

**CITY OF SPOKANE,
WASHINGTON**

CSO FLOW MONITORING PROJECT

FLOW, FREQUENCY AND DURATION

SEWER MAINTENANCE

**Monthly Report
April 2008**

June 4, 2008
CSOMonthly2008-04.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				Missing data 4/30 15:25 to 4/30 15:30
2.	NW Blvd @ Kiernan	6	2	Total	5,637	185	Missing data 4/7 11:00 to 4/7 11:05 Missing data 4/21 09:05 to 4/21 09:10
				4/14	851	105	
				4/23	4,786	80	
3.	Columbia @ Downriver	7	None				Missing data 4/7 10:35 to 4/7 10:45
4.	Nettleton @ York/Buckeye	10	None				Missing data 4/7 11:30 to 4/7 11:35
5.	Nora @ Pettet	12	3	Total	12,472	535	
				4/5	891	140	
				4/14	7,280	210	
				4/23	4,301	185	
6.	Sherwood @ Summit	14	2	Total	1,574	120	
				4/6	574	30	
				4/14	1,000	90	
7.	Nettleton @ Ohio	15	None				
8.	A @ Linton	16B	None				Missing data 4/30 15:35 to 4/30 15:45
9.	7 th @ Inland Empire	19	None				Missing data 4/14 09:30 to 4/14 09:35
10.	3500 High Drive	20	None				Missing data 4/14 09:45 to 4/14 09:50

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
11.	Main @ Oak	22B	None				Missing data 4/7 15:20 to 4/7 15:25
12.	Cedar @ Ide	23	3	Total	17,223	135	Missing data 4/24 13:20 to 4/24 14:30 Missing data 4/25 09:10 to 4/25 09:50
				4/6	16,815	45	
				4/14	269	60	
				4/23	139	30	
13.	Riverside @ Cedar	24A	3	Total	12,395	225	Missing data 4/7 14:55 to 4/7 15:00
				4/6	4,400	35	
				4/14	5,708	145	
				4/23	2,287	45	
14.	Riverside @ Cedar	24B	1	Total	523	20	
				4/6	523	20	
15.	Cedar @ Main	25	3	Total	23,631	210	Missing data 4/7 15:30 to 4/7 15:35
				4/4	21,171	125	
				4/14	1,183	45	
				4/23	1,277	40	
16.	Riverside @ Lincoln	26	3	Total	571,700	365	Missing data 4/7 13:45 to 4/9 14:05
				4/6	209,269	105	
				4/14	250,536	175	
				4/23	111,895	85	
17.	Arthur @ 5 th	33A	None				Missing data 4/14 15:00 to 4/14 15:05
18.	Perry @ 3 rd	33B	None				
19.	Arthur @ 3 rd	33C	None				Missing data 4/15 07:55 to 4/15 08:05
20.	Arthur @ 1 st	33D	2	Total	1,157	65	Missing data 4/15 08:05 to 4/15 08:15
				4/14	292	20	
				4/23	865	45	
21.	Riverside @ Napa/Crestline	34	2	Total	273,374	220	Missing data 4/14 14:20 to 4/14 14:30
				4/14	273,135	195	
				4/23	239	25	
22.	S. Riverton @ Magnolia	38	1	Total	4,069	120	Missing data 4/14 14:10 to 4/14 14:15
				4/6	4,069	120	
23.	S. Riverton @ Altamont	39	1	Total	1,270	25	Missing data 4/14 14:00 to 4/14 14:10 Missing data 4/29 11:05 to 4/29 11:10
				4/6	1,270	25	

April 2008

	Location	CSO#	Freq.	Date of Event ¹	Estimated ² Total Flow (Gallons)	Event Duration (Minutes)	Comments
24.	S. Riverton @ Regal	40	1	Total	6,793	90	Missing data 4/14 13:55 to 4/14 14:00
				4/6	6,793	90	
25.	Rebecca @ Upriver	41	1	Total	35,485	70	Missing data 4/14 13:45 to 4/14 13:50
				4/6	35,485	70	
26.	Riverton @ Surro	42	None				Missing data 4/14 13:30 to 4/14 13:35
	Monthly Total		28		967,303	2,385	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
04/01/08	0.01	0	0	X	0	0	0	0	0	0	0	0	0	0	T	T	1
04/02/08	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	T
04/03/08	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
04/04/08	0.08	0.17	0.03	X	0.16	0.07	0.06	0.08	0.11	0.08	0.07	0.1	0.1	0	0.05	0.2	0
04/05/08	0.05	0.3	0.09	X	0.24	0.12	0.2	0.15	0.35	0.17	0.21	0.04	1.5	0	0.18	1.8	T
04/06/08	0.15	0.22	0.08	X	0.18	0.61	0.11	0.22	0.22	0.23	0.17	0.18	0.1	0	0.16	T	0
04/07/08	0.01	0	0	X	0	0	0.1	0	0.02	0.01	OP	0.01	T	0	T	T	0
04/08/08	0.06	0.08	0.02	X	0.09	0.01	0.11	0.01	0.09	0.02	0.04	0.09	T	0	0.18	0.6	T
04/09/08	0.02	0.02	0.01	X	0.01	0	0	0	0	0	0.01	T	T	0	0.05	0.2	T
04/10/08	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
04/11/08	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
04/12/08	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
04/13/08	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
04/14/08	0.3	0.42	0.2	X	0.48	0.32	0.31	0.28	0.42	0.4	0.36	0.3	0	0	0.29	0	0
04/15/08	0	0	0	X	0	0	0.04	0	0.01	0	0.02	T	T	0	0.04	0.3	T
04/16/08	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
04/17/08	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
04/18/08	0	0	0	X	0	0	0	0	0	0	0	0.01	0.4	0	0.02	0.1	0
04/19/08	0	0	0	X	0	0	0	0	0	0	0	T	T	0	T	T	T
04/20/08	0.03	0	0	X	0	0	0	0	0	0	0	0.07	1.3	0	0.03	0.9	0
04/21/08	0.02	0.04	0.02	X	0.01	0.01	0.01	0.03	0.01	0.03	0	0.09	0.7	T	0.08	0.8	T
04/22/08	0	0	0	X	0	0	0	0	0	0	0	T	0	0	T	0	0
04/23/08	0.1	0.16	0.09	X	0.14	0.18	0.12	0.15	0.19	0.2	0.23	0.23	0.3	T	0.12	0	0
04/24/08	0.01	0	0	X	0	0	0	0	0	0	0	0.01	0	0	T	0	0
04/25/08	0	0	0	X	0	0	0	0	0	0	0	T	T	0	T	T	0
04/26/08	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
04/27/08	0	0	0	X	0	0	0	0	0	0	0	0	0	0	0	0	0
04/28/08	0	0	0	X	0	0.01	0	0	0	0.03	0.03	0.02	0	0	T	0	0
04/29/08	0	0	0	X	0	0	0	0	0	0	0	T	0	0	T	0	0
04/30/08	0.15	0.02	0.05	X	0.07	0.02	0	0.01	0.02	0.11	0.02	0.12	0.4	0	T	T	0
Total	0.99	1.43	0.59	0	1.38	1.35	1.06	0.93	1.44	1.28	1.16	1.27	4.8		1.20	4.9	

- 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.