



**Combined Sewer Overflow  
Public Notification Program  
2019 Annual Report**

**City of Lakewood, Ohio  
May 1, 2020**

City of Lakewood, Ohio  
 CSO Public Notification Program  
 Annual Report for 2019

The City of Lakewood has combined sewer overflows (CSO) on Lake Erie and Rocky River. Public access areas affected by CSOs are Rocky River and Lake Erie beaches. Lakewood reports CSO activity monthly to the Ohio EPA. The City has three (3) rain gauges that recorded 26.9 to 34.4 inches of total rainfall throughout the year. The rainfall led to sixty-eight (68) combined sewer overflows events in 2019 with no treatment. A summary of these events for 2019 caused from wet weather is as follows:

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
1 <sup>1,2</sup>	RRES 1145	1/8/19 8:40 AM	1/8/19 6:35 PM	0.12	9.9	0.77
	CSO-055	1/8/19 8:40 AM	1/8/19 6:40 PM	0.26	10.0	
	LEWS 1055	1/8/19 8:40 AM	1/8/19 6:50 PM	0.41	10.2	
	LEWS 1040	1/8/19 8:40 AM	1/8/19 8:20 PM	0.42	11.7	
	LEWS 1130	1/8/19 8:40 AM	1/8/19 8:40 PM	0.06	12.0	
	CSO-052	1/8/19 8:40 AM	1/8/19 10:50 PM	0.09	14.2	
	LEWS 1070	1/8/19 8:40 AM	1/9/19 11:40 PM	0.12	39.0	
	CSO-056B	1/8/19 8:45 AM	1/8/19 7:35 PM	0.87	10.8	
	CSO-058	1/8/19 8:45 AM	1/11/19 10:55 AM	0.99	74.2	
	CSO-056A	1/8/19 8:50 AM	1/8/19 7:20 PM	0.22	10.5	
	CSO-057	1/8/19 8:50 AM	1/8/19 8:30 PM	0.30	11.7	
	LEWS 1045	1/8/19 3:40 PM	1/8/19 6:20 PM	0.25	2.7	
	CSO-059	1/8/19 3:40 PM	1/8/19 7:25 PM	0.18	3.8	
	CSO-002	1/8/19 3:45 PM	1/8/19 9:10 PM	1.66	5.4	
2 <sup>1,2</sup>	CSO-052	1/23/19 5:00 AM	1/24/19 8:55 AM	0.32	27.9	1.06
	RRES 1145	1/23/19 5:15 AM	1/23/19 10:10 PM	0.09	16.9	
	LEWS 1040	1/23/19 5:15 AM	1/24/19 4:05 AM	1.65	22.8	
	LEWS 1070	1/23/19 5:25 AM	1/24/19 3:25 AM	0.53	22.0	
	CSO-057	1/23/19 5:25 AM	1/24/19 4:00 AM	1.13	22.6	
	LEWS 1055	1/23/19 6:25 AM	1/23/19 11:00 AM	0.29	4.6	
	LEWS 1130	1/23/19 6:25 AM	1/24/19 1:35 AM	0.10	19.2	
	CSO-056B	1/23/19 6:45 AM	1/24/19 2:00 AM	2.77	19.3	
	CSO-002	1/23/19 7:10 AM	1/24/19 4:40 AM	7.73	21.5	
	CSO-055	1/23/19 8:00 AM	1/24/19 1:05 AM	0.15	17.1	
	CSO-056A	1/23/19 8:00 AM	1/24/19 1:40 AM	0.58	17.7	
	CSO-059	1/23/19 8:10 AM	1/24/19 1:45 AM	0.80	17.6	
	LEWS 1045	1/23/19 8:30 AM	1/23/19 3:30 PM	0.09	7.0	
	CSO-058	1/23/19 8:45 AM	1/23/19 5:35 PM	0.03	8.8	

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
3 <sup>1</sup>	CSO-055	2/7/19 2:35 PM	2/7/19 4:15 PM	0.02	1.7	0.39
	LEWS 1070	2/7/19 2:35 PM	2/7/19 7:50 PM	0.07	5.3	
	CSO-052	2/7/19 2:35 PM	2/7/19 9:10 PM	0.03	6.6	
	LEWS 1040	2/7/19 2:40 PM	2/7/19 7:55 PM	0.29	5.3	
	CSO-056B	2/7/19 2:45 PM	2/7/19 6:50 PM	0.30	4.1	
	LEWS 1055	2/7/19 2:50 PM	2/7/19 4:45 PM	0.07	1.9	
	CSO-057	2/7/19 2:50 PM	2/7/19 7:45 PM	0.19	4.9	
	CSO-056A	2/7/19 3:10 PM	2/7/19 6:45 PM	0.05	3.6	
	CSO-002	2/7/19 3:25 PM	2/7/19 8:30 PM	1.11	5.1	
4 <sup>1,2</sup>	CSO-052	2/12/19 4:35 AM	2/12/19 10:25 PM	0.08	17.8	0.91
	LEWS 1070	2/12/19 4:50 AM	2/12/19 11:45 PM	0.22	18.9	
	LEWS 1040	2/12/19 4:55 AM	2/12/19 9:40 PM	0.78	16.8	
	CSO-057	2/12/19 5:00 AM	2/12/19 9:25 PM	0.48	16.4	
	RRES 1145	2/12/19 5:05 AM	2/12/19 11:50 AM	0.01	6.8	
	CSO-056B	2/12/19 5:10 AM	2/12/19 8:10 PM	0.82	15.0	
	CSO-055	2/12/19 5:40 AM	2/12/19 7:25 AM	0.02	1.8	
	CSO-002	2/12/19 5:55 AM	2/12/19 10:05 PM	3.40	16.2	
	CSO-056A	2/12/19 6:00 AM	2/12/19 8:00 PM	0.15	14.0	
	CSO-059	2/12/19 6:05 AM	2/12/19 8:45 AM	0.05	2.7	
	LEWS 1055	2/12/19 3:15 PM	2/12/19 7:15 PM	0.18	4.0	
5 <sup>1</sup>	CSO-052	2/20/19 5:55 PM	2/20/19 9:35 PM	0.02	3.7	0.24
	LEWS 1040	2/20/19 6:00 PM	2/20/19 8:30 PM	0.14	2.5	
	LEWS 1055	2/20/19 6:10 PM	2/20/19 7:50 PM	0.02	1.7	
	CSO-056B	2/20/19 6:15 PM	2/20/19 8:00 PM	0.11	1.8	
	CSO-057	2/20/19 6:15 PM	2/20/19 8:45 PM	0.09	2.5	
	CSO-002	2/20/19 7:00 PM	2/20/19 9:00 PM	0.30	2.0	
6 <sup>1</sup>	LEWS 1055	3/9/19 7:15 PM	3/10/19 6:20 AM	0.11	11.1	0.56
	LEWS 1040	3/9/19 7:20 PM	3/10/19 5:40 AM	0.15	10.3	
	CSO-052	3/9/19 7:20 PM	3/10/19 6:05 AM	0.03	10.8	
	CSO-057	3/9/19 7:35 PM	3/10/19 5:55 AM	0.15	10.3	
	CSO-056B	3/9/19 7:40 PM	3/10/19 3:25 AM	0.10	7.8	
	CSO-055	3/9/19 8:45 PM	3/9/19 9:30 PM	0.01	0.8	
	CSO-002	3/9/19 9:10 PM	3/9/19 11:00 PM	0.18	1.8	

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
7 <sup>1.2</sup>	CSO-055	3/14/19 5:20 PM	3/14/19 6:55 PM	0.06	1.6	0.47
	LEWS 1070	3/14/19 5:20 PM	3/14/19 8:30 PM	0.04	3.2	
	LEWS 1040	3/14/19 5:20 PM	3/14/19 9:00 PM	0.22	3.7	
	LEWS 1055	3/14/19 5:20 PM	3/14/19 9:05 PM	0.06	3.8	
	CSO-052	3/14/19 5:20 PM	3/14/19 9:45 PM	0.06	4.4	
	RRES 1145	3/14/19 5:25 PM	3/14/19 7:25 PM	0.03	2.0	
	CSO-056B	3/14/19 5:25 PM	3/14/19 7:45 PM	0.26	2.3	
	CSO-057	3/14/19 5:35 PM	3/14/19 9:05 PM	0.15	3.5	
	CSO-059	3/14/19 5:40 PM	3/14/19 7:35 PM	0.01	1.9	
	LEWS 1130	3/14/19 5:50 PM	3/14/19 7:15 PM	0.02	1.4	
	CSO-056A	3/14/19 5:55 PM	3/14/19 7:45 PM	0.06	1.8	
	CSO-002	3/14/19 6:20 PM	3/14/19 8:55 PM	0.54	2.6	
8 <sup>1</sup>	LEWS 1055	3/29/19 4:20 AM	3/29/19 10:15 AM	0.02	5.9	0.30
	CSO-057	3/29/19 6:00 AM	3/29/19 7:30 AM	0.01	1.5	
9 <sup>1.2</sup>	LEWS 1055	3/30/19 9:40 AM	3/31/19 2:15 PM	0.29	28.6	0.74
	RRES 1145	3/30/19 9:45 AM	3/30/19 9:20 PM	0.03	11.6	
	LEWS 1040	3/30/19 9:45 AM	3/31/19 3:05 AM	0.41	17.3	
	CSO-052	3/30/19 9:45 AM	3/31/19 5:55 AM	0.09	20.2	
	CSO-057	3/30/19 9:55 AM	3/31/19 3:30 AM	0.37	17.6	
	LEWS 1070	3/30/19 3:25 PM	3/31/19 2:20 AM	0.10	10.9	
	CSO-056B	3/30/19 3:35 PM	3/31/19 1:25 AM	0.56	9.8	
	CSO-059	3/30/19 3:50 PM	3/30/19 10:10 PM	0.10	6.3	
	CSO-055	3/30/19 4:50 PM	3/30/19 8:50 PM	0.05	4.0	
	CSO-002	3/30/19 4:50 PM	3/31/19 3:30 AM	2.30	10.7	
	CSO-056A	3/30/19 5:00 PM	3/30/19 10:25 PM	0.09	5.4	
	LEWS 1045	3/30/19 8:10 PM	3/30/19 9:45 PM	0.01	1.6	

