OPTIONAL)

5' WIDE (TYP.) 4" CONCRETE SIDEWALK WITH 2"
CRUSHED SURFACING TOP COURSE MIN. DEPTH
(SEE LAKEWOOD STANDARD PLAN FR-03)

GENERAL NOTES:

1. THE TRAVEL LANES ACCOMMODATE BICYCLES AND MOTORIZED VEHICLES.
2. 10' SIDEWALK WIDTH AT TRANSIT STOP LOCATIONS.
3. RIGHT OF WAY WIDTH 50 FEET WITH UNDERGROUND UTILITY; 60 FEET WITH SURFACE UTILITIES.

RIGHT-OF-WAY CALCULATION

TYPICAL SECTION

2 TRAVEL LANES AT 12' = 24'

CURB-TO-CURB WIDTH = 24'

2 CURBS AT 0.5' = 1'

2 PLANTER STRIPS AT 5' = 10'

2 SIDEWALKS AT 5' = 10'

STANDARD RIGHT-OF-WAY
WIDTH = 60'

APPROVED FOR PUBLICATION

Paul A. Bucich
Paul A. Bucich, P.E.
PUBLIC WORKS DIRECTOR/CITY ENGINEER

01/10/20
DATE



Public Works Department

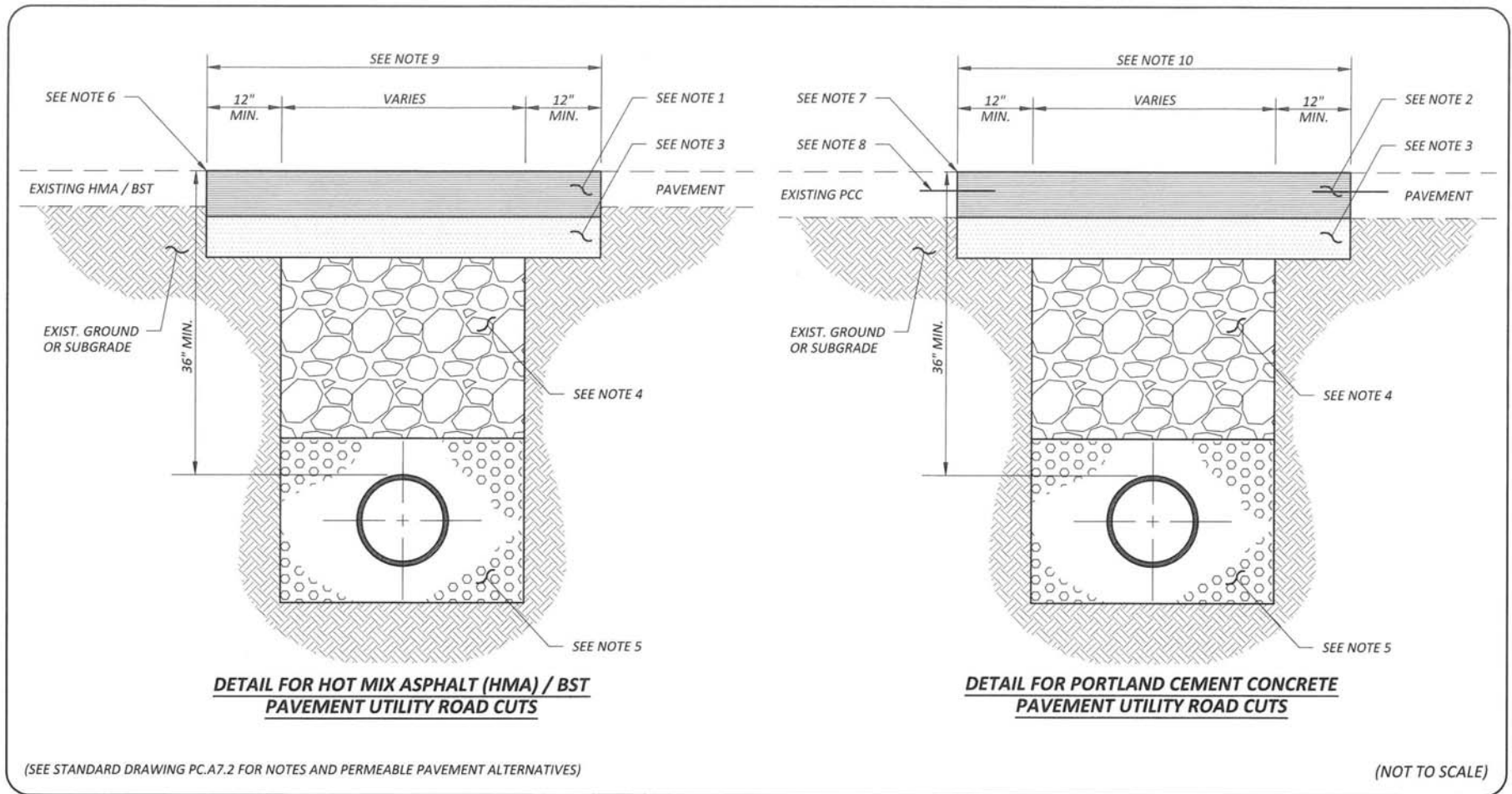
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6000 Main Street SW 98499

NOT TO SCALE

**Local Access
Street**

RW-04



Pierce County

Public Works

Office of the County Engineer
Tacoma Mall Office Building
4301 South Pine Street, Suite 628
Tacoma, Washington 98409-7207
An APWA Accredited Agency



BRIAN D. STACY, P.E.
COUNTY ENGINEER

Office of the County Engineer

UTILITY PATCH

SHEET 1 OF 2

PC.A7.1

NOTES:

- 1) HOT MIX ASPHALT (HMA) CL. 1/2 IN. PG 64-22, WITH MINIMUM COMPACTED DEPTH OF 3" OR EXISTING PAVEMENT DEPTH PLUS 1", WHICHEVER IS GREATER. PLACE IN LIFTS WITH A MAXIMUM COMPACTED DEPTH OF 3" PER WSDOT STANDARD SPECIFICATIONS 5-04, AND MACHINE ROLL FLUSH WITH EXISTING PAVEMENT.
- 2) PORTLAND CEMENT CONCRETE PAVEMENT WITH A STANDARD PAVING SECTION EQUAL TO THE EXISTING PAVEMENT DEPTH. PLACE PER WSDOT STANDARD SPECIFICATIONS 5-05. THE ENGINEER MAY SPECIFY THE DESIGN AGE. ANY ASPHALT CONCRETE COVERING THE PORTLAND CEMENT CONCRETE SHALL BE CUT BACK AN ADDITIONAL 4" AND REPLACED WITH HMA CL. 1/2 IN. PG 64-22, COMPACTED TO A DEPTH EQUAL TO THAT OF THE EXISTING ASPHALT CONCRETE PAVEMENT, OR PUT CSBC AS PREFERRED ALTERNATIVE.
- 3) CRUSHED SURFACING TOP COURSE MATCH EXISTING 2" MINIMUM DEPTH, COMPACTED TO 95% MAXIMUM DENSITY.
- 4) IMPORTED OR NATIVE MATERIAL COMPACTED TO 95% MAXIMUM DENSITY. THE MATERIAL SHALL BE ESSENTIALLY FREE FROM VARIOUS TYPES OF WOOD WASTE OR OTHER EXTRANEEOUS OR OBJECTIONABLE MATERIALS. IT SHALL HAVE SUCH CHARACTERISTICS OF SIZE AND SHAPE THAT IT WILL COMPACT READILY AND SHALL MEET THE FOLLOWING TEST REQUIREMENTS:

SIEVE SIZE	PERCENT PASSING
4" SQUARE	100
2" SQUARE	75-100
U.S. No. 4	22-100
U.S. No. 200	0-10

DUST RATIO: % PASSING U.S. No. 200 2/3 MAX.
 % PASSING U.S. No. 40

SAND EQUIVALENT 30 MIN.

