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ENGINEERS PLANNERS SURVEYORS LANDSCAPE ARCHITECTS

November 17, 2020

Gene Williams, Senior Staff Engineer
City of Lee's Summit
220 SE Green Street
Lee's Summit, MO 64063

RE: "SANITARY SEWER CAPACITY ANALYSIS: MIDDLE SCHOOL 4" PREPARED FOR LEE'S SUMMIT SCHOOL DISTRICT R7

Dear Mr. Williams:

We are submitting the following information in connection with the "Sanitary Sewer Capacity Analysis: Middle School 4" report, dated August 2020, prepared by Olsson for Lee's Summit School District R-7. The report analyzed the Lee's Summit R-7 School District's proposed development of a new middle school on a 52 acre site located on the south side of Bailey Road at the intersection of Country Lane and SE Bailey Road in Lee's Summit, Missouri. The purpose of the district's analysis was to determine if the existing Big Creek Interceptor could accommodate future flows from the proposed development of the middle school.

Olsson has analyzed a portion of the existing downstream sanitary sewer capacity starting at the existing upstream manhole MH 47-019 and ending at an existing downstream manhole MH 54-002. Their proposed school conditions indicated pipe upsizing the existing 15" main with approximately 4,400 LF and 1,750 LF of 18" and 21" pipe, respectively. Recommendations were also provided for the ultimate development condition, and it is our understanding that the City and the school district have entered into an agreement to upsize the existing interceptor to ultimate conditions capacity between MH 47-023 and MH 54-002.

Located directly east of the school district's 52 acre site is Bailey Farms, a proposed 88-acre single-family residential development located on the southwest side of Bailey Road and SE Ranson Road. A vicinity map showing the location of Bailey Farms in the Big Creek Interceptor watershed is attached as Exhibit A.

To determine the wastewater flow impact of the proposed Bailey Farms development, we have analyzed the portion of the existing downstream sanitary sewer main between MH 47-019 to MH 47-023. This portion of interceptor was not previously identified as being upsized with Olsson's proposed conditions. Our analysis matches Olsson's design flow assumptions. This included matching Olsson's assigned manning "n" of 0.013 to the pipe calculations.

The development of Bailey Farms results in an increase of 0.88 cfs. Exhibit B shows Olsson's proposed condition sewer design with the additional Bailey Farms development. The pipe capacity was analyzed at 94% flow. Our analysis shows that this flow can be accommodated in the existing 18" main between MH 47-023 and MH 47-019.

Flows from Bailey Farms will connect to the existing manhole structure MH 47-019 through a proposed 15" main, as recommended by Olsson.

In summary, we have shown that the existing conditions upstream of Olsson's proposed school conditions at MH 47-023 will not need to be upsized to accommodate the additional inflow from Bailey Farms. It is our understanding that downstream of MH 47-023 the City and the school district have entered into an agreement to upsize the existing main to ultimate condition capacity to MH 54-002, which will also accommodate the increase in flows from Bailey Farms.

If you have any concerns or questions regarding this analysis, please let us know and we'll be happy to discuss in more detail our methodology.

Sincerely,

Schlagel & Associates, P.A.