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
10 <sup>1,2</sup>	LEWS 1055	4/14/19 6:05 AM	4/14/19 10:45 AM	0.04	4.7	0.97
	CSO-057	4/14/19 6:40 AM	4/14/19 10:50 AM	0.06	4.2	
	LEWS 1040	4/14/19 7:10 AM	4/14/19 10:30 AM	0.07	3.3	
	CSO-052	4/14/19 7:10 AM	4/14/19 10:50 AM	0.64	3.7	
	CSO-056B	4/14/19 9:15 AM	4/14/19 10:05 AM	0.04	0.8	
	CSO-002	4/14/19 9:45 AM	4/14/19 10:35 AM	0.05	0.8	
	LEWS 1180	4/14/19 4:45 PM	4/14/19 5:10 PM	0.22	0.4	
	RRES 1145	4/14/19 4:45 PM	4/14/19 5:35 PM	0.10	0.8	
	LEWS 1040	4/14/19 4:45 PM	4/14/19 7:15 PM	0.21	2.5	
	CSO-056B	4/14/19 4:50 PM	4/14/19 5:55 PM	0.23	1.1	
	CSO-059	4/14/19 4:50 PM	4/14/19 5:55 PM	0.02	1.1	
	LEWS 1055	4/14/19 4:50 PM	4/15/19 5:05 AM	0.13	12.3	
	CSO-055	4/14/19 4:55 PM	4/14/19 5:25 PM	0.13	0.5	
	CSO-058	4/14/19 4:55 PM	4/14/19 5:35 PM	0.01	0.7	
	LEWS 1130	4/14/19 4:55 PM	4/14/19 5:35 PM	0.01	0.7	
	CSO-056A	4/14/19 4:55 PM	4/14/19 5:50 PM	0.04	0.9	
	CSO-052	4/14/19 4:55 PM	4/14/19 9:05 PM	1.40	4.2	
	CSO-057	4/14/19 5:05 PM	4/14/19 7:20 PM	0.09	2.3	
	CSO-002	4/14/19 5:10 PM	4/14/19 7:20 PM	0.23	2.2	

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
11 <sup>1,2</sup>	LEWS 1055	4/19/19 2:50 AM	4/20/19 6:45 PM	0.65	39.9	1.74
	CSO-056B	4/19/19 2:55 AM	4/19/19 3:40 AM	0.03	0.8	
	LEWS 1040	4/19/19 2:55 AM	4/20/19 11:25 AM	0.97	32.5	
	CSO-057	4/19/19 3:05 AM	4/20/19 11:45 AM	0.80	32.7	
	CSO-052	4/19/19 3:10 AM	4/20/19 11:50 AM	7.82	32.7	
	LEWS 1070	4/19/19 3:05 PM	4/20/19 11:35 AM	0.36	20.5	
	CSO-056B	4/19/19 3:15 PM	4/19/19 11:40 PM	1.82	8.4	
	RRES 1145	4/19/19 3:25 PM	4/19/19 9:25 PM	0.10	6.0	
	CSO-055	4/19/19 3:25 PM	4/19/19 9:50 PM	0.23	6.4	
	CSO-056A	4/19/19 3:30 PM	4/19/19 11:15 PM	0.34	7.8	
	CSO-059	4/19/19 3:35 PM	4/19/19 11:20 PM	0.66	7.8	
	CSO-002	4/19/19 3:45 PM	4/20/19 12:55 PM	5.94	21.2	
	CSO-058	4/19/19 4:35 PM	4/19/19 9:25 PM	0.04	4.8	
	LEWS 1130	4/19/19 4:40 PM	4/19/19 9:10 PM	0.05	4.5	
	LEWS 1045	4/19/19 4:45 PM	4/19/19 10:30 PM	0.10	5.8	
	RRES 1145	4/20/19 5:45 AM	4/20/19 8:05 AM	0.13	2.3	
	CSO-056B	4/20/19 5:45 AM	4/20/19 9:55 AM	0.88	4.2	
	LEWS 1130	4/20/19 5:50 AM	4/20/19 7:05 AM	0.02	1.3	
	CSO-055	4/20/19 5:50 AM	4/20/19 9:05 AM	0.31	3.3	
	CSO-058	4/20/19 5:55 AM	4/20/19 7:30 AM	0.03	1.6	
	CSO-056A	4/20/19 5:55 AM	4/20/19 9:15 AM	0.16	3.3	
CSO-059	4/20/19 6:00 AM	4/20/19 9:40 AM	0.39	3.7		
LEWS 1045	4/20/19 6:20 AM	4/20/19 9:15 AM	0.05	2.9		
12 <sup>1,2</sup>	LEWS 1055	4/25/19 7:20 PM	4/26/19 2:50 PM	0.13	19.5	0.58
	LEWS 1040	4/25/19 7:25 PM	4/26/19 2:20 AM	0.15	6.9	
	LEWS 1070	4/25/19 11:50 PM	4/26/19 2:55 AM	0.05	3.1	
	RRES 1145	4/25/19 11:55 PM	4/26/19 1:50 AM	0.07	1.9	
	CSO-056B	4/25/19 11:55 PM	4/26/19 2:10 AM	0.42	2.3	
	CSO-057	4/26/19 12:00 AM	4/26/19 2:40 AM	0.13	2.7	
	CSO-052	4/26/19 12:00 AM	4/26/19 4:10 AM	1.11	4.2	
	CSO-055	4/26/19 12:15 AM	4/26/19 1:35 AM	0.08	1.3	
	CSO-056A	4/26/19 12:25 AM	4/26/19 2:00 AM	0.08	1.6	
	LEWS 1130	4/26/19 12:30 AM	4/26/19 1:10 AM	0.01	0.7	
	CSO-058	4/26/19 12:30 AM	4/26/19 1:30 AM	0.01	1.0	
	CSO-059	4/26/19 12:30 AM	4/26/19 2:10 AM	0.08	1.7	
	CSO-002	4/26/19 12:30 AM	4/26/19 3:15 AM	0.83	2.8	

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
13 <sup>1</sup>	LEWS 1055	4/27/19 8:40 PM	4/28/19 2:25 PM	0.06	17.8	0.46
	LEWS 1040	4/27/19 8:50 PM	4/28/19 4:05 AM	0.08	7.3	
	CSO-052	4/28/19 12:10 AM	4/28/19 8:10 AM	1.01	8.0	
	CSO-057	4/28/19 12:15 AM	4/28/19 3:55 AM	0.06	3.7	
	CSO-056B	4/28/19 1:00 AM	4/28/19 2:35 AM	0.01	1.6	
	CSO-002	4/28/19 1:25 AM	4/28/19 4:10 AM	0.21	2.8	
14 <sup>1,2</sup>	LEWS 1055	4/29/19 4:55 PM	4/30/19 2:50 AM	0.14	9.9	0.45
	LEWS 1040	4/29/19 5:10 PM	4/29/19 8:35 PM	0.20	3.4	
	LEWS 1070	4/29/19 5:10 PM	4/29/19 8:50 PM	0.05	3.7	
	RRES 1145	4/29/19 5:15 PM	4/29/19 7:40 PM	0.03	2.4	
	CSO-056B	4/29/19 5:15 PM	4/29/19 7:55 PM	0.43	2.7	
	CSO-057	4/29/19 5:20 PM	4/29/19 8:40 PM	0.15	3.3	
	CSO-052	4/29/19 5:25 PM	4/29/19 11:15 PM	1.50	5.8	
	CSO-055	4/29/19 5:30 PM	4/29/19 7:15 PM	0.06	1.8	
	LEWS 1130	4/29/19 5:35 PM	4/29/19 7:10 PM	0.01	1.6	
	CSO-056A	4/29/19 5:35 PM	4/29/19 7:45 PM	0.07	2.2	
	CSO-059	4/29/19 5:40 PM	4/29/19 7:55 PM	0.08	2.3	
	CSO-002	4/29/19 5:55 PM	4/29/19 9:15 PM	0.73	3.3	
	LEWS 1045	4/29/19 6:45 PM	4/29/19 7:45 PM	0.01	1.0	
15 <sup>1</sup>	LEWS 1055	4/30/19 12:40 PM	4/30/19 2:35 PM	0.01	1.9	0.10
	LEWS 1040	4/30/19 12:50 PM	4/30/19 1:40 PM	0.02	0.8	
	CSO-057	4/30/19 1:05 PM	4/30/19 1:55 PM	0.01	0.8	
	CSO-052	4/30/19 1:10 PM	4/30/19 2:05 PM	0.19	0.9	
16 <sup>1,2</sup>	CSO-056B	5/1/19 5:50 PM	5/1/19 6:35 PM	0.10	0.8	0.54
	LEWS 1040	5/1/19 5:50 PM	5/2/19 6:40 AM	0.14	12.8	
	LEWS 1055	5/1/19 5:50 PM	5/2/19 6:20 PM	0.13	24.5	
	CSO-055	5/1/19 5:55 PM	5/1/19 6:20 PM	0.04	0.4	
	CSO-056A	5/1/19 5:55 PM	5/1/19 6:30 PM	0.01	0.6	
	RRES 1145	5/1/19 5:55 PM	5/1/19 10:05 PM	0.02	4.2	
	CSO-052	5/1/19 6:00 PM	5/2/19 9:10 AM	1.46	15.2	
	CSO-057	5/1/19 6:05 PM	5/2/19 6:40 AM	0.10	12.6	
	CSO-055	5/2/19 4:40 AM	5/2/19 5:15 AM	0.02	0.6	
	CSO-056B	5/2/19 4:40 AM	5/2/19 5:40 AM	0.10	1.0	
	CSO-056A	5/2/19 4:45 AM	5/2/19 5:30 AM	0.02	0.8	
	CSO-002	5/2/19 4:55 AM	5/2/19 6:45 AM	0.18	1.8	

