CONTECH CONSTRUCTION PRODUCTS INC.

The Stormwater Management StormFilter® **Sizing Summary**

Central Maintenance Facility

Town of Leesburg, VA

Stormwater Treatment System - Design Summary **May 5th, 2011**

Information provided by RK&K (KSB)

Structure ID	Area (ac)	C	Water Quality Flow (cfs)
SF	0.20	0.90	0.05

area flowing to BMP updated to include canopy

- Presiding agency = VDCR

Design Criteria:
- Design storm = Modified Rational method
- Rainfall intensity = 0.35in/hr (currently accepted by the VDCR)
- Media = Zeolite/Perlite/GAC
- Head Requirement (Operating Head-Outlet Elevation) = 33" for 27" Cartridges, 24" for 18" Cartridges, 18" for 18" Low-Drop Cartridges
- Cartridge Operating Flow @ 2 gpm/sf = 22.5 gpm (27"), 15 gpm (18"), 10 gpm (18" Low-Drop)

Size estimates:

The Stormwater Management StormFilter® is a passive, siphon-actuated, flow-through stormwater filtration system consisting of a structure that houses rechargeable, media-filled filter cartridges. The StormFilter works by passing stormwater through the media-filled cartridges, which trap particulates and adsorb pollutants such as dissolved metals, nutrients, and hydrocarbons. The StormFilter system is VDCR verified and as a result has received approval for 80% TSS and 50% TP removal (65% TP Removal in some locations).

The StormFilter is a flow-based system utilizing cartridges flowing at 2 gpm/ft² of filter media. The system is sized by calculating the peak water quality flow rate associated with the design storm. The water quality flow rate was calculated using the Modified Rational Method assuming a rainfall intensity of 0.35 inches per hour.

Given the information above the treatment flow rate was determined to be:

SF

$$Q_{treat} = CiA = 0.625 \times 0.35 \, {}^{in}/_{hr} \times 0.20 = 0.050 cfs$$

$$N_{cartridges} = \frac{Q_{treat} \times 449 \, {}^{gpm}/_{cfs}}{SA_{cartridge} \times Q_{specific(cart)}} = \frac{0.050 cfs \times 449 \, {}^{gpm}/_{cfs}}{7.5 ft^2 \times 2 \, {}^{gpm}/_{ft^2}} = 1.51$$

→ **use (2) 18" cartridges**

To accommodate the treatment flow rate of 0.05 cfs, **CONTECH Construction Products recommends using a 60" Manhole StormFilter with (2) 18" cartridges .** (see attached detail). The 18" tall cartridge contains 7.5 square feet of media and a radial media depth of seven inches. The estimated cost of this system, complete and delivered to the job site, is available upon request. The contractor is responsible for setting the StormFilter vault and all external piping.

The 60" Manhole StormFilter can be configured with an internal bypass.

605 Global Way, Suite 113 | Linthicum, MD 21090
Toll-free: 866.740.3318 Fax: 866.376.8511
Provided By CONTECH on: 5/10/2011

