

FLOW KIT COMPONENTS

A. ALL FLOW KIT COMPONENTS ARE PROVIDED BY STORMWATER MANAGEMENT; 2035 NE COLUMBIA BLVD., PORTLAND, OR 97211; 503-240-3393.

B. FILTER MEDIA: FILTER MEDIA SHALL CONSIST OF ONE OR MORE OF THE FOLLOWING:

1. CSF MEDIA:
 - a. FILTER MEDIA SHALL BE MADE EXCLUSIVELY OF FALLEN DECIDUOUS LEAVES WITH LESS THAN 5% BY DRY WEIGHT OF WOODY OR GREEN YARD DEBRIS MATERIALS.
 - b. FILTER MEDIA SHALL BE GRANULAR AND SHALL CONTAIN LESS THAN 0.5% FOREIGN MATERIAL SUCH AS GLASS OR PLASTIC CONTAMINANTS. MEDIA SHALL BE DRY AT THE TIME OF INSTALLATION WITH A MOISTURE CONTENT (WET WEIGHT BASIS) NO GREATER 10%.
 - c. MAXIMUM LEVEL OF DUST FOR FILTER MEDIA SHALL BE DEFINED AS: MEDIA PASSING THROUGH A U.S. STANDARD SIEVE #4 SHALL HAVE NO MORE THAN 10% (BY MASS OF DRY MEDIA) PASSING A U.S. STANDARD SIEVE #45.
 - d. FILTER MEDIA SHALL BE BY STORMWATER MANAGEMENT OR APPROVED ALTERNATE.
2. PLEATED FABRIC INSERT

PLEATED FABRIC INSERT SHALL BE CONSTRUCTED WITH A MINIMUM OF 75 SQ-FT OF FABRIC PLACED BETWEEN TWO ALUMINUM END CAPS WITH NEOPRENE GASKETS. THE OVERALL DIMENSIONS OF THE INSERT SHALL BE 16.0" O.D. X 11.5" I.D. X 18.25" TALL. THE FABRIC SHALL MEET THE FOLLOWING SPECIFICATIONS:

140 PLEATS MEASURING 2.125" X 18.25"
 100% 30 PE/FT BICOMPONENT FIBER
 WEIGHT: 4.0 OZ/SQ-YD
 THICKNESS: 19 MILS
 MULLEN BURST: 96 PSI
 COULTER POREMETER: 36 MICRON
 TENSILE STRENGTH: MD 58 LBS, CD 16 LBS

3. PERLITE MEDIA
 PERLITE MEDIA SHALL BE MADE OF NATURAL SILICEOUS VOLCANIC ROCK FREE OF ANY DEBRIS OR FOREIGN MATTER. THE EXPANDED PERLITE SHALL BE PROPAGATION GRADE WITH PARTICLE DIAMETERS RANGING FROM 0.125 TO 0.33 INCHES. DRY BULK DENSITY TO RANGE FROM 6.5 TO 8.5 LBS/CU-FT.

SCREEN SIZE	% PERLITE RETAINED BY VOLUME
4 MESH	0 TO 4
8 MESH	45 TO 65
12 MESH	10 TO 35
16 MESH	5 TO 10
20 MESH	3 TO 10
30 MESH	1 TO 5
PAN	TRACE TO 2

4. ZEOLITE MEDIA
 NATURALLY OCCURRING CLINOPTILOLITE, SHALL BE USED WITH PARTICLE DIAMETERS BETWEEN 1/8 (0.125) TO 1/4 (0.25) INCH. THE MINERAL'S GEOLOGICAL STRUCTURE IS POTASSIUM-CALCIUM-SODIUM ALUMINOSILICATE. ZEOLITE IS ALSO AN INERT, NON-TOXIC SUBSTANCE WHICH IS FEDERALLY CLASSIFIED AS GRAS (GENERALLY REGARDED AS SAFE).