ALL PERCENTAGES ARE BY WEIGHT.
 THE MATERIAL RETAINED ON A U.S. No. 4 SIEVE SHALL CONTAIN NOT MORE THAN 0.20 PERCENT BY WEIGHT OF WOOD WASTE. ANY NATIVE MATERIAL USED SHALL BE TESTED FOR COMPACTION AND/OR GRADATION AS REQUIRED BY THE ENGINEER.

- 5) BEDDING MATERIAL COMPACTED TO 95% MAXIMUM DENSITY SHALL CONSIST OF CRUSHED, PROCESSED, OR NATURALLY OCCURRING GRANULAR MATERIAL. IT SHALL BE FREE FROM VARIOUS TYPES OF WOOD WASTE OR OTHER EXTRANEEOUS OR OBJECTIONABLE MATERIALS. IT SHALL HAVE SUCH CHARACTERISTICS OF SIZE AND SHAPE THAT IT WILL COMPACT AND SHALL MEET THE FOLLOWING SPECIFICATIONS FOR GRADING AND QUALITY:

SIEVE SIZE	PERCENT PASSING
1-1/2" SQUARE	100
1" SQUARE	75-100
5/8" SQUARE	50-100
U.S. No. 4	20-80
U.S. No. 40	3-24
U.S. No. 200	10.0 MAX
SAND EQUIVALENT	35 MIN.

IF, IN THE OPINION OF THE ENGINEER, THE NATIVE GRANULAR MATERIAL IS FREE FROM WOOD WASTE, ORGANIC MATERIAL, AND OTHER EXTRANEEOUS OR OBJECTIONABLE MATERIALS, BUT OTHERWISE DOES NOT CONFORM TO THE SPECIFICATIONS FOR GRADING AND SAND EQUIVALENT, IT MAY BE USED FOR PIPE BEDDING FOR RIGID PIPES, PROVIDED THE NATIVE GRANULAR MATERIAL HAS A MAXIMUM DIMENSION OF 1-1/2 INCHES. DEPTH OF MATERIAL SURROUNDING PIPE SHALL BE ADEQUATE TO SUPPORT THE PIPE AND TRENCH.

BEDDING MATERIAL FOR SANITARY SEWERS -
 PEA GRAVEL BEDDING SHALL BE A CLEAN, SOUND, FREE DRAINING, AND GRANULAR MATERIAL CONFORMING TO THE FOLLOWING GRADATION:

SIEVE SIZE	PERCENT PASSING
3/4" SQUARE	100
3/8" SQUARE	90-100
U.S. No. 4	50-100
U.S. No. 10	0-95
U.S. No. 20	0-85
U.S. No. 40	0-55
U.S. No. 100	0-10
U.S. No. 200	0-3

ALL PERCENTAGES ARE BY WEIGHT.

- 6) NEAT, UNIFORM AND VERTICAL CUT (TYPICAL BOTH SIDES). CLEAN AND HEAT EDGES AND TACK WITH EMULSIFIED ASPHALT. SEAL JOINT WITH HOT ASPHALT CEMENT.
- 7) NEAT, UNIFORM AND VERTICAL CUT (TYPICAL BOTH SIDES).
- 8) DRILL 7/8"Ø TO 1"Ø X 12" HOLE AND SET #5 X 24" EPOXY-COATED TIE BARS WITH EPOXY RESIN INTO THE EXISTING PAVEMENT PARALLEL TO ROADWAY CENTER LINE ALONG THE TRANSVERSE VERTICAL CUT SPACED AT 18" ON CENTER (TYPICAL BOTH SIDES).
- 9) MINIMUM RESTORATION LIMITS FOR HMA UNLESS OTHERWISE DETERMINED BY THE ENGINEER. IF ANY PORTION OF A LONGITUDINAL PAVEMENT CUT AFFECTS A WHEEL TRACK AS DETERMINED BY THE ENGINEER, THE ENTIRE LANE SHALL BE REMOVED AND REPLACED. WHEREVER AN EXISTING PATCH OR CRACK IS IN CLOSE PROXIMITY TO THE NEW CUT, THE ENGINEER MAY REQUIRE REMOVAL OF THE EXISTING PATCH OR CRACK AND ANY INTERVENING PAVEMENT. DEPTH OF REPLACEMENT ASPHALT SHALL BE IN ACCORDANCE WITH NOTE 1.
- 10) MINIMUM RESTORATION LIMITS FOR PCC UNLESS OTHERWISE DETERMINED BY THE ENGINEER. REMOVE ENTIRE PANEL UNLESS WIDTH OF REMAINING PANEL PORTION IS GREATER THAN 50% OF THE EXISTING PANEL WIDTH. IF ANY PORTION OF A LONGITUDINAL PAVEMENT CUT AFFECTS A WHEEL TRACK AS DETERMINED BY THE ENGINEER, THE ENTIRE LANE SHALL BE REMOVED AND REPLACED. WHEREVER AN EXISTING PATCH OR CRACK IS IN CLOSE PROXIMITY TO THE NEW CUT, THE ENGINEER MAY REQUIRE REMOVAL OF THE EXISTING PATCH OR CRACK AND ANY INTERVENING PAVEMENT. IF THE ENTIRE PANEL IS NOT REMOVED, FOLLOW ASPHALT CONCRETE UTILITY PATCH PROCEDURES WITH AN ASPHALT CONCRETE PAVING DEPTH EQUAL TO THE DEPTH OF THE EXISTING PAVEMENT.
- 11) ALL PERMANENT FINAL PATCHES SHALL BE RECTANGULAR OR CIRCULAR IN SHAPE AND CONSTRUCTED TO BE PARALLEL AND PERPENDICULAR TO THE ROAD CENTERLINE.
- 12) CONTROLLED DENSITY FILL (CDF) SHALL BE REQUIRED ON ROADWAYS WHERE DIFFICULT SUBSURFACE CONDITIONS ARE ANTICIPATED AND SHALL BE PLACED IN ACCORDANCE WITH WSDOT STANDARD SPECIFICATIONS 2-09.3(1)E.
- 13) FOR PERMEABLE PAVEMENT ALTERNATIVES SEE PIERCE COUNTY STORMWATER MANAGEMENT AND SITE DEVELOPMENT MANUAL. MINIMUM RESTORATION LIMITS DETERMINED BY THE ENGINEER.

(SEE STANDARD DRAWING PC.A7.1 FOR DETAIL DRAWINGS)



Pierce County

Public Works

Office of the County Engineer
 Tacoma Mall Office Building
 4301 South Pine Street, Suite 628
 Tacoma, Washington 98409-7207

