

**CITY OF SPOKANE,
WASHINGTON**

CSO FLOW MONITORING PROJECT

FLOW, FREQUENCY AND DURATION

SEWER MAINTENANCE

**Monthly Report
May 2019**

June 7, 2019
CSOMonthly2019-05.docx

OVERFLOW EVENTS

Table 1 – Flow-Frequency-Duration, provides a summary of the flow volume calculated for the overflow pipes at each site for each event recorded. The flow calculations are based on flow monitor recorded level and velocity measurements.

Table 1 – Flow-Frequency-Duration

Line No.	Regulator Location	CSO No.	Freq.	Date of event ¹	Estimated Total Flow (Gallons) ²	Event Duration (Min. of Overflow)	Comments
1	AL Parkway Storage (West)	2	None				
2	NW Blvd @ Kiernan	6	1	Total	1,989,917	840	
				05/16	1,989,917	840	
3	Columbia @ Downriver	7	1	Total	74,368	55	
				05/16	74,368	55	
4	Nettleton @ York/Buckeye	10	None				Missing data 05/17 00:50 to 05/17 00:55 Missing data 05/17 01:30 to 05/17 01:35 Missing data 05/17 02:35 to 05/17 02:55 Missing data 05/17 03:15 to 05/17 03:20 Missing data 05/17 03:35 to 05/17 03:40 Missing data 05/17 04:00 to 05/17 04:10 Missing data 05/17 04:25 to 05/17 04:30 Missing data 05/17 04:35 to 05/17 04:40 Missing data 05/17 04:45 to 05/17 04:55 Missing data 05/17 05:20 to 05/17 05:25 Missing data 05/17 06:40 to 05/17 06:45
5	Nora @ Pettet	12	1	Total	1,722,421	1,085	
				05/16	1,722,421	1,085	
6	Sherwood @ Summit	14	1	Total	16,550	20	Missing data 05/13 08:55 to 05/13 09:00 Missing data 05/19 20:00 to 05/19 20:05
				05/16	16,550	20	
7	Nettleton @ Ohio	15	None				Missing data 05/13 09:50 to 05/13 09:55

¹ Designation as an event means that both a level and velocity reading were recorded concurrently. Not all level and velocity readings that were coincident are included in this report, however. The level and velocity readings that appear to be “background noise” from the electronic equipment are not included in the table.

² The flows presented in this column are calculated from measurements of velocity and depth of flow by electronic devices inserted in the water stream. These measurements are subject to singular and possibly cumulative errors. These errors result from limitations inherent in the measuring devices and from the introduction of a measuring device in to the physical flow stream. Also, error in velocity and depth measurements may be and typically are introduced by the physical conditions of each site. The flow numbers presented in this table are estimates only.

Line No.	Regulator Location	CSO No.	Freq.	Date of event ¹	Estimated Total Flow (Gallons) ²	Event Duration (Min. of Overflow)	Comments
8	A @ Linton	16B	None				Missing data 05/13 12:55 to 05/13 13:05
9	7th @ Inland Empire	19	1	Total	17,344	15	
				05/16	17,344	15	
10	3500 High Drive	20	None				
11	Main @ Oak	22B	1	Total	524,223	35	Missing data 05/09 08:40 to 05/09 08:45 Missing data 05/18 20:00 to 05/18 20:05 Missing data 05/18 22:00 to 05/18 22:05 Missing data 05/19 02:00 to 05/19 02:05 Missing data 05/19 04:00 to 05/19 04:05 Missing data 05/19 06:00 to 05/19 06:05 Missing data 05/19 08:00 to 05/19 08:05 Missing data 05/19 10:00 to 05/19 10:05 Missing data 05/19 12:00 to 05/19 12:05 Missing data 05/19 14:00 to 05/19 14:05 Missing data 05/19 16:00 to 05/19 16:05 Missing data 05/19 18:00 to 05/19 18:05 Missing data 05/19 20:00 to 05/19 20:05 Missing data 05/19 22:00 to 05/19 22:05 Missing data 05/20 02:00 to 05/20 02:05
				05/16	524,223	35	
12	Cedar @ Summit	23-1	1	Total	31,395	40	Missing data 05/03 12:40 to 05/03 12:45 Missing data 05/16 07:55 to 05/16 08:00
				05/16	31,395	40	
15	1st @ Adams	24-1	1	Total	5,243,278	1,030	
				05/16	5,243,278	1,030	
16	Cedar @ Main	25	1	Total	61,746	50	Missing data 05/17 18:40 to 05/17 18:45 Missing data 05/17 22:30 to 05/17 22:35
				05/16	61,746	50	
17	Riverside @ Lincoln	26	3	Total	6,829,887	1,115	Missing data 05/24 13:00 to 05/24 13:15 Missing data 05/29 00:00 to 05/29 00:05
				05/16	6,688,830	1,075	Volume estimated due to vault surcharge
				05/24	128,952	20	
				05/26	12,105	20	
19	Arthur @ 3rd	33C	1	Total	1,691	70	
				05/16	1,691	70	
20	Liberty Park (west end)	33-1	1	Total	925,841	330	Missing data 05/17 21:05 to 05/17 21:10 Missing data 05/17 21:35 to 05/17 21:40 Missing data 05/18 11:55 to 05/18 12:00
				05/17	925,841	330	