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
17 <sup>1,2</sup>	RRES 1145	5/3/19 1:05 AM	5/3/19 1:50 AM	0.09	0.8	0.19
	LEWS 1040	5/3/19 1:05 AM	5/3/19 1:55 AM	0.04	0.8	
	CSO-056B	5/3/19 1:05 AM	5/3/19 2:05 AM	0.26	1.0	
	LEWS 1055	5/3/19 1:05 AM	5/3/19 9:35 AM	0.06	8.5	
	CSO-055	5/3/19 1:10 AM	5/3/19 1:40 AM	0.11	0.5	
	CSO-058	5/3/19 1:10 AM	5/3/19 1:50 AM	0.01	0.7	
	CSO-059	5/3/19 1:10 AM	5/3/19 1:55 AM	0.01	0.8	
	CSO-056A	5/3/19 1:10 AM	5/3/19 2:00 AM	0.05	0.8	
	CSO-052	5/3/19 1:15 AM	5/3/19 3:15 AM	0.50	2.0	
	CSO-057	5/3/19 1:20 AM	5/3/19 2:35 AM	0.06	1.3	
	CSO-002	5/3/19 1:25 AM	5/3/19 2:45 AM	0.19	1.3	
18 <sup>1</sup>	LEWS 1040	5/9/19 10:30 AM	5/9/19 7:55 PM	0.02	9.4	0.23
	LEWS 1055	5/9/19 1:35 PM	5/9/19 9:40 PM	0.02	8.1	
	CSO-056B	5/9/19 2:05 PM	5/9/19 2:35 PM	0.03	0.5	
	CSO-057	5/9/19 2:10 PM	5/9/19 2:55 PM	0.02	0.8	
	CSO-052	5/9/19 2:10 PM	5/9/19 3:35 PM	0.18	1.4	
19 <sup>1</sup>	LEWS 1055	5/12/19 12:25 AM	5/12/19 5:25 AM	0.04	5.0	0.30
	LEWS 1040	5/12/19 1:00 AM	5/12/19 3:50 AM	0.03	2.8	
	CSO-057	5/12/19 1:25 AM	5/12/19 4:10 AM	0.03	2.8	
	CSO-052	5/12/19 1:25 AM	5/12/19 4:15 AM	0.30	2.8	
20 <sup>1</sup>	LEWS 1055	5/12/19 5:45 PM	5/12/19 11:55 PM	0.02	6.2	0.20
	CSO-052	5/12/19 6:40 PM	5/12/19 11:15 PM	0.15	4.6	
21 <sup>1</sup>	CSO-052	5/19/19 6:45 PM	5/19/19 7:20 PM	0.05	0.6	0.10
22 <sup>1,2</sup>	LEWS 1040	5/23/19 7:05 AM	5/23/19 7:50 AM	0.03	0.8	0.14
	CSO-056B	5/23/19 7:10 AM	5/23/19 7:45 AM	0.08	0.6	
	LEWS 1055	5/23/19 7:10 AM	5/23/19 8:25 AM	0.03	1.3	
	CSO-055	5/23/19 7:15 AM	5/23/19 7:35 AM	0.06	0.3	
	RRES 1145	5/23/19 7:15 AM	5/23/19 7:40 AM	0.02	0.4	
	CSO-056A	5/23/19 7:15 AM	5/23/19 7:45 AM	0.01	0.5	
	CSO-052	5/23/19 7:20 AM	5/23/19 8:40 AM	0.24	1.3	
	CSO-057	5/23/19 7:25 AM	5/23/19 8:10 AM	0.03	0.8	



Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
23 <sup>1,2</sup>	LEWS 1055	5/26/19 8:10 AM	5/26/19 9:10 PM	0.20	13.0	0.56
	LEWS 1070	5/26/19 2:45 PM	5/26/19 6:55 PM	0.04	4.2	
	LEWS 1040	5/26/19 3:30 PM	5/26/19 6:15 PM	0.20	2.8	
	CSO-056B	5/26/19 3:35 PM	5/26/19 6:10 PM	0.45	2.6	
	CSO-055	5/26/19 3:40 PM	5/26/19 5:40 PM	0.18	2.0	
	CSO-058	5/26/19 3:40 PM	5/26/19 5:45 PM	0.02	2.1	
	RRES 1145	5/26/19 3:40 PM	5/26/19 5:45 PM	0.06	2.1	
	CSO-056A	5/26/19 3:40 PM	5/26/19 6:05 PM	0.10	2.4	
	LEWS 1130	5/26/19 3:45 PM	5/26/19 5:50 PM	0.01	2.1	
	CSO-052	5/26/19 3:45 PM	5/26/19 6:30 PM	0.63	2.8	
	CSO-059	5/26/19 3:50 PM	5/26/19 6:20 PM	0.08	2.5	
	CSO-057	5/26/19 3:50 PM	5/26/19 6:40 PM	0.18	2.8	
	CSO-002	5/26/19 4:20 PM	5/26/19 6:40 PM	0.50	2.3	
	LEWS 1045	5/26/19 5:15 PM	5/26/19 6:10 PM	0.01	0.9	
24 <sup>1</sup>	LEWS 1055	5/27/19 11:40 PM	5/28/19 5:55 AM	0.05	6.3	0.24
	CSO-056B	5/27/19 11:45 PM	5/28/19 1:15 AM	0.07	1.5	
	LEWS 1040	5/27/19 11:45 PM	5/28/19 1:25 AM	0.05	1.7	
	CSO-057	5/27/19 11:55 PM	5/28/19 1:45 AM	0.06	1.8	
	CSO-052	5/28/19 12:05 AM	5/28/19 1:45 AM	0.22	1.7	
25 <sup>1,2</sup>	LEWS 1040	5/28/19 5:55 PM	5/29/19 2:15 AM	0.63	8.3	1.05
	LEWS 1180	5/28/19 6:00 PM	5/28/19 6:20 PM	0.14	0.3	
	CSO-056B	5/28/19 6:00 PM	5/28/19 10:30 PM	1.44	4.5	
	LEWS 1070	5/28/19 6:00 PM	5/29/19 2:05 AM	0.18	8.1	
	LEWS 1055	5/28/19 6:00 PM	5/29/19 12:40 PM	0.47	18.7	
	LEWS 1295	5/28/19 6:05 PM	5/28/19 7:05 PM	0.03	1.0	
	CSO-055	5/28/19 6:05 PM	5/28/19 9:15 PM	0.33	3.2	
	CSO-058	5/28/19 6:05 PM	5/28/19 9:20 PM	0.03	3.3	
	LEWS 1130	5/28/19 6:05 PM	5/28/19 9:35 PM	0.04	3.5	
	RRES 1145	5/28/19 6:05 PM	5/28/19 9:45 PM	0.35	3.7	
	CSO-056A	5/28/19 6:05 PM	5/28/19 10:10 PM	0.22	4.1	
	CSO-059	5/28/19 6:10 PM	5/28/19 11:25 PM	0.85	5.3	
	CSO-052	5/28/19 6:10 PM	5/29/19 4:10 AM	3.93	10.0	
	CSO-057	5/28/19 6:15 PM	5/29/19 2:30 AM	0.37	8.3	
	CSO-002	5/28/19 6:15 PM	5/29/19 2:35 AM	2.03	8.3	
LEWS 1045	5/28/19 6:35 PM	5/28/19 10:40 PM	0.08	4.1		
LEWS 1190	5/28/19 6:50 PM	5/28/19 7:25 PM	0.01	0.6		