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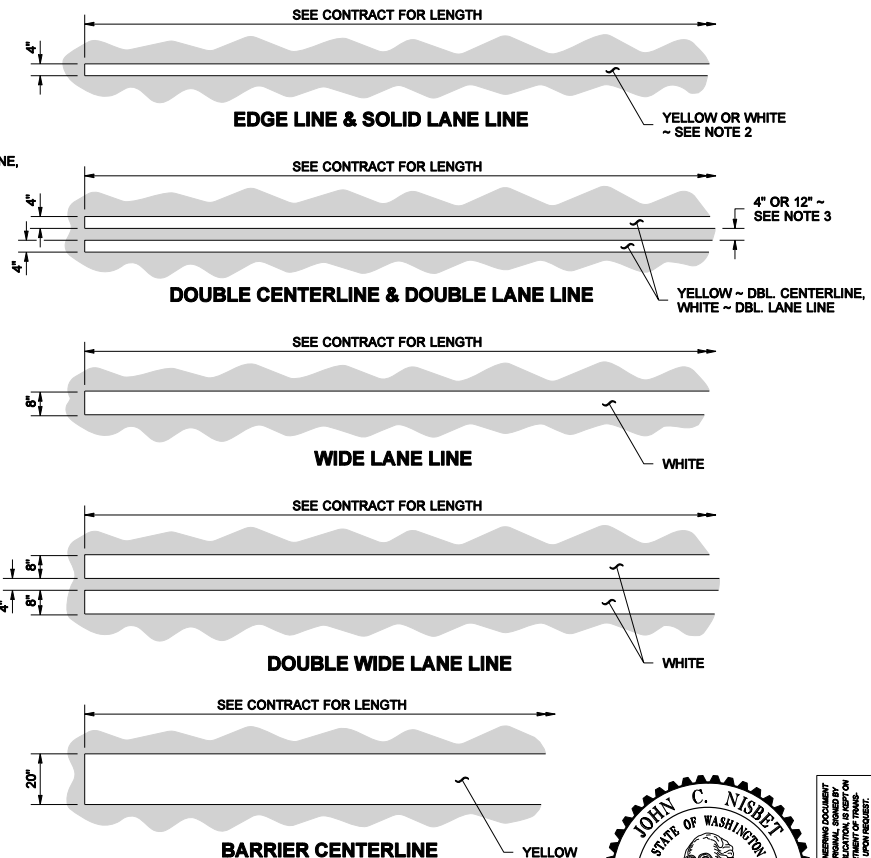
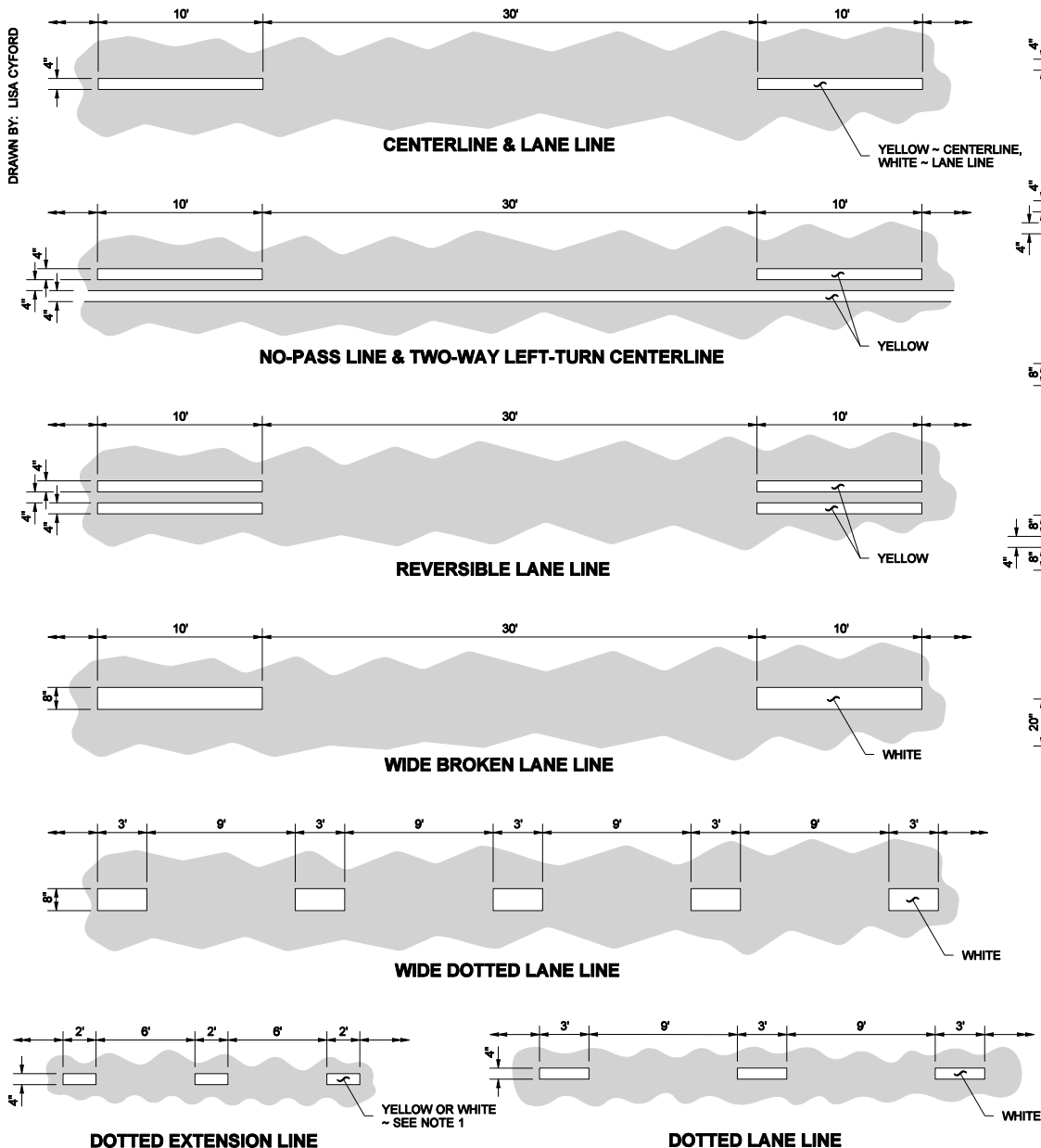
BRIAN D. STACY, P.E.
COUNTY ENGINEER

Office of the County Engineer

UTILITY PATCH

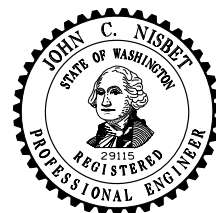
SHEET 2 OF 2

PC.A7.2



NOTES

1. Dotted Extension Line shall be the same color as the line it is extending.
2. Edge Line shall be white on the right edge of traveled way, and yellow on the left edge of traveled way (on one-way roadways). Solid Lane Line shall be white.
3. The distance between the lines of the Double Centerline shall be 12" everywhere, except 4" for left-turn channelization and narrow roadways with lane widths of 10 feet or less. Local Agencies (on non-state routes) may specify a 4" distance for all locations.
 The distance between the lines of the Double Lane Line shall be 4".



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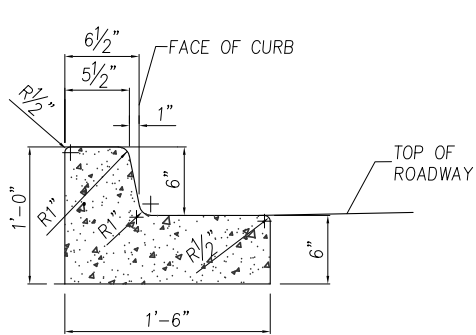
LONGITUDINAL MARKING PATTERNS STANDARD PLAN M-20.10-02

SHEET 1 OF 1 SHEET

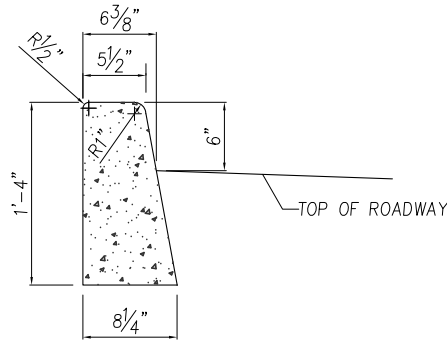
APPROVED FOR PUBLICATION

Pasco Bakotich III 06-03-11

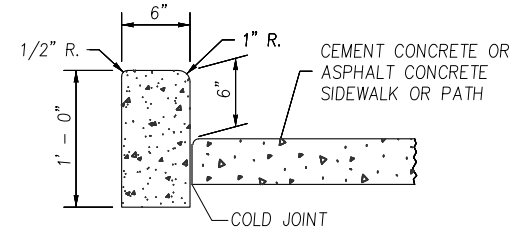
STATE DESIGN ENGINEER DATE
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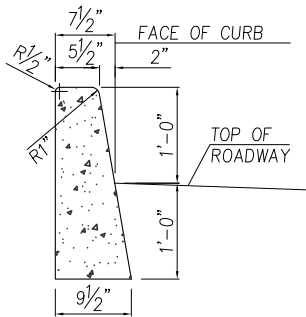
TRAFFIC CURB AND GUTTER



