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 5097 New Baumgartner Road
 St. Louis, Missouri 63129

STORM SEWER HYDRAULICS

P+Z No. 21-004994
 City No. 21-011444
 Date: 05-20-2024
 Job No. 20-09-327

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 IMP

ISSUE REMARKS/DATE
 1 2023-09-28, INITIAL SUBMITTAL
 2 2024-02-01, CITY COMMENTS
 3 2024-04-17, CITY COMMENTS
 4 2024-05-20, FOR APPROVAL

Phase 1B 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 Dwnstrm	HGL Upstrm	FreeBoard	Critical Depth	EGLDn	EGLUp	Energy Loss	Capacity Full	n-value	Note: All inlet tops are set at the sill elevation
(in)	(in)	(cfs)	(ft)	(ft)	(ft)	(%)	(ft/s)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)		
FF X50-MH X51	54	151.75	572.00	574.06	205.74	1.00	10.32	577.04	584.50	576.50	577.67	6.83	3.61	577.92	579.58	1.251	196.79	0.013	Starting HGL Inside top of Pipe
MH X51-FE X52	36	39.30	574.06	575.21	28.87	3.98	6.05	584.50	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	584.50	584.00	577.67	578.70	5.30	3.20	579.36	580.39	0	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	602.36	587.99	598.30	4.06	0.80	588.41	598.73	0	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	166.74	0.013	Starting HGL 15yr 20min-596.65
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	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	39.2	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	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	5.06	1.18	607.91	617.25	0	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	5.84	0.98	617.07	617.59	0	10.47	0.013	
AI L15-AI L16	15	5.60	616.18	621.68	109.96	5.00	5.48	623.00	631.12	617.16	622.64	8.48	0.96	617.64	623.12	0	14.44	0.013	
CI L16-CI L17	15	5.36	623.26	624.48	35.00	3.49	7.48	631.12	631.12	623.84	625.42	5.70	0.94	624.30	625.88	0	12.06	0.013	
CI L17-CI L18	15	4.77	624.48	629.37	139.59	3.50	4.98	631.12	636.07	625.42	630.25	5.82	0.88	625.83	630.66	0	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	631.93	631.93	4.14	0.79	631.83	632.27	0	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	3.89	0.68	632.21	632.62	0	6.46	0.013	
CI L20-CI L21	12	0.46	631.66	632.01	35.00	1.00	1.68	636.23	632.34	632.29	632.44	3.94	0.28	632.44	632.39	0	3.56	0.013	
MH L11-FE L22	42	49.30	596.10	597.01	21.00	4.33	7.15	605.30	600.97	598.67	599.20	1.77	2.19	599.61	600.14	0	209.44	0.013	
MH L12-DCI L23	15	3.86	601.81	606.84	125.83	4.00	3.92	609.60	612.53	603.33	607.63	4.90	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	612.53	612.53	607.63	608.79	3.74	0.55	607.86	609.02	0	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	4.19	0.72	604.37	615.20	0.897	10.8	0.013	
AI L14-CI L27	12	2.19	615.46	616.86	169.80	2.00	3.49	621.70	627.81	616.64	619.49	8.32	0.63	616.76	619.76	0.93	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	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	4.15	0.46	632.52	633.63	0	3.56	0.013	
FE L29-MH L30	36	43.53	603.00	603.20	20.00	1.00	6.21	606.42	610.00	606.00	606.06	3.33	2.15	606.59	606.67	0.08	66.7	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	606.67	608.55	4.95	1.62	607.32	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	5.08	1.55	609.33	614.71	0	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	6.18	1.51	614.67	620.37	0	50.57	0.013	
AI L33-DCI L34	18	15.76	618.11	619.75	40.92	4.01	9.91	625.80	628.30	619.62	621.17	7.13	1.42	620.86	622.46	0.86	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	5.23	1.40	622.30	624.19	0	21	0.013	
DCI L35-MH L36	18	9.58	621.67	626.65	124.62	4.00	5.87	628.30	633.20	623.07	627.84	5.36	1.19	623.69	628.47	0	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	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	6.12	1.00	628.85	629.18	0	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	7.45	0.85	629.12	629.54	0	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	4.49	0.48	629.34	638.69	0	8.5	0.013	
MH L30-MH L41	24	23.20	603.20	604.17	48.58	2.00	7.39	610.00	612.50	606.67	607.18	4.49	1.71	607.52	608.03	0.511	31.96	0.013	
MH L41-CI L42	24	23.20	604.17	609.49	305.00	5.07	7.75	612.50	617.95	608.01	611.20	6.75	1.71	608.86	612.22	1.068	50.91	0.013	
CI L42-CI L43	24	21.83	609.49	609.84	10.00	1.00	7.71	617.95	617.95	611.20	611.51	6.44	1.67	612.15	612.45	0	22.62	0.013	
CI L43-DCI L44	24	17.19	609.84	610.45	60.93	1.00	6.49	617.95	619.85	611.51	611.94	7.91	1.49	612.23	612.67	0	22.63	0.013	
DCI L44-DCI L45	24	15.53	611.95	612.30	35.00	1.00	7.14	619.85	619.85	613.17	613.72	6.13	1.42	613.83	614.38	0	22.62	0.013	
DCI L45-AI L46	24	11.79	612.30	613.15	85.03	1.00	5.38	619.85	620.70	613.72	614.38	6.32	1.23	614.24	614.91	0	22.61	0.013	
AI L46-MH L47	24	9.18	613.15	622.70	115.00	8.30	4.91	620.70	629.80	614.38	623.78	6.02	1.08	614.82	624.22	0	65.18	0.013	
MH L47-DCI L48	24	9.18	622.69	622.94	25.30	0.99	5.27	629.80	631.03	623.78	624.02	7.01	1.08	624.22	624.46	0	22.48	0.013	
DCI L48-DCI L49	24	7.78	622.94	623.29	35.00	1.00	4.75	631.03	631.03	624.02	624.28	6.75	0.99	624.41	624.67	0	22.62	0.013	
DCI L49-CI L50	18	6.38	623.29	623.83	53.74	1.00	5.20	631.03	633.31	624.28	624.81	8.50	0.98	624.71	625.23	0	10.53	0.013	
CI L50-AI L57	15	6.25	624.98	625.75	76.91	1.00	5.94	633.31	631.30	625.97	626.76	4.54	1.01	626.51	627.30	0	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	4.77	0.52	626.82	633.54				