Phase 2 Basin K, 15 Year, 20 Minute Pipe Hydraulics

LineID	Pipe Dia	Flow Rate	FL Dwnstrm	FL Upstrm	Pipe Length	Pipe Slope	Ave Vel	Top/Sill Elev DwnStrm	Top/Sill Elev Upstrm	HGL Dwnstrn	HGL Upstrm	FreeBoard	Critical Depth	EGLDn	EGLUp	Energy Loss	Capacity Full	n-value Pipe	Note: All inlet tops are set at the sill elevation
	(in)	(cfs)	(ft)	(ft)	(ft)	(%)	(ft/s)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)		
FE K1-OS K2	36	35.38	581.00	581.52	52.00	1.00	5.28	582.25	588.00	584.00	584.05	3.47	1.93	584.39	584.53	0.143	66.70	0.013	Starting HGL Inside Top of Pipe
FE K4-MH K5	36	30.21	585.49	585.89	44.00	0.91	4.31	588.91	592.39	588.67	588.74	3.57	1.78	588.95	589.04	0.084	63.59	0.013	Starting HGL 15yr 20min-588.67
MH K5-MH K6	36	30.21	585.89	586.79	100.00	0.90	5.61	592.39	600.00	588.82	588.57	11.43	1.78	589.56	589.31	0.000	63.27	0.013	
MH K6-DCI K7	36	30.21	586.79	587.32	58.80	0.90	6.92	600.00	598.22	588.57	589.10	9.12	1.78	589.31	589.84	0.000	63.32	0.013	
DCI K7-MH K7.1	36	26.10	587.32	587.89	63.87	0.89	6.27	598.22	599.80	589.10	589.54 j	10.26	1.65	589.77	590.21	0.000	63.01	0.013	
MH K7.1-MH K8	36	26.10	587.89	588.30	51.40	0.80	6.56	599.80	601.90	589.54	589.95	11.95	1.65	590.21	590.62	0.000	59.56	0.013	
MH K8-MH K9	30	26.10	588.30	589.06	95.00	0.80	7.38	601.90	598.20	589.95	590.80	7.40	1.74	590.74	591.60	0.000	36.68	0.013	
MH K9-AI K10	30	26.10	589.06	589.42	45.41	0.79	7.16	598.20	595.90	590.80	591.16	4.74	1.74	591.60	591.96	0.000	36.52	0.013	
AI K10-AI K11	24	21.38	589.42	602.45	250.51	5.20	7.53	595.90	609.50	591.16	604.10 j	5.40	1.65	592.08	605.02	0.000	51.58	0.013	
AI K11-AI K12	24	17.90	602.45	607.46	128.40	3.90	6.71	609.50	614.70	604.10	608.98 j	5.72	1.52	604.86	609.74	0.000	44.68	0.013	
AI K12-AI K13	18	12.96	607.46	612.47	128.40	3.90	7.54	614.70	619.80	608.98	613.82 j	5.98	1.35	609.82	614.75	1.840	20.74	0.013	
AI K13-MH K14	18	8.78	612.47	617.46	127.97	3.90	5.65	619.80	625.60	613.82	618.61 j	6.99	1.15	614.39	619.18	0.000	20.74	0.013	
MH K14-CI K15	18	8.78	617.46	618.97	100.94	1.50	6.06	625.60	628.48	618.61	620.12	8.36	1.15	619.18	620.69	0.000	12.84	0.013	
CI K15-CI K16	18	8.61	618.97	619.50	35.00	1.51	5.97	628.48	628.48	620.12	620.64 j	7.84	1.14	620.68	621.20	0.000	12.92	0.013	
CI K16-AI K17	18	5.07	619.49	620.35	86.42	1.00	4.15	628.48	626.20	620.64	621.22 j	4.98	0.87	620.99	621.57	0.000	10.48	0.013	
AI K17-AI K18	15	3.39	620.35	624.21	192.81	2.00	4.10	626.20	630.10	621.22	624.95 j	5.15	0.74	621.53	625.26	0.000	9.14	0.013	
AI K18-AI K19	12	2.13	624.21	626.73	125.90	2.00	3.77	630.10	632.60	624.95	627.35 j	5.25	0.62	625.22	627.62	0.000	5.04	0.013	
AI K10-CI K20	15	2.63	589.42	590.62	120.00	1.00	2.79	595.90	597.35	591.16	591.37	5.95	0.65	591.23	591.55	0.321	6.46	0.013	
CI K20-CI K21	12	1.33	590.62	590.97	35.00	1.00	2.77	597.35	597.35	591.40	591.46 j	5.89	0.49	591.59	591.65	0.000	3.56	0.013	
AI K11-CI K22	12	2.33	602.45	603.80	135.00	1.00	3.14	609.50	611.02	604.10	604.64	6.36	0.65	604.24	604.81	0.568	3.56	0.013	
CI K22 - CI K23	12	1.70	603.80	604.15	35.00	1.00	3.08	611.02	611.02	604.66	604.70 j	6.32	0.55	604.89	604.93	0.000	3.56	0.013	
CI K23-AI K24	12	1.07	604.15	605.20	105.00	1.00	2.83	611.02	609.70	604.70	605.63 j	4.07	0.43	604.87	605.80	0.000	3.56	0.013	
AI K12-CI K25	12	1.26	609.96	611.31	135.00	1.00	3.79	614.70	618.73	610.37	611.78	6.95	0.47	610.56	611.97	0.000	3.56	0.013	
CI K25-CI K26	12	0.63	611.31	611.66	35.00	1.00	2.25	618.73	618.73	611.78	611.99 j	6.74	0.33	611.90	612.11	0.000	3.56	0.013	
AI K12-MH K27	12	2.59	609.96	610.15	18.74	1.01	4.73	614.70	614.80	610.59	610.84	3.96	0.69	610.90	611.15	0.000	3.59	0.013	
MH K27-DCI K28	12	2.59	610.15	611.24	109.27	1.00	4.49	614.80	616.58	610.84	611.93	4.65	0.69	611.15	612.24	0.000	3.56	0.013	
DCI K28-DCI K29	12	1.13	611.24	611.59	35.00	1.00	2.64	616.58	616.58	611.93	612.04 j	4.54	0.45	612.10	612.21	0.000	3.56	0.013	
AI K13-CI K30	12	2.93	613.97	615.32	135.00	1.00	4.91	619.80	623.99	614.66	616.05	7.94	0.73	615.01	616.40	0.000	3.56	0.013	
CI K30-CI K31	12	2.12	615.32	615.67	35.00	1.00	3.78	623.99	623.99	616.05	616.29 j	7.70	0.62	616.32	616.56	0.000	3.56	0.013	
CI K31-AI K32	12	1.38	615.67	616.72	105.00	1.00	3.12	623.99	622.70	616.29	617.22 j	5.48	0.50	616.49	617.41	0.000	3.56	0.013	
AI K32-CI K33	12	0.72	616.72	618.28	156.40	1.00	2.37	622.70	624.67	617.22	618.63 j	6.04	0.35	617.35	618.76	0.000	3.56	0.013	
CI K34-CI K33	12	0.51	618.28	618.63	35.00	1.00	2.34	624.67	624.67	618.63	618.93 j	5.74	0.30	618.74	619.03	0.000	3.56	0.013	
CI K16-DCI K35	12	3.35	619.49	620.83	53.74	2.49	4.67	628.48	627.91	620.64	621.61 j	6.30	0.78	620.92	622.01	0.498	5.62	0.013	
DCI K35-DCI K36	12	1.39	620.83	622.58	35.00	5.00	2.83	627.91	627.91	621.61	623.08 j	4.83	0.50	621.81	623.27	0.000	7.96	0.013	