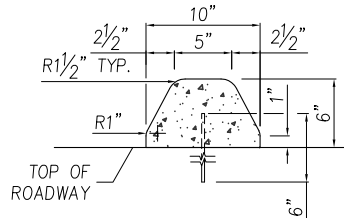
TRAFFIC BARRIER CURB



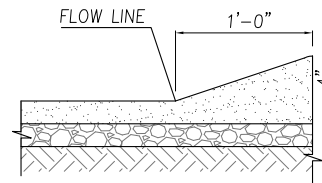
PEDESTRIAN CURB



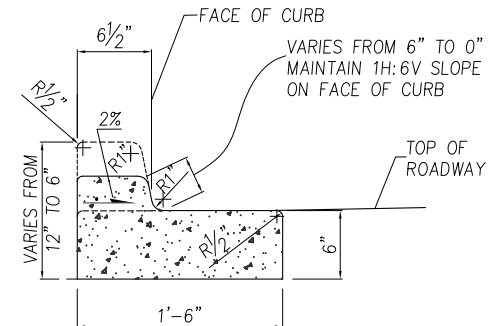
TRUCK BARRIER CURB



EXTRUDED CURB



HMA WEDGE CURB



DEPRESSED CURB AND GUTTER

(AT CURB RAMPS AND DRIVEWAY ENTRANCES)

GENERAL NOTES:

1. MATERIALS AND CONSTRUCTION REQUIREMENTS SHALL BE PER LATEST EDITION OF WSDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION.

APPROVED FOR PUBLICATION

Paul A. Bucich

Paul A. Bucich, P.E.
PUBLIC WORKS DIRECTOR/CITY ENGINEER

01/10/20
DATE



Public Works Department

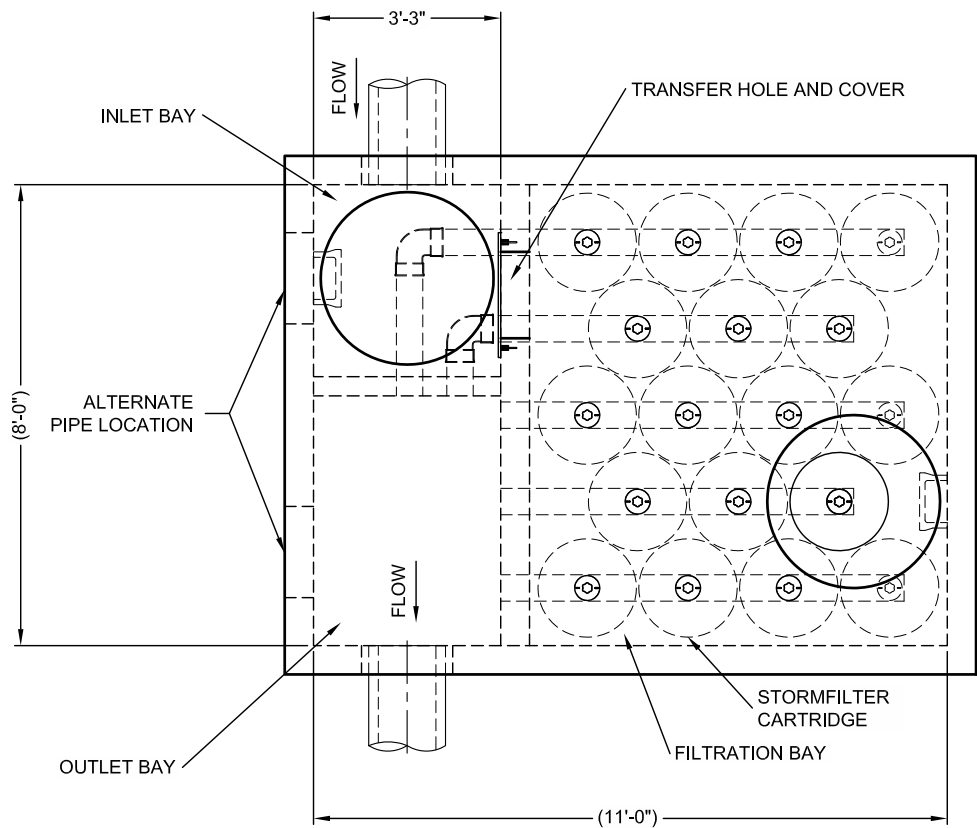
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11/2/09	ORIGINAL DRAWING	AD	DEW
2/28/12	REVISED DRAWING	TB/LC	DEW
3/2/15	REMOVED TYPE "C" CURB	LC	DEW
9/7/17	REVISED DRAWING	TJM	DEW
1/16/19	REVISED DRAWING	CD	PAB

6000 Main Street SW 98499

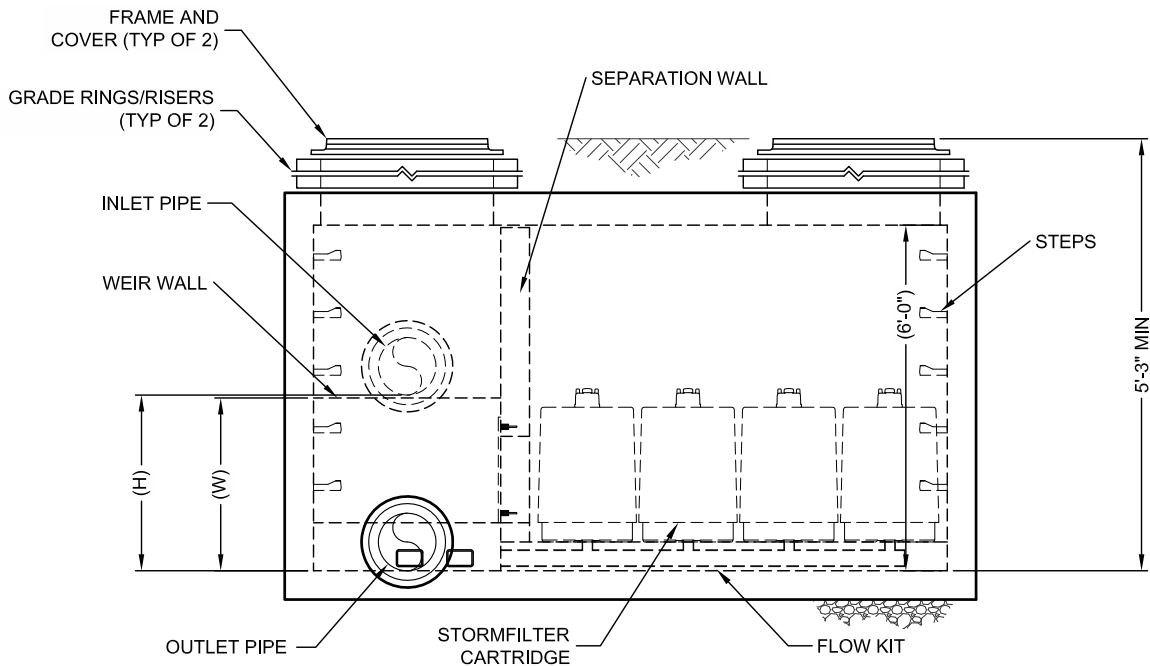
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Curbs

