

# I. EXECUTIVE SUMMARY

---

## A. BACKGROUND

This report is the culmination of various activities started in 1989. In 1989, the Michigan Department of Environmental Quality (MDEQ) re-issued the National Pollutant Discharge Elimination System (NPDES) permits for combined sewer overflows (CSO) within the Rouge River watershed. The permittees contested MDEQ's definition of "adequate treatment" of combined sewer overflows.

Adequate treatment was defined as (MDEQ, Michigan CSO Control Program Manual.):

- Retention for transportation and treatment at the wastewater treatment plant, of combined sewage flows generated during storms up to one-year, one hour storm;
- Primary treatment of combined sewage flows generated during storms up to the ten year, one hour storm (thirty minutes retention or equivalent for settling, skimming and disinfection);
- Treatment of combined sewage flows generated during storms in excess of the ten-year, one-hour storm to the extent possible with facilities designed for lesser flows.

The contested case resulted in the "Bulkley Agreement" which outlined the design and construction of CSO treatment facilities of varying sizes. Wayne County was awarded the Rouge River National Wet Weather Demonstration Project to coordinate the demonstration activities. The intent was to monitor the performance of these facilities for a two-year period. One of the primary goals of the evaluation was to collect sufficient sample data to characterize the influent and effluent concentrations of CSO Facilities. This information, in conjunction with other RPO data, primarily on river water quality, was intended to represent the most complete data set on CSO treatment available in the nation. This report

presents the data, preliminary analysis and findings during the two-year evaluation period for the Dearborn Heights CSO Basin. The data collection started in June 1997. Table I-1 shows a summary of all the rainfall events monitored, CSO volume, and calculated pollutant loads. Table I-2 shows effluent concentration of pollutants of interest.

## B. FINDINGS

This section presents highlights of the findings during the CSO Basin Evaluation Program. Generally, they are observations based on preliminary analyses for the interim final report and are presented in no particular order.

### 1. Number of Overflow Events.

The actual number of treated overflow events during the 28 month actual monitoring period was 9. If the Dearborn Heights CSO Retention Basin was sized to provide 20 minutes of contact time to the peak flow from the 1-year, 1-hour storm event, then the number of treated overflow events would have increased to 19.

### 2. Effluent Quality.

The quality of the treated effluent (~10-50 mg/L CBOD<sub>5</sub>, ~100-150 mg/L TSS), is much better than uncontrolled CSO events (60 – 220 mg/L CBOD<sub>5</sub>, 270 – 550 mg/L TSS).

### 3. Influent Flow Rate.

The influent peak flow rate was lower than expected. 25 – 80 cfs was common. The basin compartments were sized to provide 30 minutes of

Table I-1  
Dearborn Heights - Master Summary of Events

Date	Event Rainfall (in)	Event Volume		Event Duration		CBOD5 Load		TSS Load	
		Influent (MG)	Effluent (MG)	Influent (HH:MM)	Effluent (HH:MM)	Influent (LBS)	Effluent (LBS)	Influent (LBS)	Effluent (LBS)
02-Sep-97	0.55	1.76		2:48					
10-Sep-97	1.51	2.98		16:17		339		2331	
19-Sep-97	0.68	0.28		1:13					
26-Oct-97	0.62	0.38		6:28		109		233	
08-Jan-98	0.23	7.47	3.84	32:49	13:13	2496	1572	3255	1848
17/20-Feb-98	2.66	33.61	30.21	83:11	76:13	11038	6138	46405	15075
9/10-Mar-98	1.11	10.63	7.05	38:22	24:15	2529	729	8378	2630
19-Mar-98	0.27	0.12		1:16					
28-Mar-98	0.31	0.04		1:56					
9/10-Apr-98	1.41	5.04	1.57	21:07	6:10	1987	NS	7555	NS
26-Apr-98	1.68	2.98		23:43		786		1175	
31-May-98	1.34	1.58		6:59					
11-Jun-98	0.24	0.03		1:03					
12-Jun-98	0.41	0.26		1:24		70		252	
22-Jun-98	0.36	0.24		1:35		301		168	
21-Jul-98	0.57	0.24		1:52					
6/7-Aug-98	2.20	12.00	7.00	42:41	28:20	1972	1451	9184	4762
09-Aug-98	1.40	1.84		6:38					
07-Sep-98	0.49	0.27		1:55					
07-Oct-98	0.99	0.77		6:10					
06-Dec-99	0.30	0.03		1:40					
22-Jan-99	1.03	2.52		18:00		725.6		2567.8	
23/25-Jan-99	0.00	9.34		37:15					
22-Apr-99	0.52	0.38		3:30					
22/25-Apr-99	1.33	17.52	4.70	59:15	29:45	4890	119	9833	1646
12/13-Jun-99	2.98	7.67	3.93	9:36	6:10				
13/14-Jun-99	1.09	0.71		20:59					
24/25-Jun-99	1.06	1.07		3:48					
27/28-Jun-99	1.62	2.99		17:35					
28/29-Jun-99	2.75	12.14	8.94	17:56	13:40				
01-Jul-99	0.51	0.22		2:19					
03-Jul-99	0.25	0.31		2:25					
23/24-Jul-99	1.93	5.79	1.80	11:12	3:50				
26-Aug-99	0.34	0.07		1:28					
06-Sep-99	1.96	1.88		5:37					
28-Sep-99	0.65	0.50		1:51					
13-Oct-99	0.63	0.41		4:01					
<b>TOTAL</b>		<b>146.30</b>	<b>73.80</b>	<b>517:54</b>	<b>201:36</b>	<b>27,243</b>	<b>10,009</b>	<b>91,338</b>	<b>25,960</b>