Phase 2 Basin M, 15 Year, 20 Minute Pipe Hydraulics

LineID	Pipe Dia	Flow Rate	FL Dwnstrm	FL Upstrm	Pipe Length	Pipe Slope	Ave Vel	Top/Sill Elev DwnStrm	Top/Sill Elev Upstrm	HGL Dwnstrn	HGL Upstrm	FreeBoard	Critical Depth	EGLDn	EGLUp	Energy Loss	Capacity Full	n-value Pipe	Note: All inlet tops are set at the sill elevation
	(in)	(cfs)	(ft)	(ft)	(ft)	(%)	(ft/s)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)		
FE M1-OS M2	24	15.30	570.42	571.02	60.00	1.00	5.20	573.38	578.00	572.50	572.67	4.86	1.41	572.87	573.14	0.273	22.62	0.013	Starting HGL Inside Top of Pipe
FE M3-MH M4	24	14.28	573.50	573.69	19.17	0.99	4.55	575.83	580.60	577.16	577.24	3.32	1.36	577.48	577.56	0.076	22.52	0.013	Starting HGL 15yr 20min-577.16
MH M4-DCI M5	24	14.28	573.69	575.80	29.39	7.18	5.40	580.60	583.81	577.28	577.17	6.27	1.36	577.61	577.77	0.148	60.60	0.013	
DCI M5-DCI M6	24	13.05	573.98	576.43	35.00	7.00	5.10	583.81	583.81	577.54	577.73	6.08	1.30	577.80	578.30	0.160	59.84	0.013	
DCI M6-DCI M7	24	9.72	576.43	577.12	68.76	1.00	4.95	583.81	584.77	577.73	578.23 j	6.54	1.11	578.18	578.69	0.000	22.66	0.013	
DCI M7-AI M8	15	4.14	577.12	578.17	105.00	1.00	4.21	584.77	584.00	578.23	578.99 j	5.01	0.82	578.60	579.36	0.000	6.46	0.013	
AI M8-AI M9	12	1.87	578.17	584.51	253.45	2.50	3.32	584.00	589.40	578.99	585.09 j	4.31	0.58	579.23	585.33	0.000	5.63	0.013	
DCI M7-DCI M10	12	2.83	577.12	577.82	35.00	2.00	4.14	584.77	584.77	578.23	578.54 j	6.23	0.72	578.44	578.88	0.257	5.04	0.013	