FR-04



PLAN



ELEVATION



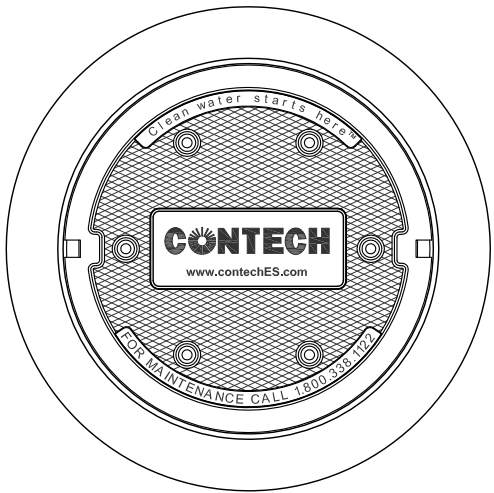
STORMFILTER DESIGN NOTES

- THE 8' x 11' PEAK DIVERSION STORMFILTER TREATMENT CAPACITY VARIES BY CARTRIDGE COUNT AND LOCALLY APPROVED SURFACE AREA SPECIFIC FLOW RATE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD.
- THE PEAK DIVERSION STORMFILTER IS AVAILABLE IN A LEFT INLET (AS SHOWN) OR RIGHT INLET CONFIGURATION.
- ALL PARTS AND INTERNAL ASSEMBLY PROVIDED BY CONTECH UNLESS OTHERWISE NOTED.

CARTRIDGE SELECTION

CARTRIDGE HEIGHT	27"			18"			LOW DROP		
RECOMMENDED HYDRAULIC DROP (H)	3.05'			2.3'			1.8'		
HEIGHT OF WEIR (W)	3.00'			2.25'			1.75'		
SPECIFIC FLOW RATE (gpm/sf)	2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf
CARTRIDGE FLOW RATE (gpm)	22.5	18.79	11.25	15	12.53	7.5	10	8.35	5

* 1.67 gpm/sf SPECIFIC FLOW RATE IS APPROVED WITH PHOSPHOSORB® (PSORB) MEDIA ONLY



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC
DATA REQUIREMENTS

STRUCTURE ID		*	
WATER QUALITY FLOW RATE (cfs)		*	
PEAK FLOW RATE (cfs)		*	
RETURN PERIOD OF PEAK FLOW (yrs)		*	
CARTRIDGE HEIGHT (27", 18", LOW DROP(LD))		*	
NUMBER OF CARTRIDGES REQUIRED		*	
CARTRIDGE FLOW RATE		*	
MEDIA TYPE (PERLITE, ZPG, PSORB)		*	
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE	*	*	*
OUTLET PIPE	*	*	*
UPSTREAM RIM ELEVATION		*	
DOWNSTREAM RIM ELEVATION		*	
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

PERFORMANCE SPECIFICATION

FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. **RADIAL MEDIA DEPTH SHALL BE 7-INCHES**. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST **38 SECONDS**. SPECIFIC FLOW RATE SHALL BE **2 GPM/SF (MAXIMUM)**. SPECIFIC FLOW RATE IS THE MEASURE OF THE FLOW (GPM) DIVIDED BY THE MEDIA SURFACE CONTACT AREA (SF). MEDIA VOLUMETRIC FLOW RATE SHALL BE **6 GPM/CF OF MEDIA (MAXIMUM)**.

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH () ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.contechES.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
5. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.

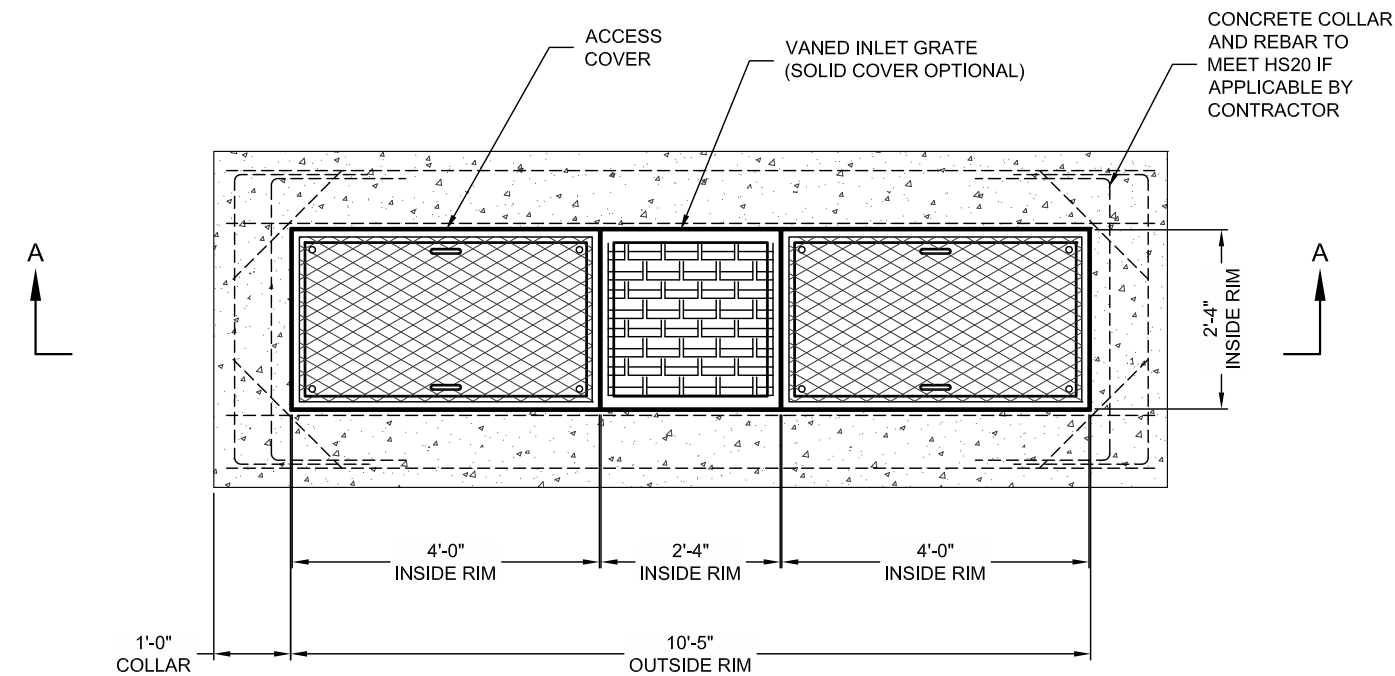
INSTALLATION NOTES

- A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE (LIFTING CLUTCHES PROVIDED).
- C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL SECTIONS AND ASSEMBLE STRUCTURE.
- D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH OUTLET PIPE INVERT WITH OUTLET BAY FLOOR.
- E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
- F. CONTRACTOR TO REMOVE THE TRANSFER HOLE COVER WHEN THE SYSTEM IS BROUGHT ONLINE.