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Enclosures

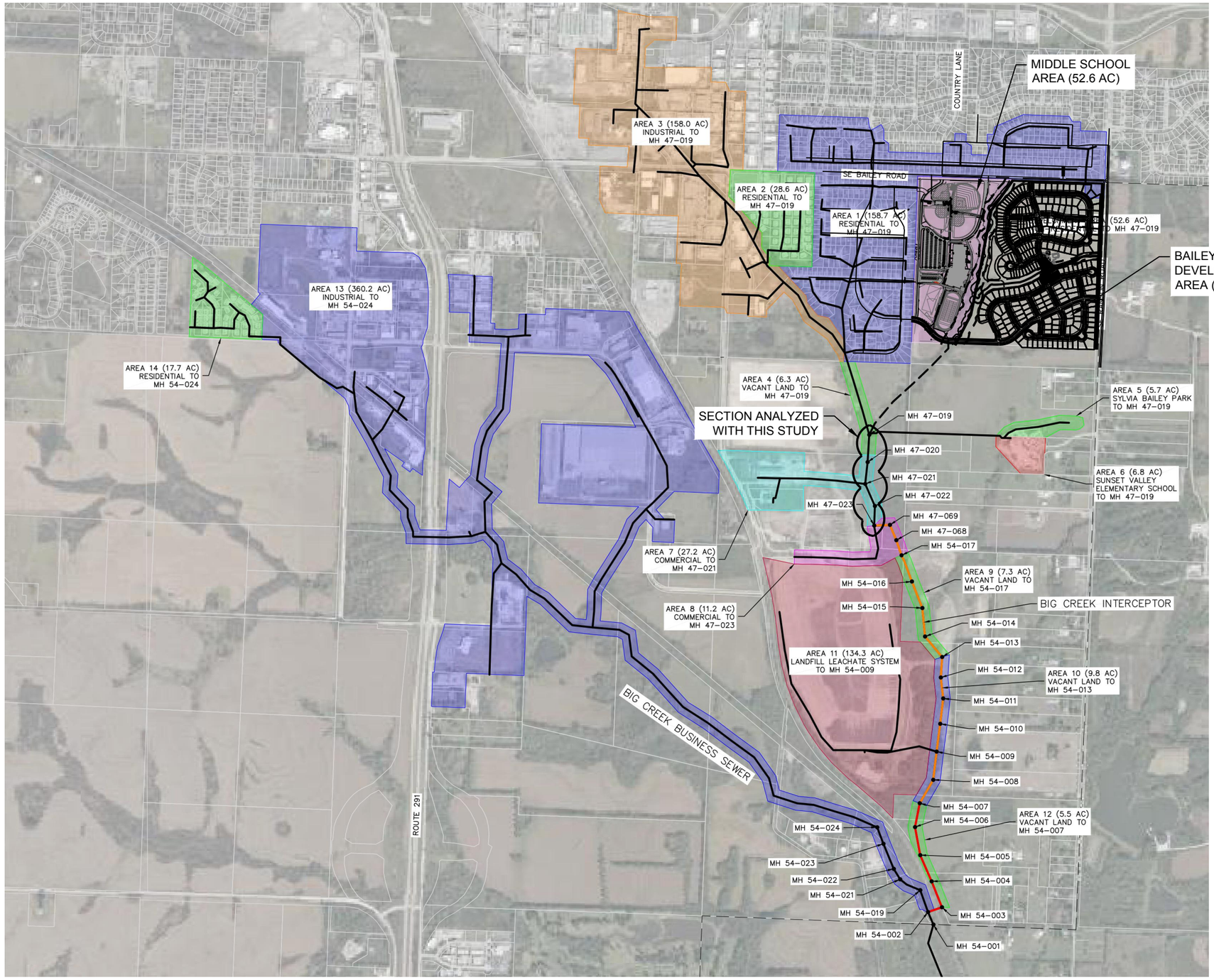

*EXHIBIT A ADOPTED FROM "SANITARY SEWER CAPACITY ANALYSIS: MIDDLE SCHOOL 4" PREPARED FOR LEE'S SUMMIT SCHOOL DISTRICT R-7, SHEET 2 OF 3, OLSSON REPORT DATED AUGUST 2020