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
26 <sup>1,2</sup>	LEWS 1070	5/30/19 4:00 PM	5/30/19 6:30 PM	0.04	2.5	0.37
	LEWS 1040	5/30/19 4:05 PM	5/30/19 5:45 PM	0.16	1.7	
	LEWS 1130	5/30/19 4:10 PM	5/30/19 4:55 PM	0.01	0.8	
	RRES 1145	5/30/19 4:10 PM	5/30/19 5:05 PM	0.05	0.9	
	CSO-056B	5/30/19 4:10 PM	5/30/19 5:20 PM	0.24	1.2	
	LEWS 1055	5/30/19 4:10 PM	5/31/19 12:35 AM	0.13	8.4	
	CSO-055	5/30/19 4:15 PM	5/30/19 4:45 PM	0.11	0.5	
	CSO-052	5/30/19 4:15 PM	5/30/19 8:20 PM	0.86	4.1	
	CSO-058	5/30/19 4:20 PM	5/30/19 4:55 PM	0.01	0.6	
	CSO-056A	5/30/19 4:20 PM	5/30/19 5:15 PM	0.04	0.9	
	CSO-057	5/30/19 4:20 PM	5/30/19 5:55 PM	0.10	1.6	
	CSO-059	5/30/19 4:25 PM	5/30/19 5:50 PM	0.06	1.4	
	CSO-002	5/30/19 4:35 PM	5/30/19 6:20 PM	0.28	1.8	
27 <sup>1,2</sup>	LEWS 1055	6/1/19 8:25 PM	6/2/19 9:35 AM	0.13	13.2	0.58
	LEWS 1040	6/1/19 8:40 PM	6/2/19 3:10 AM	0.19	6.5	
	CSO-057	6/1/19 9:00 PM	6/2/19 3:15 AM	0.21	6.3	
	LEWS 1070	6/1/19 9:25 PM	6/2/19 4:05 AM	0.08	6.7	
	RRES 1145	6/1/19 11:50 PM	6/2/19 2:30 AM	0.04	2.7	
	CSO-056B	6/1/19 11:50 PM	6/2/19 2:45 AM	0.51	2.9	
	CSO-055	6/2/19 12:00 AM	6/2/19 1:55 AM	0.05	1.9	
	CSO-056A	6/2/19 12:05 AM	6/2/19 2:35 AM	0.10	2.5	
	CSO-052	6/2/19 12:15 AM	6/2/19 2:15 AM	0.28	2.0	
	CSO-059	6/2/19 12:15 AM	6/2/19 3:10 AM	0.29	2.9	
	CSO-002	6/2/19 12:20 AM	6/2/19 3:50 AM	0.97	3.5	
	LEWS 1045	6/2/19 12:50 AM	6/2/19 2:50 AM	0.03	2.0	
28 <sup>1</sup>	LEWS 1055	6/4/19 10:40 PM	6/5/19 12:40 AM	0.01	2.0	0.15
	LEWS 1040	6/4/19 11:10 PM	6/5/19 12:15 AM	0.03	1.1	
	CSO-057	6/4/19 11:30 PM	6/5/19 12:30 AM	0.02	1.0	

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
29 <sup>1,2</sup>	RRES 1145	6/5/19 8:05 AM	6/5/19 2:05 PM	0.14	6.0	0.81
	LEWS 1040	6/5/19 8:10 AM	6/5/19 10:55 PM	0.38	14.8	
	CSO-056B	6/5/19 8:15 AM	6/5/19 10:25 PM	1.08	14.2	
	LEWS 1070	6/5/19 8:15 AM	6/5/19 11:25 PM	0.16	15.2	
	LEWS 1055	6/5/19 8:15 AM	6/6/19 11:55 AM	0.40	27.7	
	LEWS 1130	6/5/19 8:20 AM	6/5/19 2:10 PM	0.03	5.8	
	CSO-055	6/5/19 8:20 AM	6/5/19 2:20 PM	0.34	6.0	
	CSO-056A	6/5/19 8:20 AM	6/5/19 3:05 PM	0.19	6.8	
	CSO-057	6/5/19 8:25 AM	6/5/19 11:15 PM	0.32	14.8	
	CSO-058	6/5/19 8:30 AM	6/5/19 2:30 PM	0.06	6.0	
	CSO-052	6/5/19 8:30 AM	6/5/19 6:55 PM	0.83	10.4	
	CSO-059	6/5/19 8:35 AM	6/5/19 10:15 PM	0.38	13.7	
	CSO-002	6/5/19 8:35 AM	6/5/19 10:45 PM	1.53	14.2	
	CSO-055	6/5/19 9:10 PM	6/5/19 9:55 PM	0.04	0.8	
	CSO-056A	6/5/19 9:10 PM	6/5/19 10:00 PM	0.03	0.8	
CSO-058	6/5/19 9:20 PM	6/5/19 10:05 PM	0.01	0.8		
30 <sup>1,2</sup>	LEWS 1070	6/10/19 10:25 AM	6/10/19 4:25 PM	0.11	6.0	0.70
	RRES 1145	6/10/19 10:30 AM	6/10/19 1:50 PM	0.05	3.3	
	CSO-056B	6/10/19 10:30 AM	6/10/19 2:55 PM	0.80	4.4	
	LEWS 1040	6/10/19 10:30 AM	6/10/19 5:15 PM	0.27	6.8	
	LEWS 1055	6/10/19 10:30 AM	6/10/19 8:25 PM	0.20	9.9	
	CSO-055	6/10/19 10:35 AM	6/10/19 1:50 PM	0.09	3.3	
	CSO-057	6/10/19 10:40 AM	6/10/19 3:15 PM	0.22	4.6	
	LEWS 1130	6/10/19 11:50 AM	6/10/19 2:05 PM	0.03	2.3	
	CSO-056A	6/10/19 11:50 AM	6/10/19 2:40 PM	0.17	2.8	
	CSO-002	6/10/19 11:50 AM	6/10/19 3:25 PM	1.13	3.6	
	CSO-052	6/10/19 11:50 AM	6/10/19 6:50 PM	0.72	7.0	
	CSO-058	6/10/19 11:55 AM	6/10/19 2:05 PM	0.02	2.2	
	CSO-059	6/10/19 11:55 AM	6/10/19 3:15 PM	0.51	3.3	
LEWS 1045	6/10/19 12:15 PM	6/10/19 3:00 PM	0.05	2.8		
31 <sup>1</sup>	LEWS 1055	6/12/19 10:40 PM	6/13/19 1:55 AM	0.04	3.3	0.30
	LEWS 1070	6/12/19 10:45 PM	6/13/19 1:45 AM	0.03	3.0	
	LEWS 1040	6/12/19 10:55 PM	6/13/19 12:55 AM	0.09	2.0	
	CSO-057	6/12/19 10:55 PM	6/13/19 1:10 AM	0.08	2.3	
	CSO-056B	6/12/19 11:05 PM	6/13/19 12:55 AM	0.15	1.8	
	CSO-052	6/12/19 11:40 PM	6/13/19 12:05 AM	0.04	0.4	
	CSO-002	6/12/19 11:45 PM	6/13/19 1:20 AM	0.22	1.6	

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
32 <sup>1,2</sup>	LEWS 1070	6/13/19 1:25 PM	6/14/19 3:50 AM	0.16	14.4	0.84
	RRES 1145	6/13/19 1:30 PM	6/13/19 2:10 PM	0.02	0.7	
	CSO-056B	6/13/19 1:30 PM	6/13/19 2:15 PM	0.09	0.8	
	LEWS 1040	6/13/19 1:30 PM	6/14/19 2:15 AM	0.40	12.8	
	LEWS 1055	6/13/19 1:30 PM	6/14/19 11:25 AM	0.27	21.9	
	CSO-055	6/13/19 1:40 PM	6/13/19 2:00 PM	0.03	0.3	
	CSO-056A	6/13/19 1:40 PM	6/13/19 2:15 PM	0.02	0.6	
	CSO-059	6/13/19 1:45 PM	6/13/19 2:25 PM	0.01	0.7	
	CSO-057	6/13/19 1:45 PM	6/14/19 1:45 AM	0.39	12.0	
	CSO-052	6/13/19 1:50 PM	6/13/19 2:20 PM	0.09	0.5	
	CSO-056B	6/13/19 8:45 PM	6/14/19 1:10 AM	1.11	4.4	
	CSO-052	6/13/19 8:50 PM	6/14/19 5:55 AM	2.21	9.1	
	CSO-056A	6/13/19 9:00 PM	6/14/19 12:45 AM	0.20	3.8	
	CSO-059	6/13/19 9:00 PM	6/14/19 2:15 AM	0.82	5.3	
	CSO-002	6/13/19 9:10 PM	6/14/19 3:00 AM	1.73	5.8	
	CSO-058	6/13/19 9:15 PM	6/13/19 11:40 PM	0.02	2.4	
	CSO-055	6/13/19 9:25 PM	6/13/19 11:50 PM	0.18	2.4	
	LEWS 1130	6/13/19 9:35 PM	6/13/19 11:25 PM	0.03	1.8	
	RRES 1145	6/13/19 9:35 PM	6/14/19 12:30 AM	0.07	2.9	
	LEWS 1045	6/13/19 9:40 PM	6/14/19 1:00 AM	0.04	3.3	
33 <sup>1,2</sup>	LEWS 1055	6/15/19 1:40 PM	6/17/19 8:25 AM	0.35	42.8	1.06
	LEWS 1040	6/15/19 1:45 PM	6/16/19 3:20 AM	0.13	13.6	
	LEWS 1070	6/15/19 4:20 PM	6/17/19 12:25 AM	0.29	32.1	
	CSO-057	6/15/19 4:40 PM	6/16/19 3:05 AM	0.09	10.4	
	CSO-056B	6/16/19 12:20 AM	6/16/19 2:45 AM	0.08	2.4	
	CSO-002	6/16/19 12:50 AM	6/16/19 4:05 AM	0.45	3.3	
	LEWS 1040	6/16/19 9:50 AM	6/16/19 5:55 PM	0.31	8.1	
	CSO-057	6/16/19 10:25 AM	6/16/19 5:50 PM	0.28	7.4	
	RRES 1145	6/16/19 10:40 AM	6/16/19 2:35 PM	0.08	3.9	
	CSO-056B	6/16/19 10:40 AM	6/16/19 4:55 PM	0.99	6.3	
	LEWS 1130	6/16/19 10:45 AM	6/16/19 2:25 PM	0.02	3.7	
	CSO-055	6/16/19 10:50 AM	6/16/19 2:10 PM	0.14	3.3	
	CSO-056A	6/16/19 10:50 AM	6/16/19 4:15 PM	0.17	5.4	
	CSO-052	6/16/19 10:50 AM	6/16/19 4:40 PM	1.06	5.8	
	CSO-002	6/16/19 10:50 AM	6/16/19 7:35 PM	1.43	8.8	
	CSO-058	6/16/19 10:55 AM	6/16/19 2:50 PM	0.03	3.9	
	CSO-059	6/16/19 10:55 AM	6/16/19 6:05 PM	0.77	7.2	
LEWS 1045	6/16/19 11:10 AM	6/16/19 5:15 PM	0.07	6.1		