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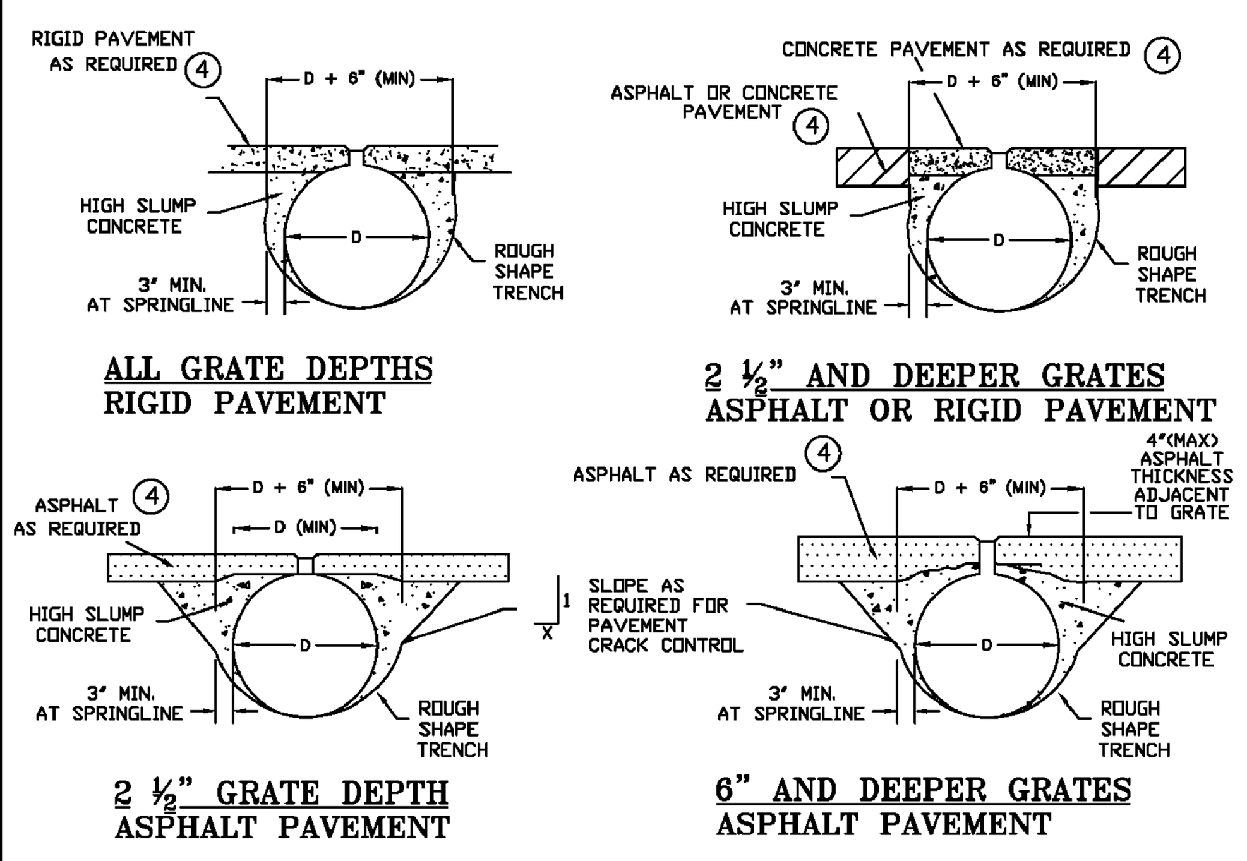
Maintenance:

The StormFilter requires regular maintenance to operate effectively. CONTECH recommends annual inspections, with full maintenance typically required every 24-36 months. Disposal of material should be handled in accordance with local regulations. Please contact CONTECH's Maintenance Department for all questions regarding maintenance at 866-740-3318 or visit our website at www.contech-cpi.com/maintenance.

CMP-VII-6



REQUIREMENTS:

1. EITHER 2-1/2" OR 6" DEEP GRATING IS ACCEPTABLE FOR STANDARD HIGHWAY (H10 THROUGH H25) LOADS USING THE GAGES IN TABLE 1, SEE DRAWING NO. 1009776. HIGH SLUMP CONCRETE BACKFILL IS REQUIRED, WITH THE ENVELOPE EXTENDING A MINIMUM OF 3 INCHES BEYOND THE SPRINGLINE, AS SHOWN ABOVE. THE HIGH SLUMP CONCRETE MUST PROVIDE A MINIMUM 750 psi COMPRESSIVE STRENGTH.
2. FOR INSTALLATIONS SUBJECTED TO OCCASIONAL LIGHT VEHICLE (LESS THAN H10) LOADS, SELECT GRANULAR BACKFILL MAY BE USED. HOWEVER, THE DRAIN MUST BE SET IN A TRENCH WIDE ENOUGH TO PROPERLY HAUNCH THE PIPE (TYPICALLY D + 36"). THE GRANULAR BACKFILL MUST BE A CLEAN, NON-PLASTIC, WELL GRADED MATERIAL, COMPACTED TO 95% STANDARD PROCTOR DENSITY.
3. DURING INSTALLATION, RECESS THE TOP OF THE GRATE 1/4" BELOW THE FINISHED GRADE OF THE PAVEMENT.
4. PAVEMENT AS REQUIRED ELSEWHERE IN THE PROJECT. IF CONCRETE PAVEMENT ELSEWHERE IS REINFORCED, CONTINUE THIS SAME REINFORCMENT INTO THE SLOTTED DRAIN ZONE. MINIMUM STEEL REINFORCEMENT AS REQUIRED TO MINIMIZE TEMPERATURE CRACKING OF THE CONCRETE IS RECOMMENDED IN THE SLOTTED DRAIN ZONE.
5. HEAVIER WHEEL LOADS DICTATE THE USE OF A MINIMUM 6" DEEP GRATING AND TYPICALLY A LARGER HIGH SLUMP CONCRETE EMBEDMENT ZONE. (SEE DRAWING 1008136)

