

**CITY OF SPOKANE,
WASHINGTON**

CSO FLOW MONITORING PROJECT

FLOW, FREQUENCY AND DURATION

SEWER MAINTENANCE

**Monthly Report
September 2009**

November 18, 2009
CSOMonthly2009-09.doc

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

	Location	CSO#	Freq.	Date of Event ¹	Estimated ² Total Flow (Gallons)	Event Duration (Minutes)	Comments
1.	AL Parkway Storage (West)	2	None				
2.	NW Blvd @ Kiernan	6	1	Total	213,971	130	Missing data 9/10 10:50 to 9/10 13:05 Missing data 9/10 13:10 to 9/10 13:15
				9/17	213,971	130	
3.	Columbia @ Downriver	7	1	Total	53,600	50	
				9/17	53,600	50	
4.	Nettleton @ York/Buckeye	10	1	Total	6,550	105	
				9/17	6,550	105	
5.	Nora @ Pettet	12		Total	431,714	205	
				9/6	3,108	50	
				9/17	428,606	155	
6.	Sherwood @ Summit	14	None				
7.	Nettleton @ Ohio	15	1	Total	38,965	95	
				9/17	38,965	95	
8.	A @ Linton	16B	None				
9.	7 th @ Inland Empire	19	None				Missing data 9/14 08:05 to 9/14 08:10
10.	3500 High Drive	20	None				Missing data 9/11 13:50 to 9/11 15:30 Missing data 9/14 08:10 to 9/14 08:15
11.	Main @ Oak	22B	None				Missing data 9/20 13:55 to 9/25 15:20

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.

	Location	CSO#	Freq.	Date of Event ¹	Estimated ² Total Flow (Gallons)	Event Duration (Minutes)	Comments
12.	Cedar @ Ide	23	1	Total	91,115	120	
				9/17	91,115	120	
13.	Riverside @ Cedar	24A	1	Total	764,527	180	Missing data 9/10 14:30 to 9/10 14:55 Missing data 9/30 09:30 to 9/30 15:35
				9/17	764,527	180	
14.	Riverside @ Cedar	24B	1	Total	2,326	50	Missing data 9/30 09:00 to 9/30 15:00
				9/17	2,326	50	
15.	Cedar @ Main	25	1	Total	200,389	105	
				9/17	200,389	105	
16.	Riverside @ Lincoln	26	1	Total	1,379,914	145	
				9/17	1,379,914	145	
17.	Arthur @ 5 th	33A	1	Total	1,261	55	Missing data 9/14 09:45 to 9/14 09:50
				9/17	1,261	55	
18.	Perry @ 3 rd	33B	1	Total	136,557	15	Missing data 9/14 09:10 to 9/14 09:15
				9/17	136,557	15	
19.	Arthur @ 3 rd	33C	1	Total	1,071	35	Missing data 9/14 09:15 to 9/14 09:20
				9/17	1,071	35	
20.	Arthur @ 1 st	33D	1	Total	34,577	150	Missing data 9/14 09:30 to 9/14 09:35
				9/17	34,577	150	
21.	Riverside @ Napa/Crestline	34	1	Total	6,576	60	Missing data 9/14 09:00 to 9/14 09:05
				9/17	6,576	60	
22.	S. Riverton @ Magnolia	38	1	Total	595	100	Missing data 9/14 08:55 to 9/14 09:00
				9/17	595	100	
23.	S. Riverton @ Altamont	39	None				Missing data 9/14 08:45 to 9/14 08:50 Missing data 9/18 14:50 to 9/18 16:00 Missing data 9/28 14:05 to 9/28 15:35 Missing data 9/30 10:15 to 9/30 11:05
24.	S. Riverton @ Regal	40	None				Missing data 9/14 08:35 to 9/14 08:45
25.	Rebecca @ Upriver	41	1	Total	125	20	Missing data 9/14 08:25 to 9/14 08:30
				9/17	125	20	
26.	Riverton @ Surro	42	None				Missing data 9/14 08:15 to 9/14 08:20
	Monthly Total		18		3,363,833	1,620	No Dry Weather Overflows

Table 2 – Rainfall Summary³

Date	1004 Rain	343 Rain	344 Rain	Shadle Rain	Hartson Rain	CityHall Rain	Joe_Albi Rain	RkwdVsta Rain	Station8 Rain	W_Drive Rain	Nora&Pet Rain	GEG Rain	Snow	Dpth	NWS Rain	Snow	Dpth
09/01/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/02/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/03/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	T	0	0
09/04/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/05/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/06/09	0.1	0.15	0.08	0.2	0.15	0.25	0.1	0.13	0.24	0.23	0	0.1	0	0	0.15	0	0
09/07/09	0.02	0.01	0	0	0.01	0	0.01	0.01	0.01	0	0	T	0	0	0.07	0	0
09/08/09	0	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0
09/09/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/10/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/11/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/12/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/13/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/14/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/15/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/16/09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09/17/09	0.48	0.19	0.29	X	0.22	0.66	0.47	0.36	0.36	0.75	0	0.38	0	0	0.19	0	0
09/18/09	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
09/19/09	0.01	0	0	X	0	0	0	0	0	0.01	0	0.01	0	0	T	0	0
09/20/09	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
09/21/09	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
09/22/09	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
09/23/09	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
09/24/09	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
09/25/09	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
09/26/09	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
09/27/09	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
09/28/09	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
09/29/09	0	0	0	X	0	0	0	0	0	0	0	0	0	0	T	0	0
09/30/09	0	0	0	X	0	0	0	0	0	0	0	T	0	0	0	0	0
Total	0.61	0.35	0.37	3.6	0.38	0.91	0.58	0.5	0.61	0.99	0	0.00	0.0		0.00	0.0	

- 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

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.