Line No.	Regulator Location	CSO No.	Freq.	Date of event ¹	Estimated Total Flow (Gallons) ²	Event Duration (Min. of Overflow)	Comments
21	Sprague Ave @ Sprague Wy	33-2	None				
22	Riverside @ Napa/Crestline	34	1	Total	15,148	30	Missing data 05/07 07:55 to 05/07 08:00
				05/16	15,148	30	
23	S. Riverton @ Magnolia	38-1	None				
24	Rebecca @ Upriver	41	1	Total	80,680	55	
				05/16	80,680	55	
25	Riverton @ Surro	42	None				
26	RPWRF CSO-Related Bypass	N/A	None				Permit Section S13.H
	Monthly Total		16		17,534,489	4,770	No Dry Weather Overflows No RPWRF CSO-Related Bypasses

Table 2 – Rainfall Summary³

Date	343 Rain	344 Rain	Shadle Rain	Hartson Rain	CityHall Rain	Joe_Albi Rain	RkwdVsta Rain	Station8 Rain	W_Drive Rain	Nora&Pet Rain	Lincoln Rain	Northeast Rain	Crest&Hoff Rain	GEG Rain	Snow	Dpth	NWS Rain	Snow	Dpth	SFF Rain
05/01/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/02/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/03/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/04/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/05/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/06/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-
05/07/19	-	-	-	-	0.01	-	-	-	-	-	-	-	-	0.04	-	-	0.09	-	-	-
05/08/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/09/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/10/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/11/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/12/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/13/19	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/14/19	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	0.02	-	-	T
05/15/19	-	0.01	0.01	-	0.01	0.02	-	0.02	0.05	0.02	0.01	0.01	0.02	0.03	-	-	0.01	-	-	T
05/16/19	1.00	0.74	1.12	1.21	1.30	0.84	1.59	1.30	1.39	1.25	1.27	0.94	1.22	0.27	-	-	0.23	-	-	0.83
05/17/19	1.57	1.19	1.31	1.41	1.32	1.27	2.10	1.39	1.14	1.39	0.98	0.94	0.67	0.80	-	-	0.84	-	-	1.22
05/18/19	0.07	0.04	0.03	0.05	0.04	0.04	0.06	0.06	0.03	0.03	0.07	0.08	0.04	0.03	-	-	0.01	-	-	0.15
05/19/19	-	-	-	-	-	-	-	-	-	-	-	-	-	T	-	-	-	-	-	-
05/20/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/21/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/22/19	-	-	-	-	-	-	-	P	-	-	-	-	-	-	-	-	-	-	-	-
05/23/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/24/19	0.03	-	0.19	0.03	0.23	0.37	0.03	0.45	0.05	0.10	0.75	0.20	0.19	T	-	-	0.06	-	-	0.55
05/25/19	0.05	0.05	0.04	0.09	0.06	0.03	0.10	0.06	0.05	0.08	0.04	0.02	0.04	0.04	-	-	0.06	-	-	0.05
05/26/19	0.14	0.12	0.09	0.11	0.11	0.09	0.18	0.10	0.11	0.10	0.07	0.10	0.07	0.11	-	-	0.15	-	-	0.08
05/27/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/28/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/29/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
05/30/19	-	-	-	-	-	-	-	-	-	-	-	-	-	0.03	-	-	T	-	-	-
05/31/19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	2.86	2.15	2.79	2.90	3.09	2.66	4.06E	3.38P	2.82	2.97	3.19	2.29	2.25	1.35	0.00		1.47	0.00		2.88

E – Erroneous data

M – Missing Data

P – Partial Missing data

T – Trace of rain/snow

X – Out of Service

³ Some rain gauges are heated. Consequently, they will tend to record snow melt immediately as rain. The rain gauges that are not heated will typically register snow melt when it actually melts.

Table 3 – Rain Gauges

343	23 rd & Ray
344	Division & Manito
Shadle	Shadle Water Tower (was 345)
Hartson	Ray & Hartson (was 346)
CityHall	City Hall (was 347)
Joe Albi	Joe Albi Stadium
RkwdVsta	Rockwood Vista
Station8	Fire Station 8, Rebecca & Mission
W_Drive	West Drive Reservoir
Nora&Pet	Nora & Pettet
Lincoln	Lincoln Rd Lift Station
Northeast	Northeast Lift Station
Crest&Hoff	Crestline & Hoffman
GEG	Spokane Airport
NWS	National Weather Service – Spokane
SFF	Spokane Felts Field