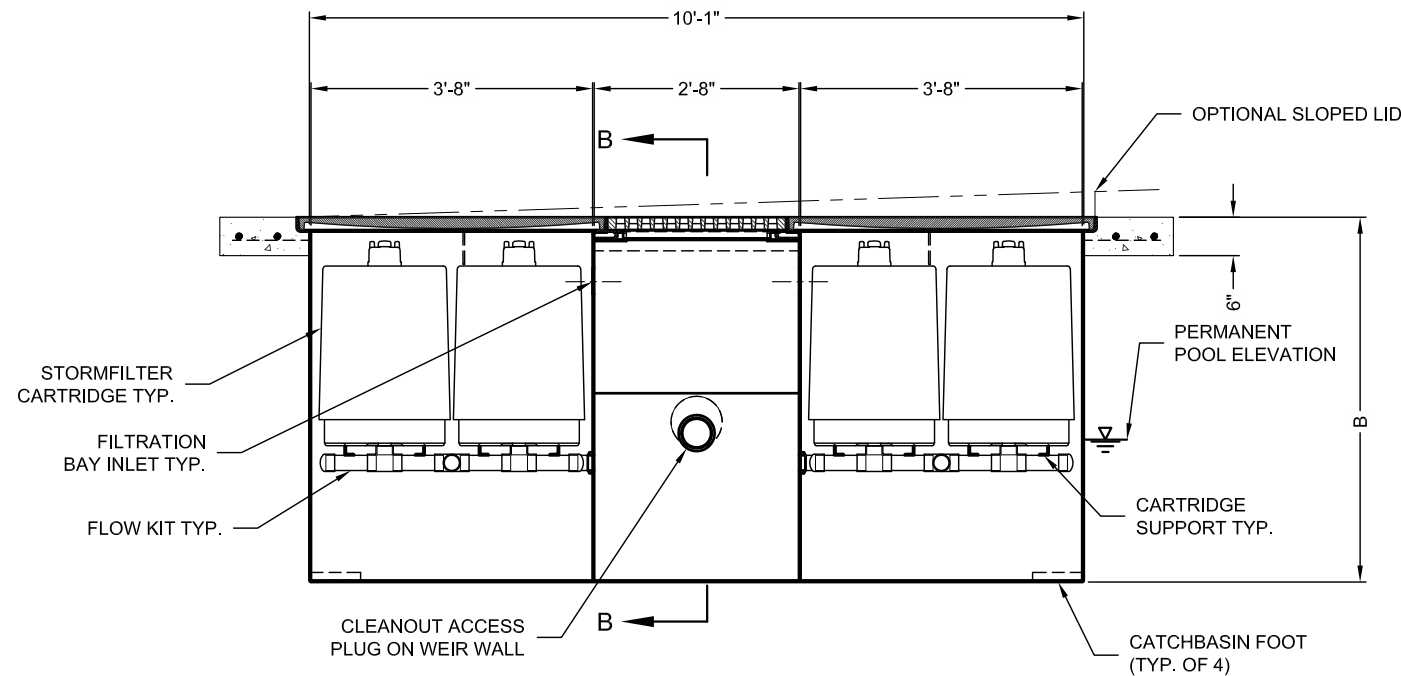
CONTECH
ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

THE STORMWATER MANAGEMENT STORMFILTER
8' x 11' PEAK DIVERSION STORMFILTER
STANDARD DETAIL

I:\COMMON\CAD\TREATMENT\10 STORMFILTER\40 STANDARD DRAWINGS\SCFB\SCFB-SOW\GSCFB-DTL.DWG 7/8/2016 2:51 PM



PLAN VIEW
27" CARTRIDGES



SECTION A-A

STORMFILTER STEEL CATCHBASIN DESIGN NOTES									
STORMFILTER TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. 4 CARTRIDGE CATCHBASIN HAS A MAXIMUM OF FOUR CARTRIDGES. SYSTEM IS SHOWN WITH A 27" CARTRIDGE, AND IS ALSO AVAILABLE WITH AN 18" CARTRIDGE. STORMFILTER CATCHBASIN CONFIGURATIONS ARE AVAILABLE WITH A DRY INLET BAY FOR VECTOR CONTROL. PEAK HYDRAULIC CAPACITY PER TABLE BELOW. IF THE SITE CONDITIONS EXCEED PEAK HYDRAULIC CAPACITY, AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.									
CARTRIDGE SELECTION									
CARTRIDGE HEIGHT	27"			18"			18" DEEP		
RECOMMENDED HYDRAULIC DROP (H)	3.05'			2.3'			3.3'		
SPECIFIC FLOW RATE (gpm/sf)	2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf	2 gpm/sf	1.67* gpm/sf	1 gpm/sf
CARTRIDGE FLOW RATE (gpm)	22.5	18.79	11.25	15	12.53	7.5	15	12.53	7.5
PEAK HYDRAULIC CAPACITY	1.0			1.0			1.8		
INLET PERMANENT POOL LEVEL (A)	1'-0"			1'-0"			2'-0"		
OVERALL STRUCTURE HEIGHT (B)	4'-9"			3'-9"			4'-9"		

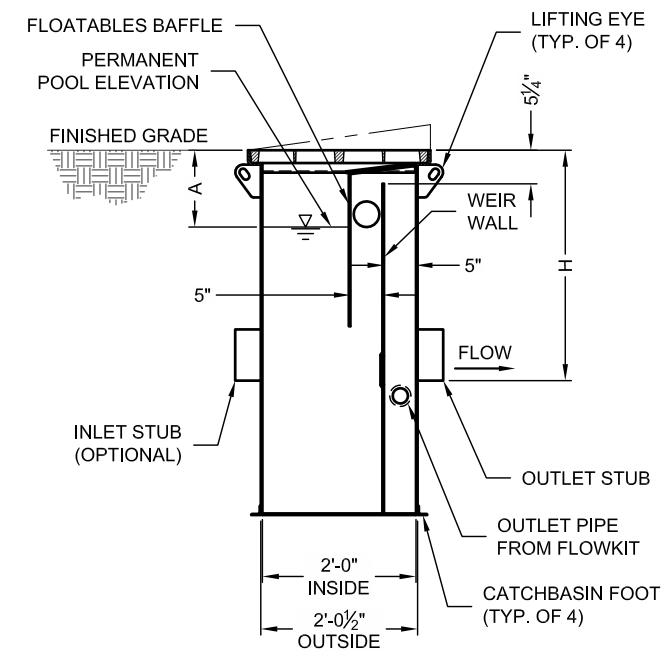
* 1.67 gpm/sf SPECIFIC FLOW RATE IS APPROVED WITH PHOSPHOSORB® (PSORB) MEDIA ONLY

GENERAL NOTES

- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
- FOR SITE SPECIFIC DRAWINGS WITH DETAILED STORMFILTER CATCHBASIN STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
- STORMFILTER CATCHBASIN WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
- INLET SHOULD NOT BE LOWER THAN OUTLET. INLET (IF APPLICABLE) AND OUTLET PIPING TO BE SPECIFIED BY ENGINEER AND PROVIDED BY CONTRACTOR.
- MANUFACTURER TO APPLY A SURFACE BEAD WELD IN THE SHAPE OF THE LETTER "O" ABOVE THE OUTLET PIPE STUB ON THE EXTERIOR SURFACE OF THE STEEL SFCB.
- STORMFILTER CATCHBASIN EQUIPPED WITH 4 INCH (APPROXIMATE) LONG STUBS FOR INLET (IF APPLICABLE) AND OUTLET PIPING. STANDARD OUTLET STUB IS 8 INCHES IN DIAMETER. MAXIMUM OUTLET STUB IS 15 INCHES IN DIAMETER. CONNECTION TO COLLECTION PIPING CAN BE MADE USING FLEXIBLE COUPLING BY CONTRACTOR.
- STEEL STRUCTURE TO BE MANUFACTURED OF 1/4 INCH STEEL PLATE. CASTINGS SHALL MEET AASHTO M306 LOAD RATING. TO MEET HS20 LOAD RATING ON STRUCTURE, A CONCRETE COLLAR IS REQUIRED. WHEN REQUIRED, CONCRETE COLLAR WITH #4 REINFORCING BARS TO BE PROVIDED BY CONTRACTOR.
- FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 38 SECONDS.
- SPECIFIC FLOW RATE IS EQUAL TO THE FILTER TREATMENT CAPACITY (gpm) DIVIDED BY THE FILTER CONTACT SURFACE AREA (sq ft).