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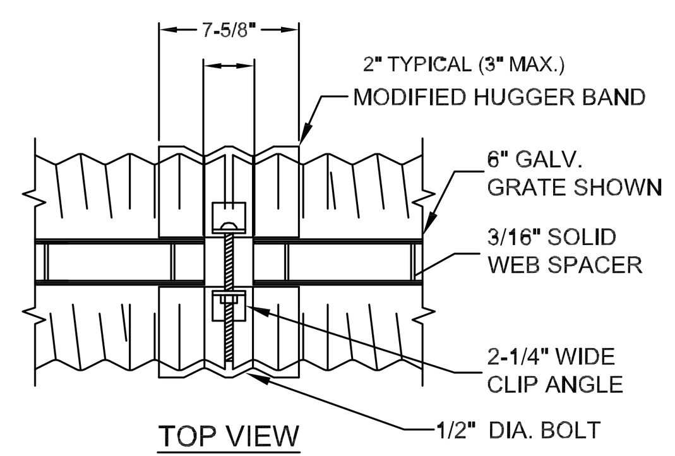
SLOTTED DRAIN INSTALLATION HIGHWAY WHEEL LOADINGS			
DRAWN BY: F.B.	REV. BY: JWK	SCALE: N/A	
DATE: 3-20-92	DATE: 05/23/01	1008607D	

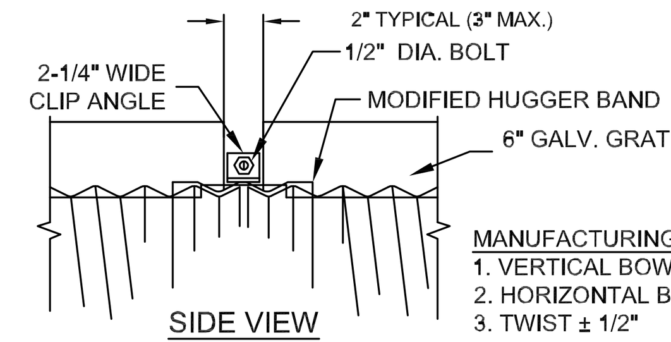


STANDARD SIZES						
GAGE OF PIPE	DIAMETER OF PIPE					
	12"	15"	18"	24"	30"	36"
16	X					

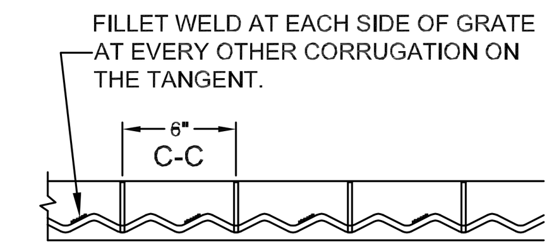
TYPE	"A"
6" VERT	1-3/4"

