

**CITY OF SPOKANE,
WASHINGTON**

CSO FLOW MONITORING PROJECT

FLOW, FREQUENCY AND DURATION

SEWER MAINTENANCE

**Monthly Report
November 2011**

January 6, 2011
CSOMonthly2011-11

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. See Attachment A for a summary of the precipitation volumes.

Table 1 – Flow-Frequency-Duration

Line	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	2	Total	105,221	165	Missing Data 11/02 07:00 to 11/02 07:05 Missing Data 11/12 02:00 to 11/12 02:05 Missing Data 11/21 15:00 to 11/21 15:05
				11/17	86,220	125	
				11/24	19,001	40	
3	Columbia @ Downriver	7	None				
4	Nettleton @ York/Buckeye	10	None				Missing Data 11/08 15:35 to 11/08 16:30 Missing Data 11/18 11:10 to 11/18 11:15
5	Nora @ Pettet	12	None				Missing Data 11/03 18:00 to 11/03 18:05 Missing Data 11/07 17:35 to 11/07 17:40 Missing Data 11/07 21:35 to 11/07 21:40 Missing Data 11/08 05:35 to 11/08 05:40 Missing Data 11/08 13:35 to 11/08 13:40 Missing Data 11/08 17:35 to 11/08 17:40 Missing Data 11/09 05:35 to 11/09 05:40 Missing Data 11/09 09:35 to 11/09 09:40 Missing Data 11/11 23:00 to 11/11 23:05 Missing Data 11/20 17:00 to 11/20 17:05 Missing Data 11/25 06:50 to 11/25 06:55 Missing Data 11/29 22:00 to 11/29 22:05
6	Sherwood @ Summit	14	None				Missing Data 11/17 08:05 to 11/20 08:55 Missing Data 11/20 15:00 to 11/20 15:05 Missing Data 11/26 17:00 to 11/26 17:05
7	Nettleton @ Ohio	15	None				
8	A @ Linton	16B	None				Missing Data 11/28 09:25 to 11/28 09:30
9	7th @ Inland Empire	19	None				Missing Data 11/05 03:25 to 11/05 03:30 Missing Data 11/21 23:20 to 11/21 23:25 Missing Data 11/24 14:35 to 11/24 14:40

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	Regulator Location	CSO No.	Freq	Date of event ¹	Estimated Total Flow (Gallons) ²	Event Duration (Min. of Overflow)	Comments
10	3500 High Drive	20	None				Missing Data 11/28 08:00 to 11/28 08:05
11	Main @ Oak	22B	None				Missing Data 11/28 07:40 to 11/28 07:45
12	Cedar @ Ide	23	None				Missing Data 11/28 08:55 to 11/28 09:00
13	Riverside @ Cedar (West)	24A	2	Total	27,883	350	Missing Data 11/28 07:50 to 11/28 07:55
				11/17	16,579	100	
				11/21	11,304	250	
14	Riverside @ Cedar (East)	24B	None				Missing Data 11/28 07:45 to 11/28 07:50
15	Cedar @ Main	25	1	Total	758	15	
				11/17	758	15	
16	Riverside @ Lincoln	26	2	Total	93,679	85	Missing Data 11/28 09:00 to 11/28 09:05
				11/17	54,772	45	
				11/21	38,907	40	
17	Arthur @ 5th	33A	None				Missing Data 11/28 08:20 to 11/28 08:25
18	Perry @ 3rd	33B	None				
19	Arthur @ 3rd	33C	None				
20	Arthur @ 1st	33D	2	Total	9,360	115	
				11/17	3,668	20	
				11/21	5,692	95	
21	Riverside @ Napa/Crestline	34	2	Total	9,581	270	Missing Data 11/04 10:00 to 11/04 12:25 Missing Data 11/04 13:05 to 11/04 13:25 Missing Data 11/04 13:35 to 11/04 13:40 Missing Data 11/12 07:00 to 11/12 07:05 Missing Data 11/19 15:00 to 11/19 15:05 Missing Data 11/26 17:00 to 11/26 17:05
				11/17	1,028	100	
				11/24	8,553	170	
22	S. Riverton @ Magnolia	38	None				Missing Data 11/28 08:05 to 11/28 08:10
23	S. Riverton @ Altamont	39	None				Missing Data 11/21 11:50 to 11/21 11:55 Missing Data 11/28 17:15 to 11/28 17:20 Missing Data 11/29 09:20 to 11/29 09:25 Missing Data 11/30 13:40 to 11/30 13:45
24	S. Riverton @ Regal	40	None				
25	Rebecca @ Upriver	41	None				Missing Data 11/28 07:55 to 11/28 08:00
26	Riverton @ Surro	42	None				Missing Data 11/01 13:15 to 11/01 13:20 Missing Data 11/01 13:40 to 11/01 13:45 Missing Data 11/13 06:00 to 11/13 06:05
	Monthly Total		11		246,482	1,000	No Dry Weather Overflows