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
34 <sup>1,2</sup>	LEWS 1055	6/20/19 1:20 AM	6/21/19 11:25 AM	0.54	34.1	1.30
	CSO-056B	6/20/19 1:35 AM	6/20/19 5:55 AM	0.10	4.3	
	LEWS 1040	6/20/19 1:35 AM	6/20/19 10:40 PM	0.66	21.1	
	CSO-057	6/20/19 1:45 AM	6/20/19 9:55 PM	0.56	20.2	
	RRES 1145	6/20/19 4:55 AM	6/20/19 5:55 AM	0.01	1.0	
	CSO-055	6/20/19 5:05 AM	6/20/19 5:40 AM	0.01	0.6	
	CSO-002	6/20/19 5:20 AM	6/20/19 6:25 AM	0.10	1.1	
	LEWS 1070	6/20/19 1:05 PM	6/21/19 12:55 AM	0.34	11.8	
	RRES 1145	6/20/19 1:10 PM	6/20/19 6:00 PM	0.27	4.8	
	CSO-056B	6/20/19 1:10 PM	6/20/19 9:15 PM	2.49	8.1	
	LEWS 1130	6/20/19 1:15 PM	6/20/19 5:20 PM	0.02	4.1	
	CSO-055	6/20/19 1:15 PM	6/20/19 5:25 PM	0.45	4.2	
	CSO-056A	6/20/19 1:15 PM	6/20/19 8:20 PM	0.45	7.1	
	CSO-052	6/20/19 1:15 PM	6/21/19 2:45 AM	2.86	13.5	
	CSO-058	6/20/19 1:20 PM	6/20/19 6:20 PM	0.09	5.0	
	CSO-059	6/20/19 1:20 PM	6/20/19 10:55 PM	1.57	9.6	
	CSO-002	6/20/19 1:20 PM	6/21/19 12:10 AM	3.10	10.8	
	LEWS 1295	6/20/19 1:25 PM	6/20/19 1:55 PM	0.01	0.5	
	LEWS 1045	6/20/19 2:15 PM	6/20/19 9:00 PM	0.12	6.8	
35 <sup>1,2</sup>	LEWS 1070	6/24/19 2:25 PM	6/24/19 10:30 PM	0.08	8.1	0.60
	LEWS 1040	6/24/19 6:10 PM	6/24/19 9:45 PM	0.31	3.6	
	LEWS 1055	6/24/19 6:10 PM	6/25/19 2:00 AM	0.23	7.8	
	CSO-059	6/24/19 6:25 PM	6/24/19 9:40 PM	0.31	3.3	
	CSO-057	6/24/19 6:30 PM	6/24/19 9:45 PM	0.19	3.3	
	CSO-056B	6/24/19 7:10 PM	6/24/19 9:10 PM	0.53	2.0	
	RRES 1145	6/24/19 7:15 PM	6/24/19 8:35 PM	0.03	1.3	
	CSO-058	6/24/19 7:20 PM	6/24/19 8:35 PM	0.02	1.3	
	CSO-055	6/24/19 7:20 PM	6/24/19 8:45 PM	0.05	1.4	
	CSO-056A	6/24/19 7:20 PM	6/24/19 9:00 PM	0.10	1.7	
	CSO-052	6/24/19 7:20 PM	6/24/19 11:15 PM	1.31	3.9	
	CSO-002	6/24/19 7:25 PM	6/24/19 9:40 PM	0.54	2.3	
	LEWS 1045	6/24/19 7:35 PM	6/24/19 9:20 PM	0.03	1.8	

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
36 <sup>1,2</sup>	LEWS 1040	6/28/19 5:55 PM	6/28/19 7:15 PM	0.10	1.3	0.47
	RRES 1145	6/28/19 6:00 PM	6/28/19 6:35 PM	0.11	0.6	
	CSO-056B	6/28/19 6:00 PM	6/28/19 7:20 PM	0.43	1.3	
	LEWS 1070	6/28/19 6:00 PM	6/28/19 8:15 PM	0.05	2.3	
	LEWS 1055	6/28/19 6:00 PM	6/28/19 10:00 PM	0.22	4.0	
	CSO-055	6/28/19 6:05 PM	6/28/19 6:35 PM	0.12	0.5	
	CSO-056A	6/28/19 6:05 PM	6/28/19 7:10 PM	0.08	1.1	
	CSO-058	6/28/19 6:10 PM	6/28/19 7:00 PM	0.04	0.8	
	CSO-052	6/28/19 6:10 PM	6/28/19 8:15 PM	0.65	2.1	
	CSO-057	6/28/19 6:15 PM	6/28/19 7:40 PM	0.08	1.4	
	CSO-059	6/28/19 6:15 PM	6/28/19 7:45 PM	0.08	1.5	
	CSO-002	6/28/19 6:15 PM	6/28/19 9:55 PM	0.29	3.7	
37 <sup>1</sup>	LEWS 1055	6/29/19 11:55 AM	6/29/19 12:55 PM	0.01	1.0	0.02
38 <sup>1</sup>	LEWS 1040	7/2/19 9:40 PM	7/2/19 10:10 PM	0.02	0.5	0.18
	CSO-056B	7/2/19 9:45 PM	7/2/19 10:05 PM	0.02	0.3	
	LEWS 1055	7/2/19 9:45 PM	7/3/19 4:35 AM	0.02	6.8	
	CSO-057	7/2/19 10:00 PM	7/2/19 10:30 PM	0.01	0.5	
39 <sup>1,2</sup>	LEWS 1040	7/4/19 12:20 PM	7/4/19 2:45 PM	0.11	2.4	0.39
	RRES 1145	7/4/19 12:30 PM	7/4/19 1:10 PM	0.06	0.7	
	CSO-056B	7/4/19 12:30 PM	7/4/19 1:25 PM	0.20	0.9	
	CSO-055	7/4/19 12:35 PM	7/4/19 1:05 PM	0.09	0.5	
	LEWS 1070	7/4/19 12:35 PM	7/4/19 2:20 PM	0.01	1.8	
	CSO-052	7/4/19 12:35 PM	7/4/19 3:25 PM	0.60	2.8	
	LEWS 1055	7/4/19 12:35 PM	7/4/19 3:40 PM	0.14	3.1	
	CSO-056A	7/4/19 12:40 PM	7/4/19 1:25 PM	0.03	0.8	
	CSO-057	7/4/19 12:45 PM	7/4/19 2:05 PM	0.09	1.3	
CSO-058	7/4/19 12:50 PM	7/4/19 1:30 PM	0.01	0.7		
40 <sup>1,2</sup>	LEWS 1040	7/15/19 7:55 PM	7/15/19 8:55 PM	0.18	1.0	0.25
	LEWS 1055	7/15/19 8:00 PM	7/15/19 9:50 PM	0.10	1.8	
	RRES 1145	7/15/19 8:05 PM	7/15/19 8:30 PM	0.04	0.4	
	CSO-056A	7/15/19 8:05 PM	7/15/19 8:40 PM	0.02	0.6	
	CSO-055	7/15/19 8:10 PM	7/15/19 8:40 PM	0.06	0.5	
	CSO-058	7/15/19 8:10 PM	7/15/19 8:40 PM	0.01	0.5	
	CSO-056B	7/15/19 8:10 PM	7/15/19 8:50 PM	0.17	0.7	
	CSO-052	7/15/19 8:10 PM	7/15/19 9:35 PM	0.46	1.4	
CSO-057	7/15/19 8:15 PM	7/15/19 9:20 PM	0.09	1.1		

