

STORM LINE A 100-YR HYDRAULIC CALCULATIONS

Storm Drainage Calculations																																											
System ID	Collection Point			Conduit Properties							Incremental Drainage Area				Accumulated CA	Upstream T <sub>c</sub>	Design Storm Frequency	Storm Intensity	Runoff Q	Conduit Capacity Q <sub>c</sub>	Partial Flow	Velocity V	Time in Conduit	Friction Slope S <sub>f</sub>	Friction Head Loss	HGL		Headloss Calculations					Design HGL	T/C or Ground Elev.	HGL Depth below T/C	Comment							
	From (Ups Junction)	To (Dns Junction)	Pipe Length	No. of Barrels	Pipe Size Diameter	Box		Wetted Perimeter P <sub>w</sub>	Hydraulic Radius	Manning's "n"	Flowline Elevation			Inlet ID												Area	Runoff Coeff. C	Incremental C*A	Upstream	Downstream	Slope	Ac					Upstream	Downstream	V <sub>1</sub> <sup>2</sup> /2g	V <sub>2</sub> <sup>2</sup> /2g	Junction Type	Coeff. K <sub>j</sub>	Headloss H <sub>L</sub>
	Sta	Sta	ft		in	ft	ft	ft <sup>2</sup>	ft	ft		Upstream	Downstream	Slope													Ac													ft	ft		ft
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42		
A9	2+31.59	1+90.86	40.73	1	18	N/A	N/A	RCP	1.77	4.712	0.38	0.013	572.46	571.85	0.0150	A9	0.88	0.85	0.58	0.58	10.0	100	9.80	5.67	12.86	Yes	3.21	0.0	0.0029	0.12	573.47	573.35	N/A	3.21	Inlet	1.25	0.10	573.47	575.96	2.49	Design HGL = top of pipe		
A8	1+90.86	1+45.35	45.51	1	18	N/A	N/A	RCP	1.77	4.712	0.38	0.013	571.85	571.15	0.0152	N/A	0	0	0.00	0.58	10.0	100	9.80	5.67	12.93	Yes	3.21	0.2	0.0029	0.13	572.79	572.66	3.21	3.21	45 BEND	0.37	1.19	573.35	577.51	4.16	Design HGL = top of pipe		
A7	1+45.35	1+23.45	21.9	1	18	N/A	N/A	RCP	1.77	4.712	0.38	0.013	571.15	570.83	0.0151	N/A	0	0	0.00	0.58	10.2	100	9.77	5.67	12.89	Yes	3.21	0.1	0.0029	0.06	572.39	572.33	3.21	3.21	45 BEND	0.37	1.19	572.66	577.70	5.04	Design HGL = top of pipe		
A6	1+23.45	1+21.93	1.52	1	18	N/A	N/A	RCP	1.77	4.712	0.38	0.013	570.83	570.81	0.0132	N/A	0.01	0.85	0.01	0.59	10.3	100	9.75	5.76	12.05	Yes	3.26	0.0	0.0030	0.00	572.31	572.31	3.21	3.26	45 WYE	0.50	1.63	572.33	578.07	5.74	Design HGL = top of pipe		
A5	1+21.93	1+04.79	17.14	1	18	N/A	N/A	RCP	1.77	4.712	0.38	0.013	570.81	570.55	0.0152	N/A	0	0	0.00	0.59	10.3	100	9.75	5.76	12.94	Yes	3.26	0.1	0.0030	0.05	572.10	572.05	3.26	3.26	45 BEND	0.37	1.21	572.31	577.99	5.68	Design HGL = top of pipe		
A4	1+04.79	0+55.77	49.02	1	18	N/A	N/A	RCP	1.77	4.712	0.38	0.013	570.55	569.81	0.0151	N/A	0.01	0.85	0.01	0.60	10.4	100	9.74	5.85	12.91	Yes	3.31	0.2	0.0031	0.15	571.46	571.31	3.26	3.31	45 WYE	0.50	1.66	572.05	577.88	5.83	Design HGL = top of pipe		
A3	0+55.77	0+16.74	39.03	1	18	N/A	N/A	RCP	1.77	4.712	0.38	0.013	569.81	569.22	0.0151	N/A	0	0	0.00	0.60	10.6	100	9.70	5.85	12.92	Yes	3.31	0.2	0.0031	0.12	570.84	570.72	3.31	3.31	45 BEND	0.37	1.22	571.31	577.03	5.72	Design HGL = top of pipe		
A2	0+16.74	0+00.00	16.74	1	18	N/A	N/A	RCP	1.77	4.712	0.38	0.013	569.22	569.12	0.0060	N/A	0	0	0.00	0.60	10.8	100	9.67	7.02	8.12	Yes	3.97	0.1	0.0045	0.07	570.14	570.07	3.31	3.97	45 WYE	0.50	1.99	570.72	575.49	4.77	Design HGL = top of pipe		