Phase 2 Basin N, 15 Year, 20 Minute Pipe Hydraulics

LineID	Pipe Dia	Flow Rate	FL Dwnstrm	FL Upstrm	Pipe Length	Pipe Slope	Ave Vel	Top/Sill Elev DwnStrm	Top/Sill Elev Upstrm	HGL Dwnstrn	HGL Upstrm	FreeBoard	Critical Depth	EGLDn	EGLUp	Energy Loss	Capacity Full	n-value Pipe	Note: All inlet tops are set at the sill elevation
	(in)	(cfs)	(ft)	(ft)	(ft)	(%)	(ft/s)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)		
FE N1-OS N2	24	13.58	567.00	567.71	71.00	1.00	5.19	569.33	576.00	569.00	569.05	6.38	1.33	569.29	569.62	0.332	22.62	0.013	Starting HGL Inside Top of Pipe
FE N3-MH N4	24	11.04	570.50	571.11	61.00	1.00	3.51	572.83	582.90	576.08	576.23	6.59	1.19	576.27	576.42	0.145	22.62	0.013	Starting HGL 15yr 20min-576.08
MH N4-MH N5	24	11.04	575.82	577.61	15.00	11.93	11.62	582.90	583.20	576.33	578.80	4.40	1.19	576.83	579.30	0.000	78.13	0.013	
MH N5-MH N6	24	11.04	576.27	578.67	85.00	2.82	4.59	583.20	592.93	578.80	579.86 j	13.07	1.19	578.99	580.36	0.331	38.01	0.013	
MH N6-MH N6.1	24	11.04	578.67	579.23	56.11	1.00	5.66	592.93	591.30	579.86	580.42	10.88	1.19	580.36	580.92	0.000	22.60	0.013	
MH N6.1-DCI N7	24	11.04	579.23	579.73	49.90	1.00	5.66	591.30	589.86	580.42	580.92	8.94	1.19	580.92	581.42	0.000	22.64	0.013	
DCI N7-MH N8	18	6.26	579.73	580.25	52.03	1.00	4.68	589.86	591.79	580.92	581.22 j	10.57	0.97	581.34	581.64	0.000	10.50	0.013	
MH N8-AI N9	18	6.26	580.25	581.20	95.00	1.00	5.20	591.79	586.82	581.22	582.17	4.65	0.97	581.64	582.59	0.000	10.50	0.013	
AI N9-MH N10	15	5.56	581.20	584.14	98.00	3.00	5.50	586.82	590.77	582.17	585.09 j	5.68	0.95	582.64	585.57	0.000	11.18	0.013	
MH N10-CI N11	12	2.67	584.14	589.37	174.37	3.00	4.00	590.77	595.88	585.09	590.07 j	5.81	0.70	585.42	590.39	0.000	6.17	0.013	
CI N11-CI N12	12	1.97	589.37	589.72	35.00	1.00	3.69	595.88	595.88	590.07	590.32 j	5.56	0.60	590.32	590.57	0.000	3.56	0.013	
CI N12-CI N13	12	1.34	589.72	590.26	54.36	0.99	3.12	595.88	597.05	590.32	590.75 j	6.30	0.49	590.51	590.94	0.000	3.55	0.013	
CI N13-CI N14	12	0.33	590.26	592.54	35.00	6.51	1.59	597.05	597.05	590.75	592.78 j	4.27	0.24	590.83	592.86	0.000	9.09	0.013	
MH N10-AI N15	15	2.89	584.14	584.72	57.90	1.00	3.55	590.77	589.90	585.09	585.40 j	4.50	0.68	585.37	585.68	0.000	6.46	0.013	
CI N13-AI N16	12	0.61	590.26	591.00	74.41	0.99	2.18	597.05	596.26	590.75	591.32 j	4.94	0.32	590.87	591.44	0.000	3.55	0.013	

