

**CITY OF SPOKANE,
WASHINGTON**

CSO FLOW MONITORING PROJECT

FLOW, FREQUENCY AND DURATION

SEWER MAINTENANCE

**Monthly Report
December 2007**

January 29, 2008
CSOMonthly2007-12.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	3	Total	671,129	1,875	Missing data 12/3 09:35 to 12/3 09:40
				12/2	654,263	1,075	
				12/18	7,314	330	
				12/23	9,552	470	
3.	Columbia @ Downriver	7	1	Total	12,888	585	Missing data 12/3 09:20 to 12/3 09:25
				12/2	12,888	585	
4.	Nettleton @ York/Buckeye	10	1	Total	8,100	335	Missing data 12/3 09:55 to 12/3 10:00
				12/3	8,100	335	
5.	Nora @ Pettet	12	3	Total	548,237	2,175	Missing data 12/3 10:20 to 12/3 10:25
				12/2	430,180	1,150	
				12/18	24,776	580	
				12/23	93,281	445	
6.	Sherwood @ Summit	14	3	Total	26,291	2,630	Missing data 12/3 10:35 to 12/3 10:40
				12/2	18,078	1,415	
				12/18	4,345	695	
				12/23	3,868	520	
7.	Nettleton @ Ohio	15	2	Total	13,246	440	Missing data 12/3 10:45 to 12/3 10:50 Missing data 12/3 11:15 to 12/3 11:20 Missing data 12/7 09:10 to 12/7 09:45
				12/1	11,798	390	
				12/20	1,448	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
8.	A @ Linton	16B	None				Missing data 12/3 13:40 to 12/3 13:45 Missing data 12/19 10:05 to 12/19 10:25
9.	7 th @ Inland Empire	19	None				Missing data 12/10 09:35 to 12/10 09:40
10.	3500 High Drive	20	None				Missing data 12/10 09:50 to 12/10 09:55 Missing data 12/26 09:00 to 1/2 13:25
11.	Main @ Oak	22B	None				Missing data 12/3 13:15 to 12/3 13:20
12.	Cedar @ Ide	23	3	Total	367,881	830	Missing data 12/3 11:05 to 12/3 11:10
				12/2	321,604	555	
				12/18	16,904	130	
				12/23	29,373	145	
13.	Riverside @ Cedar	24A	3	Total	5,128,066	1,780	Missing data 12/3 13:55 to 12/3 14:00
				12/2	4,846,865	1,190	
				12/19	153,059	200	
				12/23	128,142	390	
14.	Riverside @ Cedar	24B	None				Missing data 12/3 14:00 to 12/3 14:05 Missing data 12/21 09:20 to 12/21 09:35
15.	Cedar @ Main	25	3	Total	9,677	515	Missing data 12/3 13:10 to 12/3 13:15
				12/2	8,860	280	
				12/16	181	80	
				12/23	636	155	
16.	Riverside @ Lincoln	26	3	Total	6,362,945	1,750	Missing data 12/3 12:00 to 12/3 12:05
				12/2	5,313,093	1,070	
				12/18	494,896	310	
				12/23	554,956	370	
17.	Arthur @ 5 th	33A	2	Total	5,790	1,125	Missing data 12/10 13:45 to 12/10 13:50
				12/2	5,442	595	
				12/15	348	530	
18.	Perry @ 3 rd	33B	1	Total	1,513,511	130	Missing data 12/10 13:30 to 12/10 13:35
				12/3	1,513,511	130	
19.	Arthur @ 3 rd	33C	1	Total	788	795	
				12/1	788	795	