PHYSICAL PROPERTIES:

ACID STABILITY	0 - 7 (PH)
ALKALI STABILITY	7 - 13 (PH)
BULK DENSITY	44 - 50 LBS/FT3
CATION EXCHANGE CAPACITY	1.0 - 2.2 MEQ/G
COLOR	WHITE
CRUSHING STRENGTH	2500 LBS/IN3
MOLECULAR RATIO (Si/Al)	5.1
PORE SIZE (DIAMETER)	4.0 A
SPECIFIC GRAVITY	2.2 - 2.4
SURFACE AREA	1357 YD2/OZ
SWELLING INDEX	NIL

IRON-INFUSED MEDIA

IRON-INFUSED MEDIA SHALL BE CREATED FROM PHENOLIC RESIN MIXED WITH IRON PARTICLES AND POLYMERIZED TO FORM OPEN CELLULAR FOAM. THE BULK DENSITY OF THE MEDIA SHALL BE BETWEEN 20 AND 30 LB/FT3 WITH A MESH SIZE OF 8 X 1/2". THE STOCK MATERIALS MUST BE FREE OF DEBRIS WITH THE IRON PARTICLES BEING NON-REACTIVE AND NON-GREASED.

PHYSICAL PROPERTIES:

SCREEN SIZE	8 X 3/8"
GRAIN SIZE	0.1 - 1/2 IN
BULK DENSITY	22.1 LB/FT3
PH	6.5
PHOSPHORUS SORPTION	800 MG-P/KG
DOT SHIPPING	PLASTIC ARTICLE/NON-HAZARDOUS

C. FILTER CARTRIDGE

1. CARTRIDGES SHALL BE CONSTRUCTED FROM LINEAR LOW DENSITY POLYETHYLENE BOTTOM, TOP, AND INNER RING. OUTER SCREEN SHALL CONSIST OF 1/2" X 1/2" OR 1/2" X 1" GALVANIZED WELDED WIRE (16 GAGE MINIMUM) BONDED TO PVC. SCREEN FASTENERS TO BE ALUMINUM OR STAINLESS STEEL. INTERNAL FITTINGS SHALL CONSIST OF ABS FITTINGS. PVC INNER CORE WITH A SIPHON DEVICE CONSISTING OF A POLYSTYRENE FLOAT, POLYPROPYLENE BALL VALVE, WITH STAINLESS STEEL CONNECTORS. OUTER FILTER FABRIC SHALL BE FIBERGLASS 10X8.5 CLEAR MESH. INNER FILTER FABRIC SHALL BE WOVEN POLYETHYLENE WITH A 20 US SIEVE OPENING SIZE. ALL MISCELLANEOUS SCREWS, NUTS, AND FASTENERS TO BE STAINLESS STEEL OR ENGINEER APPROVED. ALL WATER TIGHT FITTINGS TO BE SEALED WITH SEALANT IN CONFORMANCE WITH FDA REGULATION 21 CFR 175.000.
2. CARTRIDGES SHALL HAVE FILTER MEDIA INSTALLED (SEE SPECIFICATION ABOVE).
3. RESTRICTOR DISKS: ORIFICE PLATE SHALL BE SUPPLIED WITH EACH CARTRIDGE TO RESTRICT FLOW RATE TO 15 GPM MAXIMUM.

D. FLOW SPREADER: SHALL BE CONSTRUCTED OF LDPE BY STORMWATER MANAGEMENT.

E. PVC PIPING (INSIDE FILTER): ALL INTERNAL PVC PIPING AND FITTINGS SHALL MEET ASTM D1785.

G. FLOW SPREADER FRAME: SHALL BE MADE OF PVC OR REINFORCED FIBERGLASS BY STORMWATER MANAGEMENT.

H. HARDWARE: SHALL BE STAINLESS STEEL.

CONTRACTOR PROVIDED COMPONENTS

DRAIN PIPE: SHALL BE AASHTO M252 TYPE S HDPE SLOTTED (PERFORATED). ALL PIPE JOINTS SHALL BE MADE ACCORDING TO MANUFACTURERS SPECIFICATIONS.

SILICONE JOINT SEALANT

A. SILICONE SEALANT SHALL BE PURE RTV SILICONE CONFORMING TO FEDERAL SPECIFICATION NUMBER TT S001543A OR TT S00230C OR ENGINEER APPROVED.

B. SUB-BASE

SUB-BASE SHALL BE 6" MINIMUM OF 3/4" MINUS ROCK, 95% COMPACTION. COMPACT UNDISTURBED SUB-GRADE MATERIALS TO 95% OF MAXIMUM DENSITY AT +/- 2% OF OPTIMUM MOISTURE.