Phase 2 Basin P, 15 Year, 20 Minute Pipe Hydraulics

LineID	Pipe Dia	Flow Rate	FL Dwnstrm	FL Upstrm	Pipe Length	Pipe Slope	Ave Vel	Top/Sill Elev DwnStrm	Top/Sill Elev Upstrm	HGL Dwnstrn	HGL Upstrm	FreeBoard	Critical Depth	EGLDn	EGLUp	Energy Loss	Capacity Full	n-value Pipe	Note: All inlet tops are set at the sill elevation
	(in)	(cfs)	(ft)	(ft)	(ft)	(%)	(ft/s)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)		
FE P1-MH P2	36	43.01	583.00	585.35	235.00	1.00	7.04	586.42	594.10	586.00	587.48 j	6.62	2.13	586.58	588.48	1.157	66.69	0.013	Starting HGL Inside Top of Pipe
MH P2-MH P2.1	36	43.01	585.35	589.57	88.00	4.80	8.00	594.10	603.00	587.48	591.70	11.30	2.13	588.48	592.70	0.000	146.05	0.013	
MH P2.1-OS P3	36	41.05	589.57	590.61	21.71	4.79	7.73	603.00	600.00	591.70	592.70 j	7.30	2.09	592.66	593.65	0.000	145.96	0.013	
MH P2.1-AI P2.2	15	1.96	598.01	599.00	66.00	1.50	4.52	603.00	604.80	598.43	599.56	5.24	0.56	598.65	599.77	0.000	7.91	0.013	
FE P4-MH P5	12	2.37	594.50	594.85	35.00	1.00	3.02	595.75	602.94	600.65	600.81	2.11	0.66	600.79	600.95	0.155	3.56	0.013	Starting HGL 15yr 20min-600.47
MH P5-MH P6	12	2.37	594.85	596.75	15.00	12.67	3.02	602.94	602.90	600.83	600.89	1.97	0.66	600.97	601.03	0.066	12.67	0.013	
MH P6-CI P7	12	2.37	595.53	598.03	125.00	2.00	3.02	602.90	604.90	600.93	601.49	3.39	0.66	601.07	601.63	0.554	5.04	0.013	
CI P7-CI P8	12	0.97	598.03	600.13	35.00	6.00	1.24	604.90	604.90	601.51	601.53	3.34	0.41	601.53	601.56	0.026	8.72	0.013	
CI P8-CI P8A	12	0.67	600.13	604.39	71.05	6.00	1.84	604.90	609.16	601.56	604.73 j	4.43	0.34	601.57	604.86	0.213	8.72	0.013	
FE P9-MH P10	30	22.73	596.00	596.45	44.56	1.01	4.63	598.88	604.50	600.66	600.80	3.65	1.62	600.99	601.13	0.137	41.21	0.013	Starting HGL 15yr 20min-600.47
MH P10-MH P11	24	22.73	598.32	601.04	10.00	27.20	7.62	604.50	608.00	600.85	602.74	5.26	1.70	601.66	603.73	0.098	117.96	0.013	
MH P11-AI P11.1	24	22.73	598.50	598.95	44.76	1.01	7.24	608.00	610.80	602.74	603.19	6.81	1.70	603.55	604.00	0.452	22.68	0.013	
AI P11.1-AI P12	24	16.87	603.51	604.65	142.14	0.80	6.99	610.80	614.20	604.90	606.13	8.07	1.48	605.62	606.84	0.000	20.26	0.013	
AI P12-AI P13	24	15.54	604.65	605.51	85.68	1.00	6.38	614.20	615.90	606.13	606.93 j	8.97	1.42	606.79	607.59	0.000	22.66	0.013	
AI P13-MH P14	24	14.11	605.51	606.07	55.91	1.00	6.08	615.90	618.10	606.93	607.42 j	10.68	1.35	607.54	608.03	0.000	22.64	0.013	
MH P14-MH P15	24	14.11	606.07	607.19	112.00	1.00	6.24	618.10	616.00	607.42	608.54	7.46	1.35	608.03	609.15	0.000	22.62	0.013	
MH P15-DCI P16	24	14.11	607.19	607.86	67.23	1.00	6.24	616.00	614.74	608.54	609.21	5.53	1.35	609.15	609.82	0.000	22.58	0.013	
DCI P16-DCI P17	24	9.81	607.86	608.65	79.46	0.99	4.88	614.74	617.19	609.21	609.77 j	7.42	1.12	609.67	610.23	0.000	22.55	0.013	
DCI P17-DCI P18	18	8.51	608.65	609.00	35.00	1.00	5.99	617.19	617.19	609.77	610.13	7.06	1.13	610.32	610.68	0.000	10.50	0.013	
DCI P18-CI P19	18	7.07	609.00	609.55	55.06	1.00	5.22	617.19	617.22	610.13	610.58 j	6.64	1.03	610.59	611.04	0.000	10.50	0.013	
CI P19-AI P20	18	6.07	609.55	611.09	76.80	2.01	4.92	617.22	616.40	610.58	612.04 j	4.36	0.95	610.99	612.45	0.000	14.87	0.013	
AI P20-AI P21	15	5.35	611.09	615.00	97.64	4.00	5.38	616.40	620.20	612.04	615.94 j	4.26	0.94	612.50	616.39	0.000	12.92	0.013	
AI P21-DCI P22	12	3.25	615.00	618.63	145.00	2.50	4.63	620.20	624.46	615.94	619.40 j	5.06	0.77	616.33	619.79	0.000	5.63	0.013	
DCI P22-DCI P23	12	1.76	618.62	619.50	35.00	2.51	3.26	624.46	624.46	619.40	620.06 j	4.40	0.56	619.63	620.30	0.000	5.65	0.013	
AI P11.1-DCI P24	15	4.85	603.07	608.23	122.92	4.20	5.10	610.80	615.41	603.99	609.12 j	6.29	0.89	604.40	609.54	0.000	13.23	0.013	
AI P13-AI P25	12	0.47	609.51	613.04	117.61	3.00	3.60	615.90	617.90	609.70	613.32	4.58	0.28	609.80	613.43	0.000	6.17	0.013	
DCI P16-DCI P26	12	2.86	607.86	609.61	35.00	5.00	4.17	614.74	614.74	609.21	610.33 j	4.41	0.72	609.42	610.68	0.260	7.96	0.013	
FE P27-MH P28	24	12.10	596.00	596.56	55.50	1.01	3.85	598.33	610.30	605.21	605.37	4.90	1.25	605.44	605.60	0.159	22.72	0.013	Starting HGL 15yr 20min-600.47
MH P28-AI P29	18	12.10	604.58	606.16	15.00	10.53	9.77	610.30	611.40	605.40	607.48	3.92	1.32	606.25	608.32	0.000	34.08	0.013	
AI P29-AI P30	18	10.86	605.02	613.11	257.73	3.14	6.49	611.40	619.00	607.48	614.37 j	4.63	1.26	608.06	615.10	2.697	18.61	0.013	
AI P30-AI P31	18	9.69	613.11	617.42	215.34	2.00	6.25	619.00	627.00	614.37	618.62 j	8.38	1.20	615.01	619.26	0.000	14.86	0.013	
AI P31-AI P32	12	3.93	621.42	625.90	160.06	2.80	6.84	627.00	632.50	622.01	626.74	5.76	0.84	622.50	627.22	0.000	5.96	0.013	
AI P32-AI P33	12	3.17	625.90	631.68	206.30	2.80	4.72	632.50	637.30	626.74	632.44 j	4.86	0.76	627.12	632.82	0.000	5.96	0.013	
AI P33-DCI P34	12	1.86	631.68	632.81	112.50	1.00	3.41	637.30	638.73	632.44	633.39 j	5.34	0.58	632.68	633.63	0.000	3.57	0.013	
DCI P34-CI P35	12	0.49	632.80	633.15	35.00	1.00	1.80	638.73	638.73	633.39	633.44 j	5.29	0.29	633.50	633.54	0.000	3.56	0.013	
AI P31-DCI P36	15	4.44	617.42	618.55	112.50	1.00	4.32	627.00	628.34	618.62	619.40 j	8.94	0.85	619.01	619.79	0.000	6.47	0.013	
DCI P36-DCI P37	12	2.78	618.65	619.00	35.00	1.00	4.51	628.34	628.34	619.40	619.71 j	8.63	0.71	619.74	620.05	0.000	3.56	0.013	
DCI P37-AI P38	12	1.12	619.10	619.60	50.75	0.99	2.76	628.34	624.50	619.71	620.05 j	4.45	0.45	619.88	620.22	0.000	3.53	0.013	
AI P38-AI P39	12	0.62	619.60	624.65	84.14	6.00	2.30	624.50	629.30	620.05	624.98 j	4.32	0.33	620.16	625.10	0.000	8.72	0.013	

