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Site Improvement Plans for
LITTLE SUNSHINE PLAYHOUSE & PRESCHOOL
4220 Highway K
O'Fallon, Missouri 63368

Proj. # 1776		
No.	Description	Date
To Utilities	05/22/18	
Bid Set	05/30/18	
To City	06/21/18	
To City	07/17/18	
To City	08/03/18	

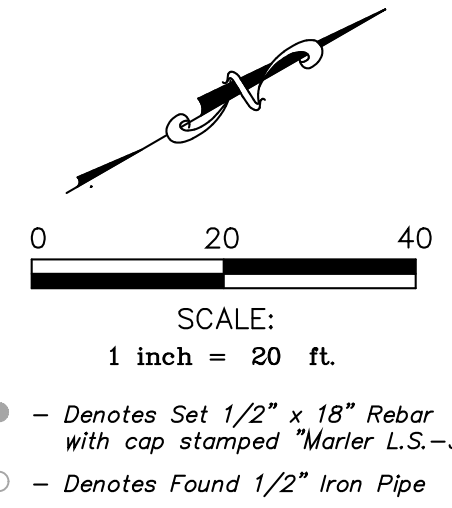
DRAINAGE AREA PLAN

C11

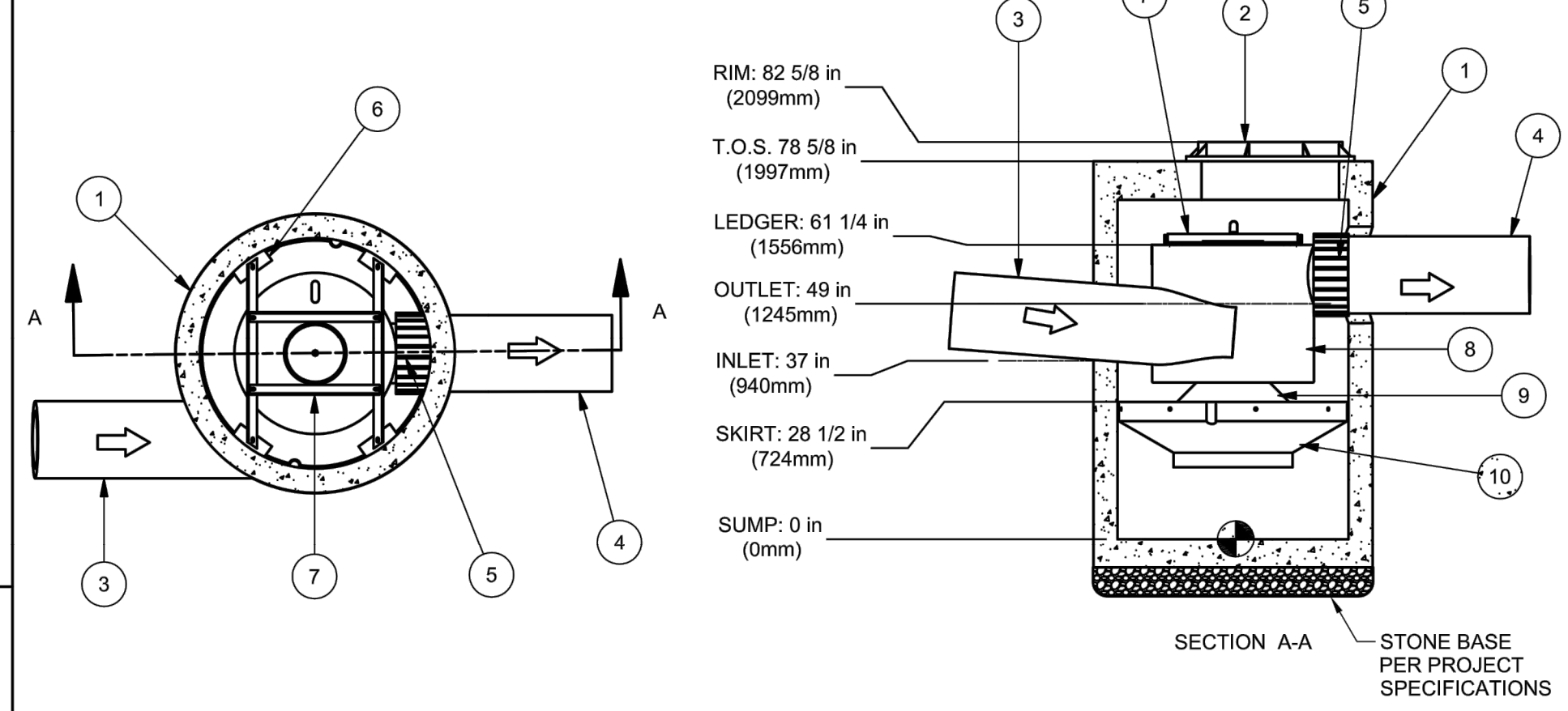
DIFFERENTIAL RUNOFF CALCULATIONS

EXISTING CONDITION	= 0.16 ac. x 3.85 c.f.s./ac. = 0.62 c.f.s.
PAVEMENT	= 1.45 ac. x 1.87 c.f.s./ac. = 2.71 c.f.s.
GRASS	= 1.61 ac. = 3.33 c.f.s.
TOTAL	= 0.62 c.f.s. + 2.71 c.f.s. + 3.33 c.f.s. = 6.66 c.f.s.
PROPOSED CONDITION	= 0.26 ac. x 3.85 c.f.s./ac. = 1.00 c.f.s.
BUILDING	= 0.92 ac. x 3.85 c.f.s./ac. = 3.54 c.f.s.
PAVEMENT	= 0.43 ac. x 1.87 c.f.s./ac. = 0.80 c.f.s.
GRASS	= 1.61 ac. = 3.33 c.f.s.
TOTAL	= 1.00 c.f.s. + 3.54 c.f.s. + 0.80 c.f.s. + 3.33 c.f.s. = 8.67 c.f.s.
DIFFERENTIAL RUNOFF	= 8.67 c.f.s. - 6.66 c.f.s. = 2.01 c.f.s. increase

STORMWATER MANAGEMENT NOTE:
LAND AREA DISTURBED = 1.44 ACRES



NOT FOR CONSTRUCTION - CONTACT HYDRO INTERNATIONAL FOR SITE SPECIFIC DRAWINGS



CAPACITIES:

1. Peak treatment flow: 3.0 cfs (85 l/s)
2. Sediment storage capacity: 0.70 Cu. yd. (0.54 cu. m.)
3. Oil storage capacity: 70 Gal. (265 liters)

ADDITIONAL DESIGN INFORMATION:

1. The outlet pipe stub (not shown) is a roto-molded product with an I.D. of 12 in. that cannot be modified. To avoid the use of a reducer or expander on the outlet a 12 in. outlet pipe should be used if possible. The orientation of the outlet pipe can be adjusted to suit site conditions.
2. Maximum pipe size is 12 in. The inlet pipe invert should be placed one inlet pipe diameter below the outlet pipe invert. The I.D. of the inlet pipe should be placed tangent to the I.D. of the manhole. The orientation of the inlet pipe can be adjusted to suit site conditions. Headloss at 3.0 cfs with a 12 in. inlet: 8 in. (203 mm). Headloss will increase with smaller inlet pipes.
3. Sediment shall be stored in a zone that is isolated from the main flow path and protected from re-entrainment by the benching skirt.
4. Dimensions are general and intended for guidance only.

ITEM	DESCRIPTION	SIZE
1	PRECAST MANHOLE (BY HYDRO VIA PRECASTER)	48 in
2	FRAME AND COVER	30 in
3	INLET PIPE (BY OTHERS)	12 in
4	OUTLET PIPE (BY OTHERS)	12 in
5	PIPE COUPLING (BY OTHERS)	
6	LEDGER ANGLE	
7	SUPPORT FRAME	
8	DIP PLATE	
9	CENTER SHAFT AND CONE	
10	BENCHING SKIRT	

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Little Sunshine - O'Fallon FLOW SPLITTER CALCULATIONS Structure #2

Computing Peak Discharge for Water Quality Storm Appendix D.10 Maryland Stormwater Design Manual)

Tributary Area =	0.81 ac.	
Impervious Area =	0.53 ac.	
Pervious Area =	0.28 ac.	
% Impervious (I) =	0.53 ac. x 100	= 65.4 %
Rv =	0.05 + 0.009I	= 0.64
Qa =	P x Rv	= 0.73 in.