C. UNSUITABLE MATERIAL BELOW SUB-GRADE SHALL BE REPLACED TO SITE ENGINEER'S APPROVAL.

BACKFILL

BACKFILL SHALL BE 3/4" MINUS ROCK (95% COMPACTION), OR AS OTHERWISE SPECIFIED IN THE PROJECT'S GENERAL TECHNICAL SPECIFICATIONS.

D. GRATING

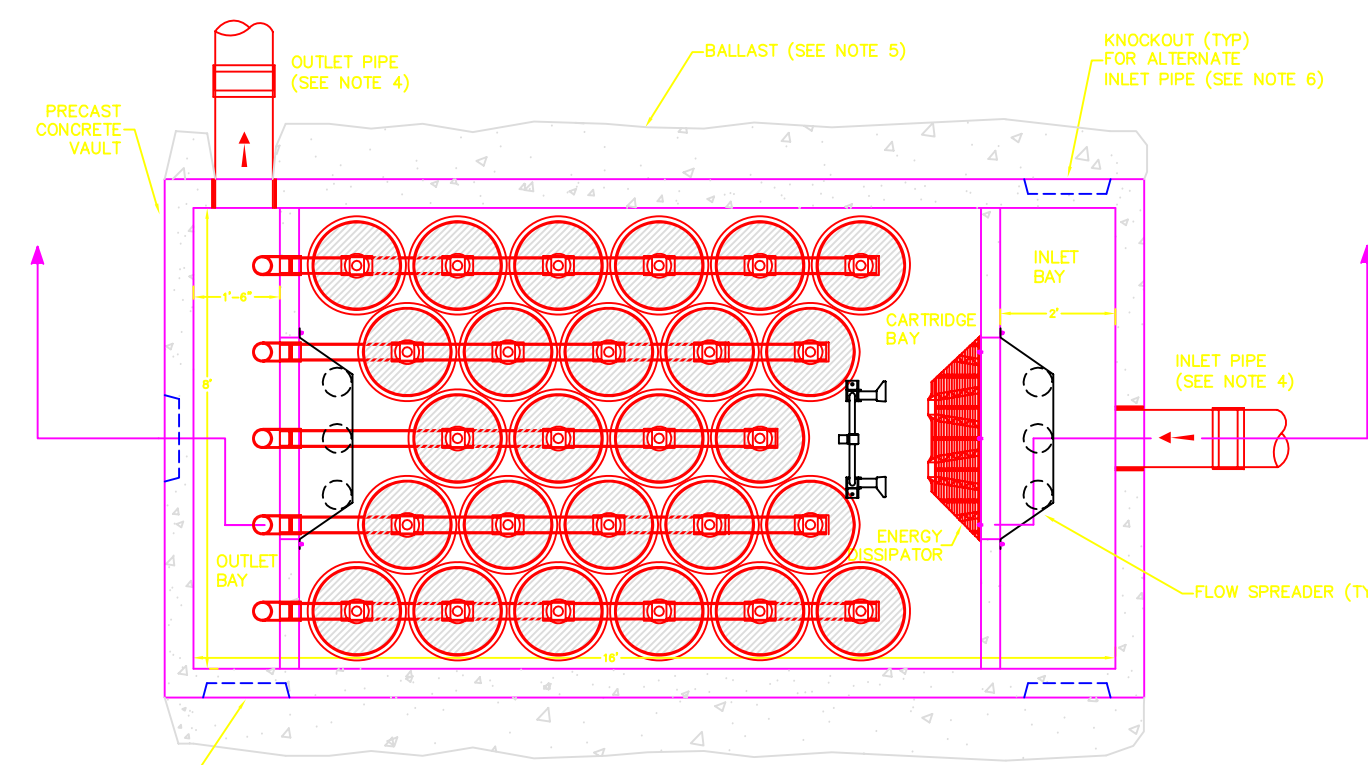
E. ALL GRATING TO HAVE A HOT DIPPED GALVANIZED FINISH AND SHALL BE CONSTRUCTED IN CONFORMANCE WITH AMERICAN NATIONAL STANDARD ANSI/NAAMM 531-93.

