

**CITY OF SPOKANE,  
WASHINGTON**

**CSO FLOW MONITORING PROJECT**

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**FLOW, FREQUENCY AND DURATION**

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**SEWER MAINTENANCE**

**Monthly Report  
April 2010**

June 7, 2010  
(Revised June 15, 2011)  
*CSOMonthly2010-04c.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 <sup>1</sup>	Estimated <sup>2</sup> Total Flow (Gallons)	Event Duration (Minutes)	Comments
1.	AL Parkway Storage (West)	2	None				
2.	NW Blvd @ Kiernan	6	4	Total	293,206	270	
				4/8	167,828	120	
				4/12	31,077	35	
				4/22	29,794	45	
				4/28	64,507	70	
3.	Columbia @ Downriver	7	None				
4.	Nettleton @ York/Buckeye	10	2	Total	902	65	
				4/8	580	50	
				4/9	322	15	Dry Weather Overflow; DOE Letter sent 4/16.
5.	Nora @ Pettet	12	5	Total	536,303	485	
				4/2	29,887	75	
				4/8	233,164	135	
				4/12	21,972	40	
				4/22	151,506	110	
				4/27	99,774	125	
6.	Sherwood @ Summit	14	None				Missing data 4/5 09:35 to 4/5 09:40
7.	Nettleton @ Ohio	15	None				
8.	A @ Linton	16B	None				Missing data 4/5 10:35 to 4/5 10:40

<sup>1</sup> 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.

<sup>2</sup> 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 <sup>1</sup>	Estimated <sup>2</sup> Total Flow (Gallons)	Event Duration (Minutes)	Comments
9.	7 <sup>th</sup> @ Inland Empire	19	None				Missing data 4/12 08:45 to 4/12 08:50
10.	3500 High Drive	20	None				Missing data 4/12 08:30 to 4/12 08:35
11.	Main @ Oak	22B	None				Missing data 4/5 10:30 to 4/5 10:35
12.	Cedar @ Ide	23	3	Total	115,808	190	
				4/8	57,349	85	
				4/22	41,221	75	
				4/29	17,238	30	
13.	Riverside @ Cedar	24A	3	Total	1,242,773	330	
				4/8	129,453	110	
				4/22	1,104,858	175	
				4/29	8,462	45	
14.	Riverside @ Cedar	24B	1	Total	119	20	
				4/22	119	20	
15.	Cedar @ Main	25	3	Total	43,958	185	Missing data 4/5 09:55 to 4/5 10:00
				4/5	12,733	60	
				4/22	28,306	110	
				4/29	2,919	15	
16.	Riverside @ Lincoln	26	3	Total	1,124,489	245	Missing data 4/5 09:50 to 4/5 09:55
				4/5	14,513	55	
				4/22	1,044,630	160	
				4/29	65,346	30	
17.	Arthur @ 5 <sup>th</sup>	33A	3	Total	2,998	375	Missing data 4/12 11:00 to 4/12 11:05
				4/8	230	15	
				4/22	2,584	70	
				4/27	184	290	
18.	Perry @ 3 <sup>rd</sup>	33B	1	Total	1,585,405	75	
				4/22	1,585,405	75	
19.	Arthur @ 3 <sup>rd</sup>	33C	1	Total	292	50	Missing data 4/12 10:55 to 4/12 11:00
				4/22	292	50	
20.	Arthur @ 1 <sup>st</sup>	33D	3	Total	34,477	190	Missing data 4/12 08:25 to 4/12 08:30
				4/8	2,176	55	
				4/22	24,977	105	
				4/29	7,324	30	