$$CN = \frac{1000}{10 + 5P + 10Qa - 10(Qa^2 + 1.25QaP)^{0.5}}$$

$$CN = 95.6$$

$$Ia = \frac{200}{CN} - 2 = 0.09$$

$$Tc = 5 \text{ min.}$$

$$Ia/P = 0.08$$

$$Qu = 1,000 \text{ csm/in. (Fig. D.11.1)}$$

$$A = 0.81 \text{ ac.}$$

$$A = 0.0013 \text{ sq. mi.}$$

$$Qp = \text{Peak Discharge}$$

$$Qp = Qu \times A \times Qa$$

$$Qp = 0.92 \text{ c.f.s.}$$

$$4" \text{ Dia. Downstream Defender Allowable Flowrate} = 1.30 \text{ c.f.s.}$$

$$\text{Check Orifice Size } h = \frac{(Q/Ca)^2}{2g}$$

$$h = 0.60 \text{ ft.}$$

$$\text{Flowline at Flow Splitter} = 536$$

$$\text{Overflow Pipe Flowline} = 536 + 0.60 + 0.333$$

$$\text{Overflow Pipe Flowline} = 536.93 \text{ (1/2 OF PIPE DIA)}$$

Little Sunshine - O'Fallon FLOW SPLITTER CALCULATIONS Structure #6

Computing Peak Discharge for Water Quality Storm Appendix D.10 Maryland Stormwater Design Manual)

Tributary Area =	0.45 ac.	
Impervious Area =	0.33 ac.	
Pervious Area =	0.12 ac.	
% Impervious (I) =	0.33 ac. x 100	= 73.3 %
Rv =	0.05 + 0.009I	= 0.71
Qa =	P x Rv	= 0.81 in.

$$CN = \frac{1000}{10 + 5P + 10Qa - 10(Qa^2 + 1.25QaP)^{0.5}}$$

$$CN = 96.7$$

$$Ia = \frac{200}{CN} - 2 = 0.07$$

$$Tc = 5 \text{ min.}$$

$$Ia/P = 0.06$$

$$Qu = 1,000 \text{ csm/in. (Fig. D.11.1)}$$

$$A = 0.45 \text{ ac.}$$

$$A = 0.0007 \text{ sq. mi.}$$

$$Qp = \text{Peak Discharge}$$

$$Qp = Qu \times A \times Qa$$

$$Qp = 0.57 \text{ c.f.s.}$$

$$4" \text{ Dia. Downstream Defender Allowable Flowrate} = 1.30 \text{ c.f.s.}$$

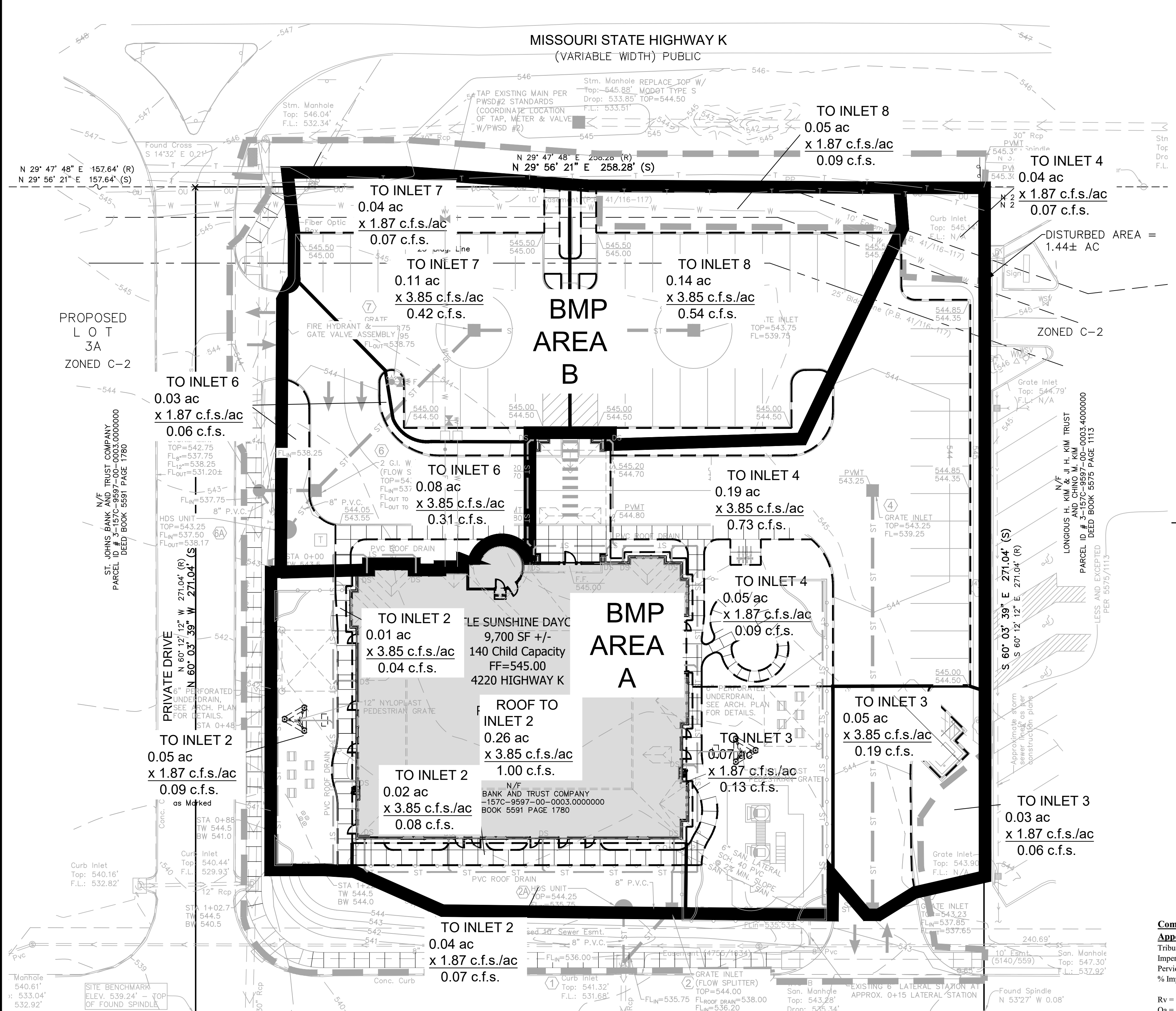
$$\text{Check Orifice Size } h = \frac{(Q/Ca)^2}{2g}$$