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
41 <sup>1,2</sup>	LEWS 1040	7/16/19 7:00 PM	7/17/19 4:00 AM	0.23	9.0	0.70
	LEWS 1130	7/16/19 7:10 PM	7/16/19 7:50 PM	0.01	0.7	
	LEWS 1055	7/16/19 7:10 PM	7/17/19 12:05 PM	0.14	16.9	
	CSO-056A	7/16/19 7:15 PM	7/16/19 7:55 PM	0.02	0.7	
	RRES 1145	7/16/19 7:15 PM	7/17/19 2:20 AM	0.02	7.1	
	CSO-055	7/16/19 7:20 PM	7/16/19 7:45 PM	0.03	0.4	
	CSO-056B	7/16/19 7:20 PM	7/17/19 2:35 AM	0.17	7.3	
	CSO-052	7/16/19 7:20 PM	7/17/19 4:45 AM	1.14	9.4	
	CSO-057	7/16/19 7:25 PM	7/17/19 4:10 AM	0.25	8.8	
	CSO-002	7/16/19 8:05 PM	7/16/19 8:45 PM	0.02	0.7	
	LEWS 1040	7/17/19 10:25 AM	7/17/19 11:45 AM	0.05	1.3	
	CSO-052	7/17/19 10:45 AM	7/17/19 12:25 PM	0.14	1.7	
42 <sup>1,2</sup>	LEWS 1040	7/20/19 5:05 AM	7/20/19 6:05 AM	0.06	1.0	0.19
	LEWS 1130	7/20/19 5:10 AM	7/20/19 5:45 AM	0.01	0.6	
	RRES 1145	7/20/19 5:10 AM	7/20/19 5:45 AM	0.02	0.6	
	LEWS 1055	7/20/19 5:10 AM	7/20/19 6:50 AM	0.06	1.7	
	CSO-055	7/20/19 5:15 AM	7/20/19 5:35 AM	0.03	0.3	
	CSO-056A	7/20/19 5:15 AM	7/20/19 5:50 AM	0.02	0.6	
	CSO-056B	7/20/19 5:15 AM	7/20/19 6:00 AM	0.09	0.8	
	CSO-052	7/20/19 5:15 AM	7/20/19 6:45 AM	0.21	1.5	
	CSO-057	7/20/19 5:20 AM	7/20/19 6:30 AM	0.08	1.2	
43 <sup>1,2</sup>	RRES 1145	7/22/19 6:55 AM	7/22/19 8:15 AM	0.02	1.3	0.53
	LEWS 1055	7/22/19 6:55 AM	7/22/19 10:35 AM	0.09	3.7	
	CSO-052	7/22/19 7:00 AM	7/22/19 9:45 AM	0.93	2.8	
	LEWS 1040	7/22/19 7:00 AM	7/22/19 9:45 AM	0.23	2.8	
	LEWS 1070	7/22/19 7:05 AM	7/22/19 10:15 AM	0.05	3.2	
	CSO-055	7/22/19 7:10 AM	7/22/19 7:50 AM	0.02	0.7	
	CSO-056A	7/22/19 7:10 AM	7/22/19 9:10 AM	0.03	2.0	
	CSO-056B	7/22/19 7:10 AM	7/22/19 9:30 AM	0.28	2.3	
	CSO-057	7/22/19 7:10 AM	7/22/19 9:55 AM	0.25	2.8	
	CSO-059	7/22/19 7:25 AM	7/22/19 9:45 AM	0.08	2.3	
	CSO-002	7/22/19 7:35 AM	7/22/19 1:30 PM	0.40	5.9	

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
44 <sup>1,2</sup>	LEWS 1040	8/6/19 11:15 AM	8/6/19 6:55 PM	0.81	7.7	1.54
	RRES 1145	8/6/19 11:20 AM	8/6/19 6:20 PM	0.36	7.0	
	CSO-055	8/6/19 11:25 AM	8/6/19 12:50 PM	0.51	1.4	
	LEWS 1130	8/6/19 11:25 AM	8/6/19 3:15 PM	0.01	3.8	
	LEWS 1055	8/6/19 11:25 AM	8/6/19 8:40 PM	0.49	9.3	
	LEWS 1215	8/6/19 11:30 AM	8/6/19 12:35 PM	0.02	1.1	
	CSO-056A	8/6/19 11:30 AM	8/6/19 4:00 PM	0.16	4.5	
	CSO-056B	8/6/19 11:30 AM	8/6/19 6:50 PM	1.67	7.3	
	CSO-058	8/6/19 11:35 AM	8/6/19 1:05 PM	0.10	1.5	
	CSO-059	8/6/19 11:35 AM	8/6/19 4:30 PM	0.74	4.9	
	LEWS 1070	8/6/19 11:35 AM	8/6/19 9:30 PM	0.15	9.9	
	CSO-002	8/6/19 11:40 AM	8/6/19 4:40 PM	1.57	5.0	
	CSO-057	8/6/19 11:40 AM	8/6/19 7:25 PM	0.51	7.8	
	LEWS 1220	8/6/19 11:45 AM	8/6/19 12:30 PM	0.02	0.8	
	CSO-052	8/6/19 12:00 PM	8/6/19 4:00 PM	1.64	4.0	
LEWS 1045	8/6/19 12:50 PM	8/6/19 4:15 PM	0.03	3.4		
45 <sup>1,2</sup>	RRES 1145	8/17/19 1:15 PM	8/17/19 1:55 PM	0.05	0.7	0.24
	LEWS 1040	8/17/19 1:25 PM	8/17/19 2:05 PM	0.05	0.7	
	LEWS 1055	8/17/19 1:25 PM	8/17/19 2:25 PM	0.11	1.0	
	CSO-055	8/17/19 1:35 PM	8/17/19 1:55 PM	0.06	0.3	
	CSO-056A	8/17/19 1:35 PM	8/17/19 2:00 PM	0.02	0.4	
	CSO-056B	8/17/19 1:35 PM	8/17/19 2:10 PM	0.12	0.6	
	CSO-057	8/17/19 1:35 PM	8/17/19 2:20 PM	0.02	0.8	
	CSO-052	8/17/19 1:35 PM	8/17/19 2:40 PM	0.12	1.1	
46 <sup>1,2</sup>	RRES 1145	8/18/19 4:40 AM	8/18/19 6:05 AM	0.06	1.4	0.48
	LEWS 1040	8/18/19 4:50 AM	8/18/19 6:25 AM	0.28	1.6	
	LEWS 1055	8/18/19 4:50 AM	8/18/19 6:25 AM	0.38	1.6	
	CSO-057	8/18/19 4:55 AM	8/18/19 6:25 AM	0.08	1.5	
	CSO-055	8/18/19 5:00 AM	8/18/19 5:25 AM	0.03	0.4	
	CSO-056B	8/18/19 5:00 AM	8/18/19 6:30 AM	0.17	1.5	
	LEWS 1070	8/18/19 5:00 AM	8/18/19 7:05 AM	0.03	2.1	
	CSO-052	8/18/19 5:05 AM	8/18/19 6:15 AM	0.57	1.2	
	CSO-056A	8/18/19 5:05 AM	8/18/19 6:15 AM	0.02	1.2	
	CSO-059	8/18/19 5:05 AM	8/18/19 6:40 AM	0.03	1.6	
	CSO-002	8/18/19 5:25 AM	8/18/19 6:45 AM	0.02	1.3	



Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
47 <sup>1,2</sup>	RRES 1145	8/18/19 10:35 PM	8/19/19 12:15 AM	0.15	1.7	0.72
	LEWS 1055	8/18/19 10:45 PM	8/19/19 12:45 AM	0.52	2.0	
	LEWS 1040	8/18/19 10:45 PM	8/19/19 1:45 AM	0.58	3.0	
	CSO-055	8/18/19 10:50 PM	8/19/19 12:25 AM	0.18	1.6	
	CSO-057	8/18/19 10:50 PM	8/19/19 12:45 AM	0.12	1.9	
	CSO-056A	8/18/19 10:50 PM	8/19/19 12:50 AM	0.16	2.0	
	LEWS 1130	8/18/19 10:50 PM	8/19/19 1:25 AM	0.02	2.6	
	CSO-056B	8/18/19 10:50 PM	8/19/19 1:45 AM	0.73	2.9	
	CSO-058	8/18/19 10:55 PM	8/19/19 12:35 AM	0.05	1.7	
	CSO-052	8/18/19 10:55 PM	8/19/19 12:55 AM	0.86	2.0	
	LEWS 1070	8/18/19 10:55 PM	8/19/19 2:25 AM	0.09	3.5	
	CSO-059	8/18/19 11:00 PM	8/19/19 1:45 AM	0.35	2.8	
	CSO-002	8/18/19 11:00 PM	8/19/19 2:20 AM	1.12	3.3	
	LEWS 1045	8/18/19 11:35 PM	8/19/19 12:40 AM	0.01	1.1	
48 <sup>1,2</sup>	RRES 1145	8/20/19 6:25 PM	8/20/19 7:00 PM	0.01	0.6	0.07
	CSO-055	8/20/19 6:35 PM	8/20/19 7:00 PM	0.08	0.4	
	CSO-056A	8/20/19 6:40 PM	8/20/19 7:10 PM	0.03	0.5	
	CSO-056B	8/20/19 6:40 PM	8/20/19 7:20 PM	0.14	0.7	
	CSO-052	8/20/19 6:55 PM	8/20/19 7:10 PM	0.01	0.3	
49 <sup>1,2</sup>	RRES 1145	8/22/19 1:25 AM	8/22/19 6:15 AM	0.01	4.8	0.46
	LEWS 1070	8/22/19 1:25 AM	8/22/19 7:45 AM	0.06	6.3	
	LEWS 1055	8/22/19 1:35 AM	8/22/19 6:25 AM	0.01	4.8	
	LEWS 1040	8/22/19 1:40 AM	8/22/19 6:55 AM	0.12	5.3	
	CSO-056B	8/22/19 1:45 AM	8/22/19 7:05 AM	0.43	5.3	
	CSO-057	8/22/19 1:50 AM	8/22/19 6:30 AM	0.02	4.7	
	CSO-052	8/22/19 1:55 AM	8/22/19 6:55 AM	0.37	5.0	
	CSO-055	8/22/19 4:15 AM	8/22/19 5:35 AM	0.08	1.3	
	CSO-056A	8/22/19 4:15 AM	8/22/19 6:50 AM	0.09	2.6	
	CSO-058	8/22/19 4:20 AM	8/22/19 6:05 AM	0.02	1.8	
	CSO-002	8/22/19 4:30 AM	8/22/19 7:35 AM	0.89	3.1	
	LEWS 1045	8/22/19 5:20 AM	8/22/19 6:45 AM	0.02	1.4	
	CSO-059	8/22/19 5:20 AM	8/22/19 7:15 AM	0.14	1.9	
50 <sup>1</sup>	LEWS 1040	8/27/19 2:05 PM	8/27/19 2:45 PM	0.02	0.7	0.19
	CSO-056B	8/27/19 2:10 PM	8/27/19 2:45 PM	0.05	0.6	
	CSO-052	8/27/19 2:25 PM	8/27/19 2:45 PM	0.03	0.3	

