

# **CITY OF SPOKANE, WASHINGTON**

## **CSO FLOW MONITORING PROJECT**

---

# **FLOW, FREQUENCY AND DURATION**

---

## **SEWER MAINTENANCE**

**Monthly Report  
May 2007**

July 2, 2007  
(Revised: September 10, 2007)  
*CSOMonthly2007-05revised.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	2	Total	165,653	230	Missing data 5/8 08:25 to 5/8 08:30
				5/4	319	50	
				5/21	165,334	180	
3.	Columbia @ Downriver	7	1	Total	31,725	155	Missing data 5/8 08:10 to 5/8 08:15
				5/21	31,725	155	
4.	Nettleton @ York/Buckeye	10	1	Total	57,096	90	Missing data 5/8 08:45 to 5/8 08:50
				5/21	57,096	90	
5.	Nora @ Pettet	12	1	Total	253,406	205	
				5/21	253,406	205	
6.	Sherwood @ Summit	14	1	Total	6,439	260	Missing data 5/25 09:35 to 5/25 09:50
				5/21	6,439	260	
7.	Nettleton @ Ohio	15	1	Total	70,623	100	Missing data 5/8 09:20 to 5/8 09:25
				5/21	70,623	100	
8.	A @ Linton	16B	2	Total	44,790	335	
				5/13	1,614	225	
				5/21	43,176	110	
9.	7 <sup>th</sup> @ Inland Empire	19	None				

<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
10.	3500 High Drive	20	None				Missing data 5/1 08:50 to 5/1 08:55 Missing data 5/9 13:30 to 5/9 14:10
11.	Main @ Oak	22B	1	Total	104,476	20	Missing data 5/8 09:55 to 5/8 10:00
				5/21	104,476	20	
12.	Cedar @ Ide	23	1	Total	146,422	170	Missing data 5/21 14:10 to 5/21 15:20
				5/21	146,422	170	
13.	Riverside @ Cedar	24A	1	Total	1,611,716	270	Missing data 5/8 11:00 to 5/8 11:05
				5/21	1,611,716	270	
14.	Riverside @ Cedar	24B	1	Total	27,582	60	Missing data 5/8 10:50 to 5/10 15:05
				5/21	27,582	60	
15.	Cedar @ Main	25	1	Total	47,952	145	
				5/21	47,952	145	
16.	Riverside @ Lincoln	26	1	Total	2,415,306	190	Missing data 5/8 13:25 to 5/8 13:30
				5/21	2,415,306	190	
17.	Arthur @ 5 <sup>th</sup>	33A	1	Total	7,163	95	
				5/21	7,163	95	
18.	Perry @ 3 <sup>rd</sup>	33B	1	Total	1,361,862	45	
				5/21	1,361,862	45	
19.	Arthur @ 3 <sup>rd</sup>	33C	None				Missing data 5/1 12:30 to 5/1 12:35
20.	Arthur @ 1 <sup>st</sup>	33D	2	Total	16,732	375	Missing data 5/1 13:10 to 5/1 13:15 Missing data 5/31 08:55 to 5/31 10:55
				5/2	1,298	180	
				5/21	15,434	195	
21.	Riverside @ Napa/Crestline	34	1	Total	802,259	190	Missing data 5/1 10:55 to 5/1 11:00
				5/21	802,259	190	
22.	S. Riverton @ Magnolia	38	1	Total	10,031	200	
				5/21	10,031	200	
23.	S. Riverton @ Altamont	39	1	Total	11,856	25	
				5/21	11,856	25	
24.	S. Riverton @ Regal	40	1	Total	6,906	45	
				5/21	6,906	45	Corrected values for flow gallons.
25.	Rebecca @ Upriver	41	1	Total	42,447	45	Missing data 5/1 10:30 to 5/1 10:35
				5/21	42,447	45	

May 2007

	Location	CSO#	Freq.	Date of Event <sup>1</sup>	Estimated <sup>2</sup> Total Flow (Gallons)	Event Duration (Minutes)	Comments
26.	Riverton @ Surro	42	None				Missing data 5/1 10:20 to 5/1 10:25
	<b>Monthly Total</b>		<b>24</b>		<b>7,242,442</b>	<b>3,250</b>	<b>No Dry Weather Overflows</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
05/01/07	0	0	0	0	0	0	0	0	0	0	0	0.02	0	0	0.04	0	0
05/02/07	0.26	0.22	0.19	0.2	0.26	0.21	0.25	0.24	0.28	0.35	0.23	0.22	0	0	0.29	0	0
05/03/07	0.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/04/07	0	0	0	0	0.01	0	0	0	0.01	0	0	T	T	0	0	0	0
05/05/07	0	0	0	0	0	0	0	0	0	0	OP	0	0	0	0	0	0
05/06/07	0	0	0	0	0	0	0	0	0	0	OP	0	0	0	0	0	0
05/07/07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/08/07	0	0	OP	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/09/07	0	0	OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/10/07	0	0	OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/11/07	0	0	OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/12/07	0	0.04	OM	0	0.03	0	0.01	0.02	0.06	0.01	0.01	T	0	0	T	0	0
05/13/07	0	0	OM	0	0.01	0.01	0	0	0	0	0.01	0	0	0	0.01	0	0
05/14/07	0	0	OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/15/07	0	0	OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/16/07	0	0	OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/17/07	0	0	OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/18/07	0	0	OM	0	0	0	0	0	0	0	0	T	0	0	0.02	0	0
05/19/07	0.07	0.08	OM	0.04	0.09	0.03	0.05	0.03	0.11	0.07	0.04	0.08	0	0	0.05	0	0
05/20/07	0.01	0	OM	0	0	0.01	0.02	0	0	0.03	0.01	0.01	0	0	0.03	0	0
05/21/07	0.82	0.65	OM	0.59	0.48	0.53	0.64	0.63	0.46	0.94	0.74	1.11	0.3	0	0.86	0.1	0
05/22/07	0.02	0.01	OM	0.02	0.02	0.01	0	0.01	0.01	0.01	0.01	0.03	0	0	0.1	0	0
05/23/07	0	0	OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/24/07	0	0	OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/25/07	0	0	OM	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0
05/26/07	0	0	OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/27/07	0	0	OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/28/07	0.11	0.09	OM	0	0.06	0.03	0.09	0.04	0.09	0.15	0.07	0.13	0	0	0.13	0	0
05/29/07	0.01	0	OM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/30/07	0	0	OP	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05/31/07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>1.31</b>	<b>1.09</b>	<b>0.19</b>	<b>0.88</b>	<b>0.96</b>	<b>0.83</b>	<b>1.06</b>	<b>0.97</b>	<b>1.02</b>	<b>1.56</b>	<b>1.12</b>	<b>1.60</b>	<b>0.3</b>		<b>1.53</b>	<b>0.1</b>	

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

**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.