INSTALLATION NOTES

- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
- CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CATCHBASIN (LIFTING CLUTCHES PROVIDED).
- CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

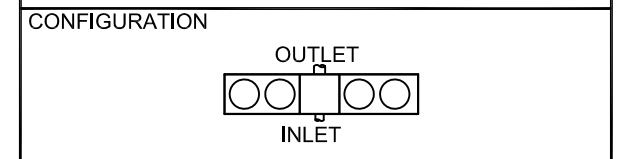


SECTION C-C

**4-CARTRIDGE CATCHBASIN
STORMFILTER DATA**

STRUCTURE ID	XXX
WATER QUALITY FLOW RATE (cfs)	X.XX
PEAK FLOW RATE (<1 cfs)	X.XX
RETURN PERIOD OF PEAK FLOW (yrs)	XXX
CARTRIDGE FLOW RATE (gpm)	XX
MEDIA TYPE (PERLITE, ZPG, PSORB)	XXXXX
RIM ELEVATION	XXX.XX'

PIPE DATA:	I.E.	DIAMETER
INLET STUB	XXX.XX'	XX"
OUTLET STUB	XXX.XX'	XX"



SLOPED LID	YES/NO
SOLID COVER	YES/NO

NOTES/SPECIAL REQUIREMENTS:

*PER ENGINEER OF RECORD

CONTECH®
ENGINEERED SOLUTIONS LLC

www.contechES.com

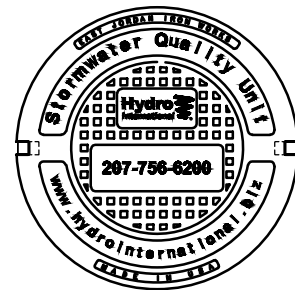
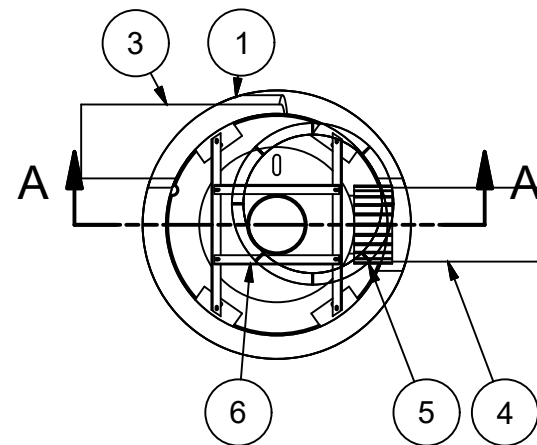
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069

800-526-3999 513-645-7000 513-645-7993 FAX

4 CARTRIDGE CATCHBASIN
STORMFILTER
STANDARD DETAIL



THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING:
U.S. PATENT NO. 8,022,409; 8,024,076; 8,027,500; 8,027,501; 8,027,502; 8,027,503; 8,027,504;
RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.



HYDRO FRAME AND COVER (INCLUDED)

GRADE RINGS BY OTHERS
AS REQUIRED

RIM: VARIES

TOS: 6.58 ft [2.007 m] (MINIMUM)

LEDGER: 5.1 ft [1.556 m]

OUTLET: 4.08 ft [1.245 m] (MINIMUM)

INLET: 3.08 ft [.940 m]

SKIRT: 2.38 ft [.724 m]

BOTTOM OF INTERNALS: 1.24 ft [.379 m]

SUMP: 0 ft [.000 m]

STONE BASE
PER PROJECT
SPECIFICATIONS

SECTION A-A

NOTE: NOT FOR CONSTRUCTION.
CONTACT HYDRO FOR SITE
SPECIFIC DETAIL

EQUIPMENT PERFORMANCE

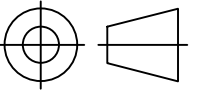
The stormwater treatment unit shall adhere to the hydraulic parameters given in the chart below and provide the removal efficiencies and storage capacities as follows:

1. The treatment system shall use an induced vortex to separate pollutants from stormwater runoff.
2. Peak Hydraulic Capacity: 3.0 cfs (85 l/s)
3. Sediment Storage Capacity: 0.70 cu. yd. (0.53 cu. m)
4. Continuous Oil Storage Capacity: 70 gal. (265 liters)
5. Sediment shall be stored in a zone that is isolated from the main flow path and protected from reentrainment by a benching skirt.
6. For more product information including regulatory acceptances, please visit <https://hydro-int.com/en/products/downstream-defender>

ANY WARRANTY GIVEN BY HYDRO INTERNATIONAL WILL APPLY ONLY TO THOSE ITEMS SUPPLIED BY IT. ACCORDINGLY HYDRO INTERNATIONAL CANNOT ACCEPT ANY RESPONSIBILITY FOR ANY STRUCTURE, PLANT, OR EQUIPMENT, (OR THE PERFORMANCE THERE OF) DESIGNED, BUILT, MANUFACTURED, OR SUPPLIED BY ANY THIRD PARTY. HYDRO INTERNATIONAL HAVE A POLICY OF CONTINUOUS DEVELOPMENT AND RESERVE THE RIGHT TO AMEND THE SPECIFICATION. HYDRO INTERNATIONAL CANNOT ACCEPT LIABILITY FOR PERFORMANCE OF ITS EQUIPMENT, (OR ANY PART THEREOF), IF THE EQUIPMENT IS SUBJECT TO CONDITIONS OUTSIDE ANY DESIGN SPECIFICATION. HYDRO INTERNATIONAL OWNS THE COPYRIGHT OF THIS DRAWING, WHICH IS SUPPLIED IN CONFIDENCE. IT MUST NOT BE USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SUPPLIED AND MUST NOT BE REPRODUCED, IN WHOLE OR IN PART, WITHOUT PRIOR PERMISSION IN WRITING FROM HYDRO INTERNATIONAL.

OUTLET STUB ID: 12" (300 mm)
OUTLET STUB OD: 12.5" (318 mm)

PROJECTION



IF IN DOUBT ASK

COMMENTS:

1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.
2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING DOWNSTREAM DEFENDER MANHOLE.

DATE:
11/8/2019

SCALE:
NTS

DRAWN BY:
GW

CHECKED BY:

APPROVED BY:

Title
4ft-DIAMETER
DOWNSTREAM DEFENDER

Hydro
International

hydro-int.com

HYDRO INTERNATIONAL

DO NOT SCALE DRAWING
STEEL FABRICATION TOLERANCES
UNLESS OTHERWISE SPECIFIED,
DIMENSIONS ARE IN INCHES.

LINEAR
000 - 012in = ±0.04in
012 - 024in = ±0.06in
024 - 048in = ±0.08in
048 - 120in = ±0.12in
120in >>> = ±0.20in

ANGULAR
000 - 120in = ±1°
120 - 240in = ±0.5°
240in >>> = ±0.25°

WEIGHT:
N/A

MATERIAL:

REFERENCE NUMBER:

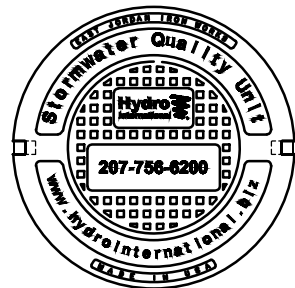
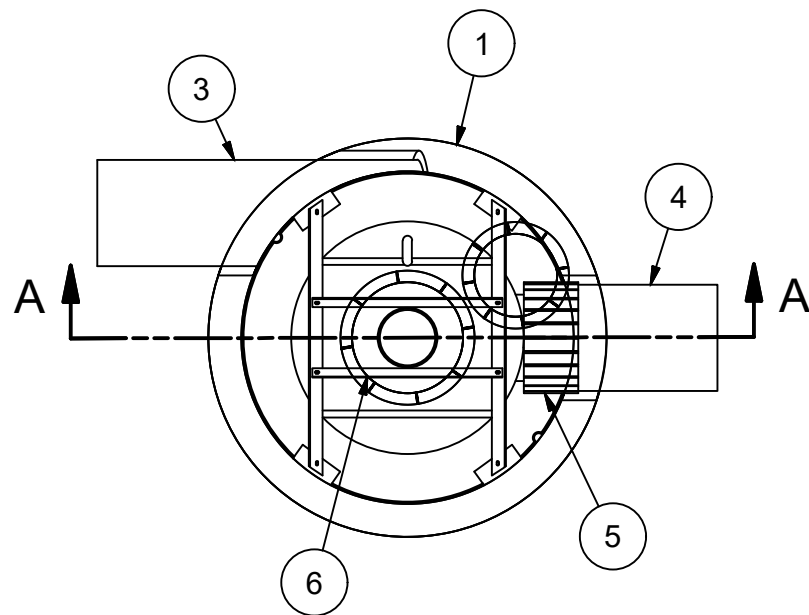
DRAWING NO.:
4'GA-DWG