VERT=VERTICAL

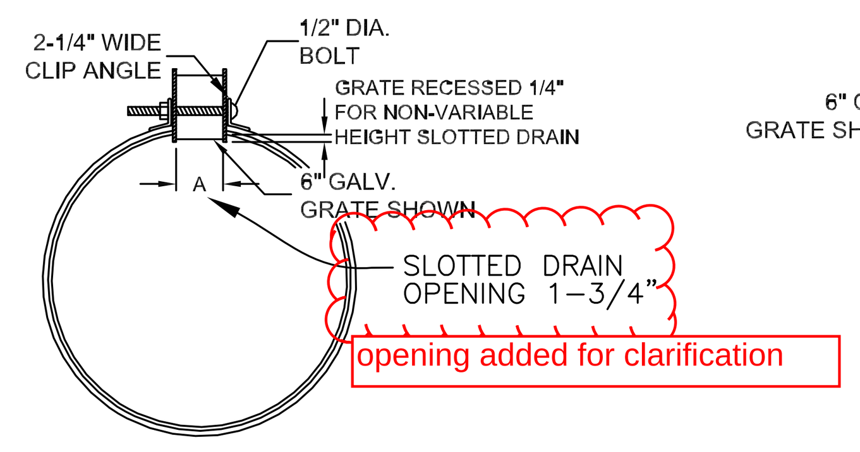
SLOTTED DRAIN NOTES:
1. GRATING IS AVAILABLE IN DEPTHS OF 2-1/2" AND 6"
2. FOR 6" VERTICAL REQUIREMENTS, THE SLOTTED DRAIN BAND MAY BE FURNISHED WITH THE 4" TECHCO BAND ANGLE.
3. DIMENSIONS ARE SUBJECT TO MANUFACTURING TOLERANCES.
4. SLOTTED DRAIN PIPE MAY HAVE TABS EVERY 59-1/2" TO ACCEPT GRATE NOTCHES.

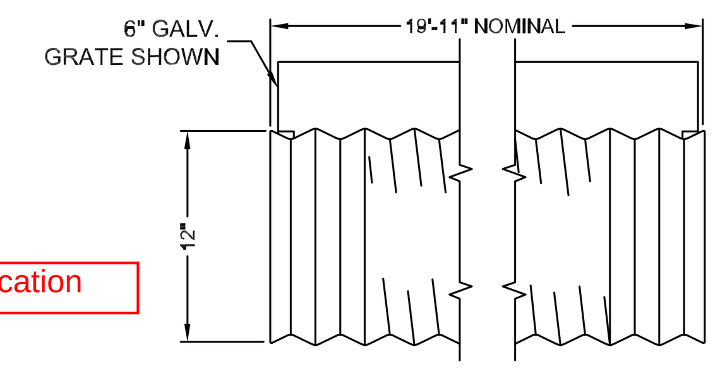


MANUFACTURING TOLERANCES
1. VERTICAL BOW ± 3/8"
2. HORIZONTAL BOW ± 5/8"
3. TWIST ± 1/2"



GRATE WELDING DETAIL

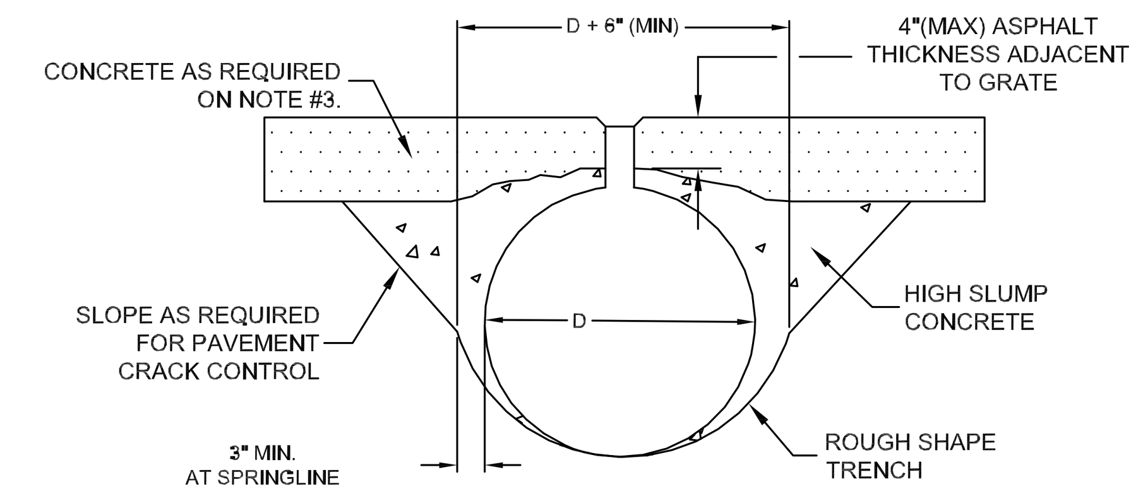




TYPICAL PIPE SECTION

SLOTTED DRAIN 6" GRATE & MODIFIED HUGGER BAND DETAIL

N.T.S.