ISSUE REMARKS/DATE

1 2024-08-13, INITIAL SUBMITTAL CITY PH.2
2 2024-11-08, REVISED PER CITY COMMENTS
3 2025-01-03, REVISED PER CITY COMMENTS
4 2025-01-16, REVISED PER ST. CHARLES CO
5 2025-02-04, REVISED PER CITY COMMENTS

Phase 2 Basin H, 15 Year, 20 Minute Pipe Hydraulics

LineID	Pipe Dia	Flow Rate	FL Dwnstrm	FL Upstrm	Pipe Length	Pipe Slope	Ave Vel	Top/Sill Elev DwnStrm	Top/Sill Elev Upstrm	HGL Dwnstrn	HGL Upstrm	FreeBoard	Critical Depth	EGLDn	EGLUp	Energy Loss	Capacity Full	n-value Pipe	Note: All inlet tops are set at the sill elevation
	(in)	(cfs)	(ft)	(ft)	(ft)	(%)	(ft/s)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)		
FE H1-MH H2	24	12.50	604.50	604.90	40.00	1.00	4.24	606.83	612.30	606.50	606.55	5.50	1.27	606.75	606.87	0.121	22.62	0.013	Starting HGL Inside Top of Pipe
MH H2-OS H3	15	6.91	604.90	610.76	41.86	14.00	5.95	612.30	618.10	606.80	611.81 j	6.29	1.05	607.29	612.42	0.468	24.16	0.013	
MH H2-MH X40	18	5.59	605.90	614.70	112.87	7.80	5.02	612.30	620.40	606.80	615.61	4.79	0.91	607.18	616.00	0.000	29.32	0.013	
MH X40-AI X41	18	5.59	614.70	615.75	105.00	1.00	4.98	620.40	621.50	615.61	616.66	4.84	0.91	616.00	617.05	0.000	10.50	0.013	
AI X41-AI X42	15	3.86	615.75	618.90	105.00	3.00	4.36	621.50	622.50	616.66	619.69 j	2.81	0.79	617.00	620.04	0.000	11.18	0.013	
FE H4-AI H5	12	0.49	614.00	614.51	51.21	1.00	0.62	615.25	624.70	616.65	616.66	8.03	0.29	616.66	616.67	0.010	3.55	0.013	Starting HGL 15yr 20min-616.65
FE H6-MH H7	18	5.10	614.00	614.22	21.99	1.00	2.89	615.79	621.20	616.65	616.70	4.44	0.87	616.78	616.83	0.052	10.50	0.013	Starting HGL 15yr 20min-616.65
MH H7-MH H8	18	5.10	614.22	616.56	17.00	13.76	3.85	621.20	626.80	616.76	617.43 j	9.37	0.87	616.89	617.79	0.070	38.96	0.013	
MH H8-AI H9	15	2.25	615.56	616.91	112.28	1.20	2.58	626.80	622.20	617.43	617.59	4.44	0.60	617.48	617.76	0.277	7.08	0.013	
AI H9-AI H10	12	1.94	616.91	619.34	97.19	2.50	3.36	622.20	625.80	617.76	619.93 j	5.87	0.59	618.01	620.18	0.000	5.63	0.013	
MH H8-CI H11	15	2.85	621.17	623.81	66.13	3.99	6.32	626.80	630.44	621.57	624.49	5.95	0.68	621.84	624.76	0.000	12.9	0.013	