F. GROUT

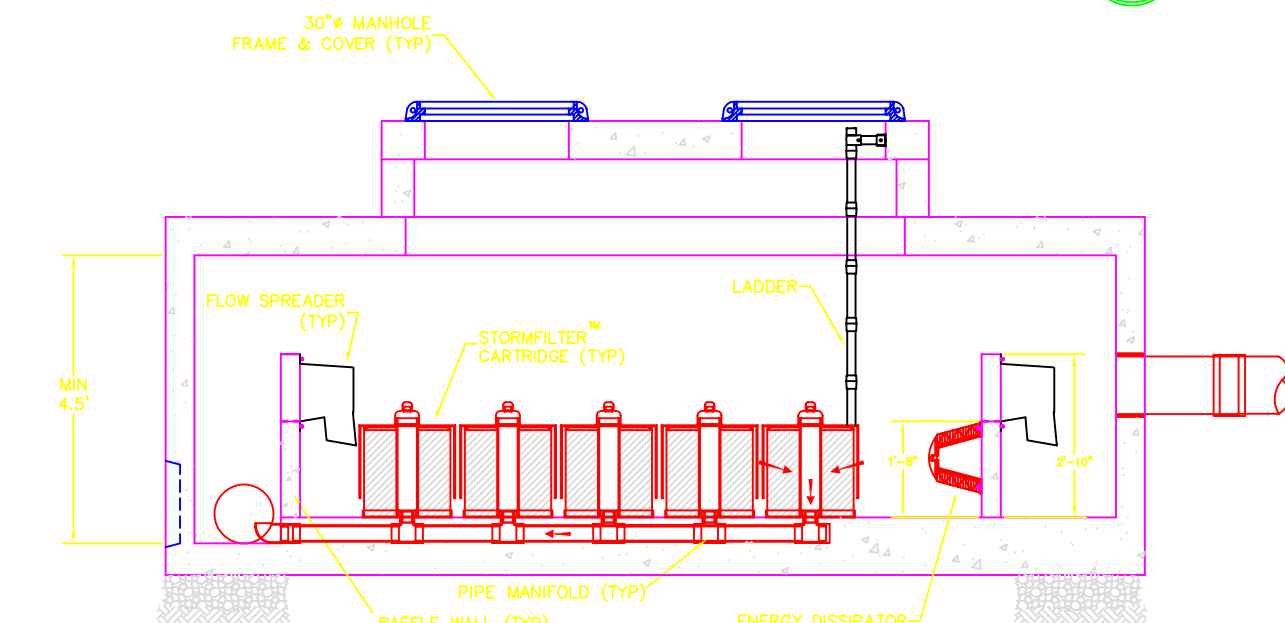
CEMENT-TYPE GROUT SHALL BE NON-SHRINK GROUT MEETING THE REQUIREMENTS OF CORPS OF ENGINEERS CRD-C588. SPECIMENS MOLDED, CURED AND TESTED IN ACCORDANCE WITH ASTM C-109 SHALL HAVE MINIMUM COMPRESSIVE STRENGTH OF 6,200 PSI. GROUT SHALL NOT EXHIBIT VISIBLE BLEEDING.

GENERAL NOTES

- 1.) STORMFILTER BY STORMWATER MANAGEMENT, PORTLAND, OREGON (503-240-3393).
- 2.) ALL STORMFILTERS REQUIRE REGULAR MAINTENANCE. REFER TO OPERATION AND MAINTENANCE GUIDELINES FOR DETAILS.
- 3.) PRECAST CONCRETE VAULT TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C888.
- 4.) INLET AND OUTLET PIPING TO BE SPECIFIED BY ENGINEER AND PROVIDED BY CONTRACTOR.
- 5.) ANTI-FLOATATION BALLAST TO BE SPECIFIED BY ENGINEER. BALLAST TO BE SET ALONG ENTIRE LENGTH OF BOTH SIDES OF VAULT. BALLAST MATERIALS TO BE PROVIDED BY CONTRACTOR.
- 6.) PRECAST STORMFILTER EQUIPPED WITH KNOCKOUTS AT ALT. INLET/OUTLET LOCATIONS. CORINGS AVAILABLE WHEN SPECIFIED.
- 7.) DETAIL REFLECTS DESIGN INTENT ONLY. ACTUAL VAULT DIMENSIONS AND CONFIGURATION WILL BE SHOWN ON THE PRODUCTION SHOP DRAWING.



8'x16' PRECAST STORMFILTER™ - PLAN VIEW
 SCALE: N.T.S.



8'x16' PRECAST STORMFILTER™ - SECTION VIEW
 SCALE: N.T.S.