STORM LINE B 100-YR HYDRAULIC CALCULATIONS

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	Sta	Sta	ft		in	ft	ft	ft <sup>2</sup>	ft	ft		Upstream	Downstream	Slope													Ac														ft	ft	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42		
A10	0+69.51	0+24.73	44.78	1	18	N/A	N/A	RCP	1.77	4.712	0.38	0.013	569.85	569.35	0.0112	A10	0.14	0.85	0.12	0.12	10.0	100	9.80	1.17	11.10	Yes	0.66	0.0	0.0001	0.01	570.86	570.85	N/A	0.66	Inlet	1.25	0.10	570.95	574.69	3.74			
A9	0+24.73	0+04.73	20	1	18	N/A	N/A	RCP	1.77	4.712	0.38	0.013	569.35	569.25	0.0050	N/A	0	0	0.00	0.12	10.0	100	9.80	1.17	7.43	Yes	0.66	0.5	0.0001	0.00	570.75	570.75	0.66	0.66	45 Bend	0.37	0.24	570.85	576.00	5.15	HGL = top of pipe		
A8	0+04.73	0+00.00	4.73	1	18	N/A	N/A	RCP	1.77	4.712	0.38	0.013	569.25	569.22	0.0063	N/A	0	0	0.00	0.12	10.5	100	9.72	1.17	8.37	Yes	0.66	0.1	0.0001	0.00	570.72	570.72	0.66	0.66	45 Bend	0.37	0.24	570.75	575.74	4.99	HGL = top of pipe		

INLET SIZING CALCULATIONS

$$L = \frac{Q}{2.3y^{1.5}} - 1.8W$$

Equation 3.18

where:  
 Q = total flow reaching inlet (cfs)  
 y = depth of flow (ft)  
 L = length of curb inlet opening (ft)  
 W = gutter depression width (ft)  
 standard inlets W = 2.0 ft, recessed inlets W = 3.0 ft

Inlet Sizing Calculations					
Inlet ID	Q (flow reaching inlet)	y (depth of flow)	W (gutter depression)	L (curb inlet opening)	Remarks
1	2	3	4	5	6
A9	5.67	0.5	2	3.37	5' inlet selected
A12	1.17	0.5	2	-2.16	5' inlet selected

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 WEST VIRGINIA, WV  
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 WYOMING, WY

REVISIONS

REV	DATE	COMMENT	BY
1	3/18/19	DOMESTIC WATER REVISION	MJH
2	4/19/19	TAS REVIEW COMMENTS	MJH

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ASBUILT RECORD DRAWING

PROJECT No.: TD180033  
 DRAWN BY: MJH  
 CHECKED BY: DOC  
 DATE: 02/25/2019  
 SCALE: 1"=10'  
 CAD I.D.: HPD

CONSTRUCTION DOCUMENTS

FOR

**brakes plus**

LOCATION OF SITE  
 1902 S. GOLIAD ST  
 LOTS 1 & 2, BLOCK A, BILLY PEOPLES ADDITION NO. 1  
 ROCKWALL, TX 75087  
 ROCKWALL COUNTY

**BOHLER ENGINEERING**

6017 MAIN STREET  
 FRISCO, TX 75034  
 Phone: (469) 458-7300  
 TX@BohlerEng.com

STATE OF TEXAS

DEAN O. CARDWELL  
 115432  
 LICENSED PROFESSIONAL ENGINEER  
 1.16.20

SHEET TITLE:  
**STORM SEWER CALCULATIONS**

SHEET NUMBER:  
**C-405**

CASE NUMBER: SP2018-030