Phase 2 Basin L, 15 Year, 20 Minute Pipe Hydraulics

LineID	Pipe Dia	Flow Rate	FL Dwnstrm	FL Upstrm	Pipe Length	Pipe Slope	Ave Vel	Top/Sill Elev DwnStrm	Top/Sill Elev Upstrm	HGL Dwnstrn	HGL Upstrm	FreeBoard	Critical Depth	EGLDn	EGLUp	Energy Loss	Capacity Full	n-value Pipe	Note: All inlet tops are set at the sill elevation
	(in)	(cfs)	(ft)	(ft)	(ft)	(%)	(ft/s)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)		
FE X50-MH X51	54	151.74	572.00	574.06	205.74	1.00	10.32	577.04	585.00	576.50	577.67	7.33	3.61	577.92	579.58	1.250	196.79	0.013	Starting HGL Inside top of Pipe
MH X51-FE X52	36	39.29	574.06	575.21	28.87	3.98	6.05	585.00	578.63	577.67	577.59	0.38	2.04	578.15	578.25	0.103	133.12	0.013	
MH X51-OS L1	48	112.45	574.06	575.50	96.17	1.50	9.93	585.00	584.00	577.67	578.70	5.30	3.20	579.36	580.39	0.000	175.78	0.013	
FE L3-MH L4	15	3.54	581.00	581.90	45.00	2.00	2.88	582.52	592.60	585.52	585.66	6.93	0.76	585.65	585.78	0.135	9.13	0.013	Starting HGL 15yr 20min - 585.52
MH L4-DCI L5	12	3.54	587.58	597.50	122.50	8.10	8.49	592.60	602.86	587.99	598.30	4.56	0.80	588.41	598.73	0.000	10.13	0.013	
FE L7-MH L8	42	68.64	581.00	582.26	63.00	2.00	7.13	584.96	592.30	585.52	585.81	6.11	2.59	586.31	586.61	0.293	142.28	0.013	Starting HGL 15yr 20min - 585.52
MH L8-AI L9	42	68.64	582.26	590.61	111.30	7.50	8.06	592.30	598.70	586.19	593.20	5.50	2.59	586.98	594.46	0.579	275.56	0.013	
AI L9-MH L10	42	67.20	590.61	594.50	141.62	2.75	8.84	598.70	602.40	593.20	597.07	5.33	2.57	594.43	598.29	0.000	166.74	0.013	
MH L10-MH L11	42	67.20	594.50	596.10	159.97	1.00	8.88	602.40	605.30	597.07	598.67	6.63	2.57	598.29	599.89	0.000	100.62	0.013	
MH L11-MH L12	24	17.90	598.13	601.81	122.53	3.00	9.58	605.30	609.60	599.08	603.33	6.27	1.52	599.83	604.09	0.000	39.20	0.013	
MH L12-AI L13	18	11.22	601.81	606.02	52.59	8.01	6.67	609.60	612.40	603.33	607.30 j	5.10	1.28	603.96	608.06	0.582	29.71	0.013	
AI L13-AI L14	18	9.33	606.02	615.46	285.00	3.31	6.03	612.40	621.70	607.30	616.64 j	5.06	1.18	607.91	617.25	0.000	19.11	0.013	
AI L14-AI L15	18	6.45	615.46	616.18	72.38	0.99	4.80	621.70	623.00	616.64	617.16 j	5.84	0.98	617.07	617.59	0.000	10.47	0.013	
AI L15-CI L16	15	5.60	616.18	621.68	109.96	5.00	5.48	623.00	631.62	617.16	622.64 j	8.98	0.96	617.64	623.12	0.000	14.44	0.013	
CI L16-CI L17	15	5.36	623.26	624.48	35.00	3.49	7.48	631.62	631.62	623.84	625.42	6.20	0.94	624.30	625.88	0.000	12.06	0.013	
CI L17-CI L18	15	4.77	624.48	629.37	139.59	3.50	4.98	631.62	636.07	625.42	630.25 j	5.82	0.88	625.83	630.66	0.000	12.09	0.013	
CI L18-CI L19	15	3.84	630.79	631.14	35.00	1.00	5.09	636.07	636.07	631.48	631.93	4.14	0.79	631.83	632.27	0.000	6.46	0.013	
CI L19-CI L20	15	2.90	631.14	631.66	52.00	1.00	3.88	636.07	636.23	631.93	632.34 j	3.89	0.68	632.21	632.62	0.000	6.46	0.013	
CI L20-CI L21	12	0.46	631.66	632.01	35.00	1.00	1.68	636.23	636.23	632.34	632.29	3.94	0.28	632.44	632.39	0.000	3.56	0.013	
MH L11-FE L22	42	49.30	596.10	597.21	37.00	3.00	7.15	605.30	600.97	598.67	599.40 j	1.57	2.19	599.61	600.34	0.000	174.26	0.013	
MH L12-DCI L23	15	3.86	601.81	606.84	125.83	4.00	3.92	609.60	613.03	603.33	607.63 j	5.40	0.79	603.49	607.98	0.645	12.91	0.013	
DCI L23-DCI L24	12	1.70	606.84	608.24	35.00	4.00	3.18	613.03	613.03	607.63	608.79 j	4.24	0.55	607.86	609.02	0.000	7.12	0.013	
MH L12-MH L25	12	2.82	601.81	602.84	102.64	1.00	3.59	609.60	612.80	603.33	603.98	8.63	0.72	603.53	604.18	0.644	3.57	0.013	
MH L25-CI L26	12	2.82	602.84	614.14	122.80	9.20	4.13	612.80	619.05	604.17	614.86 j	4.19	0.72	604.37	615.20	0.897	10.80	0.013	
AI L14-CI L27	12	2.19	615.46	618.86	169.80	2.00	3.49	621.70	627.81	616.64	619.49 j	8.32	0.63	616.76	619.76	0.930	5.04	0.013	
CI L27-CI L28	12	1.21	622.86	623.56	35.00	2.00	4.33	627.81	627.81	623.19	624.02	3.79	0.46	623.37	624.20	0.000	5.04	0.013	
CI L20-AI L20.1	12	1.21	631.66	632.99	133.00	1.00	2.75	636.23	637.60	632.34	633.45 j	4.15	0.46	632.52	633.63	0.000	3.56	0.013	