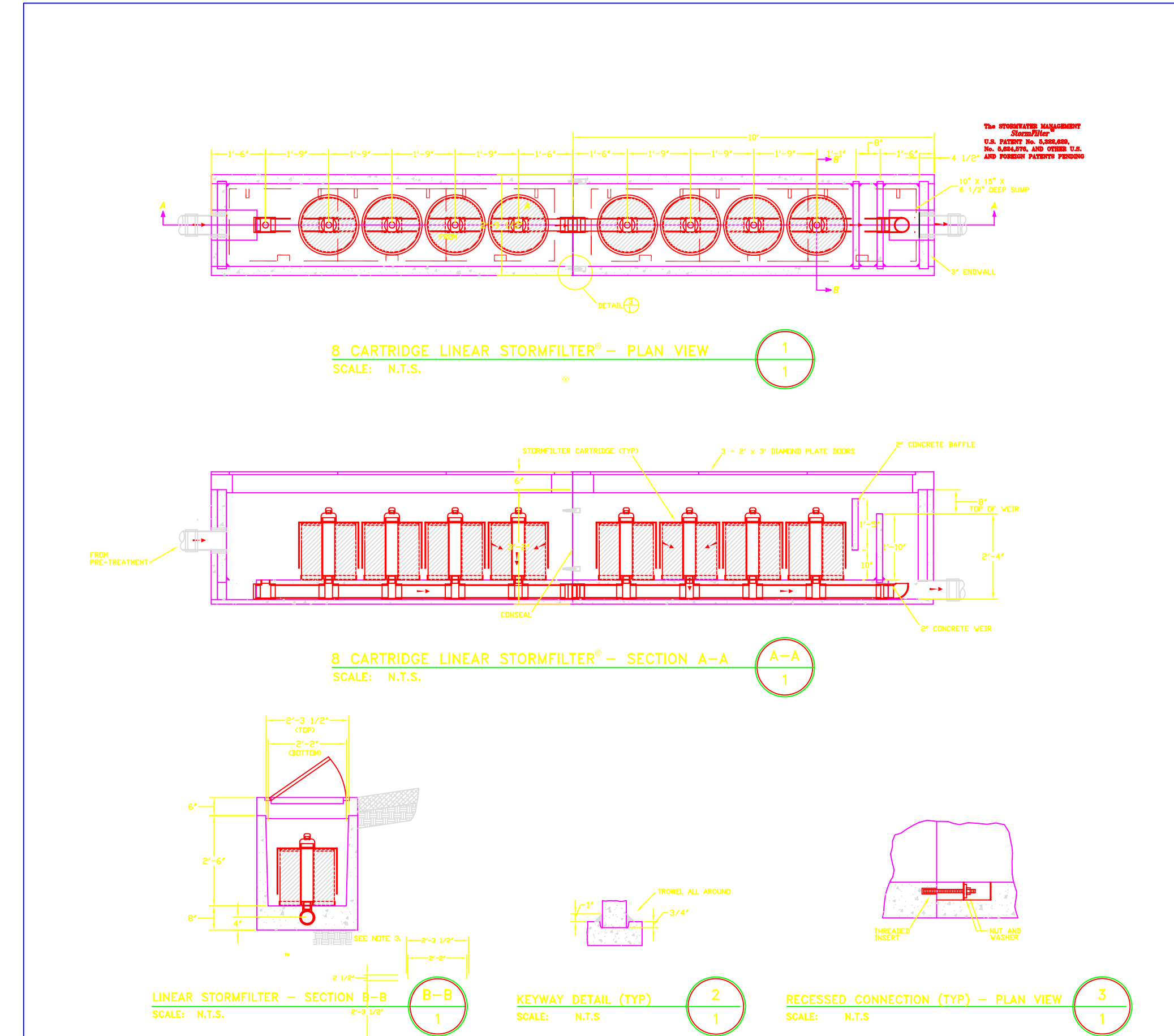
8' X 16' PRECAST STORMFILTER - 28 CARTRIDGE PLAN AND SECTION VIEW STANDARD DETAIL

SCALE: AS SHOWN PROJECT NO. DRAWING FILE NAME: B18.DWG

STORMWATER MANAGEMENT INC.