6" AND DEEPER GRATES
ASPHALT PAVEMENT

REQUIREMENTS:

1.) HIGH SLUMP CONCRETE BACKFILL IS REQUIRED, WITH THE ENVELOPE EXTENDING A MINIMUM OF 3 INCHES BEYOND THE SPRINGLINE, AS SHOWN ABOVE. THE HIGH SLUMP CONCRETE MUST PROVIDE A MINIMUM 750 psi COMPRESSIVE STRENGTH.

2.) DURING INSTALLATION, RECESS THE TOP OF THE GRATE 1/4" BELOW THE FINISHED GRADE OF THE PAVEMENT.

3.) PAVEMENT DESIGNS AS REQUIRED FOR LOADING CONDITIONS. FOR REINFORCED CONCRETE PAVEMENTS, CONTINUE THE REINFORCEMENT OVER THE SLOTTED DRAIN. FOR UNREINFORCED CONCRETE PAVEMENTS, MINIMUM SHRINKAGE STEEL IS RECOMMENDED.

SLOTTED DRAIN BACKFILL DETAIL

N.T.S.

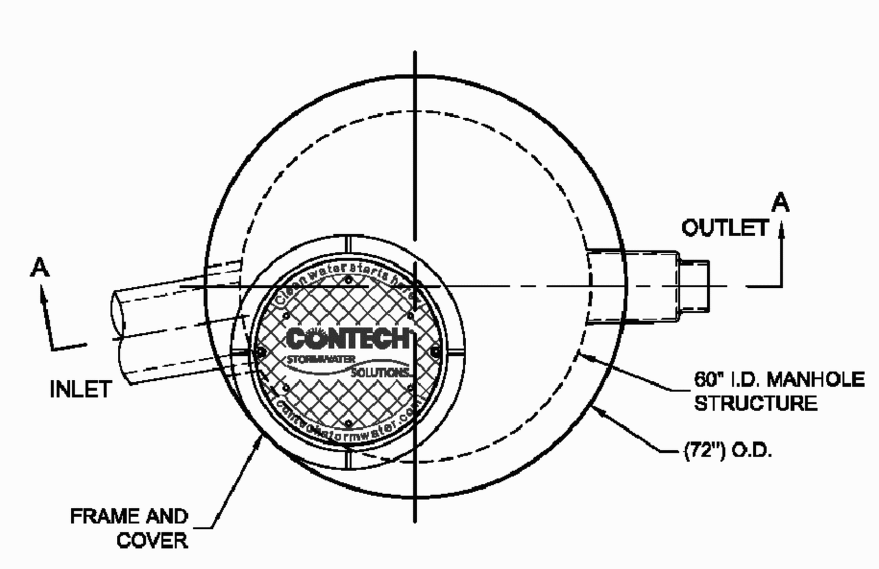
MARK	DATE	REVISION DESCRIPTION	BY

CONTECH CONSTRUCTION PRODUCTS INC. www.contech-cpi.com 9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069 800-338-1122 513-645-7000 513-645-7993 FAX