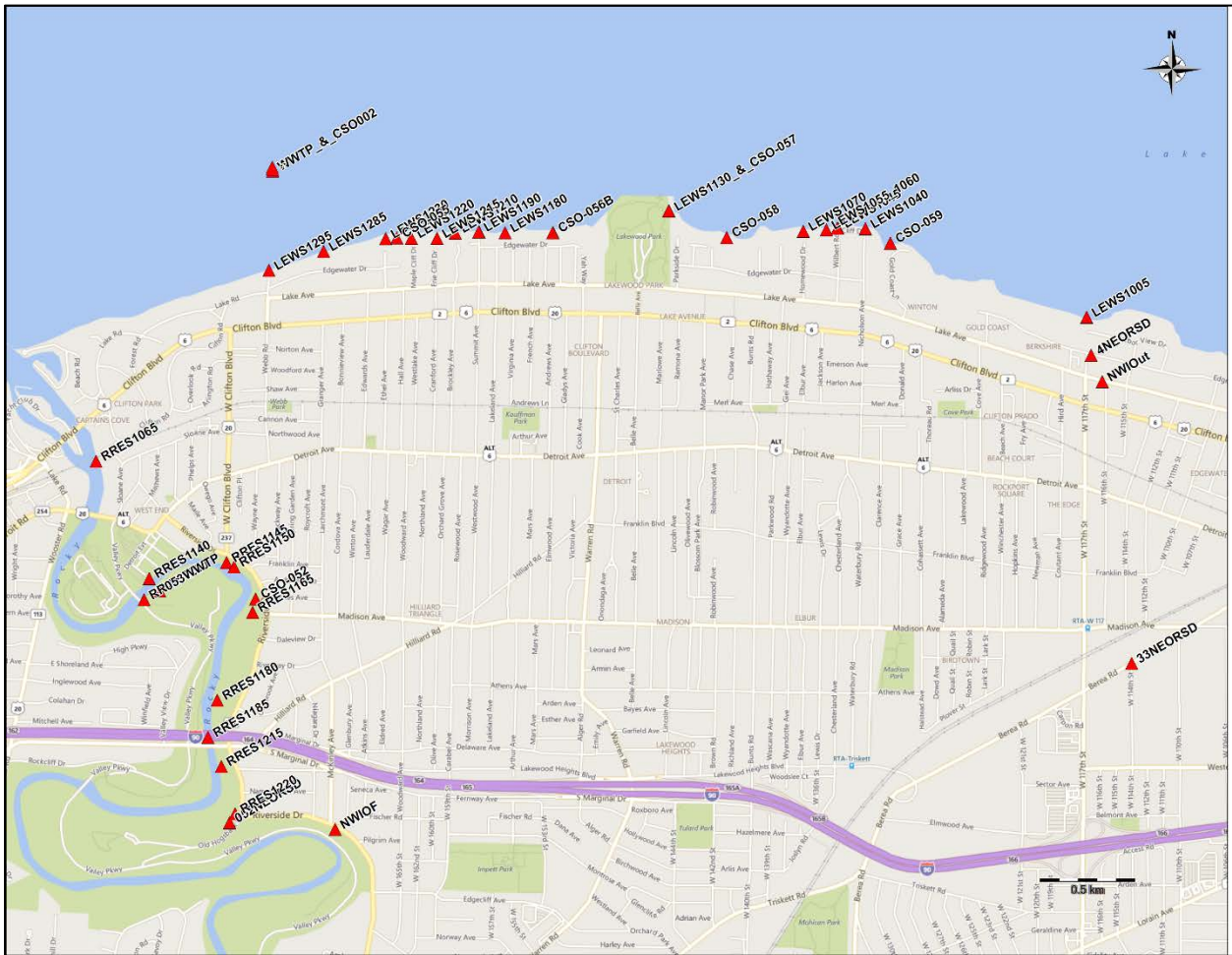
Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
51 <sup>1,2</sup>	LEWS 1040	9/11/19 11:30 PM	9/12/19 12:15 AM	0.04	0.8	0.38
	RRES 1145	9/11/19 11:40 PM	9/12/19 12:05 AM	0.01	0.4	
	CSO-052	9/11/19 11:40 PM	9/12/19 6:15 AM	0.40	6.6	
	CSO-056B	9/11/19 11:50 PM	9/12/19 12:20 AM	0.06	0.5	
52 <sup>1,2</sup>	LEWS 1040	9/13/19 6:55 PM	9/13/19 8:20 PM	0.54	1.4	0.77
	RRES 1145	9/13/19 7:00 PM	9/13/19 7:40 PM	0.09	0.7	
	CSO-055	9/13/19 7:00 PM	9/13/19 8:10 PM	0.10	1.2	
	CSO-002	9/13/19 7:00 PM	9/13/19 8:40 PM	0.44	1.7	
	LEWS 1055	9/13/19 7:05 PM	9/13/19 8:00 PM	0.20	0.9	
	CSO-056A	9/13/19 7:05 PM	9/13/19 8:10 PM	0.08	1.1	
	CSO-056B	9/13/19 7:05 PM	9/13/19 8:20 PM	0.58	1.3	
	LEWS 1070	9/13/19 7:05 PM	9/13/19 9:00 PM	0.04	1.9	
	CSO-059	9/13/19 7:10 PM	9/13/19 8:35 PM	0.12	1.4	
	CSO-052	9/13/19 7:10 PM	9/13/19 10:10 PM	1.29	3.0	
53 <sup>1</sup>	CSO-052	10/2/19 3:15 PM	10/2/19 7:05 PM	0.18	3.8	0.39
	LEWS 1040	10/2/19 3:25 PM	10/2/19 6:45 PM	0.04	3.3	
	LEWS 1055	10/2/19 3:35 PM	10/2/19 6:40 PM	0.01	3.1	
	CSO-056B	10/2/19 3:40 PM	10/2/19 6:45 PM	0.06	3.1	
	CSO-002	10/2/19 6:00 PM	10/2/19 7:05 PM	0.11	1.1	
54 <sup>1</sup>	CSO-052	10/12/19 12:50 AM	10/12/19 4:45 AM	0.07	3.9	0.27
	LEWS 1040	10/12/19 3:15 AM	10/12/19 3:50 AM	0.01	0.6	
55 <sup>1</sup>	CSO-052	10/16/19 4:30 AM	10/16/19 8:40 AM	0.85	4.2	0.52
	LEWS 1055	10/16/19 4:35 AM	10/16/19 7:50 AM	0.02	3.3	
	LEWS 1070	10/16/19 4:35 AM	10/16/19 8:55 AM	0.06	4.3	
	LEWS 1040	10/16/19 4:40 AM	10/16/19 8:10 AM	0.18	3.5	
	CSO-056B	10/16/19 4:50 AM	10/16/19 8:15 AM	0.34	3.4	
	CSO-002	10/16/19 5:55 AM	10/16/19 8:30 AM	0.82	2.6	
	CSO-056A	10/16/19 6:05 AM	10/16/19 8:05 AM	0.08	2.0	
	CSO-059	10/16/19 6:30 AM	10/16/19 8:35 AM	0.26	2.1	
	LEWS 1045	10/16/19 6:35 AM	10/16/19 8:15 AM	0.03	1.7	
56 <sup>1</sup>	LEWS 1070	10/16/19 4:25 PM	10/16/19 9:45 PM	0.04	5.3	0.37
	CSO-052	10/16/19 4:30 PM	10/16/19 10:10 PM	0.34	5.7	
	LEWS 1040	10/16/19 4:40 PM	10/16/19 9:25 PM	0.11	4.8	
	LEWS 1055	10/16/19 6:15 PM	10/16/19 9:20 PM	0.02	3.1	
	CSO-002	10/16/19 6:15 PM	10/16/19 9:45 PM	0.40	3.5	
	CSO-056B	10/16/19 6:20 PM	10/16/19 9:15 PM	0.14	2.9	
	CSO-056A	10/16/19 6:35 PM	10/16/19 7:40 PM	0.02	1.1	
	CSO-059	10/16/19 6:45 PM	10/16/19 9:25 PM	0.09	2.7	