SHEET	DESIGNED BY: JEL	CHECKED BY:	CHECK DATE:
1/1	DRAWN BY: JEL	APPROVED BY:	APPR. DATE:
	DATE: 04/18/01		

VAULT #1



8 CARTRIDGE LINEAR STORMFILTER™ - PLAN VIEW
 SCALE: N.T.S.

8 CARTRIDGE LINEAR STORMFILTER™ - SECTION A-A
 SCALE: N.T.S.

LINEAR STORMFILTER™ - SECTION B-B
 SCALE: N.T.S.

KEYWAY DETAIL (TYP)
 SCALE: N.T.S.

RECESSED CONNECTION (TYP) - PLAN VIEW
 SCALE: N.T.S.

NOTES:
 TO SHOW GRATES/GUTTERS:
 TURN ON LAYERS: GRATE, GUTTER, AND GUTTER-LID
 TURN OFF LAYER: DOOR-LID

GENERAL NOTES

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- 3.) PRECAST CONCRETE VAULT TO BE CONSTRUCTED IN ACCORDANCE WITH ASTM C888.
- 4.) INLET AND OUTLET PIPING TO BE SPECIFIED BY ENGINEER AND PROVIDED BY CONTRACTOR.
- 5.) PRE-TREATMENT STRUCTURE SHOULD HAVE A DOWNTURNED 90° ELBOW ON THE OUTLET PIPE.
- 6.) DETAIL REFLECTS DESIGN INTENT ONLY. ACTUAL VAULT DIMENSIONS AND CONFIGURATION WILL BE SHOWN ON THE PRODUCTION SHOP DRAWING.

LINEAR PRECAST STORMFILTER - 8 CARTRIDGE PLAN AND SECTION VIEW STANDARD DETAIL

SCALE: AS SHOWN PROJECT NO. DRAWING FILE NAME: L18.DWG

STORMWATER MANAGEMENT INC.

SHEET	DESIGNED BY: JEL	CHECKED BY:	CHECK DATE:
1/1	DRAWN BY: JEL	APPROVED BY:	APPR. DATE:
	DATE: 10/20/02		

VAULT #2

FILTER CARTRIDGE

- A. CARTRIDGES SHALL NOT BE INSTALLED UNTIL THE PROJECT SITE IS CLEAN AND STABILIZED. THE PROJECT SITE INCLUDES ANY SURFACE WHICH CONTRIBUTES STORM DRAINAGE TO THE FILTER. ALL IMPERMEABLE SURFACES SHALL BE CLEAN AND FREE OF DIRT AND DEBRIS. ALL CATCH BASINS, MANHOLES AND PIPES SHALL BE FREE OF DIRT AND SEDIMENTS.
- B. CONTRACTOR MUST NOTIFY STORMWATER MANAGEMENT (503-240-3393) TWO (2) WEEKS BEFORE CARTRIDGE INSTALLATION. STORMWATER MANAGEMENT PERSONNEL OR AUTHORIZED AGENT WILL INSTALL CARTRIDGES COMPLETE WITH FILTER MEDIA AND PLUGS AT ALL OTHER LOCATIONS IN THE PIPE MANIFOLD WHERE A CARTRIDGE IS NOT SPECIFIED.

WEIRS: SHALL BE LEVEL AND SEALED AT ALL JOINTS WITH SILICONE SEALANT. SEALANT SHALL BE WORKED INTO JOINT FROM BOTH SIDES.

CLEANUP: REMOVE ALL EXCESS MATERIALS, ROCKS, ROOTS, OR FOREIGN MATERIAL LEAVING THE SITE IN A CLEAN, COMPLETE CONDITION APPROVED BY THE ENGINEER. ALL PVC AND FIBERGLASS FILTER COMPONENTS SHALL BE FREE OF ANY FOREIGN MATERIALS INCLUDING CONCRETE AND EXCESS SEALANT.

FLOW SPREADER FRAMES: SHALL BE INSTALLED WITHIN 3/8 INCH OF PLAN DIMENSIONS AND SET VERTICALLY.

PVC PIPING: SHALL BE JOINED IN ACCORDANCE WITH ASTM D2564.

CAST-IN-PLACE CONCRETE FINISHING

A. UNEXPOSED WALL FINISH - PATCH ALL ROCK POCKETS, FORM TIE HOLES, AND OTHER IRREGULARITIES WITH MORTAR. NO FURTHER FINISHING WILL BE REQUIRED.