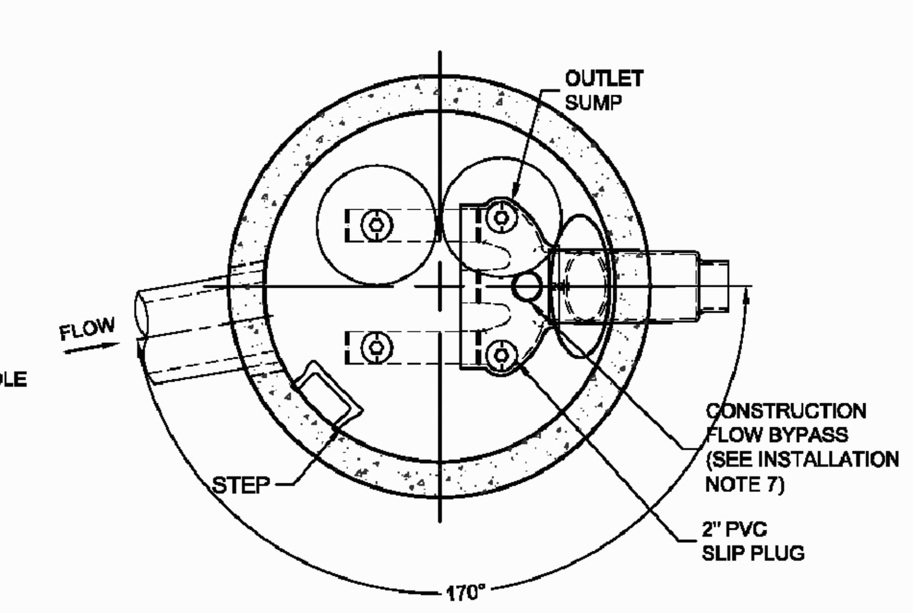
CONTECH DRAINAGE SYSTEMS — CONTECH CONTRACT DRAWING

SLOTTED DRAIN - 439270-002
CENTRAL WAREHOUSE & MAINTENANCE FACILITY
LEESBURG, VA
SITE DESIGNATION: DRAINAGE

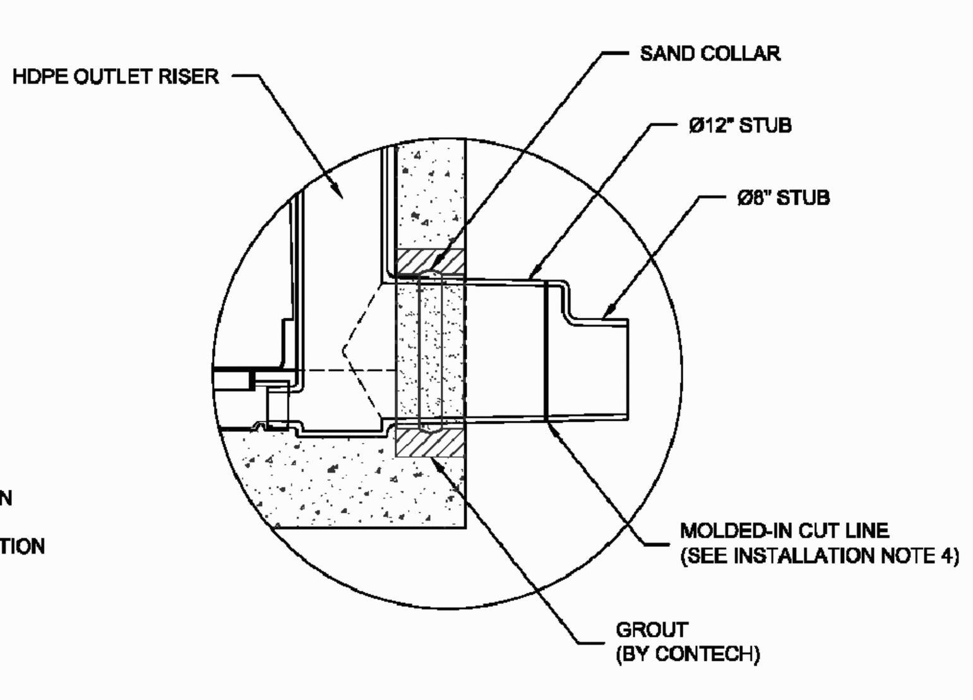
PROJECT No.: 439270	SEQ. No.: 002	DATE: 4/27/11
DESIGNED: ----	DRAWN: JAP	
CHECKED: ----	APPROVED: ----	
SHEET NO.: 4 OF 5		