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
57 <sup>1</sup>	LEWS 1070	10/26/19 2:35 PM	10/27/19 2:10 AM	0.15	11.6	0.81
	CSO-052	10/26/19 2:40 PM	10/27/19 3:05 AM	1.05	12.4	
	LEWS 1040	10/26/19 2:55 PM	10/26/19 11:20 PM	0.13	8.4	
	LEWS 1055	10/26/19 3:05 PM	10/26/19 10:35 PM	0.02	7.5	
	CSO-056B	10/26/19 3:10 PM	10/26/19 11:30 PM	0.27	8.3	
	CSO-055	10/26/19 3:15 PM	10/26/19 3:30 PM	0.01	0.3	
	CSO-056A	10/26/19 3:15 PM	10/26/19 11:20 PM	0.04	8.1	
	CSO-059	10/26/19 3:20 PM	10/26/19 11:40 PM	0.18	8.3	
	CSO-002	10/26/19 3:20 PM	10/27/19 1:25 AM	1.82	10.1	
58 <sup>1</sup>	CSO-052	10/30/19 2:05 PM	10/30/19 10:10 PM	0.09	8.1	0.38
59 <sup>1</sup>	CSO-052	10/31/19 8:10 AM	10/31/19 3:20 PM	1.75	7.2	1.21
	LEWS 1070	10/31/19 8:25 AM	11/1/19 5:25 PM	0.35	33.0	
	LEWS 1055	10/31/19 8:30 AM	10/31/19 2:45 PM	0.04	6.3	
	LEWS 1040	10/31/19 8:35 AM	10/31/19 3:20 PM	0.33	6.8	
	CSO-056B	10/31/19 8:50 AM	10/31/19 3:05 PM	0.83	6.3	
	CSO-059	10/31/19 8:50 AM	10/31/19 3:50 PM	0.89	7.0	
	CSO-056A	10/31/19 9:10 AM	10/31/19 2:55 PM	0.21	5.8	
	CSO-002	10/31/19 9:10 AM	10/31/19 3:55 PM	2.50	6.8	
	CSO-055	10/31/19 9:45 AM	10/31/19 2:20 PM	0.02	4.6	
	LEWS 1045	10/31/19 9:45 AM	10/31/19 3:15 PM	0.11	5.5	
	CSO-052	10/31/19 10:10 PM	11/1/19 7:05 AM	0.90	8.9	
	LEWS 1040	10/31/19 10:35 PM	11/1/19 6:15 AM	0.16	7.7	
	CSO-002	10/31/19 11:25 PM	11/1/19 7:05 AM	1.97	7.7	
	CSO-059	10/31/19 11:40 PM	11/1/19 6:05 AM	0.42	6.4	
	CSO-056B	10/31/19 11:50 PM	11/1/19 5:35 AM	0.28	5.8	
	CSO-056A	11/1/19 12:15 AM	11/1/19 5:15 AM	0.06	5.0	
LEWS 1045	11/1/19 12:30 AM	11/1/19 5:40 AM	0.04	5.2		
60 <sup>1,2</sup>	RRES 1145	11/11/19 12:35 PM	11/11/19 11:10 PM	0.05	10.6	0.74
	CSO-052	11/11/19 12:55 PM	11/12/19 12:50 AM	1.43	11.9	
	LEWS 1070	11/11/19 1:25 PM	11/12/19 1:30 AM	0.20	12.1	
	LEWS 1040	11/11/19 1:30 PM	11/11/19 9:45 PM	0.15	8.3	
	CSO-059	11/11/19 1:45 PM	11/11/19 10:35 PM	0.30	8.8	
	CSO-056B	11/11/19 1:50 PM	11/11/19 9:15 PM	0.22	7.4	
	CSO-002	11/11/19 2:15 PM	11/11/19 11:05 PM	1.81	8.8	
	CSO-056A	11/11/19 2:40 PM	11/11/19 9:05 PM	0.04	6.4	
	LEWS 1045	11/11/19 3:05 PM	11/11/19 9:20 PM	0.02	6.3	
61 <sup>1,2</sup>	RRES 1145	11/27/19 1:30 AM	11/27/19 10:10 AM	0.01	8.7	0.21
	CSO-052	11/27/19 1:40 AM	11/27/19 10:25 AM	0.08	8.8	
	LEWS 1040	11/27/19 9:20 AM	11/27/19 9:50 AM	0.01	0.5	

Event	Location	Event Start	Event End	Total Volume (MG)	Duration (Hrs)	Total Rain (in)
62 <sup>1,2</sup>	CSO-052	12/1/19 5:10 AM	12/1/19 6:35 AM	0.23	1.4	0.19
	RRES 1145	12/1/19 5:10 AM	12/1/19 9:15 AM	0.02	4.1	
	CSO-055	12/1/19 5:15 AM	12/1/19 5:40 AM	0.02	0.4	
	CSO-056A	12/1/19 5:20 AM	12/1/19 5:50 AM	0.01	0.5	
	CSO-056B	12/1/19 5:20 AM	12/1/19 5:50 AM	0.04	0.5	
	LEWS 1040	12/1/19 5:20 AM	12/1/19 5:50 AM	0.02	0.5	
63 <sup>1,2</sup>	CSO-052	12/1/19 3:35 PM	12/1/19 7:10 PM	0.40	3.6	0.24
	RRES 1145	12/1/19 3:35 PM	12/1/19 7:50 PM	0.02	4.3	
	LEWS 1040	12/1/19 3:45 PM	12/1/19 5:05 PM	0.05	1.3	
	CSO-056B	12/1/19 3:50 PM	12/1/19 4:30 PM	0.03	0.7	
	CSO-002	12/1/19 4:30 PM	12/1/19 6:20 PM	0.16	1.8	
64 <sup>1</sup>	CSO-052	12/2/19 9:45 AM	12/2/19 12:50 PM	0.01	3.1	0.11
65 <sup>1</sup>	CSO-052	12/9/19 9:35 AM	12/9/19 9:45 PM	0.18	12.2	0.37
	LEWS 1040	12/9/19 10:25 AM	12/9/19 4:40 PM	0.01	6.3	
66 <sup>1</sup>	CSO-052	12/14/19 4:40 AM	12/14/19 2:45 PM	0.71	10.1	0.48
	LEWS 1070	12/14/19 4:55 AM	12/14/19 1:20 PM	0.05	8.4	
	LEWS 1040	12/14/19 7:05 AM	12/14/19 10:25 AM	0.05	3.3	
	CSO-002	12/14/19 8:00 AM	12/14/19 12:50 PM	0.27	4.8	
	CSO-056B	12/14/19 8:40 AM	12/14/19 10:20 AM	0.07	1.7	
	CSO-059	12/14/19 9:15 AM	12/14/19 10:45 AM	0.06	1.5	
67 <sup>1</sup>	CSO-052	12/29/19 8:40 AM	12/29/19 1:50 PM	0.09	5.2	0.22
68 <sup>1</sup>	CSO-052	12/29/19 9:50 PM	12/30/19 1:45 AM	0.24	3.9	0.22
	LEWS 1040	12/29/19 10:45 PM	12/29/19 11:55 PM	0.02	1.2	
	CSO-002	12/30/19 12:35 AM	12/30/19 12:55 AM	0.01	0.3	

<sup>1</sup> Clifton Beach and Edgewater Beach (both Bathing Waters) – potentially-impacted public access area

<sup>2</sup> Rocky River (Primary Contact Recreation) and Rocky River Marina – potentially-impacted public access area



Above is a map of the outfalls.

The City of Lakewood has an Integrated Wet Weather Improvement Plan (IWWIP) that will reduce combined sewer overflow events to four or less in a typical year of rainfall. The plan was submitted to the EPA on March 1, 2019, and currently incorporates: 1) the installation of a high rate treatment (HRT) facility for CSO-002 (currently in construction); 2) combined sewer overflow storage tank projects for CSO-059, RRES-1160 and RRES-1165B which would discharge to the WWTP once the plant has recovered from the rain event; 3) sewer separation projects that reduce infiltration to the sewers at both the public and private levels; and, 4) increasing permeable surfaces where appropriate. The City's IWWIP is continually progressing.

For more information contact Mark Papke, City Engineer, 216.529.6807, [Mark.Papke@lakewoodoh.net](mailto:Mark.Papke@lakewoodoh.net)

The City of Lakewood, operates and maintains its collection system in accordance with the U.S. EPA's 1994 nine minimum controls (*Federal Register / Vol.59, No.75 / Tuesday, April 19, 1994 / Notices* Section II B. page18691). A brief description of the controls and Lakewood's activities for this reporting year follows:

**Control 1—Reducing CSOs Through Operation and Maintenance**

Lakewood continued to implement its operation and maintenance program for the combined sewer collection system, including: cleaning and televising sewer mains, catch basins and manholes.

**Control 2—Storing CSOs in Collection System**

To maximize as much sewage storage as possible in the collection system, the interceptor is filled prior to any CSO discharge. This is routinely done in order to reduce the magnitude, frequency, and duration of CSOs. In 2019 Lakewood modified several overflow structures (raised weirs, etc. ) to store more flow within in the pipes before an overflow occurs.

**Control 3—Optimizing Pretreatment Program**

Lakewood monitored the industrial pretreatment discharges. This was done to minimize CSO pollutants from the discharges of non-domestic users.

**Control 4—Maximizing Flow through the Treatment Plant**

Lakewood continued to operate the WWTP at its maximum treatable flow rate during wet weather flow conditions. This is routinely done to reduce the magnitude, frequency, and duration of CSOs.

**Control 5—Preventing Dry-Weather Overflows**

There were no dry weather overflows at Lakewood's CSO outfalls during this reporting year.

**Control 6—Controlling Solids and Floatables**

Lakewood maintains street sweeping from March-November every year as well as catch basin and sewer main cleaning. Volume over the past year of debris collected was 1,236 cubic yards.

**Control 7—Preventing Pollution of Receiving Water Bodies**

To reduce the impact of CSOs, the first flush during the CSO event(s) is routed to additional treatment capacity at the plant. The City also implements sewer improvement projects as a part of most public works improvements projects. These sewer improvement components include manhole separation and CIPP sewer lining where necessary, which reduce flow communication between "over" and "under" sewers. The City's "under" sewers route to the WWTP, whereas the "over" sewers generally route to receiving waters.

**Control 8—Notifying the Public**

In 2019, a public notification process was continued to inform the EPA, Cuyahoga County Board of Health, and interested citizens when CSOs occur. CSO's are publicly reported here: <http://cso.onelakewood.com/>.

**Control 9—Monitoring CSO Outfalls to Confirm the Effectiveness of CSO Controls**

Lakewood continued to monitor the CSO outfalls to characterize CSO discharges. Monitoring included metering the volume of the CSO discharge, visually inspecting the overflow for floatables, and sampling the initial overflow for pollutant concentrations.