B. ORDINARY WALL FINISH - IMMEDIATELY AFTER REMOVAL OF FORMS, PATCH OR POINT UP ALL DEFECTS AND CURE PATCHES TO A POINT 6" BELOW EXPOSED GRADE. AFTER POINTINGS HAVE SET SUFFICIENTLY, GRIND OR FILL ALL FORM MARKS AND POINTINGS TO GIVE A SMOOTH SURFACE EVEN WITH THE FLAT WALL SURFACE.

C. HORIZONTAL SURFACES

1. FINISH UPPER HORIZONTAL SURFACES SUCH AS TOPS OF WALLS BY PLACING AN EXCESS OF CONCRETE IN THE FORMS AND REMOVING OR STRIKING OFF SUCH EXCESS WITH A WOODEN FLOAT AND FORGING COARSE AGGREGATE BELOW MORTAR SURFACE. TOPPING THE USE OF MORTAR FOR SURFACES FALLING UNDER THIS CLASSIFICATION WILL NOT BE PERMITTED.
2. AFTER CONCRETE HAS BEEN STRUCK OFF, WORK SURFACE THOROUGHLY AND FLOAT WITH A WOODEN, CANVAS OR CORK FLOAT, BY SKILLED AND EXPERIENCED CONCRETE FINISHERS. BEFORE THIS LAST FINISH HAS SET, BROOM SURFACE LIGHTLY, PARALLEL TO THE LONG DIMENSION, WITH A FINE BRUSH TO REMOVE SURFACE CEMENT FILM LEAVING A FINE-GRAINED, SMOOTH, BUT SANDY TEXTURE.

PRECAST STORMFILTER™ DATA #1

DESIGN WATER QUALITY FLOW (cfs)	1.37
PEAK FLOW (cfs)	3.63
RETURN PERIOD OF PEAK FLOW (yrs)	100
RADIAL FLOW CARTRIDGES REQUIRED	26
PRECAST STORMFILTER™ SIZE	8 x 16
(In-Out)=2.3' Min.	I.E. MATERIAL DIAMETER
INLET PIPE #1	185.56 N-12 12"
INLET PIPE #2	N/A N/A N/A
INLET PIPE #3	N/A N/A N/A
OUTLET PIPE	183.26 N-12 12"
RIM ELEVATION(S):	
	1 = 189.5±
	2 = 189.5±
ADJUSTABLE LID	NO
DOOR OPENING DIRECTION: (FACING DOWNSTREAM - SEE FIGURE ABOVE EXAMPLE: "2 TO 1" OR "1 TO 2". USE "N/A" FOR METAL GRATE).	2 TO 1
H-20 TRAFFIC RATED LID	NO
LADDER	YES
ANTI-FLOATATION BALLAST (USE N/A IF NOT REQUIRED)	WIDTH HEIGHT N/A N/A

SEE SHEET C05 FOR PLAN VIEW

PRECAST STORMFILTER™ DATA #2

DESIGN WATER QUALITY FLOW (cfs)	0.40
PEAK FLOW (cfs)	1.22
RETURN PERIOD OF PEAK FLOW (yrs)	100
RADIAL FLOW CARTRIDGES REQUIRED	8
PRECAST STORMFILTER™ SIZE	3 x 20
(In-Out)=2.3' Min.	I.E. MATERIAL DIAMETER
INLET PIPE #1	235.10 N-12 12"
INLET PIPE #2	N/A N/A N/A
INLET PIPE #3	N/A N/A N/A
OUTLET PIPE	232.80 N-12 12"
RIM ELEVATION	N/A
ADJUSTABLE LID	NO
DOOR OPENING DIRECTION: (FACING DOWNSTREAM - SEE FIGURE ABOVE EXAMPLE: "2 TO 1" OR "1 TO 2". USE "N/A" FOR METAL GRATE).	2 TO 1
H-20 TRAFFIC RATED LID	NO
LADDER	NO
ANTI-FLOATATION BALLAST (USE N/A IF NOT REQUIRED)	WIDTH HEIGHT N/A N/A

SEE SHEET C06 FOR PLAN VIEW



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 MUKILTEO, WA.

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PROJECT NO.: 03002
 DRAWN BY: DJW
 ISSUE DATE: 02-28-03
 SHEET REV.: 06-26-03

STORM FILTER VAULT DETAILS AND SPECIFICATIONS
 SHEET TITLE
 SHEET TITLE
 SHEET TITLE
 SHEET TITLE

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C12