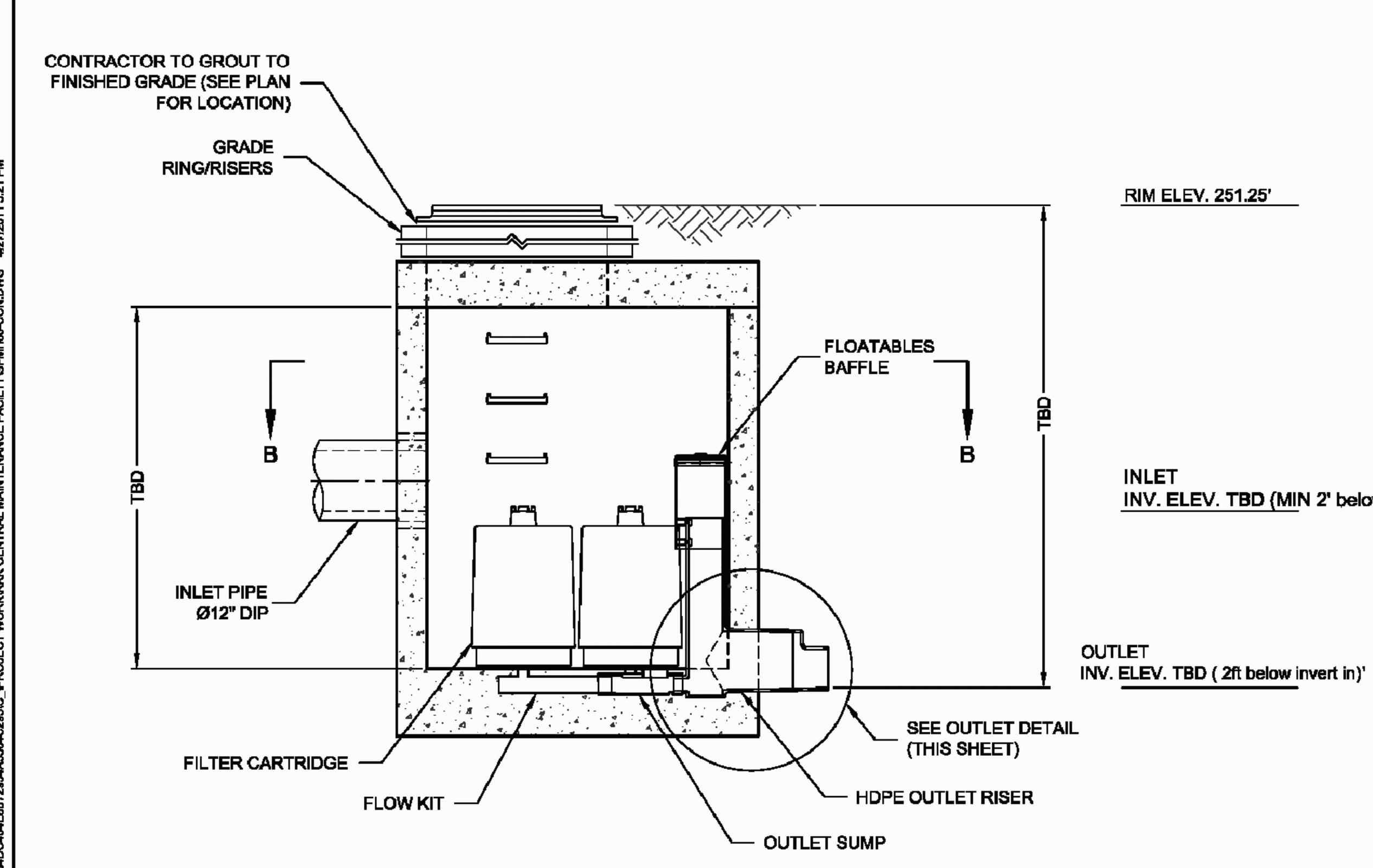
PLAN VIEW



SECTION B-B
STANDARD OUTLET RISER
FLOWKIT: 41A



OUTLET DETAIL



SECTION A-A

MATERIAL LIST - PROVIDED BY CONTECH

COUNT	DESCRIPTION	INSTALLED BY
2	18", 15 GPM, ZPG CARTRIDGE (BLK)	PRECASTER
2	2" PVC SLIP PLUG	PRECASTER
1	18" OUTLET RISER	PRECASTER
1	FLOW KIT	PRECASTER
1	JOINT SEALANT (BY PRECASTER)	CONTRACTOR
1 PLC	GRADE RINGS/RISERS	CONTRACTOR
1	Ø30" x 4" FRAME AND COVER	CONTRACTOR