Table I-2  
Dearborn Heights - Treated Effluent Concentration for Overflow Events

Date	Rainfall (in)	Total Volume (MG)		Treated Effluent Concentration (mg/L)			
		Influent	Effluent	CBOD5	TSS	NH3	PHOS_T
08-Jan-98	0.23	7.47	3.84	<b>43.2</b> 33 - 53	<b>71.7</b> 30 - 151	<b>4.47</b> 3.9 - 5.8	<b>1.01</b> 0.85 - 1.10
17/20-Feb-98	2.66	33.61	30.21	<b>20.6</b> 15 - 40	<b>71.1</b> 38 - 136	<b>2.22</b> 1.6 - 3.4	<b>0.68</b> 0.58 - 0.76
9/10-Mar-98	1.11	10.63	7.05	<b>12.6</b> 11 - 14	<b>48</b> 40 - 61	<b>2.33</b> 2.2 - 2.4	<b>1.26</b> 0.54 - 2.60
9/10-Apr-98	1.41	5.04	1.57	<b>No Samples</b>			
6/7-Aug-98	2.20	12.00	7.00	<b>23.8</b> 6.2 - 56	<b>82.7</b> 51 - 126	<b>2.21</b> 0.53 - 2.9	<b>0.66</b> 0.19 - 1.2
22/25-Apr-99	1.33	17.53	4.70	<b>4.6</b> < 2.0 - 7.0	<b>53.3</b> 33 - 60	<b>2.26</b> 2.1 - 2.4	<b>0.92</b> 0.80 - 1.00
12/13-Jun-99	2.98	7.67	3.93	<b>5.7</b> 2.8 - 10	<b>86.25</b> 10 - 174	<b>1.15</b> < 0.12-1.9	<b>1.13</b> 0.4 - 1.1
20/29-Jun-99	2.75	12.14	9.84	<b>5.29</b> < 2.0 - 8.6	<b>44.4</b> 22 - 75	<b>0.26</b> < 0.12 - 0.24	<b>0.57</b> 0.3 - 1.3
23/24-Jul-99	1.93	5.79	1.80	<b>No Samples</b>			

**Note:** **BOLD** – Average Concentration  
Range – Minimum and Maximum Concentration

contact time from a 10-year, 1-hour storm event (204 cfs). The collector sewer and influent pump station were sized to transport the flows (500 cfs) resulting from a 10-year, 24-hour storm event.

4. First Flush Profile.

A first flush profile was not identified for any of the pollutants in the Dearborn Heights evaluation results. It appears that the Wayne County Interceptor System has a greater impact on the influent pollutant characteristics. High interceptor flow levels appear to have caused increased flows to the CSO basin, changing the influent pollutant profile.

5. Screenings.

Less than 1 cubic yard of screenings are collected on average per event. More screenings at beginning of event. More screenings during fall storms (fallen leaves)

6. Dewatering During Event.

During some storm events, interceptor capacity was available at the same time that the CSO basin is filling. At these times, wet well and/or basin compartments were dewatered to limit treated effluent discharge to river.

7. Disinfection.

Difficult to meet fecal coliform event geometric mean limits of 400 cfu/100 mL unless total residual chlorine (TRC) concentration is 1.0 to 1.5 mg/L with current operational scheme. The goal was to limit the event average TRC to less than 1.0 mg/L.

8. Retention Time.

The actual retention times under pumped conditions are highly variable, not constant, and much longer than the “design value“ expected. The minimum monitored retention time was approximately 3 hours.

9. Runoff Coefficient.

The actual observed runoff coefficient from the evaluation data (0.58) was more than the value used in design (0.50). This occurred because of high interceptor levels, which caused increased flows to the CSO basin. This situation will change with the start of Lift Station 1A.

C. PHASE II CRITERIA EVALUATION

Based upon the data and analysis supporting the Phase II determination, the following conclusions can be made:

1. The disinfection and floatable removal performance of the Dearborn Heights CSO Detention Basin over the range of storm events during the evaluation demonstrates that the Dearborn Heights CSO Detention Basin meets Phase II treatment performance criteria. The facility has succeeded in protecting to “protect public health” by providing disinfection and to “eliminate raw sewage discharge” by removing “identifiable sanitary trash” and providing sufficient screening, skimming, and settling.
2. It is difficult to meet fecal coliform event geometric mean limit of 400 cfu/100 mL unless the total residual chlorine (TRC) concentration is 1.0 to 1.5 mg/L. The goal was to limit the event mean TRC concentration to

less than 1.0 mg/L. From the available demonstration data, raising the goal to 1.5 mg/l would assure that the fecal coliform limits are met. A total residual chlorine (TRC) study will provide information on whether this is adequate to protect the river from infrequent discharges. If not, dechlorination facilities will need to be considered.

3. The detention times encountered during the evaluation have been higher than the design detention time (20 minutes). A study is currently being done to verify that the event geometric mean can be met at shorter detention times.
4. The event geometric mean limit is more difficult to satisfy rather than the monthly geometric mean limit.