Table 2 – Rainfall Summary³

	1004	343	344	Shadle	Hartson	CityHall	Joe_Albi	RkwdVsta	Station8	W_Drive	Nora&Pet	GEG			NWS			SFF	
Date	Rain	Rain	Rain	Rain	Rain	Rain	Rain	Rain	Rain	Rain	Rain	Rain	Snow	Dpth	Rain	Snow	Dpth	Rain	
11/01/11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/02/11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11/03/11	0.06	0.03	0.03	0.04	0.01	0.02	0.03	0.02	0.02	0.04	0.06	0	0	0.03	0	0	0	0.02	
11/04/11	0.01	0	0	0	0	0	0	0	0	0	0.01	T	0	0	T	0	0	0	
11/05/11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11/06/11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11/07/11	0	0	0	0	0	0	0	0	0	0	0	T	0	0	T	0	0	0	
11/08/11	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11/09/11	0.01	0.01	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11/10/11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11/11/11	0.05	0.11	0.12	0.01	0.09	0.04	0.03	0.06	0.08	0.03	0.06	0.04	T	0	0.04	T	0	0.08	
11/12/11	0.03	0.21	0.12	0.09	0.21	0.16	0.21	0.16	0.18	0.18	0.22	0.25	1.7	1	0.2	1.6	1	0.2	
11/13/11	0	0.09	0.09	0	0	0	0	0	0	0	0	T	T	T	T	T	0	0	
11/14/11	0	0	0	0	0	0	0	0	0	0	0	T	T	0	T	T	0	T	
11/15/11	0	0	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11/16/11	0.06	0.1	0.08	0.08	0.05	0.1	0.08	0.12	0.02	0.09	0.13	0.12	0.3	0	0.15	0.2	0	0.05	
11/17/11	0.16	0.19	0.19	0.12	0.41	0.19	0.23	0.18	0.15	0.18	0.56	0.18	T	0	0.21	T	T	0.17	
11/18/11	0.06	0.07	0.03	0.11	0.11	0.2	0.37	0.09	0.11	0.18	0.19	0.21	3	1	0.15	1.8	2	0.14	
11/19/11	0	0	0	0	0.03	0.04	0.01	0	0.04	0.02	0	0.05	0.8	3	0.01	0.3	1	0.05	
11/20/11	0	0	0	0	0	0	0	0	0	0	0	T	0.1	3	T	T	1	T	
11/21/11	0.18	0.54	0.4	0.23	0.18	0.15	0.14	0.34	0.14	0.13	0.36	0.2	0.2	3	0.22	0.3	1	0.13	
11/22/11	0.25	0.29	0.28	0.11	0.27	0.25	0.23	0.3	0.25	0.3	0.34	0.33	0	0	0.37	0	0	0.24	
11/23/11	0.14	0.14	0.11	0.06	0.14	0.09	0.11	0.12	0.1	0.12	0.14	0.13	0	0	0.11	0	0	0.12	
11/24/11	0.12	0.21	0.14	0.08	0.2	0.12	0.11	0.18	0.13	0.13	0.15	0.16	0.4	0	0.14	0.2	0	0.15	
11/25/11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	T	T	0	0	
11/26/11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	T	T	0	0	
11/27/11	0	0.00	0	0.00	0	0	0	0	0	0	0	T	0	0	T	0	0	T	
11/28/11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11/29/11	0.01	0	0	0	0	0	0	0	0	0	0	T	0	0	T	0	0	T	
11/30/11	0	0	0	0	0	0	0	0	0	0	0	T	0.1	0	T	0.1	T	0.01	
Total	1.15	1.99	1.59	0.93	1.7	1.36	1.55	1.57	1.2	1.38	2.2	1.73	6.6		1.63	4.5		1.36	

- E - Erroneous data
- M - Missing data
- P - Partial missing data
- T - Trace of rain/snow
- X - Out of Service

Table 3 – Rain Gauges

1004	Airway Heights
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
GEG	Spokane Airport
NWS	National Weather Service – Spokane
SFF	Spokane Felts Field

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.