	Location	CSO#	Freq.	Date of Event ¹	Estimated ² Total Flow (Gallons)	Event Duration (Minutes)	Comments
20.	Arthur @ 1 st	33D	3	Total	87,501	1,320	Missing data 12/10 14:00 to 12/10 14:05 Missing data 12/27 09:20 to 12/27 11:00
				12/2	78,552	995	
				12/18	8,215	210	
				12/23	734	115	
21.	Riverside @ Napa/Crestline	34	3	Total	5,531,437	1,470	Missing data 12/10 12:40 to 12/10 12:45
				12/2	4,528,233	970	
				12/19	517,924	175	
				12/23	485,280	325	
22.	S. Riverton @ Magnolia	38	1	Total	116	245	Missing data 12/10 12:25 to 12/11 15:10
				12/2	116	245	
23.	S. Riverton @ Altamont	39	None				Missing data 12/10 12:15 to 12/10 12:20
24.	S. Riverton @ Regal	40	None				Missing data 12/10 12:10 to 12/10 12:15
25.	Rebecca @ Upriver	41	2	Total	50,756	570	
				12/2	50,531	470	
				12/23	225	100	
26.	Riverton @ Surro	42	None				Missing data 12/10 11:40 to 12/10 11:45
	Monthly Total		38		20,338,359	18,570	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
12/01/07	0	0	0	0	0.03	0.05	0.11	0.05	0.04	0.07	0	0.11	1.9	3	0.1	2.8	3
12/02/07	0.33	0.68	0.35	0	0.47	0.33	0.24	0.38	0.44	0.47	0.75	0.34	0.8	3	0.29	0.7	6
12/03/07	0.92	0.86	0.47	OP	1	0.82	0.88	0.93	1.19	1.23	1P	1.18	0	T	1.03	0	0
12/04/07	0.11	0.1	0.05	OM	0.11	0.11	0.09	0.09	0.1	0.14	0.13	0.14	0	0	0.06	0	0
12/05/07	0.01	0	0	OM	0	0	0	0	0	0	0	0	0	0	0	0	0
12/06/07	0.01	0.01	0	OM	0	0	0	0	0	0	0.01	0	0	0	T	0	0
12/07/07	0.01	0	0.01	OM	0	0	0	0	0	0	0	0	0	0	0	0	0
12/08/07	0	0	0	OM	0	0	0	0	0	0	0	0	0	0	0	0	0
12/09/07	0	0	0	OM	0.01	0.02	0.03	0.02	0	0.03	0	0.08	1	0	0.06	1	0
12/10/07	0.15	0.03	0	OM	0.07	0.07	0.07	0.05	0.09	0.09	0	0.08	1.9	3	0.07	1.8	3
12/11/07	0	0	0	OP	0.02	0.02	0.03	0.02	0.02	0.02	0	0.03	0.4	2	0.03	0.5	3
12/12/07	0	0	0	0	0	0	0	0	0	0	0	T	T	2	T	T	3
12/13/07	0	0	0	0	0.09	0.08	0.08	0.08	0.11	0.09	0	0.09	1.4	2	0.08	1.6	2
12/14/07	0	0.01	0	0	0	0	0	0	0	0	0	0.01	0.4	3	0.01	0.3	3
12/15/07	0.07	0	0	0	0.06	0.08	0.09	0.08	0.05	0.12	0.17	0.12	1.7	4	0.1	1.8	4
12/16/07	0.02	0	0	0	0	0	0	0	0	0	0.01	T	T	4	T	T	4
12/17/07	0.15	0.47	0	0	0.12	0.09	0.09	0.11	0.09	0.1	0.13	0.12	1.1	5	0.1	1.2	4
12/18/07	0.22	0.29	0.03E	0	0.23	0.2	0.19	0.23	0.17	0.28	0.3	0.23	1.1	4	0.24	0.9	5
12/19/07	0.22	0.29	0.12	OP	0.28	0.2	0.14	0.21	0.15	0.33	0.24	0.24	0.1	3	0.19	T	2
12/20/07	0.12	0.21	0.06	0	0.23	0.14	0.06	0.16	0.16	0.26	0.16	0.18	0	1	T	T	1
12/21/07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
12/22/07	0	0	0	0	0.07	0.08	0.11	0.08	0.07	0.13	0	0.1	1.8	2	0.13	1.8	3
12/23/07	0.39	0.64	0.05	0	0.46	0.45	0.43	0.44	0.49	0.61	0.55	0.36	1.1	2	0.39	0.9	2
12/24/07	0.01	0.02	0.01	0	0.01	0	0	0	0	0	0.06	T	T	1	T	T	2
12/25/07	0	0	0	0	0.11	0.11	0.09	0.11	0.1	0.18	0	0.11	1.8	3	0.13	2	4
12/26/07	0.06	0	0	0	0.06	0.05	0.09	0.04	0.08	0.09P	0	0.04	0.9	3	0.07	1.3	6
12/27/07	0	0	0	0	0	0	0.01	0.01	0	OM	0	0.06	0.8	3	0.05	0.9	7
12/28/07	0	0	0	0	0	0.03	0.05	0.03	0	OM	0	0.08	1.5	5	0.1	1.4	7
12/29/07	0	0	0	0	0.01	0.01	0.03	0.01	0	OM	0	0.02	0.4	4	0.03	0.7	7
12/30/07	0	0	0	0	0	0	0	0	0	OM	0	T	T	4	0.01	0.2	7
12/31/07	0.01	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	7
Total	2.81	3.61	1.15	0	3.44	2.94	2.91	3.13	3.35	4.24	3.51	3.72	20.1		3.27	21.8	

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

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.