	Location	CSO#	Freq.	Date of Event <sup>1</sup>	Estimated <sup>2</sup> Total Flow (Gallons)	Event Duration (Minutes)	Comments
21.	Riverside @ Napa/Crestline	34	3	Total	1,432,714	225	Missing data 4/12 08:20 to 4/12 08:25 Missing data 4/29 09:05 to 4/29 09:30 Missing data 4/29 11:45 to 4/30 14:25
				4/8	517,549	85	
				4/22	906,025	115	
				4/27	9,140	25	
22.	S. Riverton @ Magnolia	38	2	Total	8,264	165	Missing data 4/12 10:45 to 4/12 10:50
				4/22	161	80	
				4/28	8,103	85	
23.	S. Riverton @ Altamont	39	1	Total	6,208	20	Missing data 4/12 10:40 to 4/12 10:45
				4/29	6,208	20	
24.	S. Riverton @ Regal	40	1	Total	4,295	35	Missing data 4/12 10:40 to 4/12 10:45
				4/29	4,295	35	
25.	Rebecca @ Upriver	41	3	Total	81,108	235	Missing data 4/12 08:55 to 4/12 09:00
				4/8	8,461	90	
				4/22	8,022	65	
				4/29	64,625	80	
26.	Riverton @ Surro	42	None				Missing data 4/12 08:45 to 4/12 08:55
	<b>Monthly Total</b>		<b>42</b>		<b>6,513,319</b>	<b>3,160</b>	<b>1 Dry Weather Overflow</b>

**Table 2 – Rainfall Summary<sup>3</sup>**

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
04/01/10	X	0	0	0	0	0	0	0	0	0	0	T	T	0	T	T	0
04/02/10	X	0.12	0.06	0.12	0.1	0.13	0.16	0.18	0.15	0.3	0.18	0.16	0.6	0	0.14	T	0
04/03/10	X	0.01	0.02	0	0.02	0	0	0.01	0.04	0	0	T	T	0	0.04	0.3	0
04/04/10	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/05/10	X	0.06	0.03	0.07	0.04	0.03	0.04	0.07	0.04	0.08	0.06	0.03	T	0	0.05	T	0
04/06/10	X	0.06	0.03	0	0.01	0.02	0	0	0.02	0.06	0.02	0.05	0.1	0	T	T	0
04/07/10	X	0	0	0.01	0	0	0	0	0	0	0	T	0	0	0.01	0	0
04/08/10	X	0.25	0.12	0.23	0.25	0.22	0.3	0.19	0.4	0.4	0.31	0.24	0	0	0.46	0	0
04/09/10	X	0	0	0	0	0	0	0	0	0	0	T	T	0	0	0	0
04/10/10	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/11/10	X	0	0	0	0	0	0	0	0	0	0	0	0	0	T	0	0
04/12/10	X	0.09	0.06	0.1	0.09	0.07	0.1	0.08	0.19	0.14	0.1	0.11	0	0	0.14	0	0
04/13/10	X	0.1	0.05	0.07	0.06	0.03	0.05	0.07	0.07	0.07	0.06	0.06	0	0	0.04	0	0
04/14/10	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/15/10	X	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0
04/16/10	X	0	0	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0
04/17/10	X	0.01	0.01	0.01	0.01	0.04	0.03	0.02	0.01	0.05	0.04	0.06	0	0	0.06	0	0
04/18/10	X	0	0	0	0	0	0	0	0	0	0	T	0	0	T	0	0
04/19/10	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/20/10	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/21/10	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/22/10	X	0.49	0.25	0.13	0.41	0.31	0.08	0.46	0.6	0.38	0.21	0.14	0	0	0.08	0	0
04/23/10	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/24/10	X	0	0	0	0	0	0	0	0	0	0	T	0	0	T	0	0
04/25/10	X	0	0	0	0	0	0	0	0	0	0	T	0	0	0	0	0
04/26/10	X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04/27/10	X	0.23	0.11	0.17	0.22	0.15	0.22	0.18	0.41	0.34	0.18	0.18	0	0	0.31	0	0
04/28/10	X	0.06	0.02	0.22	0.07	0.07	0.13	0.03	0.2	0.09	0.1	0.04	0	0	0.1	0	0
04/29/10	X	0.34	0.12	0.24	0.29	0.15	0.14	0.18	0.72	0.36	0.25	0.14	0	0	0.18	0	0
04/30/10	X	0	0.01	0.01	0	0	0	0	0.03	0	0.01	T	0	0	T	0	0
<b>Total</b>	<b>X</b>	<b>1.82</b>	<b>0.89</b>	<b>1.4</b>	<b>1.57</b>	<b>1.22</b>	<b>1.25</b>	<b>1.47</b>	<b>2.88</b>	<b>2.27</b>	<b>1.52</b>	<b>1.21</b>	<b>0.7</b>		<b>1.61</b>	<b>0.3</b>	

- 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 <sup>rd</sup> & 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

<sup>3</sup> 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.