SITE DESIGN DATA

WATER QUALITY FLOW RATE	.05 CFS
PEAK FLOW RATE	2.0 CFS
RETURN PERIOD OF PEAK FLOW	XX YRS
FILTER MEDIA TYPE	ZPG

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 **37 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.contech-cpi.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 AND CASTINGS SHALL MEET AASHTO M306 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.

INSTALLATION NOTES
1. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
2. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE (LIFTING CLUTCHES PROVIDED).
3. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL SECTIONS AND ASSEMBLE STRUCTURE.
4. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET PIPE(S).
5. CONTRACTOR TO PROVIDE AND INSTALL CONNECTOR TO THE OUTLET RISER STUB. STORMFILTER EQUIPPED WITH A DUAL DIAMETER HDPE OUTLET STUB AND SAND COLLAR. IF OUTLET PIPE IS LARGER THAN 8 INCHES, CONTRACTOR TO REMOVE THE 8 INCH OUTLET STUB AT MOLDED IN CUT LINE. COUPLING BY FERNCO OR EQUAL AND PROVIDED BY CONTRACTOR.
6. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
7. CONTRACTOR TO INSTALL SUPPLIED PLUG IN CONSTRUCTION FLOW BYPASS WHEN SYSTEM IS BROUGHT ON LINE (PRESSURE FIT ONLY, DO NOT GLUE).

STRUCTURE WEIGHT
APPROXIMATE HEAVIEST PICK = T.B.D. LBS.

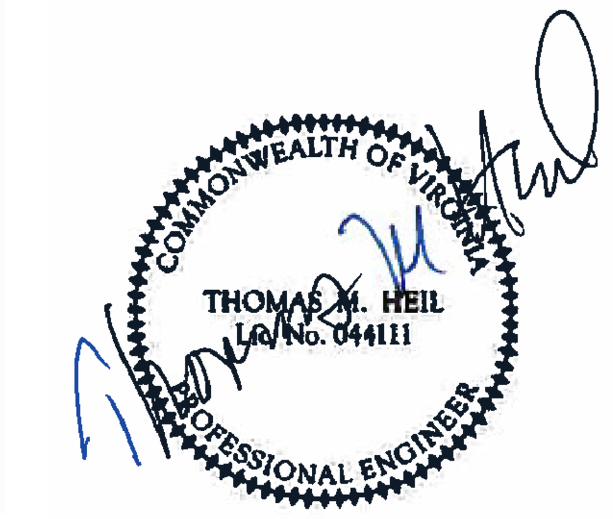
CONTECH PROPOSAL DRAWING

Ø60" MANHOLE STORMFILTER - 439,270-1
Central Warehouse and Maintenance Facility
Leesburg, VA
SITE DESIGNATION: SF

MARK	DATE	REVISION DESCRIPTION	BY

CONTECH CONSTRUCTION PRODUCTS INC. www.contech-cpi.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®

DATE: XX/XX/XX	
DESIGNED: CLG	DRAWN: CLG
CHECKED:	APPROVED:
PROJECT No.: 439,270	SEQUENCE No.: 1
SHEET: 1 OF 1	



TOWN OF
LEESBURG, VIRGINIA

25 WEST MARKET STREET,
P.O. BOX 88,
LEESBURG, VA 20178

CENTRAL WAREHOUSE &
MAINTENANCE FACILITY

FUEL ISLAND
UPGRADE

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10306 EATON PLACE
WILLOWWOOD II, SUITE 240
FAIRFAX, VA 22030
(P) 703 246-0028
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PROGRESS
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May 13, 2011
NOT FOR
CONSTRUCTION

NO. BY	REVISIONS	DATE

DWG. TITLE

TRENCH DRAIN AND BMP DETAILS

DATE	04/29/11
SCALE	N/A
DWN. KAB	CHK. WSS
PROJ. No.	
DWG. No.	C013

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