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SANITARY SEWER CAPACITY ANALYSIS
BAILEY FARMS & MIDDLE SCHOOL

LEE'S SUMMIT, MISSOURI

DRAWN BY:	DATE PREPARED:	PROJ. NUMBER:
PIW	11/16/2020	19-227

EXHIBIT A

SHEET 1

OLSSON DESIGN CRITERIA UTILIZING A MODIFIED INFLOW FACTOR (K) OF 0.002 (BAILEY FARMS & MIDDLE SCHOOL) - EXHIBIT B

	PIPE SEGMENT	PIPE LENGTH (FT)	PIPE DIAMETER (IN)	PIPE SLOPE (FT/FT)	FULL FLOW PIPE CAPACITY (CFS)	94% FULL FLOW PIPE CAPACITY (CFS)	2/3 PIPE FLOW CAPACITY (CFS)	1/2 PIPE FLOW CAPACITY (CFS)	EXISTING FLOW (CFS)	EXISTING EXCESS (CFS)	ADDITIONAL FROM MIDDLE SCHOOL (CFS)	ADDITIONAL FROM BAILEY FARMS(CFS)	PROPOSED TOTAL FINAL FLOW (CFS)	EXCESS PIPE CAPACITY (CFS)	PERCENTAGE OF 94% FLOW (%)	
BC-038 TO BC-037	56725	419.91	24	0.0033	13.03	14.02	10.21	6.52	8.56	5.46	0.51	0.88	9.95	4.07	70.99%	
BC-039 TO BC-038	56726	420.00	24	0.0033	13.03	14.02	10.21	6.52	7.92	6.10	0.51	0.88	9.31	4.71	66.42%	
BC-040 TO BC-039	56727	419.95	24	0.0091	21.64	23.28	16.96	10.82	7.92	15.36	0.51	0.88	9.31	13.97	40.00%	
BC-041 TO BC-040	56728	420.07	24	0.0037	13.80	14.84	10.82	6.90	7.92	6.92	0.51	0.88	9.31	5.53	62.73%	
54-001 TO BC-041	56729	254.87	24	0.0051	16.20	17.43	12.70	8.10	7.92	9.51	0.51	0.88	9.31	8.12	53.43%	
54-002 TO 54-001	56580	190.45	24	0.0020	10.14	10.91	7.95	5.07	7.92	2.99	0.51	0.88	9.31	1.60	85.32%	
54-003 TO 54-002	56581	200.86	21	0.0022	7.45	8.02	5.84	3.73	4.83	3.19	0.51	0.88	6.22	1.80	77.60%	
54-004 TO 54-003	56582	400.07	21	0.0026	8.10	8.71	6.35	4.05	4.83	3.88	0.51	0.88	6.22	2.49	71.38%	
54-005 TO 54-004	56583	399.93	21	0.0026	8.10	8.71	6.35	4.05	4.83	3.88	0.51	0.88	6.22	2.49	71.38%	
56-006 TO 54-005	56584	399.96	21	0.0026	8.10	8.71	6.35	4.05	4.83	3.88	0.51	0.88	6.22	2.49	71.38%	
54-007 TO 54-006	56585	348.21	21	0.0026	8.10	8.71	6.35	4.05	4.83	3.88	0.51	0.88	6.22	2.49	71.38%	
54-008 TO 54-007	56586	383.33	18	0.0097	10.37	11.16	8.13	5.19	4.83	6.33	0.51	0.88	6.22	4.94	55.74%	
54-009 TO 54-008	56587	400.01	18	0.0039	6.58	7.08	5.16	3.29	4.76	2.32	0.51	0.88	6.15	0.93	86.92%	
54-010 TO 54-009	56589	400.00	18	0.0026	5.37	5.78	4.21	2.69	4.76	1.02	0.51	0.88	6.15	(0.37)	106.46%	PROBLEM
54-011 TO 54-010	56590	361.96	18	0.0022	4.94	5.31	3.87	2.47	4.06	1.25	0.51	0.88	5.45	(0.14)	102.56%	PROBLEM
54-012 TO 54-011	56591	297.12	18	0.0055	7.81	8.40	6.12	3.91	4.06	4.34	0.51	0.88	5.45	2.95	64.86%	
54-013 TO 54-012	56592	291.30	18	0.0020	4.71	5.07	3.69	2.36	4.06	1.01	0.51	0.88	5.45	(0.38)	107.56%	PROBLEM
54-014 TO 54-013	56593	378.85	18	0.0020	4.71	5.07	3.69	2.36	3.95	1.12	0.51	0.88	5.34	(0.27)	105.39%	PROBLEM
54-015 TO 54-014	56594	407.87	18	0.0034	6.14	6.61	4.81	3.07	3.95	2.66	0.51	0.88	5.34	1.27	80.83%	
54-016 TO 54-015	56595	399.98	18	0.0060	8.16	8.78	6.40	4.08	3.95	4.83	0.51	0.88	5.34	3.44	60.85%	
54-017 TO 54-016	56596	400.01	18	0.0024	5.16	5.55	4.04	2.58	3.95	1.60	0.51	0.88	5.34	0.21	96.21%	
47-068 TO 54-017	56597	229.99	18	0.0035	6.23	6.70	4.88	3.12	3.86	2.84	0.51	0.88	5.25	1.45	78.33%	
47-069 TO 47-068	56598	230.02	18	0.0035	6.23	6.70	4.88	3.12	3.86	2.84	0.51	0.88	5.25	1.45	78.33%	
47-023 TO 47-069	56599	218.81	18	0.0037	6.41	6.89	5.02	3.20	3.86	3.03	0.51	0.88	5.25	1.64	76.18%	
47-022 TO 47-023	56546	357.00	18	0.0023	5.05	5.43	3.96	2.53	3.71	1.72	0.51	0.88	5.10	0.33	93.86%	
47-021 TO 47-022	56545	334.37	18	0.0035	6.23	6.70	4.88	3.12	3.71	2.99	0.51	0.88	5.10	1.60	76.09%	
47-020 TO 47-021	54544	313.25	18	0.0035	6.23	6.70	4.88	3.12	3.46	3.24	0.51	0.88	4.85	1.85	72.36%	
47-019 TO 47-020	56543	400.00	18	0.0035	6.23	6.70	4.88	3.12	3.46	3.24	0.51	0.88	4.85	1.85	72.36%	

DESIGN NOTES:
1. MANNING'S "n" VALUE OF 0.013 HAS BEEN ASSIGNED TO ALL PIPES
2. ALL PIPE IS PVC SDR-26
3. PROPOSED OLSSON CONDITION SHOWN. INTERCEPTOR WILL BE UPSIZED TO ULTIMATE CONDITION PER DEVELOPMENT AGREEMENT WITH SCHOOL.