FE L29-MH L30	36	43.53	602.75	603.20	45.00	1.00	6.38	606.42	610.00	605.75	605.84	3.48	2.15	606.34	606.52	0.182	66.69	0.013	Starting HGL Inside top of Pipe
MH L30-AI L31	24	20.33	603.20	606.93	138.24	2.70	6.97	610.00	613.50	606.52	608.55 j	4.95	1.62	607.17	609.41	1.132	37.15	0.013	
AI L31-AI L32	24	18.62	606.93	612.37	201.65	2.70	6.98	613.50	619.00	608.55	613.92 j	5.08	1.55	609.33	614.71	0.000	37.15	0.013	
AI L32-AI L33	24	17.67	612.37	618.11	114.83	5.00	6.84	619.00	625.80	613.92	619.62 j	6.18	1.51	614.67	620.37	0.000	50.57	0.013	
AI L33-DCI L34	18	15.76	618.11	619.75	40.92	4.01	9.01	625.80	628.30	619.62	621.17 j	7.13	1.42	620.86	622.46	0.860	21.02	0.013	
DCI L34-DCI L35	18	14.58	619.75	621.67	48.00	4.00	8.47	628.30	628.30	621.17	623.07 j	5.23	1.40	622.30	624.19	0.000	21.00	0.013	
DCI L35-MH L36	18	9.58	621.67	626.65	124.62	4.00	5.97	628.30	633.20	623.07	627.84 j	5.36	1.19	623.69	628.47	0.000	20.99	0.013	
MH L36-DCI L37	18	9.58	626.65	627.21	37.32	1.50	6.35	633.20	634.86	627.84	628.40	6.46	1.19	628.47	629.03	0.000	12.86	0.013	
DCI L37-DCI L38	18	6.66	627.21	627.74	35.00	1.51	4.87	634.86	634.86	628.40	628.74 j	6.12	1.00	628.85	629.18	0.000	12.92	0.013	
DCI L38-AI L39	15	4.45	627.74	628.30	37.01	1.51	4.61	634.86	636.60	628.74	629.15 j	7.45	0.85	629.12	629.54	0.000	7.94	0.013	
AI L39-AI L40	12	1.27	628.30	638.03	170.68	5.70	2.61	636.60	643.00	629.15	638.51 j	4.49	0.48	629.34	638.69	0.000	8.50	0.013	
MH L30-MH L41	24	23.20	603.20	604.17	48.58	2.00	7.39	610.00	612.50	606.52	607.03	4.64	1.71	607.37	607.88	0.511	31.96	0.013	
MH L41-CI L42	24	23.20	604.17	609.49	105.00	5.07	7.75	612.50	618.45	607.86	611.20 j	7.25	1.71	608.71	612.22	1.068	50.91	0.013	
CI L42-CI L43	24	21.83	609.49	609.84	35.00	1.00	7.71	618.45	618.45	611.20	611.51	6.94	1.67	612.15	612.45	0.000	22.62	0.013	
CI L43-DCI L44	24	17.19	609.84	610.45	60.93	1.00	6.49	618.45	620.35	611.51	611.94 j	8.41	1.49	612.23	612.67	0.000	22.63	0.013	
DCI L44-DCI L45	24	15.53	611.95	612.30	35.00	1.00	7.14	620.35	620.35	613.17	613.72	6.63	1.42	613.83	614.38	0.000	22.62	0.013	
DCI L45-AI L46	24	11.79	612.30	613.15	85.03	1.00	5.38	620.35	620.70	613.72	614.38 j	6.32	1.23	614.24	614.91	0.000	22.61	0.013	
AI L46-MH L47	24	9.18	613.15	622.70	115.00	8.30	4.91	620.70	630.30	614.38	623.78 j	6.52	1.08	614.82	624.22	0.000	65.18	0.013	
MH L47-DCI L48	24	9.18	622.69	622.94	25.30	0.99	5.27	630.30	631.53	623.78	624.02 j	7.51	1.08	624.22	624.46	0.000	22.48	0.013	
DCI L48-DCI L49	24	7.78	622.94	623.29	35.00	1.00	4.75	631.53	631.53	624.02	624.28 j	7.25	0.99	624.41	624.67	0.000	22.62	0.013	
DCI L49-CI L50	18	6.38	623.29	623.83	53.74	1.00	5.20	631.53	633.81	624.28	624.81 j	9.00	0.98	624.71	625.23	0.000	10.53	0.013	
CI L50-AI L57	15	6.25	624.98	625.75	76.91	1.00	5.94	633.81	631.30	625.97	626.76	4.54	1.01	626.51	627.30	0.000	6.46	0.013	
AI L57-AI L58	12	1.51	625.75	632.81	78.47	9.00	2.79	631.30	638.10	626.76	633.33 j	4.77	0.52	626.82	633.54	0.317	10.68	0.013	
CI L43-AI L52	12	3.80	611.34	613.70	78.66	3.00	6.86	618.45	618.70	611.91	614.53	4.17	0.83	612.37	614.99	0.000	6.17	0.013	
AI L52-AI L53	12	2.45	613.70	619.64	156.20	3.80	3.95	618.70	624.80	614.53	620.31 j	4.49	0.67	614.83	620.61	0.000	6.94	0.013	
AI L53-AI L54	12	1.23	619.64	626.69	156.61	4.50	2.81	624.80	631.70	620.31	627.16 j	4.54	0.47	620.49	627.34	0.000	7.56	0.013	
DCI L45-DCI L55	12	3.04	612.30	613.90	53.39	3.00	4.35	620.35	621.25	613.72	614.65 j	6.60	0.75	613.95	615.01	0.431	6.17	0.013	
DCI L55-DCI L56	12	1.47	613.90	614.95	35.00	3.00	2.98	621.25	621.25	614.65	615.46 j	5.79	0.51	614.85	615.67	0.000	6.17	0.013	
AI L57-CI L51	12	1.91	625.75	631.70	33.08	17.99	3.20	631.30	638.30	626.76	632.29 j	6.01	0.59	626.85	632.53	0.159	15.10	0.013	
CI L51-CI L51.1	12	0.54	631.70	632.05	35.00	1.00	1.89	638.30	638.30	632.29	632.35 j	5.95	0.30	632.40	632.47	0.000	3.56	0.013	
DCI L35-AI L59	15	3.46	621.67	623.11	35.92	4.01	3.66	628.30	629.70	623.07	623.86 j	5.84	0.75	623.19	624.17	0.166	12.93	0.013	