$$h = 0.60 \text{ ft.}$$

$$\text{Flowline at Flow Splitter} = 537.75$$

$$\text{Overflow Pipe Flowline} = 537.75 + 0.60 + 0.333$$

$$\text{Overflow Pipe Flowline} = 538.68 \text{ (1/2 OF PIPE DIA)}$$



BEST MANAGEMENT PRACTICE (BMP) CONSTRUCTION NOTES

- ALL STORM WATER FLOW TO THE BMP AREAS SHALL BE DIVERTED, PLUGGED OR DISCONNECTED UNTIL THE CONSTRUCTION SITE IS STABLE AND THE MSD INSPECTOR PROVIDES APPROVAL TO PLACE THE BMP ONLINE.
- CONSTRUCTION SITE RUNOFF SHALL NOT FLOW INTO BMP AREAS.
- CONSTRUCT PERMEABLE PAVEMENT LATE IN THE PROJECT SCHEDULE SO THAT ALL OF THE DIRT WORK SUCH AS GRADING AND LANDSCAPING IS COMPLETED FIRST. PERVIOUS PAVEMENT AND THE STONE BED SHALL NOT BE INSTALLED UNTIL ALL AREAS TRIBUTARY TO IT ARE ESTABLISHED.
- PERMEABLE PAVEMENTS MUST BE PROTECTED FROM SEDIMENT DURING AND AFTER THE PAVING PROCESS. AT NO TIME SHALL SEDIMENT OR OTHER MATERIAL CAPABLE OF CLOGGING THE SURFACE BE ALLOWED TO CONTACT THE PAVEMENT.
- CONTRACTOR IS RESPONSIBLE FOR ALL COORDINATION AND ASSOCIATED COSTS REQUIRED IN OBTAINING OBSERVATION AND VERIFICATION BY A MISSOURI PROFESSIONAL ENGINEER.

BMP TABLE				
BMP AREA	TRIBUTARY AREA	BMP	WATER QUALITY FLOW/ VOLUME REQUIRED	WATER QUALITY FLOW/ VOLUME PROVIDED
A	0.81 ACRES	HDS UNIT	0.92 C.F.S.	1.30 C.F.S.
B	0.45 ACRES	HDS UNIT	0.57 C.F.S.	1.30 C.F.S.
TOTAL =				1.26 ACRES

FOR DRAINAGE AREAS ONLY
~NOT FOR CONSTRUCTION~