SHEET SIZE:
B

SHEET:
1 OF 1

Rev:
-

PARTS LIST				
ITEM	QTY	SIZE (in)	SIZE (mm)	DESCRIPTION
1	1	48	1200	PRECAST MANHOLE (BY HYDRO VIA PRECASTER)
2	1	30	750	FRAME AND COVER
3	1	12 (MAX)	300 (MAX)	INLET PIPE (BY OTHERS)
4	1	12 (MAX)	300 (MAX)	OUTLET PIPE (BY OTHERS)
5	1			PIPE COUPLING (BY OTHERS)
6	1			INTERNAL COMPONENTS (PRE-INSTALLED)



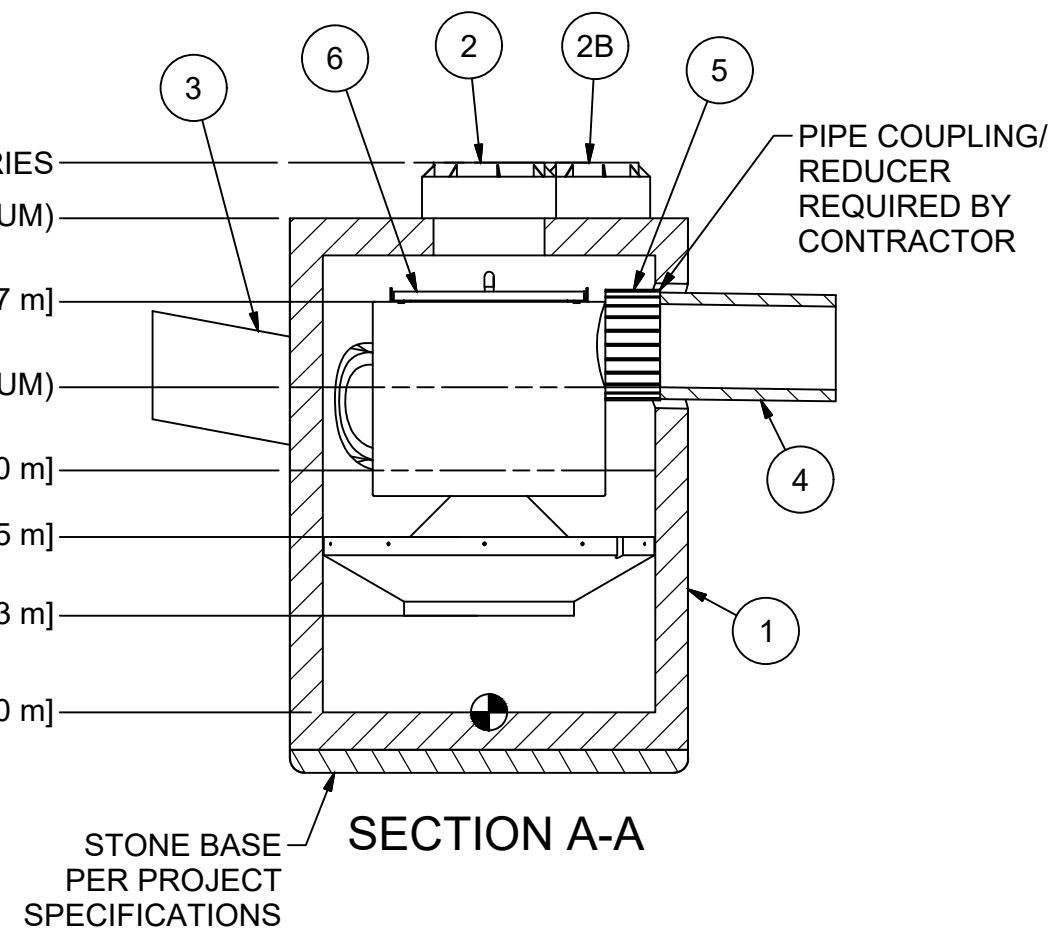
HYDRO FRAME AND COVER (INCLUDED)
GRADE RINGS BY OTHERS
AS REQUIRED

EQUIPMENT PERFORMANCE

The stormwater treatment unit shall adhere to the hydraulic parameters given in the chart below and provide the removal efficiencies and storage capacities as follows:

1. The treatment system shall use an induced vortex to separate pollutants from stormwater runoff.
2. Peak Hydraulic Capacity: 8.0 cfs (227 l/s)
3. Sediment Storage Capacity: 2.10 cu. yd. (1.59 cu. m)
4. Continuous Oil Storage Capacity: 216 gal. (818 liters)
5. Sediment shall be stored in a zone that is isolated from the main flow path and protected from reentrainment by a benching skirt.
6. For more product information including regulatory acceptances, please visit <https://hydro-int.com/en/products/downstream-defender>

RIM: VARIES
T.O.S.: 8.9 ft [2.717 m] (MINIMUM)
LEDGER: 7.41 ft [2.257 m]
OUTLET: 5.86 ft [1.788 m] (MINIMUM)
INLET: 4.36 ft [1.330 m]
SKIRT: 3.17 ft [.965 m]
BOTTOM OF INTERNALS: 1.75 ft [.533 m]
SUMP: 0 ft [.000 m]



NOTE: NOT FOR CONSTRUCTION.
CONTACT HYDRO FOR SITE
SPECIFIC DETAIL

PARTS LIST				
ITEM	QTY	SIZE (in)	SIZE (mm)	DESCRIPTION
1	1	72	1800	PRECAST MANHOLE (BY HYDRO VIA PRECASTER)
2	3	24	600	FRAME AND COVER
2B	1	18	450	FRAME AND COVER
3	1	18 (MAX)	450 (MAX)	MAX INLET PIPE (BY OTHERS)
4	1	18 (MAX)	450 (MAX)	MAX OUTLET PIPE (BY OTHERS)
5	1			PIPE COUPLING (BY OTHERS)
6	1			INTERNAL COMPONENTS (PRE-INSTALLED)

PROJECTION

IF IN DOUBT ASK

COMMENTS:

1. MANHOLE WALL AND SLAB THICKNESSES ARE NOT TO SCALE.

2. CONTACT HYDRO INTERNATIONAL FOR A BOTTOM OF STRUCTURE ELEVATION PRIOR TO SETTING DOWNSTREAM DEFENDER MANHOLE.

DATE: 11/8/19	SCALE: NTS	
DRAWN BY: GW	CHECKED BY:	APPROVED BY:

Title
6ft-DIAMETER
DOWNSTREAM DEFENDER

Hydro International

hydro-int.com
<COMPANY>

DO NOT SCALE DRAWING
STEEL FABRICATION TOLERANCES
UNLESS OTHERWISE SPECIFIED,
DIMENSIONS ARE IN INCHES.

LINEAR 000 - 012in = ±0.04in 012 - 024in = ±0.06in 024 - 048in = ±0.08in 048 - 120in = ±0.12in 120in >>> = ±0.20in	ANGULAR 000 - 120in = ±1° 120 - 240in = ±0.5° 240in >>> = ±0.25°
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WEIGHT:	MATERIAL:	
REFERENCE NUMBER:		
DRAWING NO.:		
SHEET SIZE:	SHEET:	Rev: -

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