AI L39-CI L60	12	2.43	628.30	628.66	36.01	1.00	3.88	636.60	636.10	629.15	629.33 j	6.77	0.67	629.45	629.62	0.000	3.56	0.013	
CI L60-CI L61	12	1.16	628.66	631.06	48.00	5.00	2.72	636.10	636.10	629.33	631.51 j	4.59	0.45	629.50	631.69	0.000	7.96	0.013	
FE L70-MH L71	30	28.97	581.00	581.93	46.50	2.00	5.90	583.88	597.00	585.52	585.75	11.17	1.83	586.06	586.29	0.232	58.00	0.013	Starting HGL 15yr 20min - 585.52
MH L71-MH L72	30	28.97	589.40	590.54	113.95	1.00	8.28	597.00	597.10	590.95	592.37	4.73	1.83	591.83	593.25	0.000	41.02	0.013	
MH L72-AI L73	30	28.97	590.54	591.19	64.85	1.00	7.51	597.10	599.30	592.37	593.02	6.28	1.83	593.25	593.90	0.000	41.06	0.013	
AI L73-AI L74	30	28.30	591.19	593.97	60.50	4.60	7.38	599.30	601.20	593.02	595.78 j	5.42	1.81	593.88	596.64	0.000	87.91	0.013	
AI L74-AI L75	30	23.67	593.97	596.17	129.50	1.70	6.54	601.20	604.80	595.78	597.83 j	6.97	1.66	596.51	598.56	0.000	53.45	0.013	
AI L75-AI L76	30	23.06	596.17	597.65	148.18	1.00	6.74	604.80	604.30	597.83	599.28 j	5.02	1.63	598.54	600.00	0.000	40.99	0.013	
AI L76-AI L77	30	20.95	597.65	598.34	69.07	1.00	6.35	604.30	606.10	599.28	599.89 j	6.21	1.55	599.95	600.56	0.000	40.99	0.013	
AI L77-MH L78	24	18.23	598.34	605.13	47.31	14.35	7.00	606.10	614.50	599.89	606.67 j	7.83	1.54	600.66	607.44	0.000	85.69	0.013	
MH L78-CI L79	24	18.23	605.13	614.81	161.28	6.00	7.04	614.50	623.21	606.67	616.35	6.86	1.54	607.44	617.12	0.000	55.41	0.013	
CI L79-CI L80	24	17.07	614.81	615.16	35.00	1.00	6.70	623.21	623.21	616.35	616.65 j	6.56	1.49	617.07	617.37	0.000	22.62	0.013	
CI L80-AI L81	24	14.88	615.16	615.95	79.45	0.99	6.16	623.21	623.70	616.65	617.34 j	6.36	1.39	617.28	617.97	0.000	22.55	0.013	
AI L81-AI L82	24	9.53	615.95	617.00	105.00	1.00	4.73	623.70	622.80	617.34	618.10 j	4.70	1.10	617.79	618.55	0.000	22.62	0.013	
AI L82-AI L83	18	8.13	617.00	619.46	88.01	2.80	5.84	622.80	624.70	618.10	620.56	4.14	1.10	618.63	621.09	0.000	17.56	0.013	
AI L83-AI L84	15	7.01	619.46	624.19	135.27	3.50	6.22	624.70	630.60	620.56	625.25 j	5.35	1.06	621.18	625.87	0.000	12.07	0.013	
AI L84-AI L85	15	5.61	624.19	629.21	143.30	3.50	5.31	630.60	635.60	625.25	630.17 j	5.43	0.96	625.73	630.65	0.000	12.09	0.013	
AI L85-AI L86	15	4.20	629.21	632.35	104.57	3.00	4.51	635.60	637.70	630.17	633.18 j	4.52	0.83	630.54	633.55	0.000	11.19	0.013	
AI L86-MH L87	12	3.13	632.35	633.85	74.99	2.00	4.70	637.70	638.40	633.18	634.61 j	3.79	0.76	633.55	634.98	0.000	5.04	0.013	
MH L87-CI L88	12	3.13	633.85	637.30	49.32	7.00	4.90	638.40	645.86	634.61	638.06	7.80	0.76	634.98	638.43	0.000	9.42	0.013	
CI L88-CI L89	12	2.43	637.30	640.66	48.00	7.00	4.09	645.86	645.86	638.06	641.33 j	4.53	0.67	638.35	641.62	0.000	9.42	0.013	
AI L74-DCI L90	12	3.68	593.97	599.37	135.01	4.00	5.02	601.20	606.17	595.78	600.19 j	5.98	0.82	596.12	600.63	1.446	7.12	0.013	
AI L77-AI L91	12	1.44	599.92	603.21	131.62	2.50	4.80	606.10	608.50	600.27	603.72	4.78	0.51	600.47	603.92	0.000	5.63	0.013	
AI L81-MH L92	15	5.09	618.20	620.45	112.53	2.00	6.47	623.70	627.30	618.87	621.36	5.94	0.91	619.30	621.80	0.000	9.13	0.013	
MH L92-DCI L93	15	5.09	620.45	620.83	37.56	1.01	5.29	627.30	628.60	621.36	621.74	6.86	0.91	621.80	622.18	0.000	6.50	0.013	
DCI L93-DCI L94	12	2.45	620.83	623.46	35.00	7.51	3.82	628.60	628.60	621.74	624.13 j	4.47	0.67	622.04	624.43	0.000	9.76	0.013	

PROJECT TITLE

HARVEST AT HOPEWELL

O'FALLON, MISSOURI

O'FALLON PHASE 2

THE STERLING CO.
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5055 New Baumgartner Road
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Corporate Certificate of Authority #001348

Date: 02-04-2025
Michael G.Boerding, PE
License No. MO E-28643
Professional Engineer

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STORM SEWER HYDRAULICS

P+Z No. 21-004994
City No. 21-011444
Date: 02-04-2025
Job No. 20-09-327

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